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Education, Occupation, and Healthcare Accessibility as Predictors of Self-Reporting Memory Rating

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Walden University
2024

Abstract

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MS, University of Maryland University College, 2015

MS, Pratt Institute, 2004

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

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Abstract

The increasing number of dementia cases in the United States, particularly among women, is a significant concern. This progressively deteriorating cognitive disease may profoundly affect talking, decision-making, and problem-solving abilities, interfere with their daily lives, and decrease their life expectancy. Although education, occupation, and healthcare access are individually associated with positive health outcomes, it was essential to explore whether their combination impacts self-reporting memory loss, an indicator of dementia. The purpose of this study was to determine the role of education, occupation, and access to health care as predictors of dementia among women in the United States. This study used Krieger's ecosocial theory of disease distribution, which branches off the social-ecological model and presents the many factors affecting health. This cross-sectional, quantitative study used secondary data from females participating in the 2018 Health and Retirement Study data set. Pearson's chi square tests of independence, crosstabulations and a multiple linear regression analysis were used to identify relationships between education, occupation, access to health care, as predictors of self-reported memory rating as a measure of dementia symptoms. Results of the multiple linear regression analysis show that age, Hispanic/Latino origin, non-Hispanic Black ethnicity, job status, affordability, and education predict self-reported memory ratings; type of place of care was not associated with memory ratings. Implications for positive social change include raising awareness of the impact of these variables on dementia and promote policy changes to improve women's lives through equal access to education, occupation, and health care.

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Dedication

This study is dedicated to all the strong, beautiful women who influenced me in my life, some who suffered from dementia and left an indelible reminder to work wholeheartedly to reach for the stars in all endeavors. It also goes to Rafael and Sofia, my children, whom I want to remind them that they can fulfill all their dreams and goals so long as they put their minds and hearts into it to overcome life's challenges along their journey. Lastly, this study is also dedicated to my husband Rafael, who never stops believing in me and encourages and supports me to further my education.

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Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction to the Study

Introduction

The number of dementia cases in the United States continues to rise, particularly among women: 60% of the current 5 million cases are female (Alzheimer's Association [AA], 2019). This increased prevalence is more significant because women have a longer life expectancy than men. The primary reasons are the patients’ quality of life and the imposed mental, physical, and financial burdens on patients, families, support-care networks, and society. Dementia-related cognitive decline implies that patients become vulnerable and dependent on their families and support-care networks. Based on the extended cost of healthcare and the limited economic productivity of families and support-care networks dedicated to these patients, costs are transferred to the nation (Wong, 2020). Krieger (2019; 2012) indicated that social determinants of health (SDoH) inequalities, such as education, occupation, and level and quality of access to healthcare infrastructure and services, disproportionately affect health dynamics, related outcomes in lower-income demographics and related economic minorities, and other vulnerable populations. Thus, it is crucial to explore the role of these social determinants as possible indicators or predictors of possible dementia onset measured by self-reported memory loss ratings. The Alzheimer's Association (AA; 2021) indicated that memory loss is the most common dementia symptom. Hence, this study used self-reported memory rating as the dependent variable to understand if there is a relation between education, occupation, access to healthcare, and memory loss. Several studies documented connections between educational attainment, occupation, and dementia development. However, there is a gap in the study of dementia development in American women that combines the effect of educational attainment, occupation, and their impact on the accessibility to healthcare infrastructure and services to diagnose and treat dementia. This study aims to determine whether there is a relationship between the combination of education, occupation, and access to health care in the development of dementia among women in the United States. A thorough understanding of the interrelation of these social determinants could help increase awareness about the importance of access to health care, education, occupation, and their impact on women's health. To that effect, this study can become a tool for sustainable positive change, as it will empower women to take charge of their health. This benefits their families and economies, promoting human development and economic growth. These are critical factors in promoting healthier behaviors and related outcomes.

This chapter includes the following sections: (a) background, which focuses on the degenerative aspects of dementia and its growing impact on public health and societal dynamics. This section also provides an overview of the literature gap regarding the interdependent role of healthcare quality and access to education and occupation in possible dementia development; (b) problem statement that identifies the concerning increase of dementia cases among women; (c) purpose of the study that will shed light on how the increase of dementia cases among women was analyzed and understood from a statistical perspective; (d) research questions that considered education, occupation and access to health care as variables measured and studied to explain how they can predict dementia development among women; (e) theoretical framework, which focused on the socio ecological theory of disease distribution seeking to understand how inequalities can impact people’s health; (f) nature of the study, summarizing variables and methods used in the analysis; (g) definitions that provided the necessary vocabulary used in the field; (h) assumptions, that clarify certain aspects of the study which may not be accurate; (i) scope and delimitations, where the research problem was addressed, target population is detailed and theoretical frameworks are defined as appropriate to the study; (j) limitations, where all factors that could lead to a methodologically weak or biased study were addressed; (k) significance of the study, where all the potential knowledge contributions to the public health field as well as implications for positive social change are explained; and (l) summary, where the main aspects of the chapter are highlighted.

Background of the Study

Dementia is a general term to refer to a progressive degenerative disease presenting symptoms pointing to individuals' cognitive function impairment that may affect their daily lives (Centers for Disease Control and Prevention [CDC], 2019). This condition progressively interferes with the individuals' everyday decision-making, event-recalling, thinking, language, and problem-solving skills (CDC, 2019), making them dependent on others for basic situations or decisions. Some symptoms relate to aging because they primarily affect older adults. However, the CDC indicates that dementia is not part of a normal aging process (CDC, 2019).

Dementia includes different diseases such as Alzheimer’s disease (AD), vascular dementia, Parkinson’s dementia, Lewy body dementia, and mixed dementia, among others (CDC, 2019). AD is the most common form of dementia (National Institute of Aging [NIA], 2021). However, the most common symptom across the dementia spectrum is memory loss (AA, 2020).

The word “dementia” derives from the Latin word “demens,” which means “being out of one’s mind” (Assal, 2019). This neurological disease has been reported since the 18th century as senile dementia. However, only in 1906, with the seminal work of Dr. Alois Alzheimer on a case of early onset vascular-origin dementia, this condition was identified as the second major mental disorder with a specific pathological basis (Ballenger, 2017). Dr. Alzheimer’s patient, Auguste D., had severe memory impairment and worsening behavioral and psychological changes (Ballenger, 2017). During autopsy, Dr. Alzheimer found a significant shrinkage of Ms. D’s brain structure as well as abnormal deposits in and around her nerve cells (AA, 2021).

In a brain with dementia, neurons cannot communicate, metabolize to break down chemicals and nutrients, or repair themselves. Instead, neurons clump together, forming plaques with abnormal production of cellular debris that inflame and disrupt the functions of the neurons. They also tangle instead of binding, which blocks the neurons’ synaptic communication system, especially on the brain regions related to memory, then spread to language, reasoning, and social behavior areas. Due to these blockages, neurons die, and connections collapse, causing brain shrinkage or brain atrophy (NIA, 2017-a). Gouras (2014) indicated that although different types of dementia present similar symptoms, they are classified based on clinical, genetic, and neuropathological features: AD is clinically diagnosed (Gouras, 2014).

Due to the increasing number of cases of dementia in the United States, this disease is the third leading cause of death for Americans 65 years and older (NIA, 2021). The number of death-related dementia cases has increased by more than 146% between 2000 and 2019, while the number of heart disease-related deaths, the leading cause of death among older adults in the United States, has diminished by 7.3% (AA, 2021). In 2021, more than 6 million Americans 65 years and older had some form of dementia, specifically Alzheimer's. However, this number may be much higher as dementia may also be undiagnosed and underdiagnosed (Wong, 2020).

Dementia imposes a significant economic burden on the patients, their families, their caregivers, and society: The United States spent $305 billion on dementia care in 2020 (AA, 2020). Medicare covered about 68% ($155 and $51 billion, respectively). Patients' out-of-pocket expenses covered 22% ($66 billion), and other sources covered the remaining 10% ($33 billion; Wong, 2020). Unfortunately, by 2050, these costs are expected to increase to $1 trillion (Wong, 2020). In general, the increased life expectancy of the population, is impacting the number of cases per year and the subsequent healthcare costs of dementia (Gouras, 2009).

Causes of dementia remain unknown. However, SDoH may shed light on such incidence and prevalence among women. While education and occupation have been related to dementia onset, it remains unclear how healthcare accessibility affect its development. This study related those three SDoH to bridge the gap and better understand the intertwined relationships of those determinants and their contributions in dementia onset.

Problem Statement

The significant prevalence of dementia in the United States among women is a growing public health concern (AA, 2021). Dementia is a general term for a group of neurological degenerative diseases that refers to the patient's impaired ability to perform cognitive tasks, such as remembering and making decisions, to the point that they disrupt their daily lives (CDC, 2019).

According to the CDC, in 2014, 1.6% of the United States population (5 million cases) had some form of dementia. However, 60% of them were among women (CDC, 2018). Based on a study by the AA (2018), the CDC indicated that this trend would continue with 14 million cases by 2060 (CDC, 2018). Among the contributing factors, ethnicity or race may play a role in the prevalence of dementia. However, since social determinants impact health (or the lack of it), the role of education, occupation, and access to health care directly associated with dementia among women in the United States should be directly associated and identified. While the literature has independently related the role of education and occupation to dementia, healthcare accessibility combined with the previously mentioned SDoH have not been studied to determine their potential influence on dementia.

Purpose of the Study

This study determined to what extent the association of education, occupation, and access to health care is related to the development of dementia as reflected in self-reported memory ratings among women in the United States. This study is quantitative, cross-sectional, and non-experimental. The study examined the independent variables of education, occupation, and healthcare access and their relationship to self-memory rating (a surrogate for memory loss, which is the most common symptom of dementia) among women in the United States.

This study identified high-risk dementia female groups as well as the determinants of health that may have a more significant relationship to memory loss measured as self-reporting memory rating. It may be valuable to focus on preventive actions leading to a reduction of dementia incidence and the reduction of affected healthcare costs for families and the entire nation.

This study used the 2018 Health and Retirement Study (HRS) data set (NIA) and Social Security Administration (SSA; 2018). The independent variables considered in this study are as follows: (a) job status to indicate whether the participant is employed or not, (b) having healthcare accessibility, more specifically affordability (to understand whether the respondent was able to cover their medical expenses), having a usual place of care (to indicate where the respondent was able to receive medical care), and the type of place of care (to analyze whether certain place of care was associated with a better outcome), and (c) education to indicate the respondents' level of education. The AA (2021) indicated that memory loss is the most common dementia symptom. Hence, this study's dependent variable was self-reported memory rating (SRMR) as a surrogate for memory loss. The SRMR variable is part of the 2018 HRS in the Cognition Section. SRMR was recoded as numeric and continuous from the ordinal responses to the 2018 HRS questionnaire (Excellent, very good, good, fair, poor, and do not know/ refused). All the variables were detailed in the methodology chapter.

This study also included race and ethnicity to analyze whether dementia is more common among women from certain ethnic groups. This investigation controls for gender as a confounding variable by focusing only on females in the United States. Although there is a common assumption that memory loss is part of the normal aging process, the literature suggests that it might not be accurate (CDC, 2019). Hence, the Age variable was included in this study because it is a confounding variable. Also, the HRS (2018) data set interviewed participants of retirement age (born between the 1920s and the 1960s) or their proxies if the participants were not available.

Research Questions and Hypotheses

Since the purpose of the study is to identify whether job status, healthcare accessibility, and education are related to self-reported memory rating, a known measure of clinical symptoms of dementia among females in the United States, the research questions (RQs) set forth this study were as follows:

RQ1: Is there a statistically significant relationship between self-reported memory rating and job status among females in the United States?

H_o1: No, there is no statistically significant relationship between self-reported memory rating and job status among females in the United States.

H_a1: Yes, there is a statistically significant relationship between self-reported memory rating and job status among females in the United States.

RQ2a: Is there a statistically significant relationship between self-reported memory rating and healthcare affordability among females in the United States?

H_o2a: No, there is no statistically significant relationship between self-reported memory rating and healthcare affordability among females in the United States.

H_a2a: Yes, there is a statistically significant relationship between self-reported memory rating and healthcare affordability among females in the United States.

RQ2b: Is there a statistically significant relationship between self-reported memory rating and the ability to have a usual place of care among females in the United States?

H_o2b: No, there is no statistically significant relationship between self-reported memory rating and the ability to have a usual place of care (location) among females in the United States.

H_a2b: Yes, there is a statistically significant relationship between self-reported memory rating and the ability to have a usual place of care (location) among females in the United States.

RQ2c: Is there a statistically significant relationship between self-reported memory rating and the type of usual place of care among females in the United States?

H_o2c: No, there is no statistically significant relationship between self-reported memory rating and the type of usual place of care among females in the United States.

H_a2c: Yes, there is a statistically significant relationship between self-reported memory rating and the type of usual place of care among females in the United States.

RQ3: Is there a statistically significant relationship between self-reported memory rating and education level among females in the United States?

H$_o$3: No, there is no statistically significant relationship between self-reported memory rating and education level among females in the United States.

H$_a$3: Yes, there is a statistically significant relationship between self-reported memory rating and education level among females in the United States.

RQ4: Is there a statistically significant and predictable relationship between self-reported memory rating and contextual SDoH (job status, healthcare affordability, the ability to have a usual place of care, education level, race, and ethnicity) among women in the United States?

H$_o$4: No, there is no statistically significant and predictable relationship between self-reported memory rating and contextual SDoH (job status, healthcare affordability, the ability to have a usual place of care, education level, race, and ethnicity) among women in the United States.

H$_a$4: Yes, there is a statistically significant and predictable relationship between self-reported memory rating and contextual SDoH (job status, healthcare affordability, the ability to have a usual place of care, education level, race, and ethnicity) among women in the United States.

Previous studies analyzed individual SDoH about cognitive decline and impairment (Adoukonou et al., 2020; Darwish et al., 2018; Delpak & Talebi, 2020; Haussmann et al., 2019; Nakahori et al., 2018; Rahman et al., 2019; Santabarbara et al., 201; Toth et al., 2018; Vega et al., 2017; Yasuno et al., 2020). However, the relationships between education, job status, and healthcare accessibility influencing the development of dementia have not been concurrently studied. Hence, recognizing that SDoH is known to be contextual and concurrent, this study's research questions aimed to evaluate contextual and often concurrent SDoH and their potential roles in the development of dementia among females in the United States.

Theoretical Foundation for the Study

This study was grounded on Bronfenbrenner's (1975) socioecological model (SEM) of health and Krieger's (2001) ecosocial theory of disease distribution. SEM is a comprehensive framework that explains the interrelation among social and environmental factors that affect the individual's health and behavior (Rural Health Information Hub, 2021; Santa Clara University, 2019). SEM considers the individual, interpersonal, organizational, and community levels. The individual level concerns knowledge, attitudes, behavior, self-concept, and personal skills. The interpersonal level refers to family, friends, and social networks. The organizational level focuses on social institutions (school, church, work), and the community level influences the relationship between organizations and the policy level (including the different levels of laws and regulations). This theory specifies that the individual's health outcomes result from the many interactions of the different socio-ecological levels in which the individual lives. Hence, for the present study, through a comprehensive approach, SEM helped to explore how some SDoH, specifically education, occupation, and access to health care, may play a significant role in the increasing number of dementia cases, especially among American women.

The second theoretical framework is the ecosocial theory of disease distribution. It indicates that the distribution of disease and social inequalities result from social and biological interactions, including a historical-ecological perspective (Krieger, 2001). Dr. Krieger's theory emphasized the impact of social injustice dynamics that affect health outcomes in current and future generations (Bernazzani, 2016). This theoretical framework initially focused on discrimination as a social injustice that promotes inequalities affecting people's health (Krieger, 2012). However, Dr. Krieger's work focused on racial discrimination and its impact on individuals' health, aiming to determine the actors and the causes of social inequalities in health (Krieger, 2012). This theory postulates that inequitable race relations simultaneously produce three critical situations: (a) benefits the group claiming to be racially superior to the detriment of those they consider intrinsically inferior, (b) racialize biology to generate and justify the categories used to set apart racial/ethnic groups, and (c) generate inequitable conditions (both living and working) which will, as a result via embodiment, materialize into the biological expression of racism with the subsequent racial health inequalities (Krieger, 2012). While the study is not focused on discrimination or segregation, this theoretical framework helped to understand whether the health of any specific demographic group based on race and socioeconomic status is more affected by dementia (or not) than others.

Nature of the Study

This quantitative cross-sectional analysis used secondary data to evaluate the association between self-reported memory rating and contextual SDoH (education, job status, and access to health care) among females in the United States. This analysis used the 2018 HRS dataset from the University of Michigan (https://hrs.isr.umich.edu/welcome-health-and-retirement-study) supported by the NIA and the SSA (HRS, 2020). Job status, healthcare accessibility and education are independent variables, while self-reported memory rating is the dependent variable (used as a surrogate for dementia for being among its most common symptoms). This statistical inferential analysis used Pearson’s chi square and crosstabulations analysis for the categorical nominal variables and multiple linear regression (MLR) analysis to identify any potential relationship between the abovementioned variables.

Definitions

Dementia entails medical conditions caused by abnormal brain changes, which often triggers progressive cognitive decline and impairment (CDC, 2019). Some characteristic clinical symptoms include memory loss, language impairment, problem-solving, and thinking skills. All these symptoms may significantly interfere with the patient's daily life, behavior, and feelings. The most common form of dementia in both the United States and globally is caused by AD (AA, 2021). Unfortunately, an accurate diagnosis of AD can only be attained through autopsy. For that reason, this study used self-reported memory rating (SRMR) as a surrogate measure for dementia, as defined later.

Education: The United Nations Educational, Scientific, and Cultural Organization, UNESCO, defines education as the process that allows the transfer and acquisition of “knowledge, skills, values, beliefs, and habits” (UNESCO, 2021). Education contributes to the development of individuals into better persons, better citizens, better communities, and better nations. Education also allows access to better opportunities in life, such as jobs, higher incomes, healthier lives, and better quality of life. Several researchers have established a relationship between education attainment and the development of dementia. Thus, this study will include education as an independent variable within the 2018 HRS population sample. In this study, the variable education will indicate the level of formal academic instruction the respondent reached. The levels of academic instruction listed on the HRS survey range from no formal education, some education without high school completed, high school diploma, some college, college graduated, post-college, and others (for cases where respondents refused to answer).

Ethnicity: According to the Britannica Encyclopedia (2023), ethnicity is the quality of being part of a group or subgroup of people who share the same cultural background, such as religion, language, art, music, ancestry, or nationality (Britannica Encyclopedia, 2023). For this study, the variable ethnicity is a confounding variable. For the 2018 HRS, this question indicates respondents' ethnic identification as Latino. Data set responses for this question are yes, no, do not know/any ascertained, refused, and blank/ inapplicable.

Healthcare affordability: It entails the respondent’s ability to pay healthcare costs. Data from the 2020 National Health Intervention Survey (NHIS) in the United States revealed that almost 10% of the NHIS respondents had to delay or could not seek medical care due to costs (Peterson KFF Health System Tracker, 2022). For this study, healthcare affordability will be an independent variable. Options for this variable on the data set are yes, no, do not know/ no ascertained, and blank/ inapplicable.

Job status: Employment entails the agreement between two parties (employer and employee) on the services transaction in return for a salary or wage. Among the many benefits of being employed, some authors have identified a link between employment and the development of dementia and that the status of being employed may prevent dementia triggers. The independent variable job status informed whether the respondent is employed or not; it may vary from being employed, unemployed and looking for work, temporarily laid off, disabled, retired, homemaker, or other (where the respondent should specify, on sick or other leave, does not know or not ascertained, refused/ blank).

Race: While race is a social construct, it is often related to the physical characteristics or features that individuals in certain groups have (Britannica Encyclopedia, 2023). The respondents will indicate whether they identify as White/ Caucasian, Black/ African American, or Other (which needs to be specified as American Indian, Alaskan Native, Asian, Native Hawaiian, and Pacific Islander). Other responses include Do not know, refused to answer, or Inapplicable. For this study, race is a covariate.

Self-reported memory rating (SRMR): There are different ways to assess dementia, but the most common is measuring the patients' cognitive decline. This term was used to indicate the rating a respondent assigns to their memory ability regarding retention and recall. Ratings may vary from excellent, very good, good, fair, poor, do not know, refused to answer/ blank. Fair and Poor ratings can be considered as an indicator of memory loss. Such rating may be subjective, biased, or inaccurate (underestimating or overestimating the current memory performance), which may depend on different factors, but it provides an idea of the respondents' own memory decline (not the caregiver's). This study's self-reported memory rating -as reported in the 2018 HRS data set- was used as a surrogate to identify memory loss.

Type of usual place of primary care: This term defines an independent variable used to identify where the respondent chose to go more often to seek medical care. The possible usual places of care according to the 2018 HRS data set vary from (a) a Clinic or health center, (b) a Doctor's office or HMO, (c) a Hospital emergency room, (d) a Hospital outpatient department, (e) Some other place, (f) Does not go to one place most often, (g) Do not know or not ascertained, and (h) Refused, and blank or inapplicable. The different places of care may help to understand whether the respondent was able to find medical care, and consequently, prevent or monitor any form of cognitive decline or if the respondent was not able to find medical care and did not seek dementia treatment at all.

Assumptions

From the ontological perspective, the nature of reality for the present study is objective because of the analysis of the literature review and the different variables at play -education, occupation, and access to health care. It determined whether some variables among them could be predictors of self-reported memory loss among women. From both the epistemological and axiological perspectives that include the researcher's association and an unbiased study, I remained independent from the focus of the study, producing an objective and unbiased analysis, aiming to contribute new knowledge to the scholarly community in the public health field, as it is a topic of concern. The study was based on a literature review, a secondary data analysis of the 2018 HRS data set, and a statistical analysis without any biased interpretation of results to alter the results. From a methodological perspective, this study resulted from a deductive process after thoroughly analyzing all the necessary articles and performing all the appropriate statistical analyses.

