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# Chronic Kidney Disease and Depressive Disorders Among Adult Non-Hispanic African Americans and Whites in Georgia

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Walden University
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Abstract

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MPH, Walden University, 2015

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Dissertation Submitted in Partial Fulfilment

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## Abstract

Chronic kidney disease (CKD), depressive disorders, and mental health are significant health issues in the United States. The purpose of this study was to examine the association of CKD and depressive disorders and days of poor mental health in adults living in Georgia, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status, marital status, and number of adults in the household. The study was a descriptive, quantitative, cross-sectional design with secondary data analysis, and the framework used was Wilson and Cleary health-related quality of life measures. The 2019 Behavioral Risk Factor Surveillance System Survey weighted sample comprised 6,831,850 White non-Hispanic and Black non-Hispanic respondents. Specifically, 64.4% ($n$ = 4,398,351) of respondents were White non-Hispanic, and 35.6% ($n$ = 2,433,499) were Black non-Hispanic. Most respondents (96%, $n$ = 6,557,146) did not have CKD, whereas 4% ($n$ = 275,304) had CKD. Two research questions were formulated for investigation. The hypotheses were tested with complex samples logistic regression. CKD was significantly associated with depression in White non-Hispanic and Black non-Hispanic participants. CKD was not significantly related to days of poor mental health among White non-Hispanic and Black non-Hispanic participants. The results of this study have potential implications for positive social change by improving patient–provider relationships when addressing CKD and mental health so that better treatment options are provided for patients and diagnosed patients experience a better quality of life.

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# Dedication

I want to dedicate this research to my husband, Lawani L. Rose; my children, Onesies and Odysseus Rose; my mother, Linda Gordon; and many sisters and other relatives. Thank you all for your patience and continuous motivation on days when I felt like giving up. The ongoing support and encouragement throughout this process kept me going knowing that there was a purpose for all the work. A special note of thanks goes to my committee member, Dr. Rohrer, and dissertation chair, Dr. Kumar, who continued to encourage and guide me throughout this process. They always challenged me to think big and pushed me out of my comfort zone.

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## Introduction

The co-occurrence of chronic kidney disease (CKD) and depressive disorders is an important public health and mental health issue in the United States. In 2019, 15% of adults, or 36 million individuals, were estimated to have CKD, ranked as the ninth leading cause of death (Centers for Disease Control and Prevention [CDC], 2019). Some researchers suggested that as many as one quarter of adults in the United States with CKD, more than 7 million individuals, may also be affected by depression (Walther et al., 2017). Studies have shown that people with chronic disease experience a high burden of mental illness and poor quality of life, contributing to the increased risk of depressive disorders (Ahlawat et al., 2018; Wen-Lin et al., 2019). Those diagnosed with CKD who are not on dialysis are three times more at risk for depression than the general population (Kustimah et al., 2019). This high rate is of concern because depression is connected with poor quality of life and prejudicial medical outcomes in CKD patients (Shirazian et al., 2017). However, this association has not been tested among specific racial or ethnic groups.

People belonging to a minority racial/ethnic group have a higher CKD prevalence than non-Hispanic White individuals. For instance, CKD is more common in non-Hispanic Blacks (16%) than non-Hispanic Whites (13%), according to Assari and Burgard (2015). The prevalence of CKD varies by state. For example, in Georgia, the age-adjusted death rate for CKD is 18.5, and CKD was ranked as the eighth leading cause

of death in the state in 2018. Black and Non-Hispanic Whites accounted for the disease's highest rates (CDC, n.d.).

Nonetheless, few researchers have examined the association of CKD and depressive disorders among adult non-Hispanic Blacks and Whites in Georgia. Assari (2014) contrasted the frequency of CKD, major depressive episodes (MDEs), and general anxiety disorder (GAD) among African Americans (i.e., Blacks). The researcher suggested that the main confounders associated with CKD, GAD, and MDE vary based on race. Given the high rates of these conditions, there should be further consideration of race/ethnicity to evaluate and treat mental health problems among Black patients with CKD. I examined the prevalence of depressive disorders, including major depression and persistent depressive disorder, among adult non-Hispanic Black and White patients diagnosed with CKD in Georgia.

The results of this study may lead to positive social change by providing health care workers with the knowledge to provide better patient care to non-Hispanic Black individuals with CKD. The findings may also inform a more targeted public health approach for CKD and depressive disorders. Targeted patient care can help reduce the public health burden of depression associated with CKD, help the target population recognize these issues as part of their treatment plans, and increase adherence to medication to help reduce end-stage renal disease (ESRD) rates in minority populations (Ahlawat et al., 2018). In addition, public health and mental health play significant roles in any chronic disease diagnosis. Therefore, public health professionals must collaborate

with mental health professionals to develop targeted interventions to yield better population health outcomes.

## Problem Statement

CKD is known to affect the diagnosed person's mental health. Depressive disorders, including major depression and persistent depression, are often undiagnosed in the non-Hispanic Black population (Shirazian et al., 2017). Shirazian et al. also acknowledged that individuals belonging to a minority racial/ethnic group, such as non-Hispanic Blacks, have a higher incidence of kidney disease than non-Hispanic Whites. Symptoms of depression are an increasingly recognized issue in those patients who had CKD before starting dialysis. Shirazian et al. found that over 26% of patients diagnosed with CKD had symptoms of depression. The prevalence was almost three times higher than populations receiving primary care for other chronic illnesses (Shirazian et al., 2016). Moreover, CKD patients with depressive symptoms were associated with reduced quality of life and adverse medical outcomes (Loosman et al., 2015; Shirazian et al., 2016).

Individuals who suffer from CKD are at risk for depressive disorders due to the many changes upon diagnosis. CDK in the United States is estimated to be more prevalent in non-Hispanic Blacks, 16%, than in non-Hispanic Whites, at 13% (National Institute of Diabetes and Digestive and Kidney Diseases [NIDDK], 2021). In Georgia, kidney disease was the eighth leading cause of death and ranked the sixth cause of death in the United States (CDC, n.d.). For adults who are diagnosed with CKD, depressive

disorders such as major depression and dysthymia are known to be extremely prevalent (Ahlawat et al., 2018).

Although many researchers have examined the associations among CKD before dialysis, depressive disorders, and quality of life (Loosman et al., 2015; Shirazian et al., 2016), very little is known about the prevalence of depressive disorder/symptoms in minority patients with CKD (Shirazian et al., 2016). The epidemiological data that Shirazian et al. (2017) analyzed regarding depression prevalence in non-Hispanic Blacks and Whites show that the CKD incident rate is highest among the minority population. Unfortunately, a search through databases to find recent literature that would help support and justify depressive disorders such as major depression and persistent depression related to CKD proved unfruitful, exposing a gap in the research. There is a need to explore the association between CKD and depressive disorders in adults living in Georgia, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, and high blood pressure status.

## Purpose of the Study

I examined the association of CKD and depressive disorders in adults living in Georgia, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status, marital status, and number of adults in the household and to examine the association between CKD and days of poor mental health, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status, marital status, and number of adults in the household. The independent variable was CKD. The dependent variables were depressive disorders and

days of poor mental health. Even though certain depressive disorders are the most common psychological issues among patients with CKD, they have been underdiagnosed, particularly among racial or ethnic minorities (Tuot et al., 2019). Similarly, many researchers have examined data that associate depression with early mortality among patients with CKD living in the United States. This study was unique in that I addressed an underresearched area of depressive disorders and days of poor mental health related to CKD diagnoses in non-Hispanic Blacks living in Georgia.

## Research Questions and Hypotheses

RQ1: Is there an association between CKD and major depressive disorders (MDDs), controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status marital status and number of adults in the household?

$H_0$1: There is no association between CKD and MDDs, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status, marital status, and number of adults in the household.

$H_1$1: There is an association between CKD and MDDs, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status marital status, and number of adults in the household.

RQ2: Is there an association between CKD and days of poor mental health, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status, marital status, and number of adults in the household?

$H_0$2: There is no association between CKD and days of poor mental health, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status, marital status, and number of adults in the household.

$H_1$2: There is an association between CKD and days of poor mental health, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status, marital status, and number of adults in the household.

## Theoretical Foundation for the Study

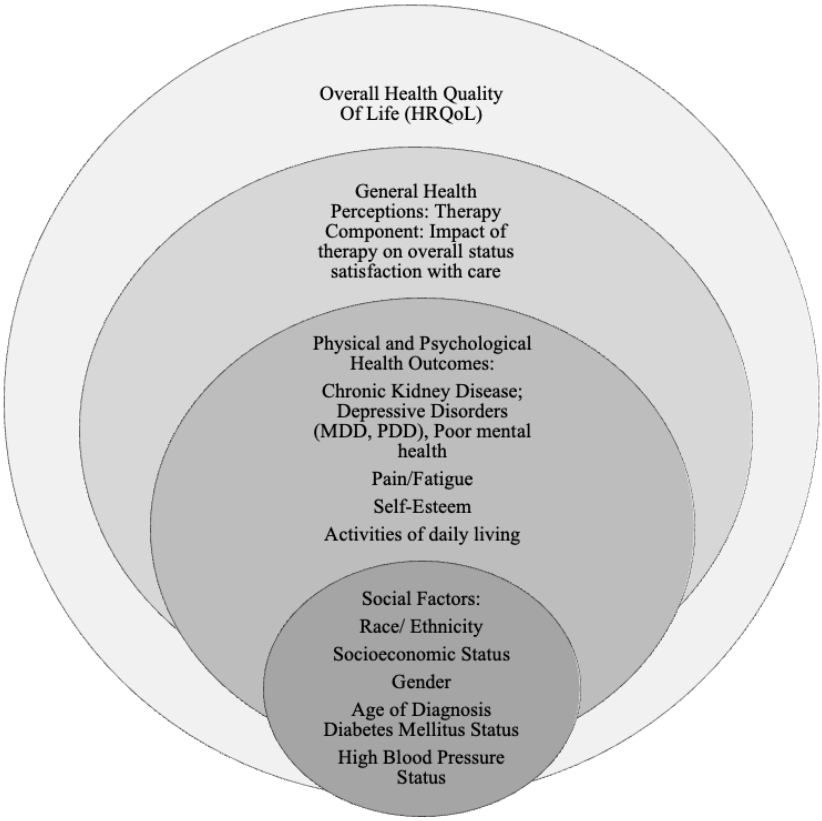
This study's theoretical framework was Wilson and Cleary's 1995 health-related quality of life (HRQoL) conceptual model (Ferrans et al., 2005). This model includes areas associated with mental, social, physical, and emotional health. Thus, the framework includes more than the typical measures associated with life expectancy, population health, and causes of death. Still, the model is focused on an individual's health status and its impact on their quality of life (Ferrans et al., 2005). Public health officials frequently use this model to develop data collection instruments (CDC, n.d.). For example, health care providers measure the effects of chronic illnesses such as cancer and diabetes renal diseases (Juczyński, 2006; Megari, 2013), which can also effectively address CKD treatment and short- and long-term disabilities. Researchers at the CDC (n.d.) use this theoretical framework to collect and analyze BRFSS data.

The HRQoL framework is a multidimensional concept (Megari, 2013) that can help understand depressive disorders among adult African Americans/Blacks with CKD.

The framework takes into consideration both physical and psychological health outcomes (Megari, 2013). The HRQoL's targeted screening approach will help health care providers better assess adult African Americans/Blacks diagnosed with CKD and living in Georgia. A provider can assess the following related to newly diagnosed CKD patients including: (a) individual's functional capabilities when they were diagnosed with CKD, (b) how the individual perceives their level of satisfaction with their life, and (c) illness symptoms (Juczyński, 2006). Understanding these critical assessment questions using the HRQoL framework will allow for better data collection and assessment on each patient related to CKD and depressive disorders, as demonstrated in Figure 1. The development of effective public health interventions will also be possible.

**Figure 1**

*HRQoL Framework Diagram*




## Nature of the Study

This study was a descriptive, quantitative, cross-sectional study using data from the 2019 Behavioral Risk Factor Surveillance System Survey (BRFSS). Two population groups were compared: adult non-Hispanic African Americans/Blacks and adult non-Hispanic Whites. Both groups had diagnoses of CKD, depressive disorders, and days of poor mental health in 2019. Additionally, I considered several variables including: (a) race/ethnicity, (b) socioeconomic status, (c) gender, (d) age, (e) diabetes mellitus status, (f) high blood pressure status, (g) marital status, and (h) number of adults in the

household. Finally, I used binary logistic regression and ordinal logistic regression analysis to test for an association between the variables and outcomes.

Data were obtained from the CDC's (2019) BRFSS. The BRFSS uses telephone surveys to collect data from residents in all 50 states regarding their health behaviors, preventive services, and chronic health conditions. The BRFSS also collects demographic data. For this study, I selected cases from Georgia using the data from the telephone surveys regarding participants demographic and health as they relate to the study.

