EXAMINING DEPRESSION AND ANXIETY BY GENDER, RACE/ETHNICITY, AND RESIDENCE IN SOUTH CENTRAL TEXAS

A Dissertation

by

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ABSTRACT

The current study is an extension and replication of a previous study that examined the severity of depressive symptoms and rates of probable depression assessed by different instruments, the CESD-5 and PHQ-9, in two separate surveys (2006, 2010), among residents in predominately rural regions of South Central Texas. The current study examines the rate of depression, and the associations between depression, race/ethnicity, gender, and residence in a sample of 5,230 participants. Participants included individuals from various ethnic groups including White/Caucasian, Black/African American, Hispanic/Latino, Asian or Pacific Islander, and Native American. Participants ranged in age from 18-99 years old. The study expands on previous work by examining the rate of anxiety and the link between anxiety, race/ethnicity, gender, and residence. The study utilized two reliable and valid measures of depression (Patient Health Questionnaire-2) and anxiety (Generalized Anxiety Disorder-7). We found the same pattern in the rates of depression reported in the previous study. The current study revealed that Black/African American, female, rural area respondents had higher percentages of depression and anxiety.

DEDICATION

This dissertation is dedicated to my family: To my mother and father who have been with me every step of the way, and who encouraged and provided me with the skills needed to overcome challenges. Additionally, I dedicate this dissertation to my brothers who motivated me to complete every task set before me with hard work and perseverance. I share this accomplishment with you.

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Regional Healthcare Partnership-17 (RHP-17) and its community outreach program provided the data analyzed for Chapter IV. The study relies upon a secondary data set that resulted from regional health survey of the Brazos Valley conducted by the RHP-17 and its community outreach program.

All the work for the dissertation was completed by the student, under the advisement of Professor Timothy R. Elliott of the Department of Educational Psychology.

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CHAPTER I

INTRODUCTION

Disparities occur in several different areas all over the United States, but rural areas tend to have the most difficulty accessing vital services. These services include but are not limited to: transportation services, medical services, educational opportunities, health insurance, providers, and employment opportunities. Rural areas often experience challenges in one or more of the areas listed. Access to existing health care options is often challenged by geographic, cultural, and historic factors. Rural residents have greater limitations to access than urban residents and the gap is widening.

Access to health care services continues to be an overwhelming priority, which shows that traditional concerns about access to primary and hospital care continue to dominate rural health policy (Hartley, 2004). Studies of geographic differences indicate that rural areas ranked poorly on selected population health indicators, including health behaviors and/or mental health. An individual's behavior is greatly influenced by environment and context. Major health behavior pattern differences exist between rural residents and urban residents (Eberhardt & Pamuk, 2004). Minority groups face disparate burdens of many mental health conditions (Smalley, Warren, and Rainer, 2012). Mental health issues can often be exacerbated due to perceived racial discrimination and limitations to health care access. Consequently, rural residents experiencing from mental health disorders enter mental health care later and with more serious symptoms (Smalley et. al., 2012). These symptoms often are correlated with

other psychological and/or physical impediments. For instance, there is definitive and positive relationship between anxiety and depression.

Social status, income, education, occupation, and place of residence are significant determinants of life expectancy and health. There have been studies that have investigated and proven the effect of place on residence or community on health (Hartley, 2004). Rural residents are characterized as a vulnerable population and they are more likely than others to report poor health, lack of health insurance, have a chronic health condition, and live in poverty (Wagenfeld, 1990). However, it has been reported that psychiatric disorders appear to affect the United States population regardless of urban and rural residence. For instance, an analysis of the National Comorbidity Study Replication (NCS-R) found no statistically rural-urban differences in 12-month prevalence of major depressive disorder (Kessler, Mickelson, & Williams, 1999). Yet the larger analysis of the National Health Interview Survey found small, but statistically significant differences in rural-urban 12-month prevalence rates (Probst, Laditkam Moore, Harun, Powell, & Baxley, 2006). There is conflicting evidence in regards to the effect on residence or community on mental health. Rural areas typically lack social, health, and especially mental health services and services that do exist are described as disjointed and lacking in consistency (Blank, Fox, Hargrove, & Turner, 1995; Jameson & Blank, 2007; Wang et al., 2005).