Scope and Delimitations

The increase in dementia cases among women in the United States, without an identified reason, is a very current public health concern. Different SDoH have been studied separately and on different demographic groups in the United States and abroad. However, the relationships between self-reported memory loss as a measure of dementia and SDoH (education, occupation, and healthcare accessibility) as predictors have not been studied among females in the United States. It is, therefore, imperative to understand how these SDoH may be predictors of a dementia outcome, and to take the necessary actions to improve the living and working conditions of females in the United States to delay or potentially prevent dementia.

This study aimed to raise awareness about the above-mentioned potential relationships and their related risks for developing dementia among females in the United States. While education and, to some extent, the level and quality of employment have been related to dementia outcomes, not much research has been done to relate access to healthcare and dementia, especially among women in the United States. Therefore, the study provided otherwise overlooked evidence on the importance of improving women's living and working conditions as part of reducing their dementia risk.

According to the AA (2020), 60% of the current dementia cases are female (AA, 2020). The study population is focused entirely on women 50 and older who were part of a survey by the 2018 HRS from the University of Michigan, supported by the NIA and the SSA. Among the variables used, race will also be considered in the analysis as a modifier in case the data can provide more specific information on more vulnerable demographic groups. The theoretical frameworks used were the SEM and the eco-social theory of disease distribution, which poses discrimination as a form of social injustice that produces health inequalities across societal groups (Krieger, 2012). In this regard, the study did not include the variable income to assess socio-economic discrimination. Instead, such discrimination was examined through other sources such as education (highest level) and job status. This study could also be generalized for a more accurate and location-based analysis.

Limitations

Among the limitations of this study were that while the 2018 HRS survey was administered to a large sample, the survey responses were self-reported or responded to by a proxy when necessary. Self-reporting can also be subjective because no standard reference was used across all respondents. Then, self-reporting was a limitation due to the inaccuracy of some of the answers which may incur information bias based on the respondents' self-perception or a caregiver's perception, especially if the respondent is a close relative. However, these survey responses are acknowledged as reliable since they have been used in previous studies by the NIA and the SSA.

This study focused on dementia in general. The literature review identified dementia as the most common form of cognitive degeneration and included a review of studies from more specific forms of dementia. It is essential to recognize that dementia may have many different forms with similar symptoms, such as AD, vascular dementia, Huntington's disease, and Parkinson's disease dementia (AA, 2021). Furthermore, AD can only be definitively diagnosed from an autopsy after physically comparing clinical measures and microscopic examination of brain tissue (NIA, 2017). Memory loss is the most common symptom of any form of dementia. Therefore, it would be more beneficial to the study to focus on dementia in general rather than only Alzheimer's cases.

Ideally, a survey should have been designed specifically for information concerning education, occupation, healthcare access, and the development of dementia among women in the United States. However, a statistically large data sample provided enough statistical power, and allowed the results to be generalized. The data set from HRS (2018) was collected for a different purpose and has analyzed different aspects of the American aging population in the United States. One of this study's challenges was finding a recent dataset with enough participants, including the necessary variables to analyze possible contributors to dementia among women in the United States. As indicated earlier, the survey was conducted in 2018 and updated over time.

Significance

This study is an original contribution to the public health field in the United States as these variables (education, occupation, and healthcare accessibility) have yet to be studied simultaneously and exclusively among women in the United States. Considering the significant economic burden that dementia poses to the national economy, it is crucial to understand the direct impact of SDoH on dementia among women in the country. This, in turn, could allow the implementation of policies and changes to the system aiming to modifying such trends to generating positive social change for women and to the nation.

This study is significant in that it is an original contribution to the public health field in the United States because education, employment, and healthcare affordability have yet to be simultaneously studied among American women. Since dementia is usually underdiagnosed (the diagnosis rate in low-income countries is about 10% and in higher-income countries about 50%; Lian, 2017), this study provides policymakers with valuable information regarding determinants of dementia among women to design policy and interventional programs to addressing dementia through early interventions generating positive social change.

Summary

Due to the concerning increase of dementia cases among women, this study focused on the analysis of job status, healthcare accessibility and education as potential predictors of dementia measured as self-reported memory rating (SRMR) as a surrogate for memory loss among females in the United States. For job status, the study examined employment status (whether the participant is employed or not). For healthcare accessibility, the study examined whether the participant had a healthcare facility to attend as well as the participants' ability to afford medical care. For education, the study considered the participants' education attainment. The study assessed all the variables to determine whether those SDoH can predict dementia outcomes.

Dementia is a neurodegenerative disease. This study raised awareness about the impact of the afore-mentioned SDoH on women's mental health. While health is affected by different SDoH as presented on the SEM, this study is mainly based on the ecosocial theory of health distribution by Dr. Krieger, which examines whether indeed certain living and working conditions did impact more vulnerable groups due to their permanent life-course exposure (Krieger, 2012). This study is centered on females 50 years and older in the United States with a sample population from the 2018 HRS study. This study aims to raise awareness about the impact of SDoH (education, job status, and access to health care) on the development of dementia among women, a population that has increasingly extended its lifespan in the past decades. Such a situation has become a patient's family financial burden and a national burden due to the health care costs that could triple in the next two decades (AA, 2020). Unveiling any relationship between those SDoH could provide more evidence and awareness of the importance of living and working conditions in developing diseases among different groups. This study could be contextualized with other geographical and socioeconomic settings, triggering even more significant positive social change.

Chapter 2 includes literature review strategies, theoretical framework. This study is based on relevant concepts, available literature on each topic variable/ concept, and a summary.

Chapter 2: Literature Review

Introduction

Dementia is a public health concern in the United States due to the increasing prevalence of this condition across the elderly population, but most specifically among women: two out of three dementia cases in the United States are females (AA, 2020). While brain activity changes and minor forgetfulness may be part of the aging process, dementia is not considered part of it (NIA, 2020). Some other factors may be playing important roles in the development of dementia among women in the United States. The purpose of this study is to identify whether the combination of education level, occupation, as well as healthcare access can predict the development of dementia among women in the United States. While many genetic, environmental, and socioeconomic factors may contribute to the development of this condition, more research is needed to further understand the contribution of education, job status, and healthcare access in the development of dementia among women. Education has been extensively studied as related to dementia development, indicating that the higher education the individual attains, the less likelihood for them to develop dementia due to cognitive reserve acquired during those years of schooling. The relationship between occupations and dementia has also been studied. The studies suggested that individuals who have held jobs with decision-making capabilities had less chance of developing dementia as compared to those who did not have those capabilities.

Moreover, some studies indicated that those individuals who had less skilled jobs had greater chances of developing dementia. However, little is known about the impact of healthcare access (or the lack of it) and the development of dementia. In most cases, the studies included the general population, not females only. The relationship between education, job status, and healthcare access and how it may impact women has yet to be studied.

Chapter 2 presents the literature research strategy, the theoretical framework, and key concepts necessary to understand the topic better. This chapter also includes a detailed review of the available literature on dementia, education, job status, and healthcare accessibility that could potentially predict the condition.

Literature Review Strategy

I conducted a systematic review of the available literature to identify relevant studies about any possible association between dementia (using memory loss as a surrogate since it is the most common symptom and accurate predictor of dementia) and each of the SDoH to be analyzed (education, occupation, and healthcare access). I also included race and ethnicity studies to explore the possibility of their relationship to dementia. I assumed a predictive model could be developed using a thorough literature review where the determinants of health and dementia mentioned above were assessed.

I used the Walden University library to search for relevant articles on the EBSCO database. All the studies were recent and peer-reviewed, from 2018 to the present. Since dementia is the broader term to refer to brain changes, I used the following Boolean operators and keywords to include or exclude variables:

1. (Dementia) AND (education) AND (female or women or woman or females)
2. (Dementia) AND (occupation) AND (female or women or woman or females)

3. (Dementia) AND (healthcare access) AND (female or women or woman or females)
4. (Dementia) AND (access to health care OR access to healthcare) AND (women or female or gender)
5. (Dementia) AND (race) AND (female or women or woman or females)
6. (Dementia) AND (ethnicity) AND (female or women or woman or females)
7. (Dementia) AND (minorities) AND (female or women)
8. (Dementia) AND Ecosocial theory

The inclusion/exclusion criteria are explained as follows: the searches included all the limiters, such as full text and peer-reviewed scholarly journals recently written from the last four years, to obtain recent articles and possibly new developments in dementia predictors. The initial searches for dementia AND education AND women yielded 883 results. However, many results included more clinical information than epidemiological information. The former ones were discarded. The search dementia AND occupation AND women yielded 47 articles. All those articles, including clinical treatments and procedures, were discarded. Also, all the articles referring to environmental exposures as part of occupations were omitted since they are irrelevant to this study. Dementia AND healthcare access AND female or women yielded 82 results. This study is limited to analyzing the influence of education, occupation, and healthcare accessibility, known SDoH inequalities that often adversely impact the health outcome of lower-income demographic groups across the ethnocultural spectrum.

Furthermore, there is a subjacent relationship between educational attainment, and occupation related to income levels that limit access to quality healthcare infrastructure and services. While these three variables have been independently studied for their impact on dementia among women, this study seeks to shed light on the subjacent relationship, understanding that there could be other confounding factors that may individually affect the variables of this study in such a relationship. The search dementia AND race AND women yielded 140 results. However, some of these studies included clinical studies (not epidemiological) and studies on female caregivers (or staff), not female patients. Those focused on female caregivers were also discarded. The search Dementia AND ethnicity AND women yielded 103 results. Some of the studies included genetic components such as apolipoprotein epsilon-4 (APOE ε4), the allele known as the one positing the highest risk for dementia (Rahman et al., 2019). While it is essential information to understand the complexity of dementia as a health condition, these genetic studies were not included in the study since they are focused on specific SDoH (education, occupation, and healthcare access) and how they can, to some extent, become predictors of dementia. All the articles, including comorbidities such as diabetes, cardiovascular disease, hypertension, depression, menopause transition, and metabolic syndrome, were included in the present study. Although these conditions are present in the aging population, it could even complicate further the analysis due to the many additional variables to consider. Furthermore, since the data used in this study is a secondary data set, the survey on which the dataset is based may not be as accurate in portraying the comorbidities, provided less accurate information to support the study. For this reason, these comorbidities will be addressed in the Further research section.

Theoretical Framework

The SEM of health is a comprehensive framework that aims to explain many factors (and their influences) that affect the individual's health and behavior (Rural Health Information Hub, 2021). It is based on Bronfenbrenner's ecological systems theory, which explains the effects of social environments on human development (Santa Clara University, 2019). The SEM considers the individual level (that affects knowledge, attitudes, behavior, self-concept, and personal skills), interpersonal level (family and friends and social networks), organizational level (social institutions, school, church, work), community level (influences the relationship between organizations and policy level (that includes the different levels of laws and regulations). The SEM presents a comprehensive approach to understanding how SDoH, such as income, occupation, and access to health care through health insurance, may play a significant role in the increasing number of dementia cases, especially among American women.

Dementia, a neurological degenerative disease, like any other condition, is the outcome of the many complex relations that the individual has with their environment, community, and society throughout time. These relations are especially significant and impactful when populations are more vulnerable. Such vulnerability is based on low education levels that do not allow access to higher paying jobs, limiting women from accessing health care through their employers. Women are at higher risk due to greater longevity (AA, 2019) and limited access to the previously mentioned SDoH (Nakahori et al., 2018; Toth et al., 2018; Vega et al., 2017; Yasuno et al., 2020), which seems to be the cause for the two-fold prevalence of dementia among American women when compared to men. The SEM as a theoretical framework has been used to study the impact of SDoH and their relationship with dementia outcomes affecting late-life cognitive aging (Peterson et al., 2021). Peterson et al. (2021) systematically reviewed 7,802 articles. Only 123 out of the 7,802 articles met the inclusion criteria of SEM's interpersonal, community, and policy levels. The authors concluded that social environments do affect health inequalities. However, the available literature indicated that the assessment of social environments and cognitive aging were either measured at a specific time or did not consider multiple SEM levels. Since the social environment affects the outcome, it is essential to assess socio-environmental factors in a multi-level fashion and their impact on health disparities over time (Peterson et al., 2021). Since education and healthcare accessibility are governed and offered at different SE levels, Peterson et al. influenced by having me to consider these aspects in the research, conclusions, and future research.

The second theoretical framework for this study is Krieger's ecosocial theory of disease distribution. This theory posits the intrinsic relationship between societal discrimination of certain groups, societal and ecological context, and the subsequent outcome of health inequalities among the groups seen as inferior (Krieger, 2012). Dementia has traditionally been seen as part of a regular aging process. However, the greater prevalence of dementia among women in the United States, and possibly among women from certain demographic groups due to some societal and ecological interactions, could be a significant indicator of some pattern to the occurrence of this disease. Furthermore, discrimination is also reflected in socioeconomic conditions that hinder the ability of these women to remain healthy. Limited socioeconomic conditions due to limited access to education also affect healthcare access, which has increased the health inequalities among certain demographic groups. This theoretical framework was significant in exploring the processes of disease distribution (in this case of dementia among women in the United States). The ecosocial theory of disease distribution for dementia helped us understand how discrimination and life-course exposures may affect individuals' health from generation to generation. The ecosocial theory has been previously applied in similar studies (Alford, 2014) aiming to understand any relationship between pre-diabetes and dementia. This theory has also been studied associating life-course exposures (such as those among more disadvantaged demographic groups in terms of socioeconomic status) and risk factors (comorbidities such as hypertension, stroke, and dyslipidemia, among others). Alford (2014), using 2,731 cases and multivariable logistic regression analysis, found that there was no unadjusted association between pre-diabetes and dementia. However, some risk factors (atherosclerosis, hypertension, low body weight) and low/ average socioeconomic status were independently associated with dementia (Alford, 2014). Although the present study does not seek causation, this framework is essential to my research to better understand associations between social health determinants and disease development.

Literature Review Related to the Variables and Concepts

Dementia and Gender

Rahman et al. (2019) indicated that the second highest risk factor of dementia, after age, is female gender. However, specific hormones, such as estrogen, the primary female sex hormone, are associated with female gender and are the leading cause of gender difference in the development of AD among women (Rahman et al., 2019). There is an “estrogen hypothesis” where this hormone plays a significant protective role against AD and dementia, but its dysfunction may affect several areas of the brain, impacting females’ cognitive function and behavior and triggering dementia among women (Rahman et al., 2019). According to Rahman et al. (2019), this estrogen dysfunction begins with the transition into menopause, causing the emergence of dementia-related changes in the brain, making women more vulnerable to its development. In the menopause transition stage, a reduction in estrogen circulation affects brain areas associated with thinking, learning, and memory (Rahman et al., 2019). This stage is also associated with the risk of depression, cardiovascular disease, type-2 diabetes, and metabolic syndrome in women (Pucci et al., 2017), which worsens with a sedentary lifestyle, limited physical activity, disrupted sleep and stress, increasing their risk for dementia (Johnson et al., 2019; Rahman et al., 2019). Rahman et al. also indicated that the most decisive genetic risk factor for the late onset of AD is the APOE gene, or Apolipoprotein E protein, which transports lipids in the brain. The APOE has three alleles (which are alternative forms of a gene arising by mutation): ε2 has been associated with decreased AD risk, the most common is ε3, and ε4 has been associated with a higher risk of AD and an age-related cognitive decline during normal aging (Liu et al., 2013; Rahman et al., 2019). AD risk increases ten-fold in women with two ε4 alleles, AD risk increases ten-fold, while among men with two ε4, such risk is four-fold (Rahman et al., 2019). Rahman et al. also indicated that researchers suspect the interaction between the APOE gene and estrogen causes different dementia risks in women (Rahman et al., 2019). Although genetics cannot be altered and will not be further studied in this dissertation, it is essential to point out that the knowledge of genetic transformations could enable researchers and policymakers to promote preventative actions to improve the life conditions of vulnerable groups seeking positive social change.

Dementia, Race, and Ethnicity

According to the AA (2020), recent studies indicate that, although whites comprise most of the dementia cases in the United States, both Hispanics and African American women are at higher dementia risk than white women (AA, 2020): Hispanic women are about one and one-half times more likely than white women to have AD or other forms of dementia. African American women are about two times more likely than white women to have AD or other forms of dementia (AA, 2020). Unfortunately, according to the same source, Hispanic and African American women tend to have a delayed dementia diagnosis (AA, 2020). For these groups, dementia is usually diagnosed in the later stages of the disease, when patients are in greater need of medical care in general, which will require higher costs than whites for dementia care (AA, 2020; Sadarangani et al., 2020). Lin et al. (2021) performed a logistic regression analysis in a prospective cohort study with 3966 participants from the HRS (70 years and older suspected of having some form of dementia) to determine racial disparities in a timely diagnosis of dementia based on their Medicare and Medicaid claims: This study examined dementia severity based on cognition and function at diagnosis time and estimated diagnosis delay based on race and ethnicity (Lin et al., 2021). This study found that 46% of non-Hispanic Blacks and 54% of Hispanics had a delayed dementia diagnosis, while only 41% of non-Hispanic Whites had a delayed diagnosis (Lin et al., 2021). That delay led to non-Hispanic blacks and Hispanics having poorer cognitive function at the time of dementia diagnosis. This study also found that dementia diagnosis delay was about 35 months for non-Hispanic blacks and about 44 months for Hispanics, while diagnosis delay for non-Hispanic Whites was 31 months (Lin et al., 2021). While this study did not focus on gender as part of the analysis, it remains unclear how female participants were affected by dementia within each ethnic group. However, the Lin et al. study acknowledged how underdiagnosed and overlooked dementia can be among minority groups and, therefore, evidencing dementia as a more significant threat for women.

Dementia diagnosis is usually added to other comorbidities resulting from lifestyle and socio-economic factors (such as hypertension, cardiovascular disease, and diabetes), all prevalent in both the Hispanic and African American communities (AA, 2020; Rahman et al., 2019). These groups tend to have fewer years of schooling, stress, early life adversity, longer exposure to adversity, and other SDoH than their white counterparts. These conditions contribute to dementia prevalence within those groups (Hasselgren et al., 2018; Rahman et al., 2019). The above stated suggests that, while race and ethnicity are not to be considered independent predictors of dementia, race and ethnicity seem to be highly correlated to it. These variables are modifiers in the association evaluated in this study, seeking to better understand the role of race/ ethnicity in the development of dementia and determine what demographic group is more vulnerable than the other.

Dementia and Self-Rated Memory

Dementia entails a group of health conditions that cause abnormal brain changes and progressive cognitive decline (AA, 2019). Such a severe decline may disrupt the individual’s daily life, affecting their cognitive, language, and problem-solving skills (AA, 2019). While subjective, an accurate, unbiased self-rating is essential, especially for cognitive health: an honest memory self-reporting based on memory complaints will move the patient to reach out for help to use available healthcare services promptly. According to Huang and Maurer (2019), self-rated memory is essential for memory loss detection, especially in primary care settings, as memory self-ratings may be indicators of further dementia-related treatments (Huang & Maurer, 2019). Huang and Maurer (2019) indicated that self-rated memory, although not wholly reliable, could be an initial and practical way to determine any form of cognitive decline provided by the patient (Huang & Maurer, 2019). However, a study in China by Wu et al. (2019) determined that memory complaints are a surrogate for memory decline among middle-aged individuals in China (Wu et al., 2019). This register-based study used data from 2,129 patients from the Dementia Center Chang Gung Memory Hospital gathered between 2012 and 2015. The longitudinal study included about 400 patients (between 40 and 65 years old) with self-reported memory-rating complaints. The researchers divided their complaints and suggested cognitive decline (SCD), neurodegenerative disease (ND), and non-neurodegenerative diseases (NND) and diagnosed 32% of the participants with SCD, 35% with ND, and 33% with NND at baseline and studied the participants for one year to identify their cognitive decline. *One-year cognitive decline* was a reduction of >1 in the mini-mental state examination (MMSE). When deemed appropriate, the researchers performed chi-square, Fisher's exact test, *t*-test, ANOVA, and post hoc analysis (Wu et al., 2019). The study identified the one-year cognitive decline was higher in the ND group, with 36.8%, especially among the middle-aged participants, than among the other two groups (Wu et al., 2019). Also, the study determined that a lower MMSE score at baseline predicted increased cognitive decline risk (Wu et al., 2019). It is important to note that these authors did not derive conclusions specifically for female participants. The data indicated that the female population in the study sample was more significant and can, to some extent, suggest a greater prevalence of cognitive decline among women in general. Although this study adjusted for age, sex, and education as SDoH and conditions such as hypertension and type 2 diabetes, the results showed significant differences between patient groups and no direct association with the SDH. This study concluded that self-reported memory complaints were related to the risk of cognitive decline among middle-aged patients. However, since the study used archival data, it also presented limitations, such as no recollection of family history of neurodegenerative disorders (Wu et al., 2019). This study is relevant because it indicated that self-reported memory complaints during middle age years can be a predictor of further dementia development, which validates the use of self-reporting memory rating as a surrogate of dementia as it is a common symptom of this condition.