## Literature Search Strategy

A literature search was conducted relating to CKD and depressive disorders. The key search terms and phrases were *kidney disease, chronic kidney disease, major depressive disorders, dysthymia, depressive disorders in African Americans, depression in chronic kidney disease patients, American Blacks, Health-Related Quality of Life theory, mental health, and prevalence of chronic kidney disease,* and *depressive disorders in Georgia*. The databases searched were CINAHL Plus, MEDLINE, ProQuest, PubMed Central, National Institutes of Health database, and CDC. The literature search was conducted from January 1, 2020, to July 31, 2020, with a 5-year inclusion period. Due to the limited data set, I used a peer review that referenced the last 10 years to determine if the sources were relevant.

## Literature Review

### Chronic Kidney Disease

CKD occurs when the kidneys become damaged and cannot filter the blood properly (Hsiao, 2018). The damage causes waste to build up in the body and attribute to

other health problems (NIDDK, 2021). The kidneys' main job is to filter the blood to make urine and keep the body operating properly, balancing hormones and controlling blood pressure. Continuous worsening of the kidneys results in kidney failure, rendering the patient to need dialysis or a kidney transplant to stay healthy (NIDDK, 2021). Diabetes and high blood pressure are the two leading causes of CKD in the United States. As diabetes and high blood pressure rates continue to increase, there is an expectation that adult CKD diagnosis rates will also increase (NIDDK, 2021).

The kidney damage should meet the criteria of the estimated glomerular filtration rate of more than 60 ml/min for 3 months and more and based on an abnormal urine analysis (Elshahat et al., 2020; Weckmann et al., 2018). CKD occurs in five worsening stages. According to Weckmann et al. (2018), 10% of adults are in Stages 3 through 5 in the United States. Because the kidneys' function decreases with age, CKD is more common among adults ages 65 and older (38%) than those under 65 (Ahlawat et al., 2018). The prevalence is higher (40–50%) in those over age 85.

The risk factors for CKD are also important to note. Crews et al. (2019) pointed out that there are many clinical, genetic, environmental, and sociodemographic risk factors for CKD. Diabetes and high blood pressure are the greatest risk factors for developing CKD (Elshahat et al., 2020; Weckmann et al., 2018). Worldwide, 1 in 11 adults with CKD has diabetes. More than 70% live in low- or middle-income countries where opportunities and resources are limited (Crews et al., 2019). Similarly, an estimated 90% of people worldwide who suffer from high blood pressure have CKD (Crews et al., 2019; Paini et al., 2019).

Other risk factors for CKD are obesity, heart disease, and a family history of CKD (Elshahat et al., 2020). There is a burden on the population that also places many at risk for CKD. Rich countries with large poor racial and ethnic minority groups carry a high burden of the disease (Crews et al., 2019; Paini et al., 2019). Several lifestyle behaviors are associated with CKD risk and outcomes in low socioeconomic status people (Crews et al., 2019). Conversely, low-income countries also have nutrition challenges, whether undernutrition or overnutrition, putting many at risk for CKD (Paini et al., 2019).

CKD prevalence among adults in the United States is a serious public health problem because of the burden of associated disability, poor health outcomes, high health care costs, and racial disparities. In the United States, 1 in every 7 adults (14%) is estimated to have CKD. However, fewer than 10% of adults with CKD reported having it (Burrows et al., 2018; CDC, 2020). CKD can become worse over time if not treated early (Burrows et al., 2018) and can progress to ESRD, where kidney failure occurs. When the kidneys fail, patients need dialysis or a kidney transplant to survive (CDC, 2020).

Murphy et al. (2016) provided information on CKD prevalence in the United States. They conducted a cross-sectional study of data from the National Health and Nutrition Examination Survey of adults who were 20 years or older with CKD (Stages 3–5) and an estimated glomerular filtration rate of less than or equal to 60. Results showed that the prevalence of stages 3–4 CKD stabilized from 2011–2012 after controlling for age, sex, race/ethnicity, and other chronic conditions such as diabetes mellitus.

CKD is a disease multiplier, as it often occurs with chronic comorbidities, increasing the risk of hospitalizations and emergency room (ER) visits (Vassalotti et al.,

2019). Due to hospitalizations and ER visits in 2016, the Medicare costs for CKD patients was more than $100 billion (National Kidney Foundation, 2020; Vassalotti et al., 2019). In addition, the incidence and prevalence continue to increase among ethnic minority groups (Hsiao, 2018). For example, CKD is estimated to be much more common in non-Hispanic Blacks at 18% compared to non-Hispanic Whites at 13% (CDC, 2020). In 2019, 15% of adults, 36 million people, in the United States were estimated to have CKD, ranked as the ninth leading cause of death (CDC, n.d.). Furthermore, some researchers suggested that as many as one quarter of adults in the United States, more than 7 million individuals, with CKD may be affected by depression (Walther et al., 2017).

The study findings suggest that the main confounders associated with CKD, GAD, and MDE vary based on race/ethnicity. Given the high rates of these conditions, there must be further consideration of race/ethnicity to evaluate and treat mental health problems among Black patients with CKD. In this study, I examined the prevalence of depressive disorders, including major depression and dysthymia, among adult non-Hispanic Black patients in Georgia diagnosed with CKD.

**Depressive Disorders and Prevalence**

One of the most common groups of psychiatric disorders is depressive disorders (i.e., depression). According to the National Institute of Mental Health, in 2015, an estimated 16.1 million U.S. adults aged 18 years or older had at least one major depressive episode within the prior year (Walther et al., 2017). When looking at these disorders, two of the most prevalent are MDD and persistent depressive disorder (PDD or

dysthymia; American Psychiatric Association [APA], 2016), which are identified as disruptive mood disorders.

MDD is one of the principal causes of mental health challenges, also known as *depression* (Kupferberg et al., 2016). MDD is characterized by a persistent feeling of sadness and the loss of interest in the things an individual once enjoyed (Kupferberg et al., 2016). An individual often describes their mood with MDD as sad, hopeless, discouraged, or depressed (APA, 2016; Driessen et al., 2019; Kupferberg et al., 2016). MDD affects how one thinks, feels, or behaves, which can eventually lead to physical and emotional problems (Driessen et al., 2019). In the United States, the lifetime prevalence rate of MDD is about 16%, the 12-month rate is about 7%, and the 1-month rate is about 6%. The prevalence among 18–29-year-olds is higher than among those who are 60 years or older (APA, 2016; Driessen et al., 2019).

While the incident rate is high among individuals in their 20s, late onset of MDD is not uncommon (Driessen et al., 2019). In individuals who may have a chronic illness or a medical condition that is disabling, such as diabetes, morbid obesity, or cardiovascular disease, the risk for MDD increases because of the chronic nature of the diseases (APA, 2016; Driessen et al., 2019). There is a reported prevalence between 20%–30% of the general population, where depression is common (Shirazian, 2019). However, few recent studies have been conducted to examine this association (Shirazian, 2019). According to Ahlawat et al. (2018), depressive disorders are among the most common psychiatric problems in patients diagnosed with CKD.

PDD or dysthymia is a chronic form of depression. PDD is a mood disorder characterized by losing interest in normal daily activities, feeling hopeless, having low self-esteem, lacking productivity, and possessing an overall feeling of inadequacy (APA, 2016). Dysthymia is defined as having two of the six defined persistent depressive symptoms that last 2 years (Adler et al., 2015; APA, 2016). MDD may precede PDD because some major depressive episodes may occur during PDD (APA, 2016). In the United States, PDD prevalence is about 0.5%, compared to chronic MDD, which is 1.5% (APA, 2016). In addition, other complications linked to PDD, chronic pain, and medical illness can reduce life quality (APA, 2016; Walther et al., 2017).

**Prevalence of Depressive Disorder and CKD Comorbidity**

The reported prevalence of depression in patients with CKD varies in the literature. Depression among CKD patients may contribute to mental, sociodemographic factors, gender, and employment status (Assefa et al., 2016; Shirazian et al., 2017). Assefa et al. (2016) found that up to 10% of patients with CKD have a depressive symptom, and 14.3% of those with a chronic physical disorder have at least one mental disorder. The magnitude of depression in CKD patients is high (Assefa et al., 2016). CKD patients who are not on dialysis also have rates of depression three times higher than those in the general population (Shirazian et al., 2017). CKD adversely affects patients' mental status, of which depression is recognized as substantial comorbidity (Assefa et al., 2016). Factors of perception also may contribute to the prevalence. Assefa et al. highlighted that mental factors, such as awareness of loss, were viewed as a strong forecaster of depression among CKD patients. Assefa et al. further discussed that

sociodemographic factors such as gender and age might be associated with depression in patients with CKD, as may also be the case with lower educational attainment. Depressive symptoms were more prevalent in women and those unemployed or had experienced loss (Assefa et al., 2016).

Similarly, CKD was found to be more prevalent in women compared to men (Hsiao, 2018). Shirazian et al. (2016) evaluated the many essential differences in the diagnosis, management, and epidemiology of depression among patients with non-dialysis-dependent CKD and ESRD. Shirazian et al. (2016) examined the statistical differences and similarities in diagnosis, management, and epidemiology of depression in patients with CKD. The researchers concluded that understanding these differences would help understand depression better in the two populations. Use of self-reports has caused the results to be less accurate in patients with ESRD than CKD (Shirazian et al., 2016). Although the prevalence of interview-based depression was approximately 20% in both groups, the risk factors for depression may vary (Shirazian et al., 2016).

Similarly, Kokoszka et al. (2016) studied the prevalence of anxiety and depressive disorders in Polish patients with CKD who were on dialysis. They used data from 107 patients who were undergoing dialysis, completed the Acceptance of Illness Scale and Beck Depression Inventory (BDI), and were diagnosed through the mini-international neuropsychiatric interview. The study's findings showed that depressive disorders such as depressive episodes and dysthymia were diagnosed in 84 patients (81%). There were statistically significant differences among the mean scores of those who completed the

BDI. Thus, the researchers concluded a very high prevalence rate of depressive disorders in the dialysis patients in the study (Kokoszka et al., 2016).

Yucens et al. (2019) explored the association between depression, anxiety, hope, and perceived social support in patients with CKD. They evaluated participants using five data collection tools matching baseline sociodemographic characteristics of Grade 65, 3, or 4 CKD patients and a healthy control group. Multiple linear regression analysis showed that hope was lower, but the depression scores were higher. Similarly, Ahlawat et al. (2018) assessed the prevalence of depression and CKD factors in patients in tertiary-care hospitals in India. The cross-sectional study involved the collection of data from 612 patients diagnosed with CKD from September 2014 to April 2016. The researchers found that approximately 44% of the patients who attended the clinic suffered from depression, and the rate of depression was higher among those below the age of 60.

**Race, CKD, and Depressive Disorders**

Assari (2014) studied African Americans in relation to CKD, MDE, and GAD. Assari analyzed Caribbean Black and African American data based on those who participated in the National Survey of American Life. Assari used the GAD and MDE measures of the World Mental Health Composite International Diagnostic Interview and examined the relationship between CKD and 1-year GAD and MDE symptoms. Race-specific logistic regressions were used. Although CKD was emphatically connected with GAD and MDE in a bivariate investigation, this affiliation did not hold in the multivariate examination, which controlled for socioeconomic factors and other medical conditions (Assari, 2014). Assari's (2014) findings suggest that the main confounders

between CKD, GAD, and MDE vary based on ethnicity. Ethnicity should be considered as necessary to evaluate and treat mental health problems among Black patients with CKD.

Assari and Burgard (2015) examined whether race controls the effect of depressive symptoms on mortality due to kidney disease. In this longitudinal study, the researchers compared effects on Blacks and Whites on baseline data of depressive symptoms on how they die from renal disease. The study's findings showed that the White-Black differences showed a significant interaction for Whites compared to Blacks.

**Socioeconomic Status, CKD, and Depressive Disorders**

Socioeconomic status is one of the most solid forecasters of morbidity and mortality. Some studies' findings highlighted a significant increase in disability and morbidity in those living under poor socioeconomic conditions, and the burden of disease in those groups continues to grow (Kivimäki et al., 2020). CKD and depressive disorders are no exceptions.

Unrecognized and untreated CKD and depressive disorders may be prevalent in lower socioeconomic status individuals in developed countries with low- and middle-income populations (Zeng et al., 2018). However, Zeng et al. (2018) also pointed out that the unrecognized and untreated illnesses in low socioeconomic status populations can stem from limited access to opportunities for physical activity, a healthy diet, or quality health care. Therefore, factors that contribute to the increase of CKD cases are multidimensional.

Zeng et al. (2018) examined the relationship between socioeconomic status and CKD's prevalence and progress in individuals. The researchers found that the size of the relationship's effect differs by one's geographic location, national income, and educational attainment. The study findings showed a high CKD prevalence in countries with high income. Conversely, there was a strong association with lower income and education level; therefore, disease progression was associated with lower income in the United States and Europe (Zeng et al., 2018). Rojas-García et al. (2015) also pointed out in a systematic review and meta-analysis that the incidence and effect of depressive disorders in developing countries are connected to a population's specific characteristics, including socioeconomic status.