However, self-reporting health is also subjective and should be carefully handled as it can be misleading. Spitzer and Weber (2019) studied self-reported physical (mobility) and cognitive health status bias among European countries (Spitzer & Weber, 2019). The researchers used data from the Health, Ageing, and Retirement survey from 19 European countries and compared performance tests and their self-reported equivalents on physical and cognitive health. Relative importance analysis based on multinomial logistic regressions was performed. Their study indicated that bias exists in self-rated memory, and gender plays little role in it. However, the study indicated differences in reporting behaviors influenced by cultural bias and the participants' education level and age and that this bias needs to be handled carefully (Spitzer & Weber, 2019): Men tended to overestimate their physical health and deny memory loss.

On the other hand, European women were more likely to underestimate their memory loss and cognition, especially in Western European countries (Spitzer & Weber, 2019). The researchers also indicated that age, occupation, and education play a role in self-reporting behaviors: Less educated participants tended to overestimate their cognition. Furthermore, when controlled for employment, those with further education tended to rate their memory and cognition accurately (Spitzer & Weber, 2019). This study is essential, even though it was performed in Europe with retired male and female participants, not among women in the United States. It helped to understand how subjective self- rating is, but most importantly, it helped to understand specific female behaviors when self-reporting cognitive health, as well as what influences their accuracy. The 2018 HRS includes "self-reported memory rating" as part of their survey in the dataset. For this dissertation, self-rated memory was statistically addressed carefully due to the patients' bias but also as a surrogate for memory loss, one of the most common symptoms and significant predictors of dementia (AA, 2019).

Dementia and Education

As indicated before, education is vital in identifying less biased, less subjective self-assessment of memory complaints that may trigger healthcare utilization. Haussmann et al. (2019) mentioned that education plays a role in the perception of illnesses and the need to seek medical treatment for dementia, which is more frequent among women (Haussmann et al., 2019). Haussmann et al. (2019) studied 186 participants (55% female) who sought medical help for memory complaints between 2016 and 2018 in Germany. The female group was approximately three years younger than men (66.5 and 69.6 years respectively). The Mini-Mental State Examination was administered to the sample population, and the scores for both groups were similar (28.1 and 28.2 points, respectively). The female group showed more significant concern about both their cognitive decline and fear of developing dementia (85% and 65%, respectively) than the male group. The female group also showed more motivation to obtain a diagnosis (81% and 64% respectively). However, the authors also noted that the perception of illness varies within societal groups and that gender differences in healthcare use could be more related to biological and cultural aspects (Haussmann et al., 2019). Since the United States is a multicultural country, for this dissertation, it is essential to explore whether education across races and ethnicities could impact dementia outcomes in American women when seeking healthcare care.

The literature indicated that education also plays a role in dementia prevention: Wu et al. (2021) indicated that the prevalence of self-reported memory loss is greater among individuals with fewer years of education (Wu et al., 2021). Likewise, authors consistently found an association between education level and a protective effect on cognitive function against neurodegeneration (Chapko et al., 2018; Darwish et al., 2018; Adoukonou et al., 2020; Delpak & Talebi, 2020; Okamoto et al., 2021; Wu et al., 2021). However, each study considered different approaches: Delpak and Talebi (2020) studied the impact of age, gender, and educational level on cognitive function in AD patients in Iran. For two years, they studied 182 patients with complaints of cognitive decline, 60 years and older, from a neurology clinic at a private hospital in Iran. Among those patients, 125 were women (68.7%), with a mean age of 74.5 years old, and 86 of those women were illiterate (88.6%). Patients underwent the Mini-Mental State Examination (MMSE) (which included domains of orientation to time, orientation to place, registration, attention and calculation, language skills, recall, and copying) to determine a baseline of the severity of their cognitive impairment. The researchers performed statistical tests for quantitative and qualitative data (percentage, frequency, mean, standard deviation, Pearson’s correlation, Point-biserial correlation, and t-tests) (Delpak & Talebi, 2020). They found that age, female gender, and lower education level resulted in low MSSE scores. Likewise, they found that low education affected communication skills, and the ability to recall was mostly affected by age. According to this study, the first impaired domain for women was an orientation to time, and the most affected domain for the female group was an orientation to place. They also found that as the disease progressed, mostly all female domains degraded (except for recall) (Delpak & Talebi, 2020). However, their statistical analysis did not find any correlation between gender and low cognitive function scores overall (Delpak & Talebi, 2020). Although this study is based in a different country with a population sample that does not reflect the characteristics of the female population in the United States, this study shed light showing that education did influence MMSE scores of cognition performance at baseline and during disease progression. This study supports what Okamoto et al. (2021) found in their study on the relationship between both education and occupation: Women presented a deeper cognitive decline than men mainly due to fewer years of formal education (which worsens due to the many years of their longest occupation as domestic workers and their extended longevity compared to men) (Okamoto et al., 2021). Okamoto et al. (2021) used data from the National Survey of the Japanese Elderly (NSJE) with participants 60 years and older in eight waves between 1987 and 2012 and in-person interviews on each wave and follow-up every three years (Okamoto et al., 2021). The population sample was 3,581 individuals and 56% were female. This study used two types of analysis: Survival analysis and decomposition analysis of gender differences. Survival analysis to determine factors related to cognitive impairment with longitudinal data from the eight waves of participants and decomposition analysis of gender differences using data from 1987 to 1990 and follow-up surveys of waves 1 through 6-not 8- to reduce bias due to participants' severe cognitive disease, and death that could influence the results. Their cognitive function survey was based on the Short Portable Mental Status Questionnaire (SPMSQ) with nine items that ranged from the interview's date and day, respondents' name, age, birthday, and address, to the name of the current prime minister and a simple calculation (Okamoto et al., 2021). Cognition was assessed based on several incorrect answers at baseline, incorrect answers between waves, and cognitive impairment with 3+ incorrect answers. This study controlled for age, marital status, home ownership, education, employment status, longest occupation, and health-related behaviors (involvement in social activities, smoking, exercise, alcohol intake, and chronic conditions associated with dementia such as hearing impairment, diabetes type 2, hypertension, and stroke) (Okamoto et al., 2021). The variables were chosen based on literature indicating their protective effects on cognitive reserve against dementia. Interestingly, this study used the Blinder-Oaxaca decomposition method (first developed for labor economics that decomposed average sex's wage difference into endowment effects (or individual attributes) and residual effects (or factors like discrimination) seeking to determine what is related to gender differences in cognitive function and decline. According to Okamoto et al. (2021), men had a higher cognitive function based on higher cognitive reserve: They were less likely to develop dementia due to their education, occupations, and engagement in more intellectual activities than women throughout their lives (worsened by female extended longevity). Okamoto et al. (2021) concluded that women faced lower educational attainment that contributed to lower cognitive performance at baseline, larger cognitive decline in follow-up, and a higher risk of cognitive impairment compared to men (Okamoto et al., 2021). They also highlighted the importance of national policies supporting gender equality to reduce the women's health gap nationwide. Although this study was performed in Japan with both male and female participants, and Japanese women had limited access to education (which greatly influenced gender work inequality in the past) this study because establishes an education/ occupation/ dementia relationship, variables that this dissertation explores.

Adoukonou et al. (2020) also studied the relationship between education and dementia in Benin to determine its associated factors. Their cross-sectional study recruited 440 retired patients (predominantly male) from two sources: the National Center of Social Security and the Public Treasury of Benin, in July-August 2014. The sample population was mainly male (92%), with a mean age of 64.9 years old, and a 50% elementary school completion rate. A questionnaire was used to gather participants' sociodemographic data, lifestyle, and medical history: Age, sex, education level, marital status, history of stroke, hypertension, diabetes and depression, alcohol consumption, smoking, daily activity, fruit/vegetable consumption, social networking and living alone (Adoukonou et al., 2020). A cognitive screening based on the Community Screening Interview for Dementia was administered. Those participants who obtained low scores were considered to have cognitive impairment and invited for a thorough examination to confirm dementia diagnosis. This study used a logistic regression to determine factors related to dementia. The study found that dementia was less prevalent among well-educated elders in Benin (Adoukonou et al., 2020). The researchers suggested that the predominance of male participants in their study was mainly due to social bias and cultural context in a country where women face an wide gender gap affecting their access to education and, consequently, access to formal employment, better income to access healthcare and retirement benefits to be part of this study's sample population. The global pattern of two-fold dementia prevalence of women over men could not be determined for that reason. Although this study was performed in an African country, and the results were mainly on the male population with different socioeconomic characteristics, it is still relevant because it associated the risk of dementia among participants with lower education attainment. Furthermore, the researchers' suggestions about reduced female participation due to their socioeconomic characteristics evidences the gender gap that negatively affects women and their healthcare, specifically on dementia development, as Dr. Krieger's ecosocial theory of health distribution posits.

In conclusion, the studies supported the argument that dementia is more common among less educated individuals, also more frequent among women, due to lesser cognitive reserve that leads to a faster degeneration of the brain cells causing dementia (Wu et al., 2019; Adoukonou et al., 2020; Okamoto et al., 2021) and that surprisingly, the female group was more likely than men to seek out medical help and healthcare utilization (Haussmann et al., 2019). It would be interesting to explore if that same scenario is also reflected among American women since the United States seems to have a different gender gap in education than the countries where these studies have been performed.

Dementia and Occupation

Studies indicate that non-favorable socioeconomic conditions affect individuals' health, and those at risk of dementia are not the exception (Hasselgren et al., 2018). It has been established that the relationship between low education as a risk factor for dementia development and low education results in low occupational level in a social gradient scale (Hasselger et al., 2018) reinforces Krieger's ecosocial theory of disease distribution. It has also been identified that the apolipoprotein ε4 allele is a significant genetic risk factor (accounting for three to fifteen times higher dementia risk) (Hasselgren et al., 2018), which has been found in over 50% of dementia patients versus 15% non-dementia patients (Ungar et al., 2014). Hasselgren et al. (2018) studied 1019 Swedish men and women (22.5% and 77.5%, respectively) to determine any association between gene-work exposure interaction that could suggest a further relationship between occupation, socioeconomic status, genetic characteristics, and dementia development. Furthermore, such gene-work environment interaction could mediate the effect of the apolipoprotein E ε4 allele on the patient's risk of dementia development (Hasselgren et al., 2018). These researchers had previously found that high levels of control, social demand, social support, and challenge at work could also protect against dementia (as higher education attainment provides a cognitive reserve that may delay dementia). They also based their study on previous literature that posited that, in terms of occupations that require greater use of skill discretion, decision-making, and psychological demands, there is a cognitive reserve related to job occupation stimulation that provides neuronal resilience and protection against dementia (Hasselgren et al., 2018).

The researchers also found in the literature that stress at the workplace is related to cardiovascular risk factors, and these are, in turn, related to dementia development (Hasselgren et al., 2018). Using a binary logistic regression, the main occupation of the sample study was related to the Job Exposure Matrix to identify the participants' exposure to five work environment factors (work control, support, psychological demands, physical demands, and job hazards) (Hasselgren et al., 2018). The initial sample population was mainly female (77.5%); among all the participants, about a third of both groups had the APOE 4 gene. Women mostly had elementary school, and about 15% had some form of college degree (25% of this group were men). Most of the sample had blue-collar occupations, and those who held white-collar/self-employed occupations were male (45%). Ninety-four participants were diagnosed with dementia at baseline in 2000, 89 of which were women. In 2012, this number increased to 219 women out of the 246 participants diagnosed with dementia from the whole sample population (Hasselgren et al., 2018).

Interestingly, Hasselgren et al. (2018) found that males showed a higher dementia risk associated mainly with work control (not physical demands, social support, or job hazards) than females. However, if males have greater control over their work environment (skill discretion and decision authority), even with the APOE 4 gene, they will show a protective effect against dementia or cognitive reserve. Women did not have such results: high-control jobs are different for men and women for women in the high-control group are associated with affective and stress disorders due to emotional demands because they also expected to face and thrive on both professional and domestic responsibilities (a more significant workload than men) that affects their health (Hasselgren et al., 2018). This finding also indicated that work-related stressors are linked to occupational hierarchies and gender gap/segregation in the job market (Hasselgren et al., 2018). This study presented a sizable female representation in the sample population and was performed in a European country. However, it provided an exciting approach to how the gender gap in the job market may affect women's health: even after reaching a high occupational hierarchy job that allows control in the work environment, which provides significant cognitive reserve that protects against dementia among men, added stressors (within or outside her job) affect women's health and her higher risk of developing dementia. This situation suggests that the same scenario transpires across the female job market, where women with less education and less income face other stressors that also affect their physical and mental health. It would be fascinating to explore if the same dynamics are observed among American women in the job market and their risk of developing dementia.

Santabarbara et al. (2019) studied the association between lifetime occupation and the incidence of AD in Zaragoza, Spain, among men and women 55 years and older. A sample of 3883 non-dementia Spaniard participants were classified by type of occupation according to both the Spaniard and International Classification of Occupations: 31% of males and 13% of females were classified as white collar, 45% male and 17% of females were classified as blue collar and 12.8% of male were classified as farmers. In contrast, 63.1% of females were considered homemakers (Santabarbara et al., 2019). As part of the medical and psychiatric histories collected using the Mini-Mental State Examination (MMSE), the History and Aetiology Schedule (HAS), the Geriatric Mental State (AGECAT), and a risk factor questionnaire, the researchers studied age, sex, education, cerebrovascular risk factors, variation of APOE gene, depression, smoking, obesity, diabetes, and traumatic brain injury to any association between the longest-held occupation and the incidence of Alzheimer's' disease (AD) (Santabarbara et al., 2019). Cox regression models were performed in this study. The researchers determined that farmers had about 66% lower AD risk among men than white-collar jobs. Farmers' risk was 50% lower among women than homemakers (Santabarbara et al., 2019). This study concluded that both farmers and homemakers had a lower incidence of AD than any other occupation, contradicting other studies that indicated that education provided cognitive reserve that could offer resilience against dementia (especially among people with low attainment education) (Okamoto et al., 2021): The study indicated that female cognitive decline is the result of the many years dedicated to domestic work (Okamoto et al., 2021). As seen in the Dementia and Education section, Okamoto et al. (2021) studied gender differences focused on cognitive functioning associated with the male-female health survival paradox among elderly Japanese (females tend to live longer than men, and females are also more likely to suffer more illnesses than them, including dementia). The researchers used a longitudinal survey from the National Survey of the Japanese people 60 years or older. They analyzed cognitive decline using the Blinder Oaxaca decomposition analysis that observed demographic, socioeconomic, and health-related factors followed by a three-year interview on 4339 individuals. The researchers considered previous studies that focused on gender-based biological, social, psychological, and behavioral differences that could trigger different dementia outcomes: men were more likely to engage in negative health behaviors associated with cardiovascular events, increasing their risk of cognitive impairment, while women engaged in more preventive behaviors, including reaching out for health services (Okamoto et al., 2021). They concluded that due to the "endowment effect" of the Blinder-Oaxaca analysis, women (especially those with less education) tended to have a more drastic cognitive decline due to the many years of domestic work, while men (usually with more years of formal education) did not experience it due to their involvement in different occupations (political, historical, mathematical related jobs) despite the inherent stressors in these fields and their behavior responding to those stressors (Okamoto et al., 2021). Although these two studies, Santabarbara et al. (2019) and Okamoto et al. (2021), were performed in rural Spain and Japan with different lifestyles and risks and similar sample sizes, the results concerning occupation and dementia present two opposite scenarios. It is, then, essential to study how women in the United States can be affected by the relation occupation-dementia.

Likewise, Chapko et al. (2018) studied the impact of life-course determinants of cognitive reserve in cognitive aging and dementia (Chapko et al. 2018) performed a systematic review search in MEDLINE, EMBASE, and PsycheInfo from the 1940s until 2013 to study cognitive reserve determinants that would provide cognitive resilience to the brain of healthy individuals and those of underlying dementia-related pathology (Chapko et al., 2018). The researchers identified that education and occupation were correlated with 54% and 60% cognitive reserve determinants, respectively, among individuals with underlying dementia-related pathology. However, among healthy cases, while education did seem to be correlated with a protective cognitive reserve against dementia, the occupation did not provide conclusive results (Chapko et al., 2018).

Dodich et al. (2018) studied the impact of occupation levels as well as specific occupation characteristics (jobs with highly demanding social, attention, and executive abilities) on the cognitive resilience of individuals with frontotemporal dementia (Dodich et al. 2018). Thirty-seven patients (26 males and 11 females, 68.9 median age and 11.9 mean years of education) were recruited from memory clinics in Milan, Italy. The researchers used the Mini-Mental State Examination (MMSE) to diagnose probable frontotemporal dementia to meet the inclusion criteria. Neurological, neurobehavioral, and neuropsychological assessments and pertaining imaging were performed (Dodich et al., 2018). Occupation levels and specific cognitive dimensions as per the O*Net network database were determined as (a) no occupation, (b) unskilled worker, (c) skilled worker, tradesman, lower-level civil servant, employee, self-employed small business, office, or salesperson, (d) mid-level servant/ management, head of small business, academician/ specialist in subordinate position, and (e) senior civil servant/ management, senior academic position or self-employed (Dodich et al., 2018). The Principal Component Analysis (PAC) was used to identify socio-cognitive skills best aligned with the occupation profiles. This study concluded that patients who mainly had one single occupation that required high social functioning and attentive control showed less neurodegeneration (Dodich et al., 2018). This study also found that higher social interaction based on education and occupation levels can protect the patient's cognitive status, reducing the neurodegenerative process. Furthermore, this study also suggested that since some experiences at high-level jobs may have shaped abilities not obtained through formal academic qualifications, occupation provides an independent source of cognitive reserve (Darwish et al., 2018; Dodich et al., 2018).

A study by van Loenhoud et al. (2019) among dementia patients explored the role of occupation based on their complexity level on their dementia development. The researchers used occupational data from 2,121 patients with different types of dementia from the Amsterdam Dementia cohort between 2000 and 2017 (median age 67 years, 57% male, and Mini-Mental State Examination [MMSE] score 21 or higher). Demographic information, medical history, neurological and neuropsychological examinations, bloodwork, and magnetic resonance were performed. X^2 analysis and post hoc logistic regressions were performed to assess the impact of occupational complexity on the development of dementia. They identified significant differences in the way dementia was distributed across occupation groups (van Loenhoud et al., 2019): vascular dementia was more common in the logistics/ transportation group (also explained by higher vascular risk factors), while AD was more common in the healthcare/ welfare occupation group (also more predominantly among women). These results support the studies by Dodich et al. (2018) and Okamoto et al. (2021) about females at risk of steeper cognitive decline due in part to the type of longest-life occupation of caring for others (despite the years of education as suggested by Adoukonou et al. (2020)). Then, the relevance of occupation alongside education in the development of dementia needs to be explored.

Dementia and Healthcare Access

The Agency for Healthcare Research and Quality, an office of the United States Department of Health and Human Services, defined access to healthcare as the timely use of personal healthcare services to secure and obtain the best outcomes (Agency for Healthcare Research and Quality [AHRQ], 2018). Access to health care includes coverage (insurance), available services, timeliness of service, and a qualified workforce (AHRQ, 2018). A timely dementia diagnosis and successful health care could significantly improve dementia outcomes, medical care expenses, and the national financial burden on dementia-related care (AA, 2020). Unfortunately, dementia is often overlooked and undiagnosed until later stages (AA, 2020; Lin et al., 2021). Lin et al. (2021) performed a prospective cohort study with 3,966 individuals 70 years and older using the HRS dataset to analyze racial/ethnic disparities and the timeliness of their dementia diagnosis based on their Medicare and Medicaid claims. A MLR analysis was used to determine the timeliness of diagnosis by race and ethnicity, dementia severity at diagnosis time, and estimated average diagnosis delay (Lin et al., 2021). This study found that non-Hispanic Blacks (46%) and Hispanic (54%) participants had more significant delays in dementia diagnosis than the white participants (41%). These minority groups had poorer cognitive functions and worse limitations than their white counterparts at the time of diagnosis. On average, the authors estimated between 34 - 43 months of diagnosis delay for non-Hispanic Black and Hispanic, respectively. While Lin et al. (2021) studied American men and women and their delayed dementia diagnosis by race and ethnicity, this study helps to shed light on the disparities that affect dementia diagnosis among the elderly population by race. Haussmann et al. (2019) found gender differences in the perception of cognitive decline and the subsequent use of healthcare services (Haussmann et al., 2019). Haussmann et al. (2019) found that women showed more significant concern for both cognitive decline and dementia development. This study also showed that women are more likely to seek medical care than men (Haussmann et al., 2019). As the AA (2020) indicates, some Hispanic and African American women cannot afford medical care and face barriers to obtaining a timely dementia diagnosis and the corresponding specialized medical care (AA, 2020). These conditions often delay access to care when needed and their ability to afford it as it becomes more expensive in the later stages (AA, 2020). Some studies showed that, especially for minorities, finding appropriate healthcare is difficult due to a lack of knowledge of dementia, lack of awareness of dementia care services, culturally based differences, and socioeconomic status (Czapka & Sagbakken, 2020; Schmachtenberg et al., 2020). Czapka and Sagbakken (2020) studied the barriers the immigrant population faces when accessing the Norwegian healthcare system and seeking dementia services and treatment. This qualitative study interviewed eight families from different ethnicities (some Europeans and others from Middle Eastern backgrounds). The researchers found that the main barriers were a lack of knowledge of dementia, a lack of awareness of dementia care services, language barriers, cultural differences, and socioeconomic status (Czapka & Sagbakken, 2020). Despite the geographic location, the different types of study, and the different target populations, this research shed light on the fact that the main barriers the immigrants faced in Norway may be similar to those in the United States. Such a situation evidences the disparities in the healthcare system, specifically in dementia diagnosis and treatment, that make dementia patients, in general, even more vulnerable. Schmachtenberg et al. (2020) systematically analyzed national dementia guidelines in 35 European countries to identify if the national response to dementia treatment included guidelines for individuals with migration backgrounds as well. Out of the 35 European countries, the researchers analyzed 46 documents from 27 European countries that had national dementia guidelines that also included immigration background, using Keller's discourse analysis model screening for migration references/ indicators. The researchers found that, at the national level, only three countries had detailed guidelines that included the immigrant population since early dementia detection and diagnosis. These results suggested that the immigrant population in European countries is usually underdiagnosed and face lower care standards. Although this study is focused on European countries and foreign dementia guidelines affecting the immigrant population, this study showed a similar scenario that minority groups in general face in the United States, evidencing the vulnerability and substandard care affecting them.

Sometimes, access to health care includes technological barriers, which are incredibly challenging for the geriatric population in need of dementia care services. A group of scientists explored if telemedicine could help facilitate dementia patients' access to healthcare (Sekhon et al., 2021). Sekhon et al. (2021) systematically reviewed 79 articles using three digital libraries (Ovid Medline, Web of Science, and ACM Digital libraries). They used keywords to select and include the articles (Telemedicine, Rural, Age, Hospitals, Rural services, vascular dementia, and frontotemporal dementia, among others). The articles included different populations (Australia, Canada, Korea, and the United States). Although the tests and results varied, physicians and patients favored telemedicine. However, the results on the reliability of cognitive tests and infrastructure needed for dementia treatment were inconclusive (Sekhon et al., 2021). Although this study reviewed the feasibility of telemedicine in the elderly population with dementia around the world, it is also relevant since it presents yet more barriers that the elderly with dementia faces when seeking treatment, convenient location, and technology.

A study by Sadarangani et al. (2020) suggested incorporating a culturally sensitive education component in the primary care setting to engage minority groups on the correct and timely path of dementia care (Sadarangani et al. 2020). Their study is based on the Kickstart-Assess-Evaluate-Refer (KAER) framework implemented by the Gerontological Society of America (GSA) developed for primary care providers. The researchers found out that minority elders would not follow up for diagnostic evaluation due to many reasons, resulting in delayed diagnosis, poorer cognitive function, and a greater need for care. The researchers started a local community-based organization partnering with New York University, creating the New York University Center for the Study of Asian American Health (NYU CSAAH). This initiative became an organization that played a crucial role in educating and addressing social needs, creating a support partner for local families to reduce cultural stigma around mental health and overcome language barriers to support early dementia diagnosis and treatment (Sadarangani et al., 2021). This initiative shows the effectiveness of this addition to primary care offices, which usually lack resources to diagnose dementia effectively and struggle to retain patients due to cultural differences and the appropriateness of services. This initiative also showed how efforts can be channeled to provide equal opportunities to every group. It is important to acknowledge existing models for dementia treatment in the United States. These examples bridge the gap facilitating the necessary services at a location familiar to underserved communities, providing timely care, and avoiding disease progression.

Co et al. (2021) studied the frequency with which minority groups used dementia-related care services and whether they experienced treatment delay and disease progression as a result (Co et al., 2021). The researchers compared 20 studies in a systematic review with a narrative synthesis that included minority dementia patients in different countries (United States, United Kingdom, Australia, Belgium, and the Netherlands). The combined population of those studies was 94,431 older adults with some level of cognition impairment. They found that there is evidence that African American groups used more acute care services than any other group. There was less evidence of using primary care/ routine care services (Co et al., 2021). As the AA (2020) indicated, the researchers suggested that the delay in healthcare access may have triggered more acute dementia services for this community (AA, 2020; Co et al., 2021). This study indicated that one minority group (African American participants) was more likely to use acute care services (suggesting the patients did not seek medical care or had no regular place of care) than any other group, complementing previous literature (Lin et al., 2021) that indicated that such delayed diagnosis contributed to more significant disease progression and worse cognitive function.

As for non-minority women with dementia risk, the available literature on access to healthcare access is minimal. It mainly focused on gender differences at the primary care level, not at a specialized level, such as dementia diagnosis and care. Gender differences related to healthcare services have been documented (Bertakis et al., 2000) but only at the primary care level, not at the specialist level like dementia care. Bertakis et al. (2000) studied 509 adult patients randomly assigned to primary care physicians at a university medical center to be monitored for one year. It was found that women tend to have a different approach, such as significantly lower self-reported health status, lower education attainment, and lower income than their male counterparts. However, women are more likely to seek medical attention and follow medical advice than men (Bertakis et al., 2000). This study suggested that women could take better care of their health if given the opportunity at available healthcare centers. It is yet to be determined if such behavior will continue when a referral for an early dementia diagnosis is in place.

Jennings et al. (2019) focused on using health care and cost outcomes of a comprehensive dementia care program for fee-for-service Medicare beneficiaries (Jennings et al. 2019). They studied 3,249 participants with dementia (382 men and 701 women) in a case-control study with a quasi-experimental design. They compared patients in a dementia care program with all the staff and required specialized complementary dementia-related services with those in a comparison cohort group. The study determined that comprehensive dementia care services may reduce the number of hospitalizations and even be either neutral or cost-saving to Medicare (Jennings et al., 2019). This study reinforced the idea that bridging the healthcare accessibility and affordability gap in the community may positively affect dementia care among the elderly, especially among women. This study supported the efficacy of the experience of the NYU Center for the Study of Asian American Health (NYU CSAAH), reported by Sadarangani et al. (2021). My study analyzed the ability to seek and afford medical care and the location to receive such care to determine whether, despite their race and ethnicity, the individuals were able to have access to healthcare and if such care was done at a local hospital/ clinic (as a regular preventative measure) or at the emergency department (not preventative but a needed visit instead).

Summary and Conclusions

Contrary to popular belief, dementia is not part of the natural aging process of an individual (AA, 2020). Instead, dementia is a neurodegenerative cognitive disease that can progressively interfere with an individual's daily life. This condition affects mainly women worldwide, and the United States is not the exception: the risk of dementia is two-fold higher among women than men (AA, 2020). This effect can be explained by their extended lifespan and genetics, among other factors. However, it was unclear whether the combination of some SDoH, specifically education, occupation, and healthcare accessibility, influenced disease development (measured as self-reporting memory rating).

The literature suggested that the female gender is a risk factor for dementia due to the reduction of estrogen production and circulation during the premenopausal stage, affecting areas of the brain governing thinking, learning, and memory skills. The transition to menopause is a sensitive time where other risk factors appear or worsen (diabetes, cardiovascular disease, and depression). Genetics also play a role in the development of dementia: the Apolipoprotein E protein ε4 (APOE4) has been linked to higher dementia risk, and while men with the APOE4 have a four-fold risk, women with that same gene have a ten-fold dementia risk. Race and ethnicity are also related to dementia: the literature indicates that Hispanic and African American women have a higher dementia risk than their white counterparts. Considering the subsequent section regarding the relationship of education to dementia, the ethnic group relationship may be based on the education relationship. Hispanic and African American women are usually underdiagnosed or diagnosed at a later stage of the condition when patients have a greater need for care.

As expressed before, SRMR was used as a surrogate to measure dementia, as memory loss is a common symptom of cognitive decline (AA, 2020). The literature stressed the importance of SRMR as a predictor of cognitive decline (Wu et al., 2019). It recognizes that, although it could be biased and inaccurate, it is essential, especially in primary care settings, because it raises patient's awareness about the need to seek further specialized medical help (Huang & Maurer, 2019). According to the literature, SRMRs may be influenced by the participants' cultural background, gender, and educational attainment. Gender behavioral differences were determined in the SRMR: Men tended to overestimate their physical health and deny memory loss, while women tended to underestimate their memory loss (Spitzer & Weber, 2019).

Nevertheless, women tended to seek medical diagnosis and further treatment more often than men. The literature also identified that less biased SRMR is linked to more years of formal education (Spitzer & Weber, 2019). No previous authors have studied SRMRs to measure cognitive decline and its relationship with occupation or healthcare accessibility. My study aimed to fill the gap in the literature on the individual and combined effects of education, occupation, and healthcare accessibility on the development of dementia measured by self-reporting memory rating among women in the United States.

Concerning the relationship between dementia and education, the literature stated that education plays a significant role in the identification of the disease and, especially among women, in the look for medical diagnosis of the condition more often than men. Also, the literature indicated that education has a proportional positive effect on the resilience of the brain's cognitive function against dementia. Authors concluded that more years of formal education provide greater cognitive reserve and suggested that such protective effect may delay symptoms onset and lessen the severity of the disease as the condition progresses. Likewise, lower education attainment contributed to a higher risk of more significant cognitive decline, especially among women, leading to faster neurodegeneration. My study analyzed whether education has any relationship with the development of dementia as reflected in SRMRs among women.

Concerning the relationship between dementia and occupation, the literature indicated that unfavorable socioeconomic conditions do affect the development of the disease. It also reinforced the relationship between education and job status in a social gradient as low education leads to low occupational level, and low-income limits healthcare access that contributes to dementia underdiagnosis. Some studies suggested that a more drastic cognitive decline is observed among women who had lower education attainment and dedicated their lives to domestic work, while others found that less cognitive degeneration was related to both less skilled jobs and domestic work. According to the literature, the type of job performed contributes to the patient's cognitive resilience: the literature suggested that some resilience is provided due to job occupation stimulation, especially in higher-ranked jobs that require decision-making and control over their work environment. Unfortunately, among women in those higher ranked positions with high education attainment, other stressors affect their development of dementia, as her societal role as a household caregiver is judged against her work advancement. In contrast, women in caregiving jobs seemed to be at higher risk of cognitive decline. My study analyzed whether job status has any relationship with the development of dementia as reflected in SRMR among women in the United States.

Concerning the relationship between dementia and healthcare access, which includes insurance coverage, available services, timeliness of service, and qualified workforce (Agency for Healthcare Research and Quality, 2018), the literature suggested a behavioral difference between men and women regarding their cognitive function/decline. It indicated that women showed more significant concern than men towards their cognitive decline, sought for diagnosis, and more likelihood to seek medical help. However, women from the two minority groups with higher risk of dementia, Hispanic and African American, found more obstacles than their white counterparts to use the available healthcare services promptly. The obstacles they found were lack of or limited or no healthcare coverage, technological barriers for the geriatric population, language barriers, socioeconomic status, and culturally based differences. Such delayed diagnosis caused the need for more acute care services due to disease progression. The variable healthcare accessibility has not been studied in dementia development. Therefore, my study explored whether there is a relationship between access to healthcare and dementia as reflected in SRMRs among women in the US.

Chapter 3 covered the methodology of the study. It explained the procedures used to analyze the variables (education, occupation, healthcare accessibility as the independent variables) with the development of dementia, measured as self-reported memory rating (as the dependent variable). Chapter 3 covered the research design, rationale, methodology, data analysis plan, and the threats to validity to ensure the reliability of the analysis.

Chapter 3: Research Method

Introduction

As mentioned before, this study aimed to identify to what extent education, occupation, and access to health care are predictors of self-reported memory loss using SRMRs as indicators of dementia development among women in the United States. While there is extensive literature on the association between education and occupation and the development of dementia (Adoukonou et al., 2020; Chapko et al., 2018; Darwish et al., 2018; Dodich et al., 2018; Hasselgren et al., 2018; Haussman et al., 2019; Nakahori et al., 2018; Santabarbara et al., 2019; Toth et al., 2018; Van Loenhoud et al., 2019; Yasuno et al., 2020), not enough research has been done in the United States that can relate access to health care and dementia measured as self-reported memory rating along with education and occupation among women. Chapter 3 covers the following sections: (a) Research design and rationale, where the variables and type of research design were identified as appropriate to satisfy the research questions seeking to advance the knowledge about the relationship between education, occupation, and access to health care and dementia among women in the United States; (b) The Methodology section will define the target population from the 2018 HRS dataset, participation, and data collection procedures; (c) Data Analysis Plan using SPSS version 28 and all the procedures associated with the data manipulation as well as statistical tests for the study; (d) Threats to validity, and possible ethical considerations for the proposal stage of the study; and (e) Summary that will include critical aspects of the study and a transition to Chapter 4.

Research Design and Rationale

This study used a cross-sectional quantitative research design, using the 2018 HRS data set, mainly focused on non-experimental, correlational research to evaluate any relationship between self-reported memory rating (the numeric continuous dependent variable) and the independent numeric and nominal variables (education, occupation, and healthcare accessibility) among females in the United States. The statistical tests performed include Pearson chi- square, crosstabulations, and MLR analysis. This statistical analysis led to identifying patterns between outcome and predictor variables, but this study identified such trends and interpreted the results via inferential statistics. This study did not attempt to determine any causality of dementia from these variables. For that purpose, each research question is based on each independent variable to determine to what extent a relationship exists between each of them and the dependent variable.

Dementia is a neurodegenerative disease that portrays a broad array of symptoms depending on the part of the brain being affected. However, an early symptom associated with dementia is the patient's recurrent difficulties with memory that progresses into disrupting daily life activities (UK Alzheimer's Society [UKAS], 2022). This study's dependent variable (DV) was self-reported memory rating (SRMR), as memory loss is an early symptom of dementia (UK AS, 2022). Self-reported memory rating is a categorical, dependent variable. This dependent variable will be measured as it appears on the 2018 HRS: (1) Excellent, (2) Very good, (3) Good, (4) Fair, (5) Poor, (8) Don't know, (9) Refused, based on the respondent's ability to recall things (2018 HRS). This variable allowed comparing each respondent's SRMR on a highest-to-lowest scale for analytical purposes.

The independent variables (IV) are as follows:

1. Education, which, for analysis purposes, was grouped by the respondents' different levels of education. This variable was recoded as numeric continuous. The 2018 HRS data- set lists this variable as QB014 on the Demographics section and has the following options: no formal education, no high school completed, high school completed, some college, college graduated, post-college, and others.
2. Occupation using job status as a surrogate (whether the respondent has any form of employment or not). *Job status* is an independent categorical variable that was dummy-coded for the proposed MLR models. It corresponds to question QJ005M1 on the Employment section of the 2018 HRS. It informs of the respondents' occupation status: employed, unemployed and looking for work, temporarily laid off, disabled, retired, homemaker, other, on sick or other leave, does not know or not ascertained, refused or blank.
3. Access to health care will contain the following sub-variables: (a) affordability (whether the respondent was able to pay for health care or not) is a nominal, categorical dichotomous variable. It is listed as question QN290 of the Health Services and Insurance section of the 2018 HRS dataset. Possible responses to this question are yes or no, and (b) Usual place of care location (where respondents listed the different options available for health care) is a

categorical, nominal variable. This variable corresponds to question QN292 of the Health Services and Insurance section of the 2018 HRS. The responses to this question on the 2018 HRS range from clinics/ health centers, doctor offices/HMOs, Hospital emergency rooms, Hospital outpatient departments, and other places. They do not go to one place most often, do not know, and refuse.

Ethnicity and race are covariates of gender (women) because they relate to the dependent variable and may affect it. This research analyzed the female population in the 2018 HRS sample population. Ethnicity/race were modifiers because the association between the independent variables (education, occupation, and healthcare accessibility) and the dependent variable (self-reported memory rating) may differ when ethnicity and race variables are present.

There were four RQs and three independent variables: RQ1 aims to establish the relationship between job status and SRMS to determine whether being employed (or not) had any relationship with the respondents' self-reported memory rating. On the variable "healthcare accessibility," RQ2a seeks to determine any relationship between the ability to afford healthcare and SRMR. At the same time, RQ2b explores the relationship between the ability to have a usual place of care and SRMS. RQ2c determined if the type of place of care had any influence over the development of dementia measured as SRMR. In general, RQ2 examined whether being able (or not) to afford healthcare at a dedicated place had any relationship with the respondents' self-reported memory rating. RQ3 focuses on the relationship between education and explored whether there is a relationship between the highest level of education the respondents achieved and their self-reported memory rating. Lastly, RQ4 combined all the independent variables (occupation, healthcare accessibility, and education) to analyze whether those relationships are consistent with the respondents' self-reported memory rating. Those variables potentially became predictors of dementia among women.

As mentioned, this study used the 2018 HRS data set based on a survey developed by the University of Michigan and the Institute of Aging. While this was an advantage due to the large sample the survey provides to this quantitative study and the power it provides for reliable results, the questions asked to the participants are limited by the survey developers. It is anticipated that time constraints for data collection purposes are slim. Using a secondary data set in this study saved valuable time, aiming to obtain a large dataset, which benefited the study's validity and reliability. Additionally, the time saved from data collection was allocated to analyzing and processing the data, resulting in a thoroughly reviewed study. Finally, and most importantly, access to a complete dataset, gave the study more power and validity.

It is important to note that using this quantitative correlational research design precisely type of study is the adequate research design to identify any possible connections leading to a better understanding of dementia, measured as self-reported memory rating. Likewise, this research design was adequate to analyze the combination of education, occupation, and healthcare accessibility that may impact the development of dementia among women measured as SRMR. This type of study may also improve women's mental health because it advanced the knowledge on the impact of each variable and dementia outcome to prevent its development among women in the United States.

The knowledge advancement of dementia's unconventional contributors is undoubtedly a positive change that would increase awareness to produce prevention mechanisms to reduce dementia development among women in the United States.

Methodology

Population

The 2018 HRS is the result of a survey conducted between April 2018 and June 2019 by the University of Michigan and funded by the NIA with the support of the SSA. It is a nationwide longitudinal study that included older Americans' economic, marital, health, and family status. The target population of this dataset consisted of different groups of Americans born between 1923 and 1965. The participants were interviewed when they turned 60 and every 2 years after that. The total number of survey respondents among all the population groups is 11,456 Americans.

Sampling and Sampling Procedures

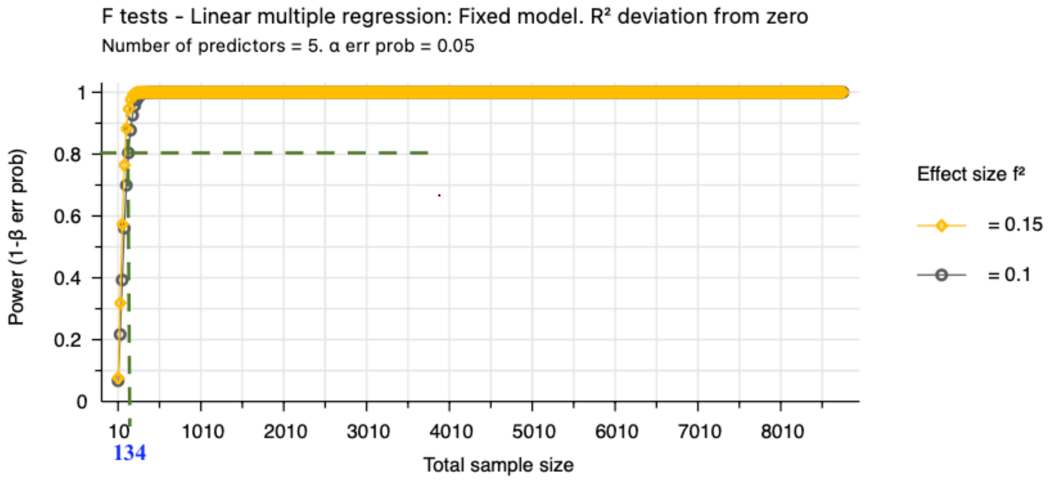
This dissertation's sampling strategy used the 2018 HRS dataset that comprises a sample population of 11,456 retired individuals. The 2018 HRS data set is archival data compiling economic, health, marital, and family status, as well as with public and private support systems, of older adults in the United States (HRS, 2018). It is an unweighted survey performed by the Institute for Social Research at the University of Michigan with the support of the NIA and SSA in 2018. The respondents were interviewed over the phone on different topics that ranged from demographics, health, cognition, family structure, housing employment, pensions, disability, retirement, and social security, health services and insurance, assets and income, widowhood, and divorce, will and life insurance, among others. The questions were asked to all respondents or of a proxy in case they could not give the interview. As a result of the use of archival data, this dissertation effort did not recruit participants. Consequently, control over the recruitment methods is not required. Moreover, such controls were implemented by the University of Michigan during the survey questions, external generalizations, data cleaning, and the sampling procedures used to collect the data. The 2018 HRS data set is downloadable from the University of Michigan website, is in the public domain, and permissions or other authorizations for its use are unnecessary. However, registration at the HRS website is required to download the data. Likewise, the data set codebook established some conditions for the use of the data set: (a) Do not attempt to identify participants; (b) Do not transfer data to third parties; (c) Do not share username or password, (d) include corresponding citations based on HRS data, (e) inform the HRS researchers about publications based on their data and provide a copy of it, (f) inform them about any error in the data, and, (g) inform them about any changes in my contact information. The HRS data set is to be used for research purposes only.

As for the inclusion criteria, since the 2018 HRS dataset of 11,456 respondents includes the retired population in general, the study will focus only on responses from female participants who are 50 years and older (N=8,764). That process was done before data cleaning in Chapter 4. Based on the dataset, the sample population reduced to approximately half the original number of respondents (N= 8,764).

A study without access to the complete data would have required an a priori sample size analysis to determine the smallest population sample size required for an analysis to be statistically significant and not due to chance and would eliminate type I error. The minimum sample size for the required X^2 and MLR tests was determined using the G*power program for a minimum effect size of 0.10, a priori power of 0.80, $\alpha = 0.05$ at 95%CI. Then, for MLR, an F-test is required to determine the minimum number of participants for this study with three predictors (education, occupation, and healthcare accessibility), the required sample size would have been 134 participants (See Figures 1 and 2).