Cross-sectional and longitudinal studies have recognized the effects of socioeconomic status on the health of a population. Assari's (2018) study compared African Americans' and Whites' household incomes and the risk for MDD for 12 months and 30 days utilizing the socioeconomic status indicators of employment, education, and income. Findings from the study found that MDD is lower in high socioeconomic status individuals than in low socioeconomic status individuals. In addition, socioeconomic status indicators (i.e., income and education) showed that depressive symptoms and MDD might be more prevalent for those who are White compared to non-Whites (Assari, 2018). According to Assari (2018), employment, education, and income greatly reduce morbidity and mortality in socially privileged populations than in socially disadvantaged populations.

Assefa et al. (2016) pointed out that the second most devastating and expensive sickness worldwide is depression, and it is the most prevalent illness in patients with CKD. Therefore, untreated depression can lead to a poor CKD prognosis. A cross-sectional study by Assefa et al. (2016) assessed the extent and influences of depression in CKD patients. Their findings showed that: (a) for people with CKD, depression is a prevalent mental health problem connected with increased morbidity and mortality; and (b) as age increases and educational level decreases, there is an increase in CKD patients with depression. In addition, some studies show that female CKD patients and CKD patient populations with high unemployment had a higher prevalence of depressive symptom comorbidity (Assefa et al., 2016).

## Definitions of Terms

*Chronic kidney disease (CKD)*: A chronic condition in which the kidneys become damaged and cannot filter the blood (Hsiao, 2018).

*Depressive disorders*: One of the most common categories of psychiatric disorders (i.e., depression, MDD, PDD, or dysthymia).

*Diabetes*: A chronic disease that affects how the body turns food into energy. There are three main types of diabetes including: (a) Type 1, (b) Type 2, and (c) gestational diabetes (diabetes while pregnant; CDC, n.d.).

*End-stage renal disease (ESRD)*: When the kidney fails or stops working; patients will need dialysis or a kidney transplant to survive (CDC, 2020).

*Estimated glomerular filtration rate*: The kidney damage criteria is more than 60 ml/min for more than 3 months and based on an abnormal urine analysis (Elshahat et al., 2020; Weckmann et al., 2018).

*High blood pressure*: Blood pressure that is higher than normal. Blood pressure changes throughout the day based on a person's activity. Having blood pressure that measures consistently above normal may be diagnosed as high blood pressure or hypertension (CDC, 2020).

*Major depressive disorder (MDD)*: One of the principal causes of mental health challenges (Kupferberg et al., 2016). MDD is defined as a persistent feeling of sadness and the loss of interest in the things an individual once enjoyed (Kupferberg et al., 2016).

*Persistent depressive disorder (PDD) or dysthymia*: A chronic form of depression. Dysthymia is a mood disorder characterized by losing interest in normal daily activities, feeling hopeless, having low self-esteem, experiencing a lack of productivity, and having an overall feeling of inadequacy (APA, 2016). Dysthymia is defined as having two of the six described persistent depressive symptoms that last two years (Adler et al., 2015; APA, 2016).

*Socioeconomic status*: A person's or group's social status or class. Components of socioeconomic status are the individual's or group's income, education, and employment (Assefa et al., 2016).

## Assumptions

There were some assumptions regarding the source of the dataset, and how the study's design was based on theory and hypotheses regarding CKD and depressive

disorders. First, there is a possibility that those diagnosed with CKD will also be diagnosed with depressive disorders. Second, the diagnosis of depressive disorders due to CKD diagnosis is prevalent in Blacks compared to Whites. Third, the dataset may have shown some association between CKD depressive disorders diagnoses and days of poor mental health. These assumptions were necessary for the study because the dataset may have included some biases during the analysis phase, causing the study to shift based on the research questions and hypotheses. My assumptions may have affected the analysis.

## Scope and Delimitations

This study was within the scope to address the association between depressive disorders and days of poor mental health for the independent variable CKD in adult African Americans/Blacks after controlling for controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status marital status, and number of adults in the household. Depression is a mental health issues that is common in patients diagnosed with CKD, with a high prevalence compared to the general population (Tuot et al., 2019). Therefore, it was necessary to look at datasets that aligned with this study's scope. The study was delimited to adults who lived in Georgia in 2019 and were non-Hispanic African Americans/Blacks or non-Hispanic Whites who had CKD, depressive disorder, and days of poor mental health according to the 2019 BRFSS data. Participants' race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status, marital status, and number of adults in the household were also considered in the study. A dataset was used to gather the participants' information based on the study's variables. Utilizing secondary data

analysis, data quality, collecting the data, and the available measurements provided some limitations if collected in the primary study.

## Significance of Social Change and Implications

The results of this quantitative study provide much-needed information about the prevalence of depressive disorders and days of poor mental health comorbid with CKD among Georgia's adults. Consequently, this research can help health care and mental health providers understand the significance of depressive disorders in patients diagnosed with CKD to provide better treatment options to lead to better health outcomes. This study may create positive social change because its findings could assist with decision-making for better care for CKD and those with mental health challenges such as depressive disorders in the non-Hispanic Black communities and designing a more tailored evidence-based public health approaches for those with these comorbidities. More tailored patient care can help reduce the public health burden of depression associated with CKD, help the target population recognize these issues as part of their treatment plans, and increase adherence to medication regimens. This will help reduce the public health burden of ESRD in minority populations. In addition, public health and mental health play a significant role in any chronic disease diagnosis. Therefore, public health professionals must collaborate with mental health professionals to develop more targeted public health interventions that allow for better population health outcomes.

## Conclusion

Even though CKD is known to affect the mental health of a person diagnosed with depressive disorders, including major depression and dysthymia, it continues to go

undiagnosed in the non-Hispanic Black population, according to Shirazian et al. (2017). CKD and depressive disorders are common in adults in the United States. In Section 1 of this proposal, findings were provided from studies as evidence that this issue exists and that CKD patients with depressive disorders are associated with having a reduced quality of life and very adverse outcomes medically (Loosman et al., 2015; Shirazian et al., 2016). The research literature shows the importance of understanding the prevalence of CKD, mental health and depressive disorders and how each can affect a population based on the risk factors. It is important to know that patients who suffer from CKD and who are not on dialysis have rates of depression much higher than the general population, especially those who belong to a historically marginalized racial/ethnic group.

Nonetheless, not much is known about the prevalence of depressive disorder/symptoms in historically marginalized with CKD (Shirazian et al., 2016). Few researchers have examined the association of depressive disorders, days of poor mental health, and CKD among adult non-Hispanic Blacks in Georgia. Further research is needed to obtain these findings. In Section 2, the research design, rationale, data used, and methodology are described in detail.

Section 2: Research Design and Data Collection

## Introduction

I examined the possible association of CKD and depressive disorders and the association of CKD and days of poor mental health in adults living in Georgia. The independent variable was CKD. The dependent variables were depressive disorders and days of poor mental health. Even though certain depressive disorders are understood to be the most common mental health issues (i.e., MDD and PDD) among patients with CKD, they have been underdiagnosed, particularly among racial and ethnic minorities, and they often go undertreated (Tuot et al., 2019). Section 2 includes (a) an overview of the proposed descriptive, quantitative, cross-sectional study design with analysis of data from the 2019 BRFSS; (b) the rationale for why this design was chosen; (c) the sampling method used to collect the data; (d) the instrument used to measure the data; (e) instrumentation and operationalization of constructs; (f) the data analysis plan; and (g) threats to validity and ethical procedure used.

## Research Design and Rationale

In this descriptive, quantitative, cross-sectional study design, I compared 2019 BRFSS data on adult non-Hispanic African Americans/Blacks and non-Hispanic Whites who have CKD and depressive disorder and days of poor mental health. Additionally, I compared many risk factors (race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status, marital status, and number of adults in the household). Only Georgia data were used.

# Methodology

## Population

The population focus for this study was adult non-Hispanic African Americans and non-Hispanic Whites in Georgia who participated in the 2019 BRFSS and who responded yes or no on the chronic health indicators of kidney disease, depressive disorders, and days of poor mental health. The required weighted population sample size was 1,188. The number of weighted cases meeting the study inclusion criteria were 6,832,450.

## Sampling and Sampling Procedure

BRFSS complex sampling is an important step in selecting data to use that views how accurately the model is predicting the dependent variable(s). This occurs by using the weighted population size instead of the unweighted, even though the valid number of individuals included in the analysis, 6,380, is actually representative of the 6,832,450 people. This allows for the ability to make more generalization of a significantly larger population than I am studying.

The 2019 BRFSS data were the data source for this study. Each year the BRFSS is supported and administered by the CDC's Population Health Surveillance Branch, under the Division of Population Health in the National Center for Chronic Disease Prevention and Health Promotion (CDC, 2021). The CDC's BRFSS involves the use of a telephone survey to collect data on adults' health-related behaviors, chronic health conditions, and preventive services including vaccinations (CDC, 2021).

The BRFSS's standardized questions are submitted in an automated system (based on phone numbers provided by the participating states) that uses the Telecordia database (used since 2019) of telephone numbers to create two groups. The groups are based on phone numbers of similarity, such as the area code, first three digits, and a randomized combination of the suffix numbers. Then, the system contacts the registered owners of said numbers to participate in the automated survey (CDC, 2021). If a state's legislator wishes to change the standardized questions or add specific questions relevant to their state or their specific regions/areas/groups case, those questions must be preapproved via cognitive and field testing before inclusion in the survey (CDC, 2021).

Many states have surveyed their noninstitutionalized adult populations via telephone surveys, better known as the BRFSS. Health-related risk behaviors, the household's use of preventive services and known chronic conditions are the statistical information compiled by the BRFSS survey. The core survey provides states with a basis for their statical data collection. However, flexibility within the survey allows states to concentrate on specific health concerns or a subset of the sample group(s). Additionally, in 2011 the BRFSS survey was modernized to include cellular participants in addition to the traditional landline-based contributors. When using the BRFSS data, the absence of a wide and varied sample group, along with complex sampling procedures, can create probability biases.

**Inclusion and Exclusion Criteria**

In any study, it is important to have inclusion and exclusion criteria. Table 1 lists the inclusion and exclusion criteria of this study.

**Table 1**

*Inclusion and Exclusion Response Criteria*

| Inclusion criteria | Exclusion criteria |
|---|---|
| Reside in Georgia | Answered "Not sure"/ "I don't know" |
| Adult ≥ 18 years of age | Refused to answer |
| African American, non-Hispanic | Skipped question |
| White, non-Hispanic | |
| Male or female | |
| Diagnosed with CKD | |
| Diagnosed with a depressive disorder (including major depression, dysthymia, or minor depression) | |
| Diagnosed with diabetes | |
| Diagnosed with high blood pressure | |
| Socioeconomic status | |
| Marital status | |
| Number of adults in the household | |
| Days of poor mental health | |

I used the land line and cell phone (LLCP) 2019 codebook report with the overall version data weighted with _LLCPWT for this study. Additionally, the complex sample analysis was used because the data set is core only for _LLCPWT for weighting; for stratification _STSTR was used and _PSU for the sampling units that are primary. This approach allowed for the creation of a complex sampling plan to prepare for data analysis of the weighted cases (CDC, 2021). The codebook includes those variables of the names, frequency of the values, and location for all reported areas for how the surveys were administered for the combined landline and the cell phone data set. In addition, the BRFSS uses a random digit-dialing technique for cell phones and landlines to decrease the chance of the data collected being skewed or biased (CDC, 2021).

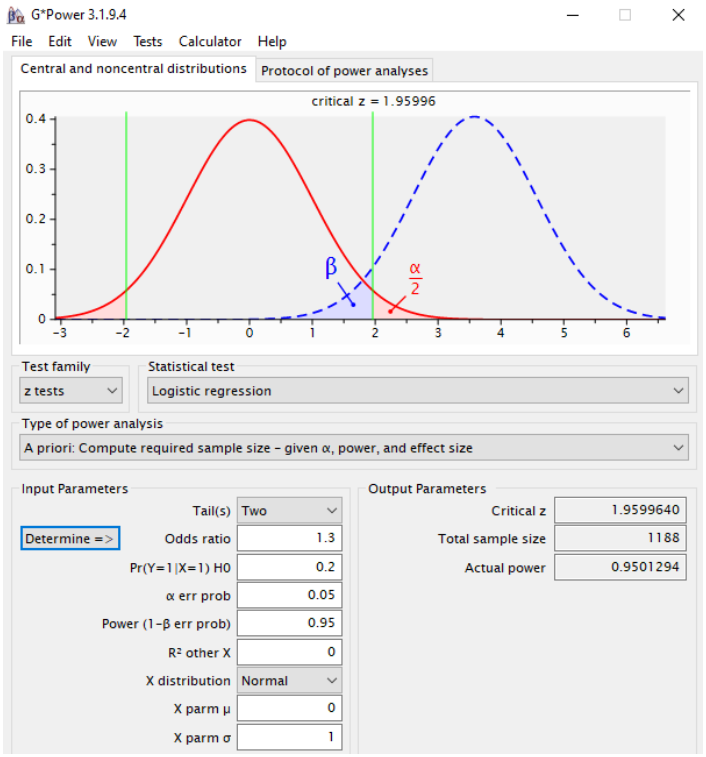
Additionally, I used the 2019 Selected Metropolitan/Micropolitan Area Risk Trends (SMART) document. SMART is a document that verifies the subset of the 2019 BRFSS that provides some local area estimates (CDC, 2021). The BRFSS data produce state-level estimates, and the SMART project provides estimates at the area level as defined by the United States census. The final data set used for analysis for study was weighted population size of 6,832,450.