Figure 1

Sample Size Determination for MLR Test

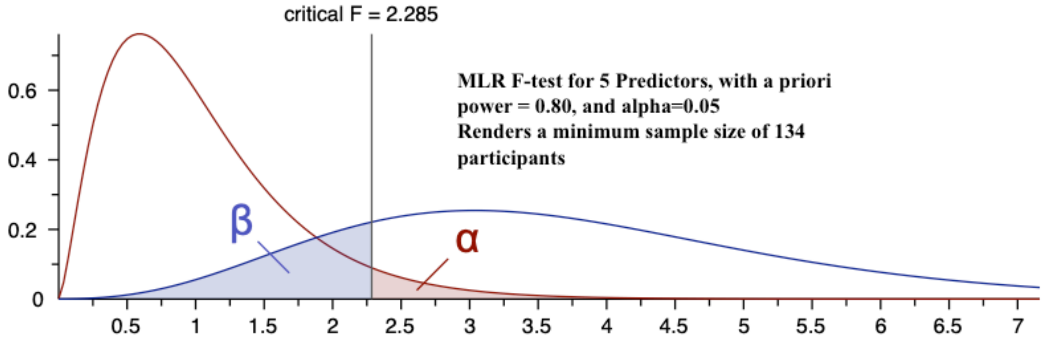


Note. Sample size calculation using G*power website.

https://www.macupdate.com/app/mac/24037/gpower

Figure 2

Power Analysis of the Sample Size for MLR Test



MLR F-test for 5 Predictors, with a priori power = 0.80, and alpha=0.05 Renders a minimum sample size of 134 participants

Note. Screenshot of the G*power program with three predictors, a priori power of 80%, and a conservative effect size of 0.10.

https://www.macupdate.com/app/mac/24037/gpower

For X^2, the minimum number of participants for this study varied per research question and related degrees of freedom between 1,200 and 2,380 (See Figures 1 & 2). However, the 2018 HRS dataset is much larger (N=8,764). Hence, the sample population will be large enough to ensure statistical power and validity to the study and eliminate type I errors.

Figure 3

Sample Size Determination for X^2 *Tests*

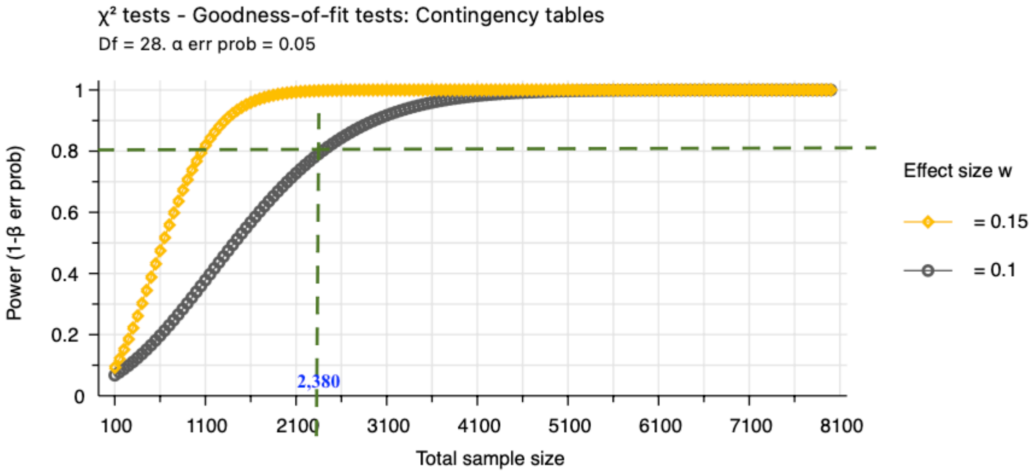
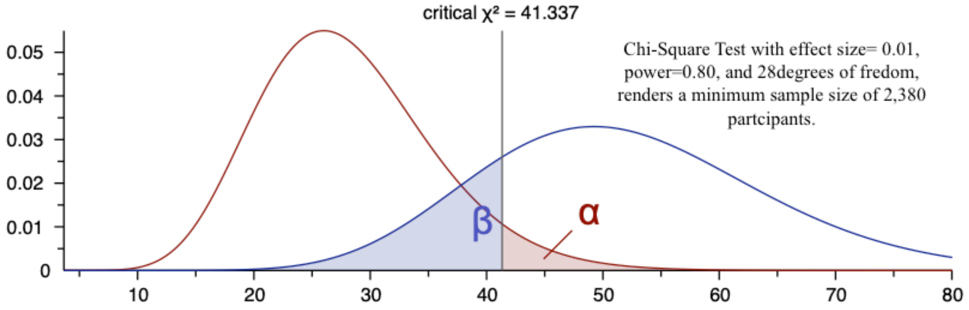


Figure 4

Power Analysis of the Sample Size for X^2 *Tests*



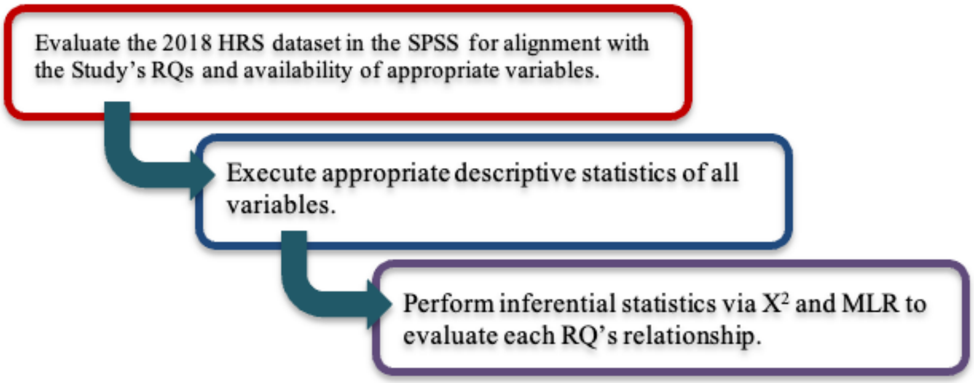
Chi-Square Test with effect size= 0.01, power=0.80, and 28degrees of fredom, renders a minimum sample size of 2,380 partcipants.

Data Analysis Plan

The purpose of the study is to identify whether education, job status, and healthcare accessibility as related to self-reported memory rating as a measurement of clinical symptoms of dementia among women in the United States. To these effects, SPSS version 28 software licensed through Walden University, was used for data cleaning procedures and the required statistical analyses to address all research questions as depicted in Figure 5.

Figure 5

Data Analysis Plan Diagram



Given that this study uses secondary for its known benefits of low or no-cost, surveys with a significant number of participants that have been already collected, the likelihood of finding some data errors does exist. Therefore, the data cleaning process of the 2018 HRS dataset in the SPSS software covered the following specific steps: (a) the identification and removal of duplicate cases or missing data; (b) the identification of extreme data values or data errors; and (c) the update or replacement of variables and value labels in case of coding inconsistencies, among others (IBM, 2021).

This study focused on the following research questions:

RQ1: Is there a statistically significant relationship between self-reported memory rating and job status among females in the United States?

H_o1: No, there is no statistically significant relationship between self-reported memory rating and job status among females in the United States.

H_a1: Yes, there is a statistically significant relationship between self-reported memory rating and job status among females in the United States.

RQ2a: Is there a statistically significant relationship between self-reported memory rating and healthcare affordability among females in the United States?

H_o2a: No, there is no statistically significant relationship between self-reported memory rating and healthcare affordability among females in the United States.

H_a2a: Yes, there is a statistically significant relationship between self-reported memory rating and healthcare affordability among females in the United States.

RQ2b: Is there a statistically significant relationship between self-reported memory rating and the ability to have a usual place of care among females in the United States?

H_o2b: No, there is no statistically significant relationship between self-reported memory rating and the ability to have a usual place of care (location) among females in the United States.

H_a2b: Yes, there is a statistically significant relationship between self-reported memory rating and the ability to have a usual place of care (location) among females in the United States.

RQ2c: Is there a statistically significant relationship between self-reported memory rating and the type of usual place of care among females in the United States?

> H_o2c: No, there is no statistically significant relationship between self-reported memory rating and the type of usual place of care among females in the United States.
>
> H_a2c: Yes, there is a statistically significant relationship between self-reported memory rating and the type of usual place of care among females in the United States.

RQ3: Is there a statistically significant relationship between self-reported memory rating and education level among females in the United States?

> H_o3: No, there is no statistically significant relationship between self-reported memory rating and education level among females in the United States.
>
> H_a3: Yes, there is a statistically significant relationship between self-reported memory rating and education level among females in the United States.

RQ4: Is there a statistically significant and predictable relationship between self-reported memory rating and contextual SDoH (job status, healthcare affordability, the ability to have a usual place of care, education level, race, and ethnicity) among women in the United States?

> H_o4: No, there is no statistically significant and predictable relationship between self-reported memory rating and contextual SDoH (job status, healthcare affordability, the ability to have a usual place of care, education level, race, and ethnicity) among women in the United States.

*H*a4: Yes, there is a statistically significant and predictable relationship between self-reported memory rating and contextual SDoH (job status, healthcare affordability, the ability to have a usual place of care, education level, race, and ethnicity) among women in the United States.

As mentioned earlier, ethnicity and race were used as covariates of gender (women) because they relate to the dependent variable and may affect it. This research focused only on 2018 HRS female population. Ethnicity/race were modifiers because the association between the independent variables (education, occupation, and healthcare accessibility) and the dependent variable (self-reported memory rating) may differ when ethnicity and race variables are present.

The appropriate statistical test to individually evaluate if a statistically significant association existed between SRMR and job status, education, healthcare affordability, and usual place of care (all categorical-nominal variables) is Pearson's X^2 Test of Independence. On the other hand, after controlling for age, gender, race/ethnicity, and Hispanic/Latino origin, a MLR test allowed for the evaluation of the association between SRMR (outcome variable converted to a continuous-numerical variable) and the confluence of job status, education, healthcare affordability, type, and usual place of care, all dummy-coded, and the highest degree of education variable was converted to a continuous-numeric variable.

Statistical significance was measured at the customary threshold $\alpha = 0.05$ for a 95%CI. However, the 2018 HRS dataset (N=8,764) provided these statistical analyses with significant validity and power.

Threats to Validity

The use of secondary analysis of an existing dataset has many advantages, such as cost, sample size, and availability. Likewise, it has shortcomings, such as being collected with a different purpose, and may need more critical information, such as family history, for more accurate results. Therefore, threats to validity are significant to consider. However, since the dataset used in this study was collected by a very reputable organization (Institute for Social Research Survey Research Center from the University of Michigan with the funding of the NIA and the SSA), the likelihood of the dataset being unreliable are minimum, as it already presents a degree of reliability and validity that does not need to be revised by me (Olabode et al., 2019). Furthermore, since it is archival data, there is no control over any external generalization the collecting institution may have made. Therefore, the present study using secondary data from the University of Michigan had no threats to validity since a renowned institution previously collected the dataset.

Ethical Procedures

Since the HRS dataset is for research purposes only, in order to protect the survey's anonymous participants, the University of Michigan established in the survey codebook some conditions for the data to be used that included not attempting to identify participants, not transfer data to third parties, communicate the HRS about publications based on their data and provide a copy of it, inform the HRS about any error in the data, among others.

Although the data are in the public domain and downloadable from the University of Michigan website, registration at the HRS website is required to download. This study requires no direct contact with the survey respondents since these surveys and follow-ups were already performed by the Institute for Social Research Survey Research Center in 2018. Therefore, this study does not require any external IRB examination.

Summary

The purpose of the present quantitative analysis is to explore any possible association between education, job status, healthcare accessibility, and self-reported memory rating, a known clinical sign of dementia, among women in the United States. This study used public-accessible archival data of 8,764 female respondents from the 2018 HRS, a longitudinal unweighted survey conducted by the University of Michigan and funded by the NIA and the SSA. This study also used Pearson's Chi-Square tests of independence and MLR to analyze the potential relationships between SRMR (outcome) and education, job status, and healthcare accessibility (independent variables). These variables may have been related to dementia in the past. However, the concurrence of these as SDoH has never been studied before. To my understanding, this original study may help improve the knowledge in the field and provide valuable information to reduce health disparities leading to dementia among women in the United States.

Chapter 4 focused on the statistical analysis of the 2018 HRS dataset using SPSS version 28 addressing this study's research questions using the appropriate statistical tests, including results and summary of findings.

Chapter 4: Results

Introduction

The present cross-sectional study evaluated the relationships between occupation (job status), healthcare accessibility (affordability, having a usual place of care and type of place of care), and education as predictors of the development of dementia in American women in the United States measured as self-reported memory rating (SRMR). The analysis centered on the female population at higher risk of SRMR due to age (50-70) from the 2018 HRS in the United States. The data analysis aimed to address the following research questions:

Occupation

RQ1: Is there a statistically significant relationship between self-reported memory rating and job status among females in the United States?

H_o1: No, there is no statistically significant relationship between self-reported memory rating and job status among females in the United States.

H_a1: Yes, there is a statistically significant relationship between self-reported memory rating and job status among females in the United States.

Healthcare Accessibility

Affordability

RQ2a: Is there a statistically significant relationship between self-reported memory rating and healthcare affordability among females in the United States?

H_o2a: No, there is no statistically significant relationship between self-reported memory rating and healthcare affordability among females in the United States.

H_a2a: Yes, there is a statistically significant relationship between self-reported memory rating and healthcare affordability among females in the United States.

Having a Usual Place of Care

RQ2b: Is there a statistically significant relationship between self-reported memory rating and the ability to have a usual place of care among females in the United States?

H_o2b: No, there is no statistically significant relationship between self-reported memory rating and the ability to have a usual place of care (location) among females in the United States.

H_a2b: Yes, there is a statistically significant relationship between self-reported memory rating and the ability to have a usual place of care (location) among females in the United States.

Type of Usual Place of Care

RQ2c: Is there a statistically significant relationship between self-reported memory rating and the type of usual place of care among females in the United States?

H_o2c: No, there is no statistically significant relationship between self-reported memory rating and the type of usual place of care among females in the United States.

H_a2c: Yes, there is a statistically significant relationship between self-reported memory rating and the type of usual place of care among females in the United States.

Education

RQ3: Is there a statistically significant relationship between self-reported memory rating and education level among females in the United States?

> H_o3: No, there is no statistically significant relationship between self-reported memory rating and education level among females in the United States.
>
> H_a3: Yes, there is a statistically significant relationship between self-reported memory rating and education level among females in the United States.

All Predictors and Outcome

RQ4: Is there a statistically significant and predictable relationship between self-reported memory rating and contextual SDoH (job status, healthcare affordability, the ability to have a usual place of care, education level, race, and ethnicity) among women in the United States?

> H_o4: No, there is no statistically significant and predictable relationship between self-reported memory rating and contextual SDoH (job status, healthcare affordability, the ability to have a usual place of care, education level, race, and ethnicity) among women in the United States.
>
> H_a4: Yes, there is a statistically significant and predictable relationship between self-reported memory rating and contextual SDoH (job status, healthcare affordability, the ability to have a usual place of care, education level, race, and ethnicity) among women in the United States.

.... Chapter 4 present the descriptive analysis of all the variables included in the study. Likewise, using IBM SPSS Statistics version 28 as the statistical platform, it presents the statistical analyses and study findings per research question based on occupation, healthcare accessibility, and education to identify their possible role as predictors of dementia among women in the United States.

Data Collection

The data used in this study was part of the 2018 HRS, a nationwide longitudinal survey done over the phone to all respondents 50 years or older (or a proxy in case they could not give the interview) that compiled information that included (a) demographics, (b) health, (c) cognition, (d) family structure, (e) housing, (f) employment, (g) pensions, (h) disability, (i) retirement and (j) social security, (k) health services and (l) insurance, (m) assets and (n) income, (o) widowhood, and (p) divorce, and (q) will and life insurance, among others. The data set was continuously updated throughout its latest release of June 2023. This study used only the data about the female participants, with a total of 8,674, not the over 14,000 that included the male population. A minimum required sample size was calculated to be 77 respondents. This minimum sample size was calculated using G*Power software with a minimum effect size of 0.15, a priori statistical power of 80%, and a significant statistical threshold $\alpha = 0.05$. The data set employed for this study had N=8,764 data points.

The statistical analysis focused only on the female population, and age, race/ethnicity, and Hispanic origin were controlled for as confounders to directly relate the result to each research question using Pearson's chi-square, crosstabulations and a MLR.

Results

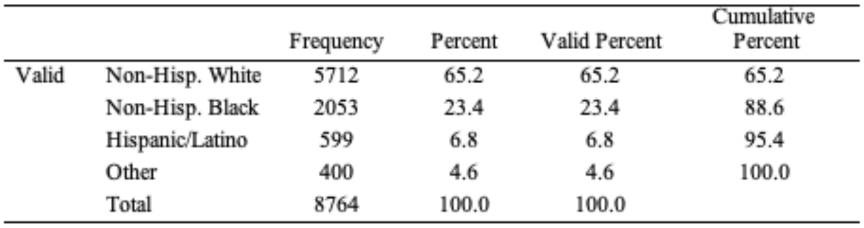
Table 1 shows the descriptive statistics of this study's variables used in the analysis. The study focuses on female only. Then, the sample population comprises 8,764 cases. While the number of valid responses varies, the study provided external validity to it because these variables vary between 6,323 and 8,764 values: For demographics (age, gender, race/ ethnicity, Hispanic origin), education and memory rating are 8,764; the valid responses for job status is 7,333, the valid responses for healthcare affordability is 7,310, and usual place of care is 7,311, and the valid cases of the type of healthcare accessibility is 6,323.

In general, the population is female and predominantly non-Hispanic white (65.2%), followed by non-Hispanic black (23.4%), 6.8% Hispanic, and 4.6% consider themselves as Other. Almost 17% reported having Hispanic origin. The mean age is 68 years. Regarding occupation status, the three largest groups are retired, currently working, and disabled. Table 1 also indicates that 92% could not afford healthcare. However, most of them do have a usual place of care (86%). Participants preferred visiting a doctor's office (73.8%). most people self-reported their memory as Good (3). Tables 1 through 9 give the descriptive statistics per variable as follows:

Table 1 shows the race/ethnicity descriptive statistics of women in the United States. The population is predominantly non-Hispanic white females (65.2%) and non-Hispanic Black females (23.4%). The Hispanic/ Latino female population is 6.8%, while the rest of the female population is 4.6%.

Table 1

Descriptive Statistics of Race/ Ethnicity for Women in the United States

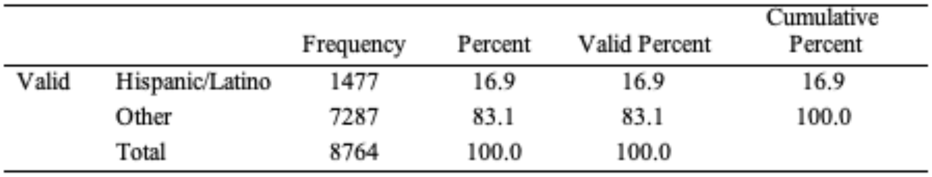


		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Non-Hisp. White	5712	65.2	65.2	65.2
	Non-Hisp. Black	2053	23.4	23.4	88.6
	Hispanic/Latino	599	6.8	6.8	95.4
	Other	400	4.6	4.6	100.0
	Total	8764	100.0	100.0	

Likewise, the data show on Table 2 that there were 1,477 female participants who identified themselves as Hispanic/Latino (16.9%) and that 7,287 (83.1%) who did not. This different result from Table 1 may reflect those who, among the White, Black, and Other demographic groups, acknowledged their Hispanic/Latino origin but may also identify themselves as White, Black, or Other because they do not speak Spanish.

Table 2

Descriptive Statistics of Hispanic/ Latino origin for Women in the United States

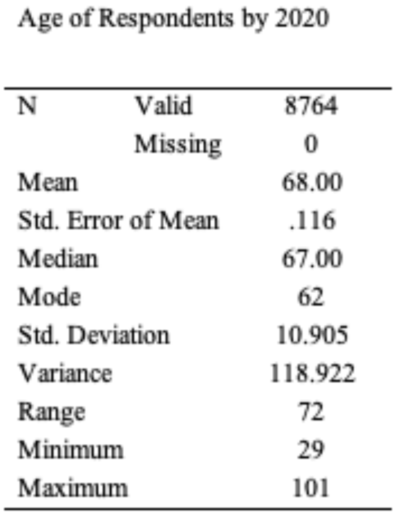


		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Hispanic/Latino	1477	16.9	16.9	16.9
	Other	7287	83.1	83.1	100.0
	Total	8764	100.0	100.0	

According to Table 3, the sample population mean age was ± 68 years old (68.00, with a SD = 10.905), and a median = 67.00. Since the sample population is comprised by women 50 years and older, tit is worth noting that this table also included a minimum age of 29, which would correspond to a younger proxy responding on behalf of the participant.

Table 3

Descriptive Statistics of Age for Women in the United States



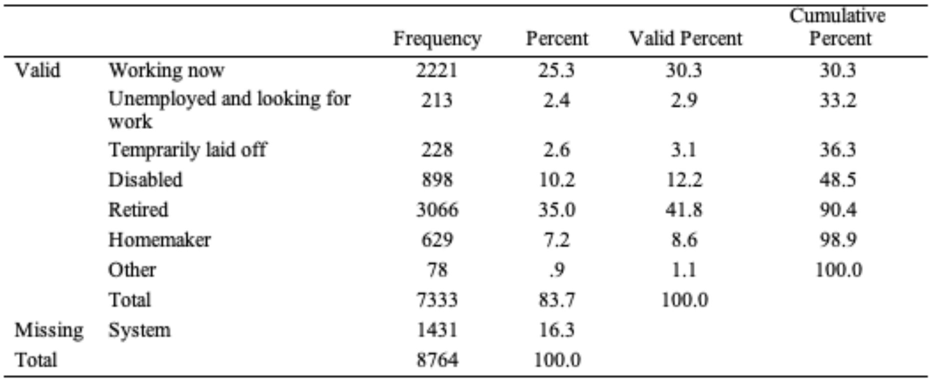
Age of Respondents by 2020

N	Valid	8764
	Missing	0
Mean		68.00
Std. Error of Mean		.116
Median		67.00
Mode		62
Std. Deviation		10.905
Variance		118.922
Range		72
Minimum		29
Maximum		101

According to Table 4, in terms of occupation, the makeup of the sample population is retired (41.8%), followed by the working now group (30.3%), the disabled group (12.2%), the homemaker group (8.6%), temporarily laid off (3.1%), and lastly, unemployed and looking for work (2.9%).