**Research Design**

Research designs have one primary classification but may have several subclassifications. For instance, this study was quantitative rather than qualitative or mixed methods. Since a relationship was sought between two or more connected variables, the research design was also correlational. The research questions were answered with complex sample binary logistic regression. Regression is an advanced correlational statistical test (Whitfield et al., 2010). The alpha level in a study is the value at which the null hypothesis will be rejected under the assumption that the null hypothesis is true. The alpha level is the probability of making a Type I Error. In social sciences, the alpha level is $p < .05$ (Brace et al., 2013). An a priori power analysis was conducted with G*Power 3.1.9.4 (see Faul et al., 2007). For a two-tailed test, a default odds ratio of 1.3, an alpha level of $p < .05$, and a power level of .95, the required sample size was 1,188. The number of cases meeting the study inclusion criteria would be 7,354. Therefore, the archival data were more than adequate. See Figure 2. The power level increases with increasing sample size. This is illustrated in Figure 3.

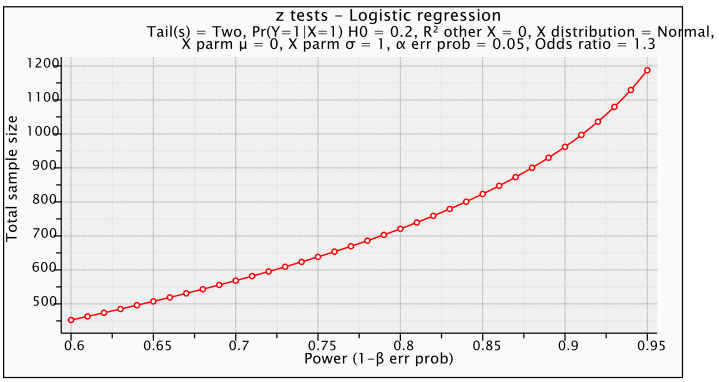
## Figure 2

*Sample Size Calculation*




## Figure 3

*Statistical Power and Sample Size*



**Instrumentation**

It was discovered in the early 1980s that individuals' health behaviors contribute significantly to the risks of the American adult population and exacerbate premature morbidity and mortality (CDC, 2021). Unfortunately, the National Center for Health Statistics was unable to conduct state-specific surveys due to the lack of participation by many state residents. As a result, funding to combat detrimental behaviors were frequently absent at the state level (CDC, 2021). However, with the greater availability of telephones in households during the 1980s, the advent of phone surveys became an effective tool for state legislators. This budget-friendly method became the most effective means of accumulating and calculating tangible data that states could use to target specific health-related programs (CDC, 2021).

The BRFSS was established by the CDC in 1984 to collect state-level data. A typical set of questions (such as those surrounding smoking, alcohol use, physical inactivity, diet, hypertension, and seat belt use) was implemented in 1988. The survey was expanded nationally in 1993. States have also since used the BRFSS to address emerging health issues, such as the 2009 H1N1 flu pandemic (CDC, 2021).

Now in its 37th year and counting, the BRFSS continues to expand its reach (now including all 50 states, the District of Columbia, and territories such as Puerto Rico and Guam) and to use accessible platforms (the Web-Enabled Analysis Tool known as WEAT), contemporary technologies (cell phones for those who no longer have landlines), and survey basis to help formulate the potential logistical requirement for vaccinations (CDC, 2021). The cultivation of the accumulated data is critical in reaching

marginalized populations, ethnicities, demographics, and educational, religious, and racial divides. In addition, public health is ever evolving, and the BRFSS aids in predicting and facing these changes (CDC, 2021).

## Research Questions and Hypothesis

The following research questions and hypotheses were used to guide this study:

RQ1: Is there an association between CKD and MDDs, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status marital status and number of adults in the household?

$H_0$1: There is no association between CKD and MDDs, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status, marital status, and number of adults in the household.

$H_1$1: There is an association between CKD and MDDs, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status marital status, and number of adults in the household.

RQ2: Is there an association between CKD and days of poor mental health, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status, marital status, and number of adults in the household?

$H_0$2: There is no association between CKD and days of poor mental health, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status, marital status, and number of adults in the household.

$H_1$2: There is an association between CKD and days of poor mental health, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status, marital status, and number of adults in the household.

## Operationalization of Constructs

### *Independent Variable*

The independent variable was CKD. The 2019 BRFSS database provides data on this variable.

### *Dependent Variables*

The dependent/outcome variables were depressive disorders and days of poor mental health. The 2019 BRFSS database provides data on these.

### *Covariate Variables*

The covariate variables were race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status marital status, and number of adults in the household. Since binary logistic regression and ordinal logistic regression tests were used, the age and income categories were recoded as dummy variables. I analyzed the weighted only data only on those who lived in Georgia. It was important to assess the covariates because the study outcome could be affected.

## Data Analysis Plan

RQ1/Hypothesis 1 was tested with complex samples binary logistic regression. This is the appropriate statistical test when trying to determine if a relationship exists between two or more variables when the outcome (dependent) variable is dichotomous

and weighted. The predictor (independent) variables can be on any scale of measurement (i.e., nominal, ordinal, interval, or ratio). CKD was on a nominal scale of measurement with two levels (yes/no). Race/ethnicity was on a nominal scale of measurement with six levels (White, non-Hispanic; Black, non-Hispanic, Asian, non-Hispanic, American Indian/Alaskan Native, non-Hispanic, Hispanic, and other race, non-Hispanic). Socioeconomic status was operationalized as household income. This variable was on an ordinal scale of measurement with eight income categories. Gender was operationalized as sex at birth. Gender was on a nominal scale of measurement with two levels (i.e., male, female) as it refers to sex at birth. Age was on an ordinal scale of measurement with six groups (18–24, 25–34, 35–44, 45–54, 55–64, 65 or older). Diabetes mellitus status was a nominal variable with two levels (i.e., yes, no). High blood pressure was a nominal variable with two levels (i.e., yes, no). Marital status was on a nominal scale of measurement with six categories (i.e., married, divorced, widowed, separated, never married, and member of an unmarried couple). Number of adults in the household was on a nominal scale of measurement collapsed into three categories (1, 2 or more, and missing) due to the distribution of the data. It should be noted that 5,072 cases were missing data for this variable. Therefore, the missing data were dummy coded for this variable.

RQ2/Hypothesis 2 was tested with complex sample logistic regression. This is the appropriate statistical test when trying to predict an outcome when the dependent or criterion variable is on an ordinal scale of measurement. The independent or predictor variable can be continuous, categorical, or ordinal. Days of poor mental health were be

on an ordinal scale of measurement with two levels (i.e., 0–13 days when mental health not good, and 14 or more days when mental health not good). The predictor variables were the same for this research question as in the first research question. See Table 2.

**Table 2**

*Research Questions, Variables of Interest, and Scales of Measurement*

| Research question | Required statistical test | Independent variable/ scale of measurement | Control variable/ scale of measurement | Dependent variable/scale of measurement |
|---|---|---|---|---|
| RQ1: Is there an association between CKD and MDD, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status marital status and number of adults in the household? | logistic regression | CKD/nominal | Race/ethnicity/ nominal<br>socioeconomic status/ordinal<br>gender/nominal<br>age/ordinal<br>diabetes status/nominal<br>high blood pressure status/nominal<br>marital status/nominal<br>number of adults in household/ordinal | MDD/nominal |
| RQ2: Is there an association between CKD and days of poor mental health, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status, marital status, and number of adults in the household? | logistic regression | CKD/nominal | Race/ethnicity/nominal<br>socioeconomic status/ordinal<br>gender/nominal<br>age/ordinal<br>diabetes status/nominal<br>high blood pressure status/nominal<br>marital status/nominal<br>number of adults in household/ordinal | Days of poor mental health/ordinal |

## Threats to Validity

It is important to consider threats to validity in any research study. Validity examines the extent to which the results measure what they are supposed to measure (Crosby et al., 2006). It is assessed by checking how well the results correspond to established theories and other measures of the same concept (Crosby et al., 2006).

### Internal Validity

According to Crosby et al. (2006), internal validity refers to how well the study was conducted based on the results attributed to the independent variable (cause and effect relationship) and not some other type of variables or factors. Some threats to internal validity for this study were the instrument used to collect the BRFSS data and if the participants' responses about their diagnoses were self-reported.

### External Validity

According to Crosby et al. (2006), external validity refers to how a study's findings can be generalized to settings, situations, and other measures. This affects whether the study findings can be applied to a broader context. If this is feasible, then the study has high external validity. Selection bias was a threat to external validity for this study. The BRFSS is not designed only for CKD and depressive disorders; it addresses multiple health behaviors and issues.

## Ethical Procedure

This study presented no risk to participants. An existing BRFSS data set was used. The BRFSS database provides free data to the public to use, and permission is not a requirement. The data and materials produced by any federal agencies are in the public

domain, and such data can be reproduced without permission (CDC, 2021). CDC officials ask that any published material derived from the BRFSS acknowledge the source. The data were treated with privacy and respect. The data were downloaded and saved on a flash drive once I received official approval to collect and review the data from Walden University's Institutional Review Board.

## Summary

The study was quantitative that involved the use of data from the CDC's (2019) BRFSS. The BRFSS telephone survey methodology involves collecting data on health-related events and behaviors from United States' residents. The target population was non-Hispanic African Americans and Whites over the age of 18. I analyzed specific variables utilizing the Statistical Package for the Social Sciences (SPSS). In addition, independent and dependent variables were analyzed using the complex sampling analysis. Power analysis was used to determine accurate sample size. Binary logistic regression statistical test determined if a relationship exists between two or more variables when the outcome (dependent) variable is dichotomous while controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status, marital status, and number of adults in the household. Secondly, ordinal logistic regression statistical test helped to predict an outcome when the dependent or criterion variable was on an ordinal scale of measurement controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status marital status, and number of adults in the household.

Section 3: Presentation of Results and Findings

## Introduction

The purpose of this study was to examine the association of CKD and depressive disorders in adults living in Georgia, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status, marital status, and number of adults in the household. The independent variable was CKD. The dependent variable was depressive disorders. The research questions and hypotheses were as follows:

RQ1: Is there an association between CKD and MDDs, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status marital status and number of adults in the household?

$H_0$1: There is no association between CKD and MDDs, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status, marital status, and number of adults in the household.

$H_1$1: There is an association between CKD and MDDs, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status marital status, and number of adults in the household.

RQ2: Is there an association between CKD and days of poor mental health, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status, marital status, and number of adults in the household?

$H_0$2: There is no association between CKD and days of poor mental health, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus

status, high blood pressure status, marital status, and number of adults in the household.

$H_2$2: There is an association between CKD and days of poor mental health, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status, marital status, and number of adults in the household.

Section 3 is organized by a discussion of the data collection of the secondary data set with sample demographics, results of research question/hypothesis testing, and a summary of the results. Data were analyzed with SPSS 23 for Windows. The following provides a discussion of the secondary data set with sample demographics.

## Data Collection of Secondary Data Set

The complex sample consisted of 6,380 unweighted but a weighted population size of over 6,832,450 million including White non-Hispanic and Black non-Hispanic respondents. Specifically, 64.4% ($n$ = 4,398,351) of respondents were White non-Hispanic, and 35.6% ($n$ = 2,433,499) were Black non-Hispanic. Most respondents (96%, $n$ = 6,557,146.28) did not have CKD, whereas 4% ($n$ = 275,304) had CKD. Most respondents (82.4%, $n$ = 106,440.087) did not have depression, whereas 17.6% ($n$ = 1,169,2595.757) had depression. A chi-square test of independence was conducted on the data to determine if there was an association between CKD and depression. A smaller percentage of the sample with CKD had depression (23.9%, $n$ = 68,061) than did not have CKD but had depression (17.6%, $n$ = 1,109). There was a disparity between the two groups relative to what would be expected due to chance. Respondents with CKD and

depression were slightly overrepresented and respondents with CKD and no depression were slightly underrepresented. This difference was not statistically significant, $X^2(1, N = 6{,}912{,}091) = 6.67$, $p = .042$. A complex samples crosstabulation of chronic kidney disease by depression is presented in Table 3.

**Table 3**

*Complex Samples Chronic Kidney Disease by Depressive Disorders*

| | | | Depressive disorders | | |
|---|---|---|---|---|---|
| | | | No | Yes | Total |
| Chronic kidney disease | No | Count | 5,458,125 | 1,169,256 | 6,627,381 |
| | | Expected count | 10,644 | 51,714 | 158,154 |
| | | % of total | 82.4% | 17.6% | 100% |
| | Yes | Count | 216,648 | 68,062 | 284,710 |
| | | Expected count | 24,525 | 9621 | 34,146 |
| | | % of total | 76.1% | 23.6% | 100% |
| Total | | Count | 5,674,773 | 1,237,318 | 6,912,091 |
| | | Expected count | 1,075,08 | 52,358 | 192,300 |
| | | % of total | 82.1% | 17.9% | 100% |

A chi-square test of independence was conducted on the data to determine if there was an association between CKD and days of poor mental health. There was no significant association between CKD and days of poor mental health, $X^2(1, N = 108{,}174) = .406$, $p = .674$. A crosstabulation of CKD by depression is presented in Table 4.

**Table 4**

*Complex Samples Chronic Kidney Disease by Days of Poor Mental Health*

| | | | Days of poor mental health during past 30 days | | |
|---|---|---|---|---|---|
| | | | 0-13 days | 14 or more days | Total |
| Chronic kidney disease | No | Count | 3,737,720.486 | 2,421,416.438 | 6,159,136.924 |
| | | Expected count | 91,659.209 | 50,820.971 | 107,495.92 |
| | | % of total | 58.2% | 37.6% | 95.7% |
| | Yes | Count | 171,867.355 | 45,231.627 | 274,126.606 |
| | | Expected count | 20,809.77 | 7,111.678 | 26,075.027 |
| | | % of total | 2.7% | 1.6% | 4.3% |
| Total | | Count | 3,909,587.842 | 989,310.25 | 6,433,263.53 |
| | | Expected count | 92,890.325 | 51,185.816 | 108,174.314 |
| | | % of total | 60.8% | 39.2% | 100% |

Most participants (58.2%, *n* = 3,737,720.486) did not have CKD and had 0-13 days of poor mental health, which was approximately the same as what would be expected due to chance (91,659.209). Conversely, 37.6% (*n* = 2,421,416.438) did not have CKD 14 days or more poor mental health during the last 30 days.

A chi-square test of independence was conducted on the data to determine if there was an association between race/ethnicity and CKD. A smaller percentage of the sample with CKD was Black non-Hispanic (1.7%, *n* = 107) than were White non-Hispanic (3.8%, *n* = 239). However, there was a disparity between the two groups relative to what would be expected due to chance. Black non-Hispanic respondents with CKD were slightly overrepresented and White non-Hispanics with CKD were slightly underrepresented. This difference was statistically significant, $X^2(1, N = 6{,}356) = 5.49$, $p = .019$. A crosstabulation of race/ethnicity by CKD is presented in Table 5.

**Table 5**

*Race/Ethnicity and Chronic Kidney Disease*

| | | | Chronic kidney disease | | |
|---|---|---|---|---|---|
| | | | No | Yes | Total |
| Race/Ethnicity | White non-Hispanic | Count | 4,297,356.333 | 175,286.427 | 4,472,642.76 |
| | | Expected count | 80,447.353 | 17,153.183 | 80,796.597 |
| | | % of total | 96.1% | 3.9% | 100% |
| | Black non-Hispanic | Count | 2,353,093.79 | 110,714.691 | 2,463,808.481 |
| | | Expected count | 93,390.744 | 20,076.218 | 95089.329 |
| | | % of total | 95.5% | 4.5% | 100% |
| Total | | Count | 6,650,450.124 | 286,001.118 | 6,936,451.241 |
| | | Expected count | 109,329.614 | 26,289.911 | 109,746.937 |
| | | % of total | 95.9% | 4.1% | 100% |

Most participants (96.1%, $n$ = 4,297,356.333) were White non-Hispanics who did not have CKD, whereas 95.5% ($n$ = 2,353,093.79) were Black non-Hispanics who did not have CKD. Eighteen percent of the sample ($n$ = 1,242,186.93) had depressive disorders, whereas 82.1% ($n$ = 5,683,275.736) did not. Black non-Hispanic respondents with depression comprised 11.8% ($n$ = 291,598.561) of the sample. This was less than what would be expected due to chance ($n$ = 30,793.024). White non-Hispanic participants with depression consisted of 21.3% ($n$ = 950,588.369) of the sample. This was more than what would be expected due to chance ($n$ = 43417.279). This difference was statistically significant, $X^2(1, N = 6925462.666) = 88.51$, $p < .001$. A crosstabulation of race/ethnicity by depressive disorders is presented in Table 6.

**Table 6**

*Race/Ethnicity by Depressive Disorders*

| | | | Depressive disorders | | |
|---|---|---|---|---|---|
| | | | No | Yes | Total |
| Race/Ethnicity | White non-Hispanic | Count | 3,511,884.965 | 950,588.369 | 4,462,473.334 |
| | | Expected count | 75435.852 | 43,417.279 | 80,708.739 |
| | | % of total | 78.7% | 21.3% | 100% |
| | Black non-Hispanic | Count | 2,171,390.771 | 291,598.561 | 2,462,989.332 |
| | | Expected count | 91,134.986 | 30,793.024 | 95,104.845 |
| | | % of total | 88.2% | 11.8% | 100% |
| Total | | Count | 5,683,275.736 | 1,242,186.930 | 6,925,462.666 |
| | | Expected count | 107,507.781 | 52,378.448 | 10,730.263 |
| | | % of total | 82.1% | 17.9% | 100% |

Black non-Hispanic respondents who did not have depression comprised 88.2% ($n$ = 2,171,390.771) of the sample. This was slightly more than what would be expected due to chance ($n$ = 91,134.986). White non-Hispanic participants who did not have depression comprised 78.7% ($n$ = 3,511,884.965) of the sample. This was less than what would be expected due to chance ($n$ = 75,435.852).

Regarding gender, there were more female (52.6%, $n$ = 3,657,159.814) than male (47.4%, $n$ = 3,294,653.836). Fifty-one percent of the sample ($n$ = 2,303,599.236) were White non-Hispanic females. This was less than what would be expected due to chance ($n$ = 62,843.230). Fifty-four percent ($n$ = 1,353,560.577) of the sample were Black non-Hispanic female. This was more than what would be expected due to chance ($n$ = 929.5). This difference was not statistically significant, $X^2(1, N = 6{,}380) = 6.559$, $p$ =.151. A crosstabulation of race/ethnicity by gender is presented in Table 7.

**Table 7**

*Race/Ethnicity by Gender*

| | | | Gender | | |
|---|---|---|---|---|---|
| | | | Male | Female | Total |
| Race/Ethnicity | White non-Hispanic | Count | 2,176,531.047 | 2,303,599.236 | 4,480,130.283 |
| | | Expected count | 64,420.315 | 62,843.23 | 80,772.759 |
| | | % of total | 48.6% | 51.4% | 100% |
| | Black non-Hispanic | Count | 1,118,122.789 | 1,353,560.577 | 2,471,683.366 |
| | | Expected count | 70,591.332 | 67,524.677 | 95,132.184 |
| | | % of total | 45.2% | 54.8% | 100% |
| Total | | Count | 3,294,653.836 | 36,57159.814 | 6,951,813.65 |
| | | Expected count | 91,421.246 | 86,579.266 | 109,682.614 |
| | | % of total | 47.4% | 52.6% | 100% |

Forty-nine percent of the sample ($n$ = 2,176,531.047) were White non-Hispanic male. This was more than what would be expected due to chance ($n$ = 64,420.315). Forty-five percent ($n$ = 1,118,122.789) of the sample were Black non-Hispanic male. This was less than what would be expected due to chance ($n$ = 70,591.332).

Approximately 14% ($n$ = 934,799.922) of the sample had diabetes, whereas 86.5% ($n$ = 6,002,758.852) did not. Twelve percent of the sample ($n$ = 548,404.761) were White non-Hispanic participants with diabetes. This was less than what would be expected due to chance ($n$ = 28,534.925) when compared to Black non-Hispanic participants, who comprised 15.7% ($n$ = 386,395.161), which was more than what would be expected due to chance ($n$ = 29,961.601). This difference was not statistically significant, $X^2(1, N = 6{,}937{,}558.774) = 14.548$, $p$ =.009. A crosstabulation of race/ethnicity by diabetes status is presented in Table 8.

**Table 8**

*Race/Ethnicity by Diabetes Status*

| | | | Diabetes | | |
|---|---|---|---|---|---|
| | | | Yes | No | Total |
| Race/Ethnicity | White non-Hispanic | Count | 548,404.761 | 3,923,725.034 | 4,472,129.795 |
| | | Expected count | 28,534.925 | 79,962.904 | 80,772.288 |
| | | % of total | 12.3% | 87.7% | 100% |
| | Black non-Hispanic | Count | 386,395.161 | 2,079,033.819 | 2,465,428.979 |
| | | Expected count | 29,961.601 | 91,580.054 | 94,992.696 |
| | | % of total | 15.7% | 84.3% | 100% |
| Total | | Count | 934,799.922 | 6,002,758.852 | 6,937,558.774 |
| | | Expected count | 40,420.931 | 110,326.988 | 109,628.903 |
| | | % of total | 13.5% | 86.5% | 100% |

Approximately 87.7% percent of the sample (*n* = 3,923,725.034) were White non-Hispanic participants who did not have diabetes. This was more than what would be expected due to chance (*n* = 79,962.904) when compared to Black non-Hispanic participants, who comprised 84.3% (*n* = 2,079,033.819), which was less than what would be expected due to chance (*n* = 91,580.054).

Thirty-eight percent (*n* = 2,613,662.438) of the sample had high blood pressure, whereas 62.3% (*n* = 4,310,303.128) did not. Approximately, 35.4% of the sample (*n* = 1,575,786.071) were White, non-Hispanic participants with high blood pressure. This was less than what would be expected due to chance (*n* = 46,756.257) when compared to Black, non-Hispanic participants, who comprised 42% (*n* = 1,037,876.367), which was more than what would be expected due to chance (*n* = 57,225.226). This difference was

statistically significant, $X^2(1, N = 6{,}923{,}965.566) = 27.607$, $p = .002$. A crosstabulation of race/ethnicity by high blood pressure is presented in Table 9.

**Table 9**

*Race/Ethnicity by High Blood Pressure*

| | | | High Blood Pressure | | |
|---|---|---|---|---|---|
| | | | No | Yes | Total |
| Race/Ethnicity | White, non-Hispanic | Count | 2,879,385.262 | 1,575,786.071 | 4,455,171.333 |
| | | Expected count | 75,420.742 | 46,756.257 | 80,294.588 |
| | | % of Total | 64.6% | 35.4% | 100% |
| | Black, non-Hispanic | Count | 1,430,917.866 | 1037,876.367 | 2,468,794.233 |
| | | Expected count | 79,086.750 | 57,225.226 | 95,107.451 |
| | | % of Total | 58% | 42% | 100% |
| Total | | Count | 4,310,303.128 | 2,613,662.438 | 2,613,662.438 |
| | | Expected count | 102,997.577 | 70,254.079 | 70,254.079 |
| | | % of Total | 62.3% | 37.7% | 37.7% |

Sixty-five percent of the sample ($n$ = 2,879,385.262) were White, non-Hispanic participants who did not have high blood pressure. This was more than what would be expected due to chance ($n$ = 75,420.742) when compared to Black, non-Hispanic participants, who comprised 58% ($n$ = 1,430,917.866), which was less than what would be expected due to chance ($n$ = 79,086.750).

Nearly 49% ($n$ = 249,959.504) of the sample were Black, non-Hispanic participants who had incomes of less than $15,000, which was less than what would be expected due to chance ($n$ = 26,009.539) when compared to White, non-Hispanic participants, who comprised 51% ($n$ = 260,511.506) of the sample, which was more than what would be expected due to chance ($n$ = 19,461.851). There was a significant

difference, $X^2(5, N = 4{,}480{,}130.283) = 134.93$, $p < .001$. Income by race/ethnicity is presented in Table 10.

**Table 10**

*Annual Household Income from All Sources by Race/Ethnicity*

| | | | Race/Ethnicity | | |
|---|---|---|---|---|---|
| | | | White, non-Hispanic | Black, non-Hispanic | Total |
| Income | Less than $15,000 | Count | 260,511.506 | 249,959.504 | 510,471.01 |
| | | Expected count | 19,461.851 | 26,009.539 | 32,162.293 |
| | | % of Total | 51% | 49% | 100% |
| | $15,000 to less than $25,000 | Count | 540,440.55 | 403,094.906 | 943,535.456 |
| | | Expected count | 30,974.139 | 37,837.088 | 48,163.779 |
| | | % of Total | 57.3% | 42.7% | 100% |
| | $25,000 to less than $35,000 | Count | 289,948.174 | 243,234.973 | 533,183.147 |
| | | Expected count | 20,886.446 | 28,088.351 | 34,682.597 |
| | | % of Total | 54.4% | 45.6% | 100% |
| | $35,000 to less than $50,000 | Count | 460,163.331 | 22,1348.136 | 68,1511.467 |
| | | Expected count | 33,909.039 | 24,982.961 | 41,734.269 |
| | | % of Total | 67.5% | 32.5% | 100% |
| | $50,000 or more | Count | 2,037,055.786 | 822,757.078 | 2,859,812.864 |
| | | Expected count | 64,846.648 | 65,281.733 | 89,055.128 |
| | | % of Total | 71.2% | 28.8% | 100% |
| | Don’t know/Not sure/Missing | Count | 892,010.937 | 531,288.770 | 1,423,299.706 |
| | | Expected count | 41,133.425 | 45,275.124 | 59,908.273 |
| | | % of Total | 62.7% | 37.3% | 100% |
| Total | | Count | 4,480,130.283 | 2,471,683.366 | 6,951,813.65 |
| | | Expected count | 80,772.759 | 95,132.184 | 109,682.614 |
| | | % of Total | 64.4% | 35.6% | 100% |

Twenty-nine percent ($n$ = 822,757.078) of the sample were Black, non-Hispanic participants who had incomes of less than $50,000 or more, which was less than what

would be expected due to chance ($n$ = 65,281.733) when compared to White, non-Hispanic participants, who comprised 71.2% ($n$ = 2,037,055.786) of the sample, which was more than what would be expected due to chance ($n$ = 64,846.648).