Table 4

Descriptive Statistics of Current Job Status for Women in the United States

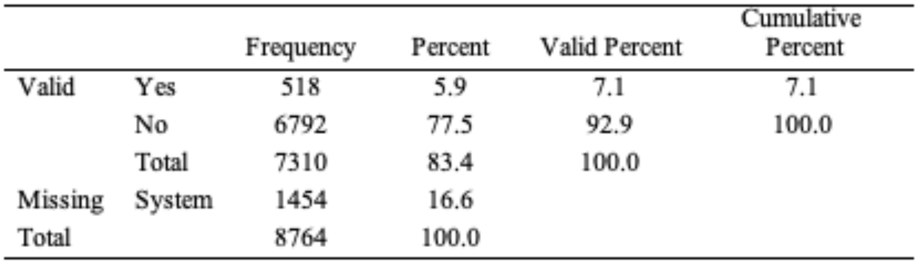


		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Working now	2221	25.3	30.3	30.3
	Unemployed and looking for work	213	2.4	2.9	33.2
	Temprarily laid off	228	2.6	3.1	36.3
	Disabled	898	10.2	12.2	48.5
	Retired	3066	35.0	41.8	90.4
	Homemaker	629	7.2	8.6	98.9
	Other	78	.9	1.1	100.0
	Total	7333	83.7	100.0	
Missing	System	1431	16.3		
Total		8764	100.0		

Table 5 shows that 92.9% of the population could not afford medical care compared to the 7.1% who could afford medical care for the sample population (N=8,764 females).

Table 5

Descriptive Statistics of Healthcare Affordability for Women in the United States

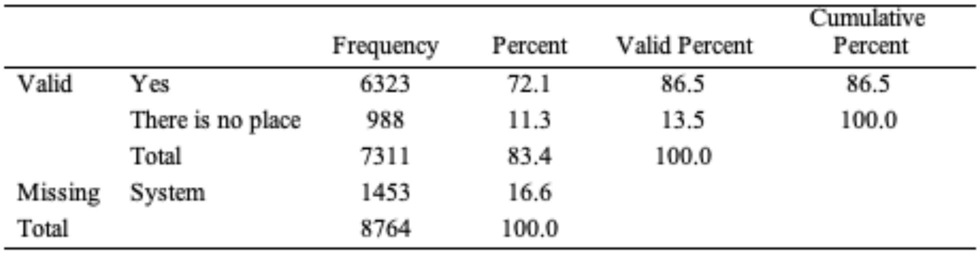


		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	518	5.9	7.1	7.1
	No	6792	77.5	92.9	100.0
	Total	7310	83.4	100.0	
Missing	System	1454	16.6		
Total		8764	100.0		

According to Table 6, almost ¾ of the sample population had a usual place of healthcare (72.1%), while 11.3% indicated there was no place of care. Similarly as with the previous question, these values may not be accurate because the dataset identified 16.6% of missing values out of the sample population (N=8,764 females). The results are still valid and able to be generalized due to the large data set.

Table 6

Descriptive Statistics of Having a Usual Place of Care for Women in the United States

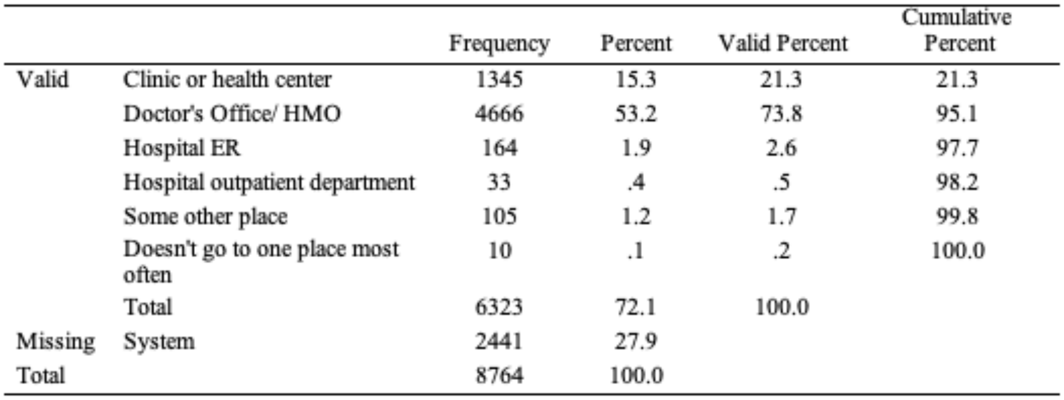


		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	6323	72.1	86.5	86.5
	There is no place	988	11.3	13.5	100.0
	Total	7311	83.4	100.0	
Missing	System	1453	16.6		
Total		8764	100.0		

According to Table 7, about 2/3 of the sample population had a doctor's office / HMO as a usual place of care (73.8%), 21.3% used a clinic or health center as their usual place of care, 2.6% used the hospital emergency department as their usual place of care, 1.7% used some other place, 0.5% used a hospital outpatient department, and 0.2% does not have a usual place of care. Just like the previous questions about healthcare accessibility, these values may not be accurate because the data set identified 27.9% of missing values out of the sample population (N=8,764 females). However, the results are still valid and able to be generalized due to the large data set.

Table 7

Descriptive Statistics of Type of Usual Place of Healthcare for Women in the United States

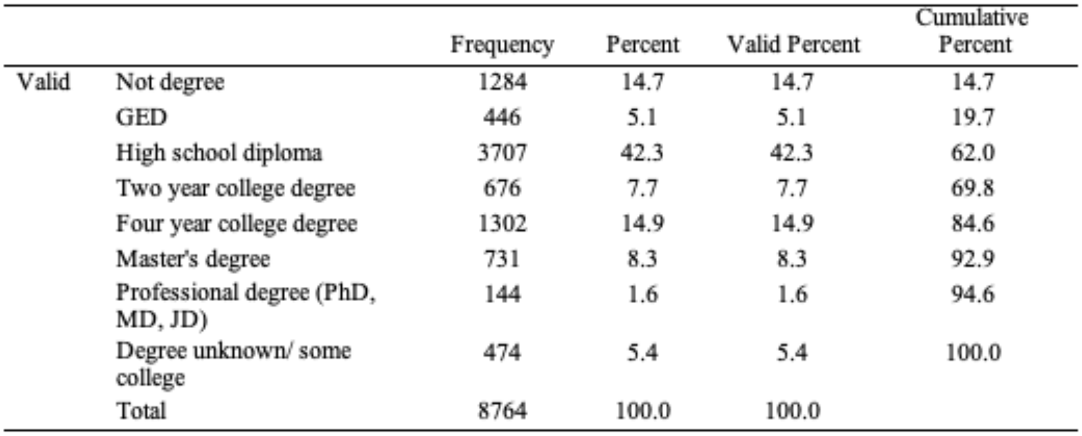


		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Clinic or health center	1345	15.3	21.3	21.3
	Doctor's Office/ HMO	4666	53.2	73.8	95.1
	Hospital ER	164	1.9	2.6	97.7
	Hospital outpatient department	33	.4	.5	98.2
	Some other place	105	1.2	1.7	99.8
	Doesn't go to one place most often	10	.1	.2	100.0
	Total	6323	72.1	100.0	
Missing	System	2441	27.9		
Total		8764	100.0		

According to Table 8, the largest group corresponds to those with a high school diploma (42.3%), followed by four-year college degree (14.9%), 14.7% had no degree, 8.3% had a master’s degree, 7.7% had a two year-college degree, followed by the group “some college/not degree” with 5.4%, and GED recipients were 5.1% while 1.6% held a professional degree. For this variable, there were no missing values reported on the dataset and the total sample population is N= 8,674 respondents. According to this table, it is safe to say that about 67.4% of the sample population did not complete any college education.

Table 8

Descriptive Statistics of Highest Degree of Education for Women in the United States

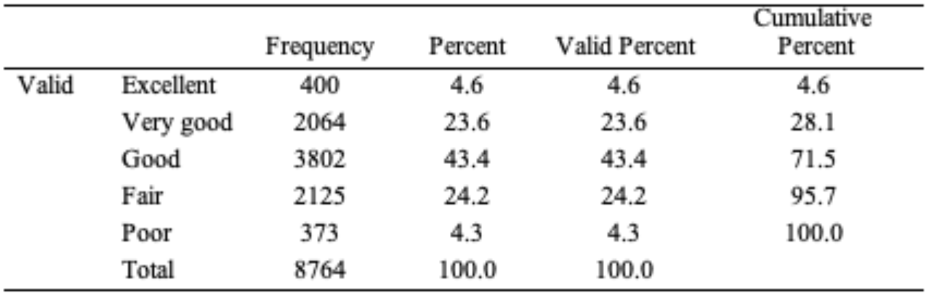


		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not degree	1284	14.7	14.7	14.7
	GED	446	5.1	5.1	19.7
	High school diploma	3707	42.3	42.3	62.0
	Two year college degree	676	7.7	7.7	69.8
	Four year college degree	1302	14.9	14.9	84.6
	Master's degree	731	8.3	8.3	92.9
	Professional degree (PhD, MD, JD)	144	1.6	1.6	94.6
	Degree unknown/ some college	474	5.4	5.4	100.0
	Total	8764	100.0	100.0	

According to Table 9, the sample population self-rated their memory as follows: Good (43.4%), fair (24.2%), very good (23.6%), excellent (4.6%), and poor (4.3%). This variable did not have any missing values on the dataset.

Table 9

Descriptive Statistics of Self-Reported Memory Rating (SRMR) for Women in the United States



		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Excellent	400	4.6	4.6	4.6
	Very good	2064	23.6	23.6	28.1
	Good	3802	43.4	43.4	71.5
	Fair	2125	24.2	24.2	95.7
	Poor	373	4.3	4.3	100.0
	Total	8764	100.0	100.0	

Bivariate analysis: The following analysis was performed to determine any form of association between the variables job status, healthcare affordability, having a usual place of care, type of place of care and education per RQ.

1. **Occupation (Job Status)**

The statistical analysis for this research question yielded the following results:

RQ1: Is there a statistically significant relationship between self-reported memory rating and job status among females in the United States?

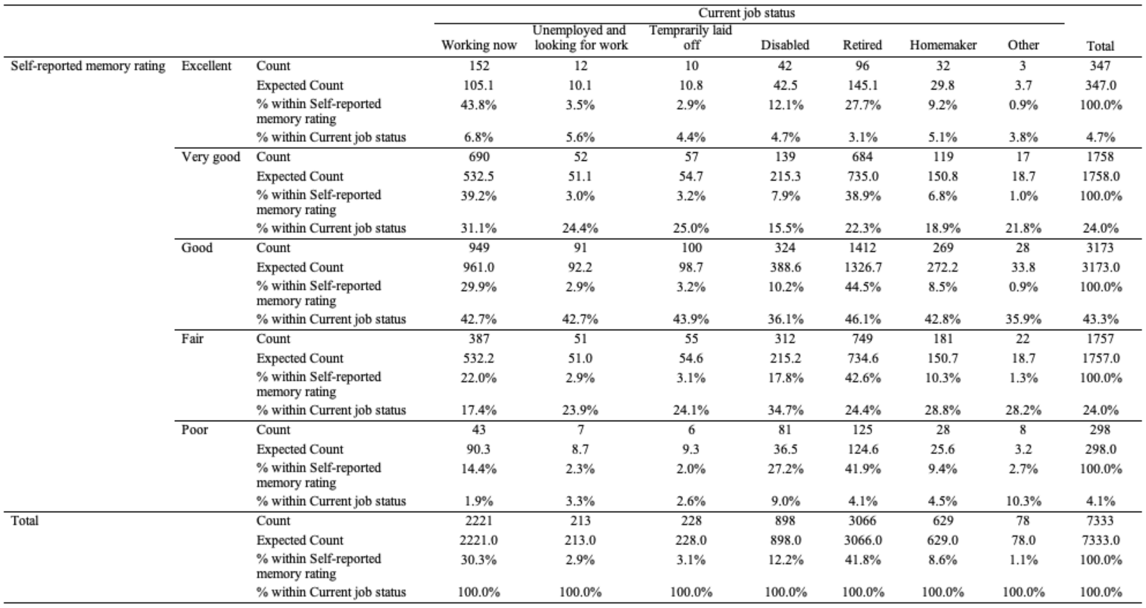
> H_o1: No, there is no statistically significant relationship between self-reported memory rating and job status among females in the United States.
>
> H_a1: Yes, there is a statistically significant relationship between self-reported memory rating and job status among females in the United States.

Given that SRMR and job status are both categorical, nominal variables, a chi square test of independence is required to evaluate whether a statistically significant relationship exists between these two variables.

Using SPSS version 28 a crosstab analysis renders the required chi square test of independence. See Table 10. Note that the difference between the observed and expected cell values of the crosstab table points to a relationship between SRMR and job status.

Table 10

Crosstabulation of SRMR and Job Status for Women in the United States

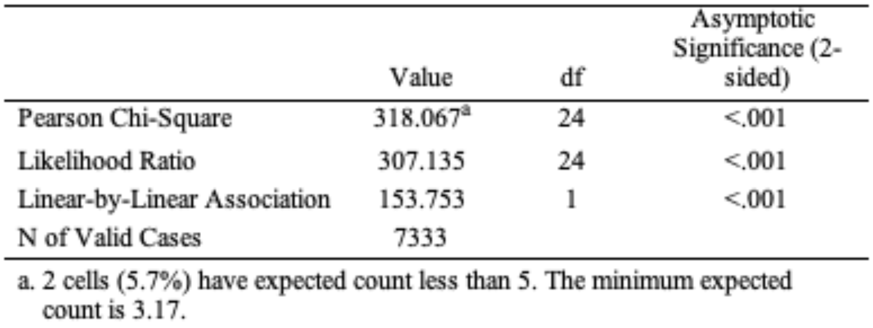


			Current job status							
			Working now	Unemployed and looking for work	Temprarily laid off	Disabled	Retired	Homemaker	Other	Total
Self-reported memory rating	Excellent	Count	152	12	10	42	96	32	3	347
		Expected Count	105.1	10.1	10.8	42.5	145.1	29.8	3.7	347.0
		% within Self-reported memory rating	43.8%	3.5%	2.9%	12.1%	27.7%	9.2%	0.9%	100.0%
		% within Current job status	6.8%	5.6%	4.4%	4.7%	3.1%	5.1%	3.8%	4.7%
	Very good	Count	690	52	57	139	684	119	17	1758
		Expected Count	532.5	51.1	54.7	215.3	735.0	150.8	18.7	1758.0
		% within Self-reported memory rating	39.2%	3.0%	3.2%	7.9%	38.9%	6.8%	1.0%	100.0%
		% within Current job status	31.1%	24.4%	25.0%	15.5%	22.3%	18.9%	21.8%	24.0%
	Good	Count	949	91	100	324	1412	269	28	3173
		Expected Count	961.0	92.2	98.7	388.6	1326.7	272.2	33.8	3173.0
		% within Self-reported memory rating	29.9%	2.9%	3.2%	10.2%	44.5%	8.5%	0.9%	100.0%
		% within Current job status	42.7%	42.7%	43.9%	36.1%	46.1%	42.8%	35.9%	43.3%
	Fair	Count	387	51	55	312	749	181	22	1757
		Expected Count	532.2	51.0	54.6	215.2	734.6	150.7	18.7	1757.0
		% within Self-reported memory rating	22.0%	2.9%	3.1%	17.8%	42.6%	10.3%	1.3%	100.0%
		% within Current job status	17.4%	23.9%	24.1%	34.7%	24.4%	28.8%	28.2%	24.0%
	Poor	Count	43	7	6	81	125	28	8	298
		Expected Count	90.3	8.7	9.3	36.5	124.6	25.6	3.2	298.0
		% within Self-reported memory rating	14.4%	2.3%	2.0%	27.2%	41.9%	9.4%	2.7%	100.0%
		% within Current job status	1.9%	3.3%	2.6%	9.0%	4.1%	4.5%	10.3%	4.1%
Total		Count	2221	213	228	898	3066	629	78	7333
		Expected Count	2221.0	213.0	228.0	898.0	3066.0	629.0	78.0	7333.0
		% within Self-reported memory rating	30.3%	2.9%	3.1%	12.2%	41.8%	8.6%	1.1%	100.0%
		% within Current job status	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 11 shows the chi square test results for the association between SRMR and job status, with x^2 *(24, N=7,333) = 318.067, p <.001,* which indicates a statistically significant relationship between these variables and a weak Cramer's V effect of ES=0.104 (See Table 12). These results reject the null hypothesis in favor of the alternative.

Table 11

Chi-Square Test of SRMR and Job Status for Women in the United States



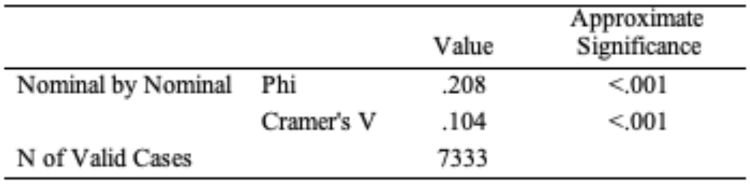
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	318.067[a]	24	<.001
Likelihood Ratio	307.135	24	<.001
Linear-by-Linear Association	153.753	1	<.001
N of Valid Cases	7333		

a. 2 cells (5.7%) have expected count less than 5. The minimum expected count is 3.17.

The strength of the association between SRMR and job status was measured by a Cramer's V because the chi-square contingency table is larger than a 2x2.

Table 12

Effect Size of SRMR and Job Status for Women in the United States



		Value	Approximate Significance
Nominal by Nominal	Phi	.208	<.001
	Cramer's V	.104	<.001
N of Valid Cases		7333	

2. Healthcare Accessibility

2.a. Affordability

The statistical analysis for this research question yielded the following results:

RQ2a: Is there a statistically significant relationship between self-reported memory rating and healthcare affordability among females in the United States?

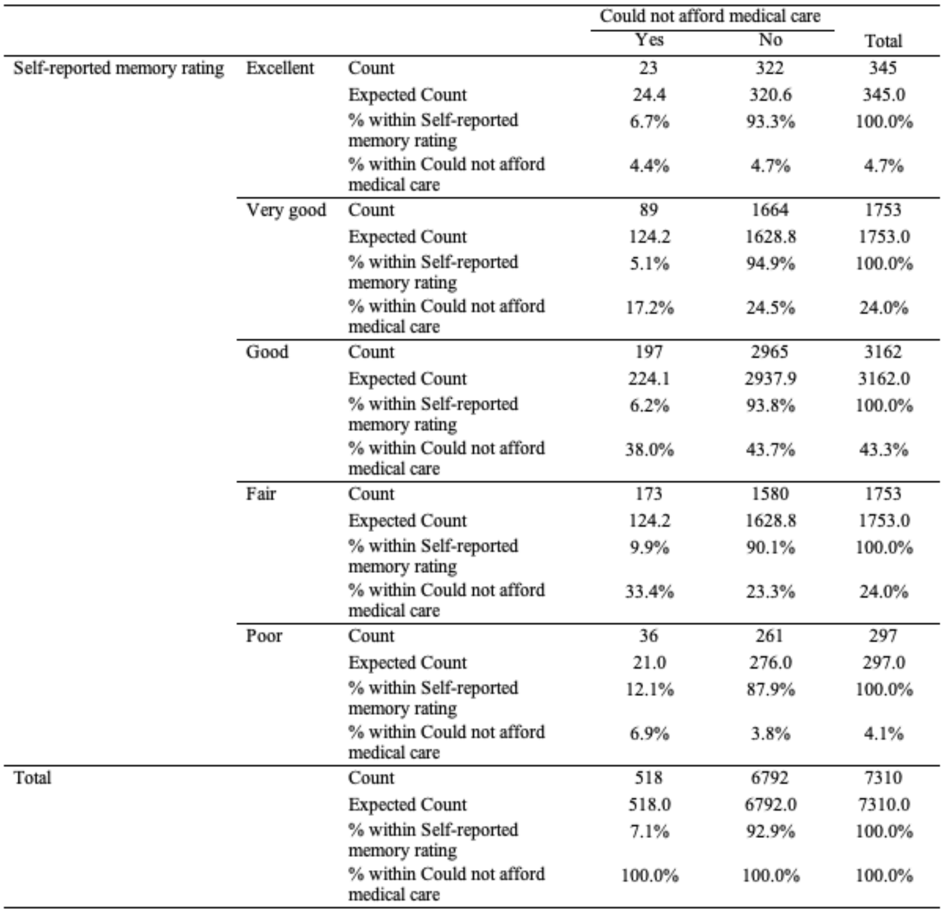
> H_o2a: No, there is no statistically significant relationship between self-reported memory rating and healthcare affordability among females in the United States.
>
> H_a2a: Yes, there is a statistically significant relationship between self-reported memory rating and healthcare affordability among females in the United States.

Given that SRMR and healthcare affordability are both categorical, nominal variables, a chi square test of independence is required to evaluate whether a statistically significant relationship exists between these two variables.