Regarding participant age, 40.5% ($n$ = 332,306.112) of the sample were Black, non-Hispanic participants who were 18–24, which was about what would be expected due to chance ($n$ = 43,307.589) when compared to White, non-Hispanic participants, who comprised 59.5% ($n$ = 487,880.708) of the sample, which was about what would be expected due to chance ($n$ = 37,932.627). However, there was a significant difference amongst the seven categories of age group relative to race/ethnicity, $X^2(5, N = 6{,}951{,}813.65) = 90.67$, $p < .001$. Age group by race/ethnicity is presented in Table 11.

**Table 11**

*Age Group by Race/Ethnicity*

| | | | Race/Ethnicity | | |
|---|---|---|---|---|---|
| | | | White, non-Hispanic | Black, non-Hispanic | Total |
| Age Group | Age 18 to 24 | Count | 487,880.708 | 332,306.112 | 820,186.82 |
| | | Expected count | 37,932.627 | 43,307.589 | 57,049.769 |
| | | % of Total | 59.5% | 40.5% | 100% |
| | Age 25 to 34 | Count | 653,887.456 | 410,441.619 | 1,064,329.074 |
| | | Expected count | 43,417.267 | 45,653.734 | 62,243.198 |
| | | % of Total | 61.4% | 38.6% | 100% |
| | Age 35 to 44 | Count | 645,946.687 | 457,958.351 | 1,103,905.037 |
| | | Expected count | 39,074.996 | 45,021.47 | 58,804.413 |
| | | % of Total | 58.5% | 41.5% | 100% |
| | Age 45 to 54 | Count | 773,228.308 | 463,505.407 | 1,236,733.715 |
| | | Expected count | 42,920.227 | 40,405.879 | 57,920.558 |
| | | % of Total | 62.5% | 37.5% | 100% |
| | Age 55 to 64 | Count | 807,780.576 | 427,980.288 | 1,235,760.864 |
| | | Expected count | 34,795.436 | 39,134.910 | 51,232.859 |
| | | % of Total | 65.4% | 34.6% | 100% |
| | Age 65 or older | Count | 1,111,406.549 | 379,491.590 | 1,490,898.139 |
| | | Expected count | 34,513.554 | 26,828.035 | 41,970.321 |
| | | % of Total | 74.5% | 25.5% | 100% |
| Total | | Count | 4,480,130.283 | 2,471,683.366 | 6,951,813.65 |
| | | Expected count | 80,772.759 | 95,132.184 | 109,682.614 |
| | | % of Total | 64.4% | 35.6% | 100% |

Twenty-six percent (*n* = 379,491.59) of the sample were Black, non-Hispanic participants who were 65 or older, which was less than what would be expected due to chance (*n* = 26,828.035) when compared to White, non-Hispanic participants, who comprised 74.5% (*n* = 1,111,406.549) of the sample, which was more than what would be expected due to chance (*n* = 34,513.554).

Regarding marital status, 24.2% (*n* = 827,515.249) of the sample were Black, non-Hispanic participants who were married, which was less than what would be expected due to chance (*n* = 60,389.259) when compared to White, non-Hispanic participants, who comprised 75.8% (*n* = 2,596,718.027) of the sample, which was more than what would be expected due to chance (*n* = 68,763.633). Conversely, 54% (*n* = 942,174.128) of the sample were Black, non-Hispanic participants who were never married, which was more than what would be expected due to chance (*n* = 63,250.899) when compared to White, non-Hispanic participants, who comprised 46% (*n* = 802,300.66) of the sample, which was less than what would be expected due to chance (*n* = 44,664.691); 59.2% (*n* = 99,909.469) of the sample were Black, non-Hispanic participants who were separated which was more than what would be expected due to chance (*n* = 20,126.06) when compared to White, non-Hispanic participants, who comprised 40.8% (*n* = 68,718.520) of the sample, which was less than what would be expected due to chance (*n* = 10,175.869). There was a significant difference, $X^2(5, N = 690,2810.618) = 481.38$, $p < .001$. Marital status by race/ethnicity is presented in Table 12.

**Table 12**

*Marital Status by Race/Ethnicity*

| | | | Race/Ethnicity | | |
|---|---|---|---|---|---|
| | | | White, non-Hispanic | Black, non-Hispanic | Total |
| Marital status | Married | Count | 2,596,718.027 | 82,7515.249 | 342,423.276 |
| | | Expected count | 68,763.633 | 60,389.259 | 87,494.281 |
| | | % of Total | 75.8% | 24.2% | 100% |
| | Divorced | Count | 456,759.534 | 355,792.615 | 812,552.149 |
| | | Expected count | 25313.626 | 33,719.28 | 41,523.517 |
| | | % of Total | 56.2% | 43.8% | 100% |
| | Widowed | Count | 350,357.347 | 160,064.9 | 938 |
| | | Expected count | 19,272.253 | 16,588.229 | 938 |
| | | % of Total | 68.6% | 31.4% | 14.8% |
| | Separated | Count | 6,8718.52 | 99,909.469 | 510,422.247 |
| | | Expected count | 10,175.869 | 20,126.06 | 25,079.906 |
| | | % of Total | 40.8% | 59.2% | 100% |
| | Never married | Count | 802,300.66 | 942,174.128 | 1,744,474.788 |
| | | Expected count | 44,664.691 | 63,250.899 | 75,694.627 |
| | | % of Total | 46.0% | 54% | 100% |
| | A member of an unmarried couple | Count | 170,489.9 | 72,010.268 | 242,500.168 |
| | | Expected count | 22,907.48 | 16,119.05 | 27,945.026 |
| | | % of Total | 70.3% | 29.7% | 100% |
| Total | | Count | 4,445,343.988 | 2,457,466.63 | 6,902,810.618 |
| | | Expected count | 80,724.406 | 95,055.465 | 109,798.699 |
| | | % of Total | 64.4% | 35.6% | 100% |

Regarding the number of adults in the household, 40% of the sample (*n* = 158,442.167) were Black, non-Hispanic participants with one adult in the household. This was more than what would be expected due to chance (*n* = 12,527.796) when compared to White, non-Hispanic participants, who comprised 59.7% (*n* = 234,292.932), which was more than what would be expected due to chance (*n* = 10,867.832). Twenty-five percent of the sample (*n* = 213,411.998) were Black, non-Hispanic participants with

two adults in the household. This was more than what would be expected due to chance ($n$ = 20,084.698) when compared to White, non-Hispanic participants, who comprised 74.1% ($n$ = 611,354.149), which was more than what would be expected due to chance ($n$ = 676.1). There was a significant difference, $X^2(3, N = 6{,}951{,}813.65) = 38.097$, $p < .001$. Number of adults in the household by race/ethnicity is presented in Table 13.

**Table 13**

*Number of Adults in Household by Race/Ethnicity*

| | | | Race/Ethnicity | | |
|---|---|---|---|---|---|
| | | | White, non-Hispanic | Black, non-Hispanic | Total |
| Number of adults in household | 1 | Count | 234,292.932 | 158,442.167 | 392,735.099 |
| | | Expected count | 10,867.832 | 12527.796 | 16,151.240 |
| | | % of Total | 59.7% | 40.3% | 100% |
| | 2 | Count | 611,354.149 | 213,411.998 | 824,766.147 |
| | | Expected count | 19,313.873 | 20,084.698 | 22,071.204 |
| | | % of Total | 74.1% | 25.9% | 100% |
| | 3 or more | Count | 205,936.476 | 132,628.971 | 338,565.447 |
| | | Expected count | 139,32.925 | 19,321.146 | 17,693.739 |
| | | % of Total | 60.8% | 39.2% | 100% |
| | Missing | Count | 3,428,546.726 | 1,967,200.231 | 5,395,746.957 |
| | | Expected count | 78,504.518 | 90,771.353 | 108,698.076 |
| | | % of Total | 63.5% | 36.5% | 100% |
| Total | | Count | 4,480,130.283 | 2,471,683.366 | 6,951,813.650 |
| | | Expected count | 80,772.759 | 95,132.184 | 109,682.614 |
| | | % of Total | 64.4% | 35.6% | 100% |

Regarding the number of days of poor mental health in the past 30 days, 37% of the sample ($n$ =1,434,550.166) were Black, non-Hispanic participants who reported zero days of poor mental health. This was about the same as what would be expected due to chance ($n$ = 73,886.931) when compared to White, non-Hispanic participants, who comprised 63.3% ($n$ = 2,479,523.083), which was about the same as what would be expected due to chance ($n$ = 65,552.765). Thirty-five percent of the sample ($n$ =

536,348.516) were Black, non-Hispanic participants who reported 1–13 days of poor mental health. This was about the same as what would be expected due to chance (*n* = 47,517.405) when compared to White, non-Hispanic participants, who comprised 65.1% (*n* = 999,440.203), which was about the same as what would be expected due to chance (*n* = 44,795.231). Thirty-two percent of the sample (*n* =322,265.348) were Black, non-Hispanic participants who reported 14 or more days of poor mental health. This was about the same as what would be expected due to chance (*n* = 36,147.792) when compared to White, non-Hispanic participants, who comprised 67.7% (*n* = 674,824.532), which was about the same as what would be expected due to chance (*n* = 37,435.311). There was no significant difference, $X^2(2, N = 6{,}446{,}951.849) = 6.273$, $p = .373$. See Table 14.

**Table 14**

*Days of Poor Mental Health During Past 30 Days by Race/Ethnicity*

| | | | Race/Ethnicity | | |
|---|---|---|---|---|---|
| | | | White, non-Hispanic | Black, non-Hispanic | Total |
| Days of poor mental health during past 30 days | 0-13 Days | Count | 2,479,523.083 | 1,434,550.166 | 3,914,073.249 |
| | | Expected count | 65,552.765 | 73,886.931 | 92,881.271 |
| | | % of Total | 63.3% | 36.7% | 100% |
| | 14 + Days | Count | 1,674,264.735 | 322,265.348 | 997,089.881 |
| | | Expected count | 37,435.311 | 36,147.792 | 51,319.316 |
| | | % of Total | 66.1% | 33.9% | 100% |
| Total | | Count | 4,153,787.818 | 2,293,164.031 | 6,446,951.849 |
| | | Expected count | 78,607.032 | 92,532.299 | 108,128.645 |
| | | % of Total | 64.4% | 35.6% | 100% |

## Results

### RQ1

RQ1 asked, Is there an association between CKD and MDD, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status marital status and number of adults in the household? RQ1 was tested with complex sample binary logistic regression. The predictor variable was CKD. The dependent variable was MDD. Control variables were race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status marital status and number of adults in the household. Table 15 shows that the logistic regression model was statistically significant $X^2(15, N = 6{,}832{,}450.120) = 217.99$, $p < .001$.

**Table 15**

*Tests of Model Coefficients for RQ1*

| Source | Df | Wald Chi-square | Sig. |
|---|---|---|---|
| (Corrected Model) | 19 | 217.989 | <.001 |
| (Intercept) | 1 | 29.978 | .481 |
| CKD | 1 | 5.344 | .026 |
| Race | 1 | 49.461 | . |
| Gender | 1 | 48.855 | <.001 |
| Diabetes | 1 | 4.486 | .030 |
| HBP | 1 | 36.977 | <.001 |
| Marital Status | 5 | 18.875 | .003 |
| Number_of_Adults | 3 | 1.418 | .528 |
| Age | 1 | 54.662 | <.001 |
| Income | 1 | 10.504 | .001 |

Dependent Variable: Depressive Disorders (reference category = No)

Model: (Intercept), CKD, Race, Gender, Diabetes, HBP, Marital Status, Number_of_Adults, Race_2, Age, Income

Table 16 summarizes the results of the prediction. For participants who disclosed that they were not diagnosed with depression, the model correctly predicted 95.5%. For participants who were diagnosed with depression, the model correctly predicts 3.9%. Overall, the model correctly predicts the outcome for 82.4% of participants.

**Table 16**

*Classification Table for RQ1*

| | . Predicted | | |
|---|---|---|---|
| Observed | No | Yes | Percent correct |
| No | 5,584,362.319 | 27,897.864 | 95.5% |
| Yes | 1,170,052.214 | 29,343.019 | 3.9% |
| Overall percent | 98.9% | 1.1% | 82.4% |

Dependent Variable: Depressive Disorders (reference category = No)

Model: (Intercept), CKD, Race, Gender, Diabetes, HBP, Marital Status, Number_of_Adults, Race_2, Age, Income

The table of variable codings is presented in Table 17.

**Table 17**

*Categorical Variable Coding for RQ1*

| | | Parameter coding | | | | |
|---|---|---|---|---|---|---|
| Variable | | (1) | (2) | (3) | (4) | (5) |
| Age group | 18–24 | 0 | 0 | 0 | 0 | 0 |
| | 25–34 | 1 | 0 | 0 | 0 | 0 |
| | 35–44 | 0 | 1 | 0 | 0 | 0 |
| | 45–54 | 0 | 0 | 1 | 0 | 0 |
| | 55–64 | 0 | 0 | 0 | 1 | 0 |
| | 65 or older | 0 | 0 | 0 | 0 | 1 |
| Marital Status | Married | 0 | 0 | 0 | 0 | 0 |
| | Divorced | 1 | 0 | 0 | 0 | 0 |
| | Widowed | 0 | 1 | 0 | 0 | 0 |
| | Separated | 0 | .0 | 1 | 0 | 0 |
| | Never married | 0 | 0 | 0 | 1 | 0 |
| | A member of an unmarried couple | 0 | 0 | 0 | 0 | 1 |
| Income | Less than $15,000 | 0 | 0 | 0 | 0 | 0 |
| | $15,000 to less than $25,000 | 1 | 0 | 0 | 0 | 0 |
| | $25,000 to less than $35,000 | 0 | 1 | 0 | 0 | 0 |
| | $35,000 to less than $50,000 | 0 | 0 | 1 | 0 | 0 |
| | $50,000 or more | 0 | 0 | 0 | 1 | 0 |
| | Don’t know/not sure/missing | 0 | 0 | 0 | 0 | 1 |
| Number of adults in household | 1 | 0 | 0 | 0 | | |
| | 2 | 1 | 0 | 0 | | |
| | 3 or more | 0 | 1 | 0 | | |
| | Missing | 0 | 0 | 1 | | |
| Diabetes | No | 0 | | | | |
| | Yes | 1 | | | | |
| Race/ethnicity | Black, non-Hispanic | 0 | | | | |
| | White, non-Hispanic | 1 | | | | |
| High blood pressure | No | 0 | | | | |
| | Yes | 1 | | | | |
| Gender | Male | 0 | | | | |
| | Female | 1 | | | | |
| CKD | No | 0 | | | | |
| | Yes | 1 | | | | |

The table of regression coefficients for the logistic regression model is presented in Table 18.

**Table 18**

*Complex Sample Logistic Regression Coefficient for RQ1*

| | Parameter estimates | | | | |
|---|---|---|---|---|---|
| | | | | 95% CI for Exp (B) | |
| Depressive disorders | Parameter | *p*-value | Exp(B) | Lower | Upper |
| | (Intercept) | <.001 | -.427 | .214 | .852 |
| | [CKD=0] | .021 | .657 | .460 | .938 |
| | [CKD=1] | | 1 | . | . |
| | [White, Non-Hispanic=1] | <.001 | 2.863 | 2.136 | 3.839 |
| | [Black, Non-Hispanic=2] | | 1 | . | . |
| | [Male=0] | <.001 | .454 | .364 | .567 |
| | [Females=1] | | 1 | . | . |
| | [Diabetes=0] | .034 | .755 | .582 | .979 |
| | [Diabetes=1] | | 1 | . | . |
| | [HBP=0] | <.001 | .485 | .385 | .613 |
| | [HBP=1] | | 1. | . | . |
| | [Married=1] | .002 | .552 | .315 | .967 |
| | [Divorced=2] | | .991 | .554 | 1.774 |
| | [Widowed=3] | | .749 | .408 | 1.376 |
| | [Separated=4] | | 1.053 | .370 | 2.991 |
| | [Never married=5] | | .723 | .411 | 1.273 |
| | [A member of an unmarried couple=6] | | 1 | . | . |
| | [Number_of_Adults=1] | .701 | .863 | .642 | 1.160 |
| | [Number_of_Adults=2] | | .933 | .697 | 1.248 |
| | [Number_of_Adults=3] | | .825 | .512 | 1.328 |
| | [Number_of_Adults=4] | | 1 | . | . |
| | [Age 18 to 24=1] | <.001 | 3.269 | .2.020 | 5.293 |
| | [Age 25 to 34=2] | | 3.366 | 2.240 | 5.057 |
| | [Age 35 to 44=3] | | 2.751 | 1.904 | 3.974 |
| | [Age 45 to 54=4] | | 1.690 | 1.204 | 2.373 |
| | [Age 55 to 64=5] | | 2.184 | 1.659 | 2.875 |
| | [Age 65 or older=6] | . | 1 | . | . |
| | Income | .001 | .929 | .888 | .971 |

Dependent variable: Depressive Disorders (reference category = No)

Model: (Intercept), CKD, Race, Gender, Diabetes, HBP, Marital Status, Number_of_Adults, Race_2, Age, Income

a. Set to zero because this parameter is redundant.

CKD was a significant predictor of depression, $p = .021$; *OR* = .657; (95% *CI*: .460 – .938). Participants without CKD were 34.3% less likely to be diagnosed with

depression than participants with CKD. Race/ethnicity was a significant predictor of depression, $p < .001$; *OR* = 2.863; (95% *CI*: 2.136 – 3.839). White, non-Hispanic participants were 2.863 more likely to be diagnosed with depression when compared to Black, non-Hispanic participants.

Annual household income from all sources was a significant predictor of depression, $p = .001$; *OR* = .929; (95% *CI*: .888 – .971). Participants from all household incomes had reduced odds of being diagnosed with depression by 7.1%. Gender was also a significant predictor of depression, $p < .001$. Males were 54.6% less likely to be diagnosed with depression (*OR = .454;* 95% *CI*: .364 – .567) than females. Age was significantly associated with depression, $p < .001$. Participants ages 25 to 34 were more likely to be diagnosed with depression *OR* = 3.366; (95% *CI*: 2.240 – 5.057).

Participants without diabetes were 24.5% less likely to be diagnosed with depression, $p = .034$ (*OR* = .755; 95% *CI*: .582 – .979) than participants with diabetes. HBP was a significant predictor of depression, $p < .001$. Participants without HBP were 51.5% less likely (*OR* = .485 *CI*: .385 – .613) to be diagnosed with depression than participants with HBP where there were no association.

Marital status was a significant predictor of depression, $p = .002$. Specifically, participants who were divorced were .991 less likely (*OR* = .991) to be diagnosed with depression than participants who were married, $p = .002$; (95% *CI*: .315 – .967). Participants who were widowed were .749 less likely (*OR* = .749) to be diagnosed with depression than participants who were married, (95% *CI*: .408– 1.376). Participants who were separated were 1.053 more likely (*OR* =1.053) to be diagnosed with depression than

participants who were married, $p$ = .002; (95% *CI*: .370–2.991). Participants who were never married were 28% less likely to be diagnosed with depression (*OR* = .723, 95% *CI*: .411 –1.273). There was no association found for participants who were members of an unmarried couple. The number of adults in the household was not a significant predictor of depression, $p$ = .701. Having one adult in the household was 14% less likely to be diagnosed with depression (*OR* = .863; 95% CI: .642 – 1.160).

**Hypothesis One**

$H_0$1 stated that there is no association between CKD and MDD, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status, marital status, and number of adults in the household. The complex sample logistic regression model proved that CKD was a significant predictor of depression, $p$ = .021; *OR* = .657; (95% *CI*: .460 –.938). Participants without CKD were 34.3% less likely to be diagnosed with depression than participants with CKD. Race/ethnicity was a significant predictor of depression; therefore, the null hypothesis was rejected.

**RQ2**

RQ2 asked, Is there an association between CKD and days of poor mental health, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status, marital status, and number of adults in the household? It was initially proposed that RQ2 would be answered with ordinal logistic regression because the dependent variable, days of poor mental health in the past 30 days was on an ordinal scale of measurement with three levels (i.e., 0 days when mental health not good, 1–13

days when mental health not good, and 14 or more days when mental health not good). In addition, ordinal logistic regression requires that the relationship between the independent variables is the same across all possible comparisons involving the dependent variable – an assumption referred to as proportional odds. This assumption was also violated. Therefore, complex samples logistic regression was used instead. Days of poor mental health was made into a dichotomous variable (i.e., 0=0–13 days of poor mental health, 1=14 or more days of poor mental health.)

The predictor variable was CKD. The dependent variable was days of poor mental health in the last 30 days. Control variables were race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status marital status and number of adults in the household. Table 19 is a table of model effects. These tests are general tests of how well the model performs. Table 19 shows that the complex samples logistic regression model was statistically significant $X^2(19, N = 6{,}362{,}354.677) = 250.159, p < .001$.

**Table 19**

*Complex Samples Test on Model Coefficients for RQ2*

| Source | df | Wald Chi-Square | Sig. |
|---|---|---|---|
| (Corrected Model) | 19 | 250.159 | <.001 |
| (Intercept) | 1 | .028 | .868 |
| CKD | 1 | .992 | .319 |
| Race | 1 | 17.256 | <.001 |
| Gender | 1 | 34.717 | <.001 |
| Diabetes | 1 | 8.438 | .004 |
| HBP | 1 | 10.998 | .001 |
| Marital Status | 5 | 25.83 | <.001 |
| Number_of_Adults | 3 | 7.608 | .055 |
| Age | 5 | 93.557 | <.001 |
| Income | 1 | 1.878 | .171 |

Dependent Variable: Days of Poor Mental Health (reference category = 0-13 Days)

Model: (Intercept), CKD, Race, Gender, Diabetes, HBP, Marital Status, Number_of_Adults, Race_2, Age, Income

Table 20 summarizes the results of the prediction. For participants who disclosed that they had 0–13 days of poor mental health, the model correctly predicts 83.2%. For participants who reported 14 or more days of poor mental health, the model correctly predicts 40.2%. Overall, the model correctly predicts the outcome for 66.3% of participants.

**Table 20**

*Classification Table for RQ2*

| | Classification | | |
|---|---|---|---|
| | Predicted | | |
| Observed | 0–13 days | 14 or more days | Percent correct |
| 0–13 Days | 3,214,332.514 | 647,112.175 | 83.2% |
| 14 or more days | 1,495,112.040 | 1,005,797.920 | 40.2% |
| Overall percent | 74.0% | 26.0% | 66.3% |

Dependent Variable: Days of Poor Mental Health (reference category = 0-13 days or more)

Model: (Intercept), CKD, Depressive Disorders, Race, Gender, Diabetes, HBP, Marital Status, Number_of_Adults, Race_2, Income, Age

The table of variable codings is presented in Table 21.

**Table 21**

*Categorical Variable Coding for RQ2*

| | | Parameter coding | | | | |
|---|---|---|---|---|---|---|
| | | (1) | (2) | (3) | (4) | (5) |
| Age group | 18–24 | 0 | 0 | 0 | 0 | .0 |
| | 25–34 | 1 | 0 | 0 | 0 | 0 |
| | 35–44 | 0 | 1 | 0 | 0 | 0 |
| | 45–54 | 0 | 0 | 1 | 0 | 0 |
| | 55-64 | 0 | 0 | 0 | 1 | 0 |
| | 65 or older | 0 | 0 | 0 | 0 | 10 |
| Marital status | Married | 0 | 0 | 0 | 0 | 0 |
| | Divorced | 1 | 0 | 0 | 0 | 0 |
| | Widowed | 0 | 1 | 0 | 0 | 0 |
| | Separated | 0 | 0 | 1 | 0 | 0 |
| | Never married | 0 | 0 | 0 | 1 | 0 |
| | A member of an unmarried couple | 0 | 0 | 0 | 0 | 10 |
| Income | Less than $15,000 | 0 | 0 | 0 | 0 | 0 |
| | $15,000 to less than $25,000 | 1 | 0 | 0 | 0 | 0 |
| | $25,000 to less than $35,000 | 0 | 1 | 0 | 0 | 0 |
| | $35,000 to less than $50,000 | 0 | 0 | 1 | 0 | 0 |
| | $50,000 or more | 0 | 0 | 0 | 1 | 0 |
| | Don’t know/Not sure/Missing | 0 | 0 | 0 | 0 | 1 |
| Number of adults in household | 1 | 0 | 0 | 0 | | |
| | 2 | 1 | 0 | 0 | | |
| | 3 or more | 0 | 1 | 0 | | |
| | Missing | 0 | 0 | 1 | | |
| Diabetes | No | 0 | | | | |
| | Yes | 1 | | | | |
| Race/ethnicity | Black, non-Hispanic | 0 | | | | |
| | White, non-Hispanic | 1 | | | | |
| High blood pressure | No | 0 | | | | |
| | Yes | 1 | | | | |
| Gender | Male | 0 | | | | |
| | Female | 1 | | | | |
| CKD | No | 0 | | | | |
| | Yes | 1 | | | | |

The table of complex samples regression coefficients for the logistic regression model is presented in Table 22.