Using SPSS version 28 a crosstab analysis renders the required chi square test of independence. See Table 13. Note that the difference between the observed and expected cell values of the crosstab table points to a relationship between SRMR and healthcare affordability.

Table 13

Crosstabulation of SRMR and Healthcare Affordability for Women in the United States

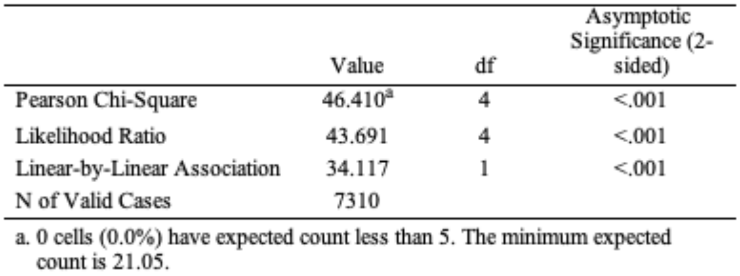


			Could not afford medical care		
			Yes	No	Total
Self-reported memory rating	Excellent	Count	23	322	345
		Expected Count	24.4	320.6	345.0
		% within Self-reported memory rating	6.7%	93.3%	100.0%
		% within Could not afford medical care	4.4%	4.7%	4.7%
	Very good	Count	89	1664	1753
		Expected Count	124.2	1628.8	1753.0
		% within Self-reported memory rating	5.1%	94.9%	100.0%
		% within Could not afford medical care	17.2%	24.5%	24.0%
	Good	Count	197	2965	3162
		Expected Count	224.1	2937.9	3162.0
		% within Self-reported memory rating	6.2%	93.8%	100.0%
		% within Could not afford medical care	38.0%	43.7%	43.3%
	Fair	Count	173	1580	1753
		Expected Count	124.2	1628.8	1753.0
		% within Self-reported memory rating	9.9%	90.1%	100.0%
		% within Could not afford medical care	33.4%	23.3%	24.0%
	Poor	Count	36	261	297
		Expected Count	21.0	276.0	297.0
		% within Self-reported memory rating	12.1%	87.9%	100.0%
		% within Could not afford medical care	6.9%	3.8%	4.1%
Total		Count	518	6792	7310
		Expected Count	518.0	6792.0	7310.0
		% within Self-reported memory rating	7.1%	92.9%	100.0%
		% within Could not afford medical care	100.0%	100.0%	100.0%

Table 14 shows the chi square test results for the association between SRMR and job status, with x^2 *(4, N=7,310) = 46.410, p <.001,* which indicates a statistically significant relationship between these variables and a weak Cramer's V effect of ES=0.080 (See Table 15). These results reject the null hypothesis in favor of the alternative.

Table 14

Chi-Square Test of SRMR and Healthcare Affordability for Women in the United States



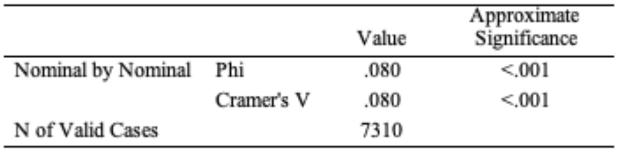
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	46.410[a]	4	<.001
Likelihood Ratio	43.691	4	<.001
Linear-by-Linear Association	34.117	1	<.001
N of Valid Cases	7310		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 21.05.

The strength of the association between SRMR and healthcare affordability was measured by a Cramer's V because the chi square table is larger than a 2x2 table.

Table 15

Effect Size of SRMR and Healthcare Affordability for Women in the United States



		Value	Approximate Significance
Nominal by Nominal	Phi	.080	<.001
	Cramer's V	.080	<.001
N of Valid Cases		7310	

2.b. Having a usual place of care:

The statistical analysis for this research question yielded the following results:

RQ2b: Is there a statistically significant relationship between self-reported memory rating and the ability to have a usual place of care among females in the United States?

> H_o2b: No, there is no statistically significant relationship between self-reported memory rating and the ability to have a usual place of care (location) among females in the United States.

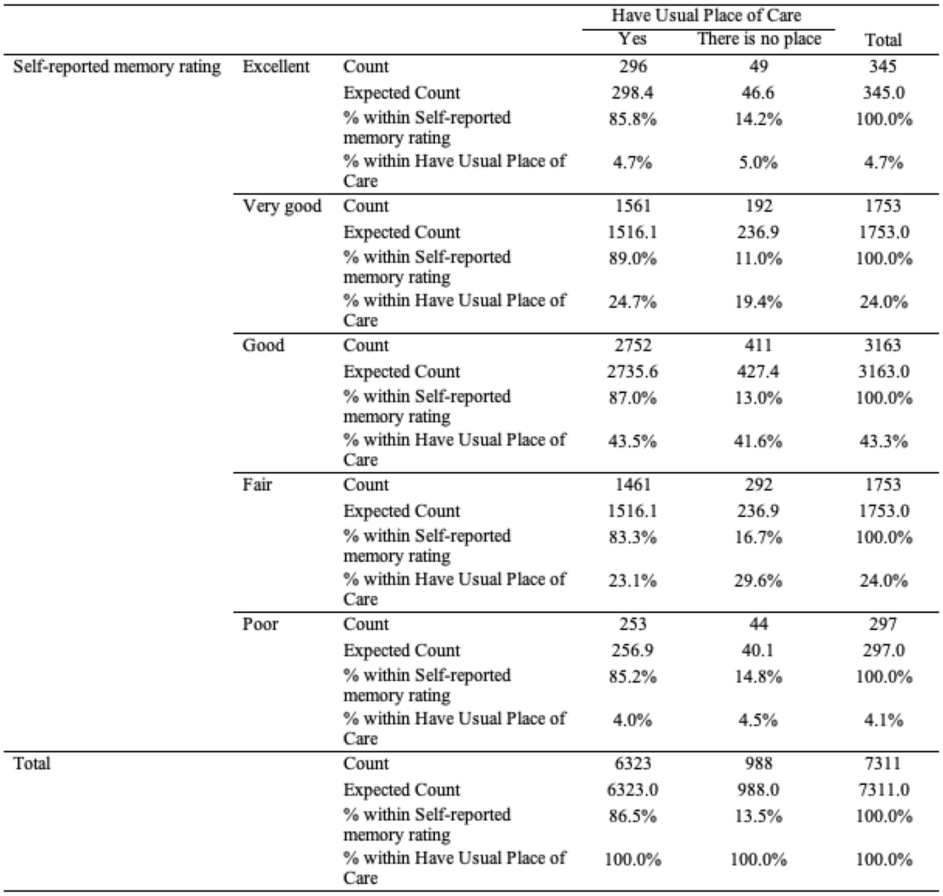
H_a2b: Yes, there is a statistically significant relationship between self-reported memory rating and the ability to have a usual place of care (location) among females in the United States.

Given that SRMR and having a usual place of care are both categorical, nominal variables, a chi square test of independence is required to evaluate whether a statistically significant relationship exists between these two variables.

Using SPSS version 28 a crosstab analysis renders the required chi square test of independence. See Table 16. Note that the difference between the observed and expected cell values of the crosstab table points to a relationship between SRMR and having a usual place of care.

Table 16

Crosstabulations of SRMR and Having a Usual Place of Care for Women in the United States

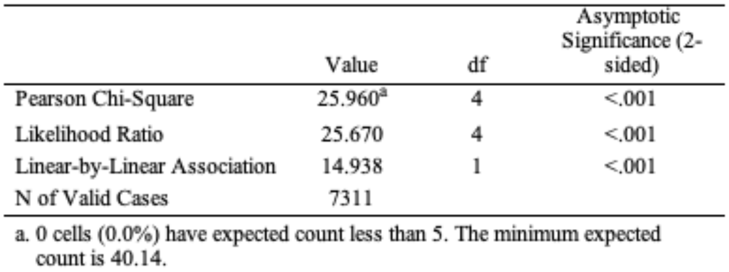


			Have Usual Place of Care		
			Yes	There is no place	Total
Self-reported memory rating	Excellent	Count	296	49	345
		Expected Count	298.4	46.6	345.0
		% within Self-reported memory rating	85.8%	14.2%	100.0%
		% within Have Usual Place of Care	4.7%	5.0%	4.7%
	Very good	Count	1561	192	1753
		Expected Count	1516.1	236.9	1753.0
		% within Self-reported memory rating	89.0%	11.0%	100.0%
		% within Have Usual Place of Care	24.7%	19.4%	24.0%
	Good	Count	2752	411	3163
		Expected Count	2735.6	427.4	3163.0
		% within Self-reported memory rating	87.0%	13.0%	100.0%
		% within Have Usual Place of Care	43.5%	41.6%	43.3%
	Fair	Count	1461	292	1753
		Expected Count	1516.1	236.9	1753.0
		% within Self-reported memory rating	83.3%	16.7%	100.0%
		% within Have Usual Place of Care	23.1%	29.6%	24.0%
	Poor	Count	253	44	297
		Expected Count	256.9	40.1	297.0
		% within Self-reported memory rating	85.2%	14.8%	100.0%
		% within Have Usual Place of Care	4.0%	4.5%	4.1%
Total		Count	6323	988	7311
		Expected Count	6323.0	988.0	7311.0
		% within Self-reported memory rating	86.5%	13.5%	100.0%
		% within Have Usual Place of Care	100.0%	100.0%	100.0%

Table 17 shows the chi square test results for the association between SRMR and job status, with x^2 *(4, N=7,311) = 25.960, p <.001,* which indicates a statistically significant relationship between these variables and a weak Cramer's V effect of ES=0.060 (See Table 18). These results reject the null hypothesis in favor of the alternative.

Table 17

Chi square test of SRMR and Having a Usual Place of Care for Women in the United States



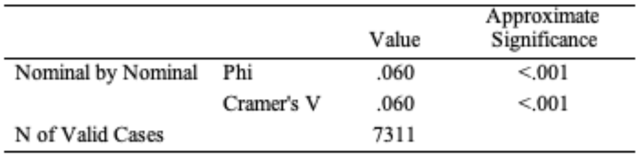
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	25.960[a]	4	<.001
Likelihood Ratio	25.670	4	<.001
Linear-by-Linear Association	14.938	1	<.001
N of Valid Cases	7311		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 40.14.

The strength of the association between SRMR and having a usual place of care was measured by a Cramer's V because the chi square table is larger than a 2x2 table.

Table 18

Effect Size of SRMR and Having a Usual Place of Care for Women in the United States



		Value	Approximate Significance
Nominal by Nominal	Phi	.060	<.001
	Cramer's V	.060	<.001
N of Valid Cases		7311	

2.c. Type of Place of Care

The statistical analysis for this research question yielded the following results:

RQ2c: Is there a statistically significant relationship between self-reported memory rating and the type of usual place of care among females in the United States?

*H*ₒ2c: No, there is no statistically significant relationship between self-reported memory rating and the type of usual place of care among females in the United

States.

H_a2c: Yes, there is a statistically significant relationship between self-reported memory rating and the type of usual place of care among females in the United States.

Given that SRMR and type of a usual place of care are both categorical, nominal variables, a chi square test of independence is required to evaluate whether a statistically significant relationship exists between these two variables.

Using SPSS version 28 a crosstab analysis renders the required chi square test of independence. See Table 19. Note that the difference between the observed and expected cell values of the crosstab table points to a relationship between SRMR and type of usual place of care.

Table 19

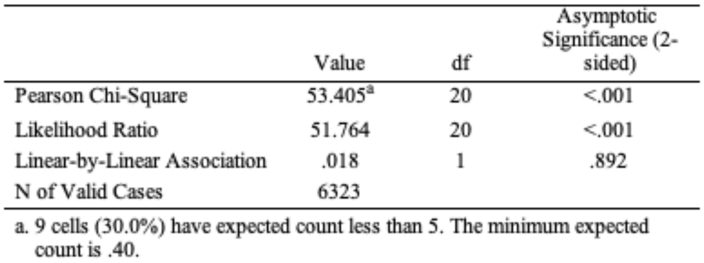
Crosstabulations of SRMR and Type of Usual Place of Care for Women in the United States

			Usual Type of place of Care						
			Clinic or health center	Doctor's Office/ HMO	Hospital ER	Hospital outpatient department	Some other place	Doesn't go to one place most often	Total
Self-reported memory rating	Excellent	Count	68	212	10	3	3	0	296
		Expected Count	63.0	218.4	7.7	1.5	4.9	.5	296.0
		% within Self-reported memory rating	23.0%	71.6%	3.4%	1.0%	1.0%	0.0%	100.0%
		% within Usual Type of place of Care	5.1%	4.5%	6.1%	9.1%	2.9%	0.0%	4.7%
	Very good	Count	310	1189	21	6	31	4	1561
		Expected Count	332.0	1151.9	40.5	8.1	25.9	2.5	1561.0
		% within Self-reported memory rating	19.9%	76.2%	1.3%	0.4%	2.0%	0.3%	100.0%
		% within Usual Type of place of Care	23.0%	25.5%	12.8%	18.2%	29.5%	40.0%	24.7%
	Good	Count	569	2066	62	11	41	3	2752
		Expected Count	585.4	2030.8	71.4	14.4	45.7	4.4	2752.0
		% within Self-reported memory rating	20.7%	75.1%	2.3%	0.4%	1.5%	0.1%	100.0%
		% within Usual Type of place of Care	42.3%	44.3%	37.8%	33.3%	39.0%	30.0%	43.5%
	Fair	Count	336	1023	62	9	28	3	1461
		Expected Count	310.8	1078.1	37.9	7.6	24.3	2.3	1461.0
		% within Self-reported memory rating	23.0%	70.0%	4.2%	0.6%	1.9%	0.2%	100.0%
		% within Usual Type of place of Care	25.0%	21.9%	37.8%	27.3%	26.7%	30.0%	23.1%
	Poor	Count	62	176	9	4	2	0	253
		Expected Count	53.8	186.7	6.6	1.3	4.2	.4	253.0
		% within Self-reported memory rating	24.5%	69.6%	3.6%	1.6%	0.8%	0.0%	100.0%
		% within Usual Type of place of Care	4.6%	3.8%	5.5%	12.1%	1.9%	0.0%	4.0%
Total		Count	1345	4666	164	33	105	10	6323
		Expected Count	1345.0	4666.0	164.0	33.0	105.0	10.0	6323.0
		% within Self-reported memory rating	21.3%	73.8%	2.6%	0.5%	1.7%	0.2%	100.0%
		% within Usual Type of place of Care	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 20 shows the chi square test results for the association between SRMR and type of usual place of care, with x^2 *(20, N=6,323) = 53.405, p <.001,* which indicates a statistically significant relationship between these variables and a weak Cramer's V effect of ES=0.046 (See Table 21). These results reject the null hypothesis in favor of the alternative.

Table 20

Chi-Square Test of SRMR and Type of Usual Place of Care for Women in the United States



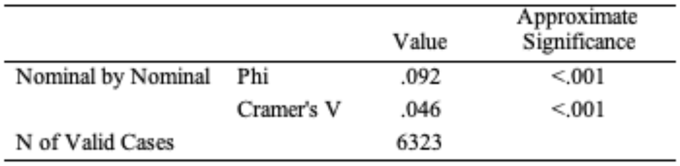
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	53.405[a]	20	<.001
Likelihood Ratio	51.764	20	<.001
Linear-by-Linear Association	.018	1	.892
N of Valid Cases	6323		

a. 9 cells (30.0%) have expected count less than 5. The minimum expected count is .40.

The strength of the association between SRMR and type of usual place of care was measured by a Cramer's V because the chi square table is larger than a 2x2 table.

Table 21

Effect Size of Type of Usual Place of Care for Women in the United States



		Value	Approximate Significance
Nominal by Nominal	Phi	.092	<.001
	Cramer's V	.046	<.001
N of Valid Cases		6323	

Education

The statistical analysis for this research question yielded the following results:

RQ3: Is there a statistically significant relationship between self-reported memory rating and education level among females in the United States?

H_o3: No, there is no statistically significant relationship between self-reported memory rating and education level among females in the United States.

*H*a3: Yes, there is a statistically significant relationship between self-reported memory rating and education level among females in the United States.

Given that SRMR and education are both categorical, nominal variables, a chi square test of independence is required to evaluate whether a statistically significant relationship exists between these two variables.

Using SPSS version 28 a crosstab analysis renders the required chi square test of independence. See Table 22. Note that the difference between the observed and expected cell values of the crosstab table points to a relationship between SRMR and education.

Table 22

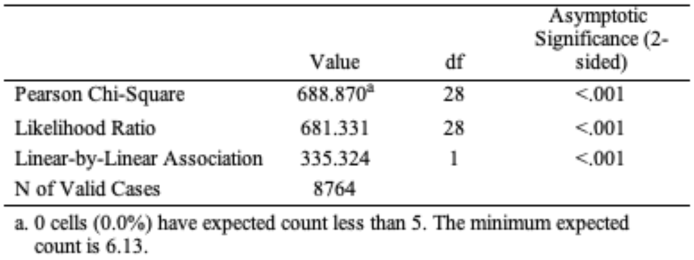
Crosstabulations of SRMR and Education for Women in the United States

			Heighest Degree of Education								
			Not degree	GED	High school diploma	Two year college degree	Four year college degree	Master's degree	Professional degree (PhD, MD, JD)	Degree unknown/ some college	Total
Self-reported memory rating	Excellent	Count	57	22	107	37	80	52	15	30	400
		Expected Count	58.6	20.4	169.2	30.9	59.4	33.4	6.6	21.6	400.0
		% within Self-reported memory rating	14.2%	5.5%	26.8%	9.3%	20.0%	13.0%	3.8%	7.5%	100.0%
		% within Heighest Degree of Education	4.4%	4.9%	2.9%	5.5%	6.1%	7.1%	10.4%	6.3%	4.6%
	Very good	Count	143	58	825	191	400	262	51	134	2064
		Expected Count	302.4	105.0	873.0	159.2	306.6	172.2	33.9	111.6	2064.0
		% within Self-reported memory rating	6.9%	2.8%	40.0%	9.3%	19.4%	12.7%	2.5%	6.5%	100.0%
		% within Heighest Degree of Education	11.1%	13.0%	22.3%	28.3%	30.7%	35.8%	35.4%	28.3%	23.6%
	Good	Count	431	197	1710	295	601	316	50	202	3802
		Expected Count	557.0	193.5	1608.2	293.3	564.8	317.1	62.5	205.6	3802.0
		% within Self-reported memory rating	11.3%	5.2%	45.0%	7.8%	15.8%	8.3%	1.3%	5.3%	100.0%
		% within Heighest Degree of Education	33.6%	44.2%	46.1%	43.6%	46.2%	43.2%	34.7%	42.6%	43.4%
	Fair	Count	536	136	921	139	186	90	23	94	2125
		Expected Count	311.3	108.1	898.8	163.9	315.7	177.2	34.9	114.9	2125.0
		% within Self-reported memory rating	25.2%	6.4%	43.3%	6.5%	8.8%	4.2%	1.1%	4.4%	100.0%
		% within Heighest Degree of Education	41.7%	30.5%	24.8%	20.6%	14.3%	12.3%	16.0%	19.8%	24.2%
	Poor	Count	117	33	144	14	35	11	5	14	373
		Expected Count	54.6	19.0	157.8	28.8	55.4	31.1	6.1	20.2	373.0
		% within Self-reported memory rating	31.4%	8.8%	38.6%	3.8%	9.4%	2.9%	1.3%	3.8%	100.0%
		% within Heighest Degree of Education	9.1%	7.4%	3.9%	2.1%	2.7%	1.5%	3.5%	3.0%	4.3%
Total		Count	1284	446	3707	676	1302	731	144	474	8764
		Expected Count	1284.0	446.0	3707.0	676.0	1302.0	731.0	144.0	474.0	8764.0
		% within Self-reported memory rating	14.7%	5.1%	42.3%	7.7%	14.9%	8.3%	1.6%	5.4%	100.0%
		% within Heighest Degree of Education	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 23 shows the chi square test results for the association between SRMR and education, with x^2 *(28, N=8,764) = 688.870, p <.001,* which indicates a statistically significant relationship between these variables and a weak Cramer's V effect of ES=0.140 (See Table 24). These results reject the null hypothesis in favor of the alternative.

Table 23

Chi-Square Test of SRMR and Education for Women in the United States



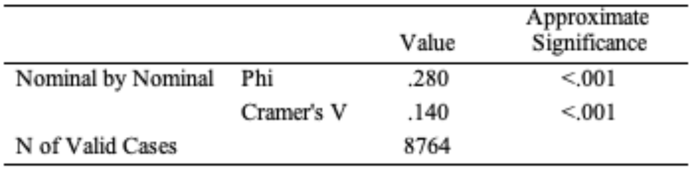
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	688.870[a]	28	<.001
Likelihood Ratio	681.331	28	<.001
Linear-by-Linear Association	335.324	1	<.001
N of Valid Cases	8764		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.13.

The strength of the association between SRMR and type of usual place of care was measured by a Cramer's V because the chi square table is larger than a 2x2 table.