**Table 22**

*Complex Samples Logistic Regression Coefficients for RQ2*

| | Parameter estimates | | | | |
|---|---|---|---|---|---|
| Days of poor mental health | Parameter | | Exp(B) | 95% Confidence Interval for Exp(B) | |
| | | p-value | | Lower | Upper |
| 14 or more days | (Intercept) | <.001 | .769 | .392 | 1.508 |
| | [CKD=0] | .319 | .810 | .535 | 1.226 |
| | [CKD=1] | | 1 | . | . |
| | [White, Non-Hispanic=1] | <.001 | 1.585 | 1.275 | 1.970 |
| | [Black, Non-Hispanic=2] | | 1 | . | . |
| | [Male=0] | <.001 | .570 | .472 | .687 |
| | [Female=1] | | 1 | . | . |
| | [Diabetes=0] | .004 | .704 | .555 | .892 |
| | [Diabetes=1] | | 1 | . | . |
| | [HBP=0] | <.001 | .699 | .566 | .864 |
| | [HBP=1] | | 1 | . | . |
| | [Married=1] | <.001 | .607 | .369 | .998 |
| | [Divorce=2] | | 1.147 | .668 | 1.968 |
| | [Marital Status=3] | | .880 | .504 | 1.538 |
| | [Widowed=4] | | .977 | .436 | 2.186 |
| | [Separated=5] | | .902 | .540 | 1.506 |
| | [Never married=6] | | 1 | . | . |
| | [Number_of_Adults=1] | .055 | .719 | .541 | .954 |
| | [Number_of_Adults=2] | | .823 | .648 | 1.044 |
| | [Number_of_Adults=3] | | 1.130 | .757 | 1.687 |
| | [Number_of_Adults=4] | | 1 | . | . |
| | Income | .171 | .975 | .940 | 1.011 |
| | [Age 18 to 24=1] | <.001 | 6.724 | 4.239 | 10.666 |
| | [Age 25 to 34=2] | | 4.146 | 2.878 | 5.972 |
| | [Age 35 to 44=3] | | 3.325 | 2.413 | 4.581 |
| | [Age 45 to 54=4] | | 2.246 | 1.698 | 2.972 |
| | [Age 55 to 64=5] | | 1.986 | 1.546 | 2.552 |
| | [Age 65 or Older] | . | 1 | . | . |

Dependent Variable: Days of Poor Mental Health (reference category = 0-13 days)

Model: (Intercept), CKD, Race, Gender, Diabetes, HBP, Marital Status, Number of_ Adults, Race_2, Income, Age

a. Set to zero because this parameter is redundant.

CKD was not significant predictor of days of poor mental health, $p$ = .319; *OR* = .810; (95% *CI*: .535 –1.226). Participants without CKD were 19% less likely to report 14 or more days of poor mental health than participants with CKD that showed no association. Race/ethnicity was a significant predictor of poor mental health, $p$ <.001; *OR* = 1.585; (95% *CI*: 1.275–1.970). White, non-Hispanic participants were 1.585 more likely to report 14 or more days of poor mental health when compared to Black, non-Hispanic participants. Annual household income from all sources was not a significant predictor of poor mental health, $p$ =.171; *OR* =.975 (95% CI: .940–1.011). Participants with household incomes from all sources are 83% more likely to report 14 or more days of poor mental health in the past 30 days.

Gender was a significant predictor of days of poor mental health, $p$ <.001. Males were 43% less likely to report 14 or more days of poor mental health in the past 30 days than females, (95% *CI*: .472 –.687). Age group was a significant predictor of days of poor mental health, $p$ <.001; *OR* = 6.74 (95% CI: 4.239–10.666). Participants in age groups 18 to 24 are 6.74 increased odds of reporting 14 or more days of poor mental health.

Diabetes was a significant predicator of days of poor mental health $p$ =.004; *OR*=.704 (95% *CI*: .555 – .892). Participants without diabetes were 27% lease likely to report 14 or more days of poor mental health in the past 30 days than participants with diabetes. Participants without HBP were 30% least likely to report 14 or more days of

poor mental health in the past 30 days with $p$ <.001; (OR= .699; 95% *CI*: .566 – .864). HBP was statistically significant.

Marital status was a significant predictor of days of poor mental health, $p$ <.001. Participants who were married were 39.3% least likely to report 14 or more days of poor mental health in the past 30 days than participants who were divorced, *OR*=1.147 (95% *CI*: .668–1.968). Participants who were separated were 2.3% (OR = .977, 95% *CI*: .436–2.186) least likely to report 14 or more days of poor mental health than participants who were divorced. Participants who were never married were 10% least likely to report 14 or more days of poor mental health than participants who were divorce as well.

The number of adults in the household was not a significant predictor of days of poor mental health, $p$ = .055. Participants with 1 adult in the household were .719 (95% *CI*: .541 – .954) least likely to be report 14 or more days of poor mental health in the past 30 days than participants with three or more adult in the household.

**Hypothesis Two**

$H_0$2 stated that there is no association between CKD and days of poor mental health, controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status, marital status, and number of adults in the household. The complex sample logistic regression model had some control variables that were statistically significant but others that were not. CKD was not a significant predictor of days of poor mental health, $p$ = .055; *OR* = .810; (95% *CI*: .535–1.226). Participants without CKD were 19% least likely to report 14 or more days of poor mental health than

participants with CKD that showed no association. Therefore, the null hypothesis was failed to be rejected.

## Summary

Two research questions and two associated hypotheses were formulated for investigation. The hypotheses were tested with logistic regression complex sample module. It was determined that CKD was significantly associated to depression amongst White, non-Hispanic and Black, non-Hispanic participants controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status, marital status, and number of adults in the household. Moreover, race/ethnicity, socioeconomic status, gender, age, high blood pressure status, diabetes mellitus status and marital status, were significant predictors of depression, and the number of adults in the household accounting were not significant predictors of depression.

It was also determined that CKD was not significantly associated to days of poor mental health amongst White, non-Hispanic and Black, non-Hispanic participants controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status, marital status, and number of adults in the household. Moreover, race/ethnicity, gender, age, diabetes mellitus status, high blood pressure status, and marital status were significant predictors of days of poor mental health and socioeconomic status; the number of adults in the household were not significant predictors of days of poor mental health. Analyses were conducted with weighted data using the SPSS complex samples module. Implications and recommendations will be discussed in Section 4.

Section 4: Application to Professional Practice and Implications for Social Change

## Introduction

I examined the association between CKD and depressive disorders and days of poor mental health in adults living in Georgia while controlling for race/ethnicity, socioeconomic status, gender, age, diabetes mellitus status, high blood pressure status, marital status, and number of adults in the household. Based on the results highlighted in Section 3 of this study, I determined that CKD was significantly related to depressive disorders among White non-Hispanic and Black non-Hispanic, participants. The results also determined that CKD was not significantly associated to days of poor mental health among White non-Hispanic and Black non-Hispanic participants. Therefore, the null hypothesis for RQ1 was rejected, and the null hypothesis for RQ2 failed to be rejected.

Analyses were conducted with unweighted data using the SPSS complex sample module. The study findings were aligned with some of the studies highlighted in the literature review in Section 1 of this study when I assessed CKD and depressive disorders and mental health. Additionally, the theoretical framework used in this study, Wilson and Cleary's (1995) HRQoL, was evident based on the analysis focused on individuals' health associated with their mental, social, physical, and emotional health and the impact that CKD has on some variables more than others. In this final section of the research study, I interpret the findings and highlight the study's limitations, recommendations, and implications for professional practice and social change.

## Interpretation of Findings

### CKD and Depressive Disorders

I found that CKD was a significant predictor of depression in Georgia. Participants without CKD had reduced odds of being diagnosed with depression when compared to participants with CKD. In addition, race/ethnicity was a significant predictor of depression; White non-Hispanic participants were more likely to be diagnosed with depression compared to Black non-Hispanic participants. Similar evidence was highlighted in the literature, where this was also a disparity. For example, CKD is estimated to be much more common in non-Hispanic Blacks at 18% compared to non-Hispanic Whites at 13% (CDC, 2020).

Additionally, annual household income from all sources, gender, age, marital status, and high blood pressure were all significant predictors of depression. These findings also align with Assefa et al. (2016), who pointed out sociodemographic factors such as gender and age might be associated with depression in patients with CKD. Conversely, number of adults in the household had reduced odds of being depressed compared to participants without diabetes. Also, participants without high blood pressure were less likely to be diagnosed with depression than participants with high blood pressure.

### CKD and Poor Mental Health

In Georgia, CKD was not a significant predictor of days of poor mental health. Participants without CKD were 19% more likely to report 14 or more days of poor mental health than participants with CKD, which showed no association. Race/ethnicity

was a significant predictor of poor mental health. Annual household income from all sources and number of adults in the household were not significant predictors of poor mental health. Gender, marital status, age, diabetes, and high blood pressure were all predictors of poor mental health. Conversely, participants without diabetes were less likely to report 14 or more days of poor mental health in the past 30 days than participants with diabetes. Participants without high blood pressure were less likely to report 14 or more days of poor mental health in the past 30 days.

## Limitations of the Study

There were a few limitations encountered during this study. First, the complex sample consisted of 6,380 unweighted but a weighted population size of over 6,832,450 million White non-Hispanic and Black non-Hispanic respondents. Specifically, 64.3% (*n* = 4,093,417) of respondents were White non-Hispanic, and 35.7% (*n* = 2,268,936) were Black non-Hispanic. Therefore, there was a disparity among the respondents during the data analysis process. Second, using a complex sampling design comes with some challenges such as the oversampling of one group over another as one can see with the population of White non-Hispanic and Black non-Hispanic respondents.

## Recommendations

Based on the results and key findings of this study, the findings from this study could be used to conduct additional research specifically by focusing on the CKD and mental health association among Black non-Hispanics. Additionally, during the data analysis discussion in Section 3, there were some key findings where each covariate and race/ethnicity were analyzed. Those findings are recommended to be used for future

studies, development and implement tailored, innovative interventions, and adoption of key health care policies knowing that race/ ethnicity, gender, household income, marital status, and other social determinants of health (Ozieh et al., 2021) measures play a role in the overall quality of life for an individual with chronic disease.

## Implications

### Professional Practice

Maintaining good mental health can be a struggle for many. However, this challenge can be exacerbated by having CKD (American Kidney Fund, 2022) because CKD was not significantly related to depressive disorders and days of poor mental health amongst White, non-Hispanic, and Black non-Hispanic participants, this does not mean that this issue does not exist in historically marginalized communities. Consequently, this affects one's quality of life. Therefore, professional practice plays a key role in helping to address these challenges on various levels. In addition, the patient-provider relationship is key to the successful management of a patient's mental health and CKD. To enhance the relationship between the patient and provider, the findings from this study brings awareness to how much training a provider should have in public health to understand the key role those social determinants of health play in the success or failure of a patient's health care journey who have may or may not have CKD or diagnosed with CKD.

As noted in the research results, depressive disorders and other mental health issues were common in those with CKD; therefore, this can also affect the way a person acts, feels, or thinks. Additionally, the Coronavirus 2019 pandemic affected everyone, especially those living with a chronic illness such as CKD; therefore, other researchers

have also noted that the pandemic can increase those feelings of depression and other mental illnesses (American Kidney Fund, 2022). Therefore, primary care providers, nephrologists, therapists, social workers, and other healthcare providers must collaborate and develop a detailed patient care plan that puts the patient first and provides better treatment options that will lead to better health outcomes for patients.

**Positive Social Change**

This study contributes to positive social change because its findings could assist with decision-making for better care for CKD and those with mental health challenges and design more tailored evidence-based public health approaches for those with these comorbidities. More tailored patient care can help reduce the public health burden of depression associated with CKD, help the target population recognize these issues as part of their treatment plans, and increase adherence to medication regimens. Additionally, findings from this study also provided evidence that the work in public health to address this public health burden requires tailored interventions at various levels of the systems, as highlighted in the HRQoL sociological framework diagram. The micro-level is where the patient and provider work together; the meso level where the systems work together to work with the patient on the micro level, and then the macro levels where the larger systems and policy play a role that impacts the individual's quality of life (Sawatzky et al., 2021). In addition, public health and mental health play a significant role in any chronic disease diagnosis. Therefore, public health professionals must collaborate with mental health professionals to develop more targeted public health interventions that improve population health outcomes.

## Conclusion

CKD was significantly related to depressive disorders amongst White, non-Hispanic participants and Black, non-Hispanic participants. The results also that CKD was not significantly related to days of poor mental health amongst White, non-Hispanic and Black, non-Hispanic participants. The null hypothesis was rejected for RQ1 and failed to be rejected for RQ2. Additional research must be done to further examine these disparities.

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