Table 24

Effect Size of Type of Usual Place of Care for Women in the United States



		Value	Approximate Significance
Nominal by Nominal	Phi	.280	<.001
	Cramer's V	.140	<.001
N of Valid Cases		8764	

All predictors and SRMR

The statistical analysis for this research question yielded the following results:

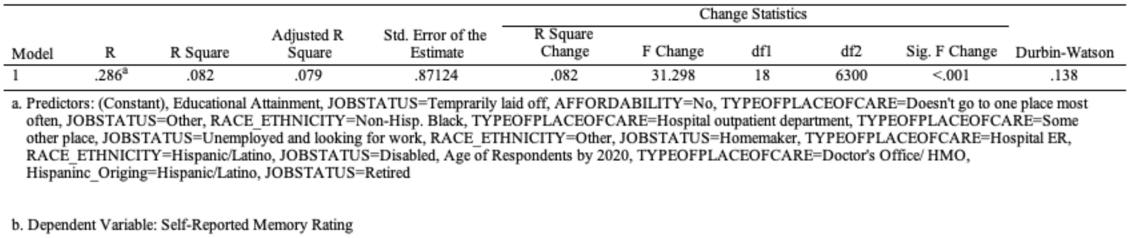
RQ4: Is there a statistically significant and predictable relationship between self-reported memory rating and contextual SDoH (job status, healthcare affordability, the ability to have a usual place of care, education level, race, and ethnicity) among women in the United States?

> H_o4: No, there is no statistically significant and predictable relationship between self-reported memory rating and contextual SDoH (job status, healthcare affordability, the ability to have a usual place of care, education level, race, and ethnicity) among women in the United States.
>
> H_a4: Yes, there is a statistically significant and predictable relationship between self-reported memory rating and contextual SDoH (job status, healthcare affordability, the ability to have a usual place of care, education level, race, and ethnicity) among women in the United States.

Table 25 presents the model summary of a MLR analysis performed to determine any possible relationship between all predictors and SRMR when controlling by age, race/ ethnicity, and Hispanic origin. This analysis showed that at least one statistically significant predictable relationship exist between SRMR and all predictors that behaves in a linear model equivalent to: Y = 2.97 + 0.26X, $F\ (1,\ 18) = 31.28,\ p < .001$ with an $r^2 = 0.082$ and an *adjusted* $r^2 = 0.079$ justifies 8.2% of the SRMR cases variance at a *95%CI* and an effect size $f^2 = R^2/(1-R^2) = 0.086 \sim 0.09$ which would render a statistical power $(1-\beta) \sim 99.99\%$ calculated post-hoc. These results reject the null hypothesis in favor of the alternative hypothesis.

Table 25

MLR Model Summary for All Predictors and SRMR for Women in the United States



					Change Statistics					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.286[a]	.082	.079	.87124	.082	31.298	18	6300	<.001	.138

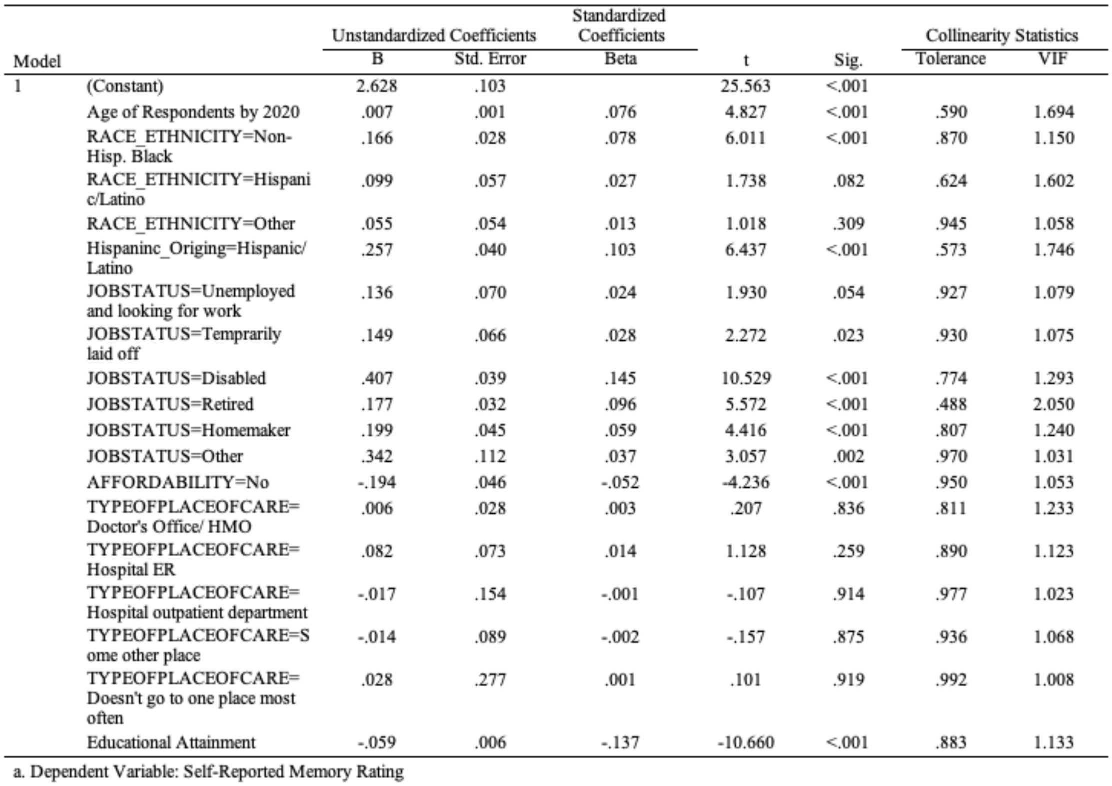
a. Predictors: (Constant), Educational Attainment, JOBSTATUS=Temprarily laid off, AFFORDABILITY=No, TYPEOFPLACEOFCARE=Doesn't go to one place most often, JOBSTATUS=Other, RACE_ETHNICITY=Non-Hisp. Black, TYPEOFPLACEOFCARE=Hospital outpatient department, TYPEOFPLACEOFCARE=Some other place, JOBSTATUS=Unemployed and looking for work, RACE_ETHNICITY=Other, JOBSTATUS=Homemaker, TYPEOFPLACEOFCARE=Hospital ER, RACE_ETHNICITY=Hispanic/Latino, JOBSTATUS=Disabled, Age of Respondents by 2020, TYPEOFPLACEOFCARE=Doctor's Office/ HMO, Hispaninc_Origing=Hispanic/Latino, JOBSTATUS=Retired

b. Dependent Variable: Self-Reported Memory Rating

Table 26 shows the SLR model coefficients for the predictors where: Y_{SRMS}= 2.628 + 0.007 (Age) + 0.166 (Non-Hispanic Black) + 0.257 (Hispanic/ Latino origin) + 0.136 (Unemployed and looking for a job) + 0.149 (Temporarily laid off) + 0.407 (Disabled) + 0.177 (Retired) + 0.199 (Homemaker) + 0.342 (Other job status) – 0.194 (Unable to Afford) – 0.059 (Educational attainment)

Table 26

MLR Coefficients of All Predictors and SRMR including Age, Race/ Ethnicity, and Hispanic/ Latino Origin for Women in the United States



Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.628	.103		25.563	<.001		
	Age of Respondents by 2020	.007	.001	.076	4.827	<.001	.590	1.694
	RACE_ETHNICITY=Non-Hisp. Black	.166	.028	.078	6.011	<.001	.870	1.150
	RACE_ETHNICITY=Hispanic/Latino	.099	.057	.027	1.738	.082	.624	1.602
	RACE_ETHNICITY=Other	.055	.054	.013	1.018	.309	.945	1.058
	Hispaninc_Origing=Hispanic/ Latino	.257	.040	.103	6.437	<.001	.573	1.746
	JOBSTATUS=Unemployed and looking for work	.136	.070	.024	1.930	.054	.927	1.079
	JOBSTATUS=Temprarily laid off	.149	.066	.028	2.272	.023	.930	1.075
	JOBSTATUS=Disabled	.407	.039	.145	10.529	<.001	.774	1.293
	JOBSTATUS=Retired	.177	.032	.096	5.572	<.001	.488	2.050
	JOBSTATUS=Homemaker	.199	.045	.059	4.416	<.001	.807	1.240
	JOBSTATUS=Other	.342	.112	.037	3.057	.002	.970	1.031
	AFFORDABILITY=No	-.194	.046	-.052	-4.236	<.001	.950	1.053
	TYPEOFPLACEOFCARE= Doctor's Office/ HMO	.006	.028	.003	.207	.836	.811	1.233
	TYPEOFPLACEOFCARE= Hospital ER	.082	.073	.014	1.128	.259	.890	1.123
	TYPEOFPLACEOFCARE= Hospital outpatient department	-.017	.154	-.001	-.107	.914	.977	1.023
	TYPEOFPLACEOFCARE=Some other place	-.014	.089	-.002	-.157	.875	.936	1.068
	TYPEOFPLACEOFCARE= Doesn't go to one place most often	.028	.277	.001	.101	.919	.992	1.008
	Educational Attainment	-.059	.006	-.137	-10.660	<.001	.883	1.133

a. Dependent Variable: Self-Reported Memory Rating

Summary

This quantitative study evaluated the relationships between job status, healthcare accessibility (affordability, having a usual place of care and type of place of care), and education, and SRMR (as a surrogate for dementia) among women in the United States. The statistical analysis provided the following results per research question:

RQ1: Is there a statistically significant relationship between self-reported memory rating and job status among females in the United States?

This analysis showed that there was a statistically significant relationship between SRMR and the variable Job status. These results reject the null hypothesis in favor of the alternative hypothesis.

RQ2a: Is there a statistically significant relationship between self-reported memory rating and healthcare affordability among females in the United States?

This analysis showed that at least one statistically significant relationship exists between SRMR and healthcare affordability. These results reject the null hypothesis in favor of the alternative hypothesis.

RQ2b: Is there a statistically significant relationship between self-reported memory rating and the ability to have a usual place of care among females in the United States?

This analysis showed that at least one statistically significant relationship exists between SRMR and having a usual place of care. These results reject the null hypothesis in favor of the alternative hypothesis.

RQ2c: Is there a statistically significant relationship between self-reported memory rating and the type of usual place of care among females in the United States?

This analysis showed that at least one statistically significant relationship exists between SRMR and type of usual place of care. These results reject the null hypothesis in favor of the alternative hypothesis.

RQ3: Is there a statistically significant relationship between self-reported memory rating and education level among females in the United States?

This analysis showed that at least one statistically significant relationship exists between SRMR and Education. These results reject the null hypothesis in favor of the alternative hypothesis.

RQ4: Is there a statistically significant and predictable relationship between self-reported memory rating and contextual SDoH (job status, healthcare affordability, the ability to have a usual place of care, education level, race, and ethnicity) among women in the United States?

This analysis showed that at least one statistically significant predictable relationship exists between SRMR and all predictors that behave in a linear model equivalent to: $Y = 2.97 + 0.26X$, $F\ (1, 18) = 31.28, p < .001$ with an $r^2 = 0.082$ and an *adjusted* $r^2 = 0.079$ accounts for 8.2% of the SRMR cases variance at a *95%CI* and an effect size $f^2 = R^2/(1-R^2) = 0.086 \sim 0.09$ which would render a statistical power $(1-\beta)$ $\sim 99.99\%$ calculated post-hoc. These results reject the null hypothesis in favor of the alternative hypothesis.

All the above-identified relationships will inform decision-makers in the development of public health policy focused on these predictors to reduce the risk of dementia among American women.

Chapter 5 will focus on Chapter 4, the interpretation of the findings, limitations of this study, recommendations for future research, and their implication for social change.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this quantitative study was to determine the relationships between occupation (job status), healthcare accessibility (affordability, having a usual place of care and type of place of care) and education and the development of dementia (measured as self-reported memory rating as a surrogate for dementia) among women in the United States. This study also aimed to bridge the existing literature gap by introducing job status and healthcare accessibility along with education as dementia predictors among women in the United States, predictors not considered before as SDoH potentially affecting women's mental health.

It was a cross-sectional, observational, correlational, non-experimental design that helped to determine the association of SRMR to education, occupation, and access to health care among American women. This analysis used a data set from the 2018 HRS from the University of Michigan supported by the NIA and the SSA (HRS, 2020). All the statistical analyses were performed using IBM SPSS v. 28 software.

SRMR was the outcome variable, and the age and education of the respondents were considered interval/ratio levels of measurement. The independent variables - job status, healthcare affordability, having a place of care, and type of place of care- were recoded as dummy variables for the analysis, which had, otherwise, no numeric value.

Interpretation of the Findings

This study revealed that at least a statistically significant and predictable relationship exists between SRMR and the SDoH (job status, affordability and access to healthcare, and education) among females in the United States after controlling for age, race, and ethnicity.

This study produced a statistically significant predictive model that first identified relationships between a dementia outcome (measured as self-reported memory rating) and specific determinants of health (job status, healthcare accessibility, and education) to predict a result. The ability of this statistical model to predict an outcome could also be modified to include different variables based on the dataset on a different region if this dataset provides that information. Based on that, other outcomes for different diseases may be predicted when introducing the sought variables to study them elsewhere. The potential of this model and its approach can be studied later in the research section.

The predictive statistical model that resulted from this study not only supports the knowledge that SDoH do influence health outcomes but also expands the knowledge in public health as new health conditions and outcomes could potentially be predicted using the corresponding data set pointing to the generalization of the model to predict conditions of public health concern.

The study supported what the literature indicated: work provides cognitive resilience that may slow down or reduce the risk of cognitive decline (poorer SRMR) among females. When referring to job status, there is a significant relationship between SRMR and age, affecting more non-Hispanic Black females and those of Hispanic/Latino origin (Hispanic descendants that may not culturally identify themselves as Hispanic) but not the Hispanic/Latino females. Some of these findings are consistent with the literature, which indicates that cognitive decline is more prevalent among non-Hispanic Black and Hispanic/Latino females. However, this study established a difference between the outcome of those of Hispanic origin and those who identify themselves as Hispanic. Further research would be needed to determine the causation of such different outcomes. Likewise, females who were temporarily laid off but looking for work, disabled, retired, and homemaker groups may be more affected by lower SRMR based on their job status. Further research may be needed to determine whether the type of job would contribute to cognitive decline among women.

Healthcare accessibility, specifically affordability, having a usual place of care, and the type of local place of care, had not been studied before as predictors of cognitive decline. Hence, there is some literature gap in this respect. When referring to affordability as part of healthcare accessibility, the model indicated that healthcare accessibility is associated with the SRMR outcome, identifying non-Hispanic Black and Hispanic/Latino origin females as the most vulnerable groups as they age. In other words, the inability to access healthcare affects the above-mentioned groups as they age. When referring to having a usual place of care as a predictor of cognitive decline among females, the model identified that the same groups (non-Hispanic Blacks and Hispanic/Latino origin females) might be the most vulnerable groups when they lack a usual place of healthcare. There is not much literature on this topic to confirm this statement. As for the type of place as a predictor of SRMR outcomes, the model indicated that there is a relationship between the SRMR outcome and the type of place of care, and such a relationship affects more aging non-Hispanic Black and both Hispanic/Latino and Hispanic/ Latino origin females. The only type of place of care that had a relationship to the SRMR was the Hospital Emergency department. This result may suggest that females in these groups tend to visit the hospitals' ER when in need of cognitive decline care. While the literature indicated that women and their health-related behaviors tend to be more compliant with doctor advice, this result may be consistent with other literature indicating that some groups may overlook their healthcare, leading to underdiagnosed/ undiagnosed conditions or looking for medical advice elsewhere within culturally accepted settings.

Further research is needed to determine the causation for each variable (affordability, having a usual place of care, and type of place of care) as well as other factors in these scenarios.

As for education attainment, the study indicated a relationship between the SRMR outcome and education. Such a predictive relationship has been previously reported in the literature. However, the model identified non-Hispanic Black and Hispanic/ Latino females as the groups at higher risk of having lower SRMR as they age. Further research is needed to determine the impact of furthering their education on their cognitive decline, as the literature indicates that greater educational attainment promotes cognitive resilience and is related to a lower risk of dementia due to cognitive reserve.

When analyzing all the predictors (job status, affordability, having a usual place of care, and type of place of care) and their relationship to SRMR, the model determined that there are significant relationships between SRMR and the predictors above. In that sense, the study determined that the groups at higher risk of having poor SRMR outcomes are females in the non-Hispanic Black, Hispanic/ Latino race, and Hispanic/ Latino origin groups. The analysis of job status yielded significant results for females on every job status as being at risk of having poor SRMR. Such relationships are especially relevant for the disabled, retired, and homemaker groups. Not being able to afford healthcare may later affect an onset of dementia. Such a relationship is significant, and therefore, healthcare affordability is a strong predictor of cognitive decline. However, the type of place of care did not contribute to the outcome when all the predictors were analyzed. Likewise, educational attainment is a strong predictor of cognitive decline outcome, as indicated in the literature, which was confirmed through this study.

The model produced by this study confirmed both theoretical frameworks used in its analysis. When analyzing the predictors -job status, healthcare accessibility, and education controlled by age, race/ ethnicity, and Hispanic/Latino origin- and the SRMR outcome, the SEM portrayed the many intertwined relationships affecting women's health at different levels. Furthermore, it evidenced the need to focus the public health work on each level to improve the SRMR outcome among females in the United States. As for Dr. Krieger’s eco-social theory of disease distribution, this study confirmed that social inequality has led to the same disease affecting different demographic groups, which, unfortunately, have been historically disadvantaged in the United States. SRMR is not an exception to this inequality, and each predictor has been identified as another pillar of such inequality: among women, lower access to education means lower access to maintaining a mentally challenging job that offers better benefits and provides access to good healthcare with preventative services to bridge the inequalities. This scenario affects more often certain groups, non-Hispanic Blacks and Hispanic females (by race/ethnicity and origin). The eco-social theory of disease distribution supported this study. It evidenced the greater need in public health to work harder on bridging the gaps socially and economically and provide better opportunities for society.

Limitations of the Study

This cross-sectional study used the 2018 HRS survey and related dataset from Michigan University with specific questions. However, the questions and available variables were not selected specifically for this dissertation. Frequently, the available data and related questions presented challenges regarding their format and measurement level. Another limitation was that the 2018 HRS survey was based on a self-reported survey (not on clinical diagnosis/ records) that may introduce responder bias that, while not manipulated in this dissertation, might alter the results. Self-reporting may hinder the accuracy of the responses as it may introduce responder bias in the analysis by exaggerating their cognitive performance. Furthermore, in the case of this study, self-reporting on a subjective perception of the individual's cognitive condition due to social acceptability and fear of aging may also contribute to altering the accuracy of this study. This responder bias also applied to those cases where the respondent was a proxy due to the inability of the senior citizen to participate in the survey. Their responses to the survey may have been biased, subjective, and inaccurate.

Recommendations

This model has the potential to determine relationships and predict various outcomes that could help in the analysis of other conditions of public health concern. The results may point to the unveiling of never-studied relationships among specific SDoH and their outcomes in the studied area. While it sounds promising, the need for adequate and reliable measured data must be stressed more.

This study found that SRMR is indeed associated with job status, healthcare accessibility, and education attainment, and such associations affect women in the United States, making cognitive decline a more prevalent condition among them. Since cognitive decline will continue to affect women in the years to come, these associations with job status, healthcare accessibility, and education attainment need to be further studied to determine causation as to why SRMR is affected by them individually. It is necessary to better understand how these SDoH contribute to a progressive cognitive decline to set in place mechanisms at the societal level to end it.

Likewise, further research is needed to better understand the protective effect that job status and educational attainment can provide against cognitive decline in women to slow down or even prevent dementia. It is also essential to further study if the type of job the individual performs may also have a protective effect on women's cognitive reserve to reduce their risk of cognitive decline. Other future research includes relationships between these SDoH and other comorbidities prevalent on the sample population as well as further study of the cultural barriers to healthcare accessibility based on the respondents' demographic and/or cultural background (language barriers, cultural stigma, and technological gap due to age). It would be interesting to determine how these culturally related barriers may play a role in the access to healthcare, and to address them as part of cognitive decline preventative actions.

Implications

Positive social change is a driving force in public health as we all, public health officials, aim to contribute our efforts and knowledge to improve societal concerns and modifiable factors that affect women's lives now and in the long run. This study would allow positive social change to happen at various levels of the SEM. Positive change will start at the individual level, where women will be able to take control of their health, contributing to their efforts to reduce their cognitive decline risk. Family dynamics will also be improved because more diligent healthcare will be established, prioritizing well-visits for every family member. Continued education at the family level may also be sought after to promote the reserve that would slow down cognitive decline. At the organizational level, positive social change will be reflected as local organizations such as schools and libraries will also support those SDoH as one of the essential pillars of the community. Positive social change will be reflected at the societal/policy level as public health policies raise awareness about the relationships between SRMR (cognitive decline) and job status, healthcare accessibility, and educational attainment. Also, healthcare preventive actions could be implemented to promote cognitive reserve among females.

While the existing literature indicates that education and educational attainment are SRMR predictors, introducing healthcare accessibility and job status as predictors of a very prevalent condition of cognitive decline among women raises awareness about the importance of furthering women's educational attainment and an instrument to obtain more mentally challenging jobs that allows access to better healthcare services.

This study provided significant information on the importance of access to healthcare, from being able to afford the care to being diligent about having a regular well-visit at a place of their choosing to identify early signs of cognitive decline. All this knowledge, along with gender-related health behaviors, could improve women's mental health, being proactive in their care and possibly reducing or slowing their cognitive decline. The acquisition and dissemination of this new knowledge could put women in control of their health, promoting positive social change through human development for this and future generations.

Conclusion

SDoH are the many indicators of how society grows and, indeed, tools to evaluate how society cares for our people. Health disparities are the accumulation of generational inequalities that translate into the way people deal with their daily lives; some thrive, some barely survive, and cognitive decline is no exception. Therefore, this study and the resulting model is a call for action to work harder to raise awareness about providing better conditions and opportunities for access to good education, good jobs, and good healthcare that will, in turn, bridge the gaps to improve women's health, so they do not just get by but enjoy life to the fullest instead. As public health scholars, we need to provide more evidence of equal opportunity benefits because society's health is the result of the individual's health.

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