Rural Americans comprise an estimated 20% of the U.S. population (U.S. Census Bureau, 2010). The lack of services and access for this population contributes to the severity of mental illness in rural America that has remained relatively unchanged over

the past few decades. The federal government funding for rural mental health has lagged behind funding received for other disparity groups (Eberhardt & Pamuk, 2004).

Definition of Rural Areas

When one thinks of a rural area, an individual imagines it as an isolated area of open country with a low population density. The terms urban, urbanized area, and rural are the Census Bureau definitions; other Federal agencies, State agencies, local officials, and private groups may use these same terms to identify areas based on different criteria (U.S. Census Bureau, 2014). Definitions of rural are frequently based on population size, population density, and economic factors, which all have distinct limitations. For instance, a common definition of rural defined by the Bureau is reported in terms of an urbanized area (UA). Each UA includes a central city and a surrounding densely settled territory that together have a population of 50, 000 or more and a population density generally exceeding 1,000 people per square mile. Specifically, all individuals who live in UA's are considered to be urban populations, all others are rural populations.

The Office of Management and Budget (OMB) designates areas as metro on the basis of standards released in January 1980. According to their definition, each metropolitan statistical area (MSA) must include at least: one city with 50, 000 or more inhabitants or an urbanized area (defined by the Bureau of the Census) with 50,000 inhabitants and a total MSA population of at least 100,000 (75,000 in New England). These standards provide that each MSA must include the county in which the central city is located (the central county) and additional contiguous counties (fringe counties), if they are economically and socially integrated with the central county. Any county not

included in an MSA is considered “non-metro”, in other words it would be considered rural.

ERS uses rural-urban continuum codes, to distinguish metro counties by size and non-metro counties by their degree of urbanization or proximity to metro areas. The USDA defines codes 0 - 3 as metro, and 4 to 9 as non-metro. For example, a code of 4 would indicate an urban population of 20,000 or more, adjacent to a metro area. A 9 on the other hand would indicate a completely rural or urban population of fewer than 2,500, not adjacent to a metro area (http://ric.nal.usda.gov/what-is-rural).

African American and Latino American Issues in Rural Areas

Minorities residing in rural areas have historically faced numerous challenges. As mentioned, the access to healthcare services is a continuous challenge in the rural residing population. Disparities among racial/ethnic minority populations have long been recognized as a public health problem. The disadvantage among rural racial/ethnic minorities is a function of place as well as race (Glover, Moore, Probst, & Samuels, 2004). Although this may be illustrated in various rural communities, the literature regarding this issue is insufficient. Specifically, for the Latino Americans there is little population specific information and knowledge about health care seeking behaviors among rural Latinos due to the lack of education and underutilized health services (Effland & Kassel, 1996). Much of the research that exists for rural populations does not focus solely on minority populations. Also much of the available research on disparities among Latinos focuses on specific health issues (e.g. diabetes, HIV/AIDS, hypertension, and/or social inequality, education, substance abuse, etc.). Assessing for depression

among rural racial/ethnic minorities in residing areas is seldom, perhaps because researchers fear their work is "discovering the obvious". Although the effect of racial/ethnic minority status is generally similar across rural and urban areas, the combined effects of rural residence and minority race/ethnicity can result in greater disadvantage than these characteristics alone (Glover, Probst, & Samuels, 2004). Therefore, research investigating issues specific to minorities in rural residing areas needs further exploration to plan for future health care needs.

As mentioned, medical and mental health disparities have been a long recognized mental health problem, specifically among racial/ethnic groups. Rural minorities lag behind Whites on many crucial economic and social services. Overall, rural residing community members are often characterized by unique challenges with access to health care services, an aging population, gender disparities, poorer health, lower socio-economic status, low level of health insurance, various stressors and coping problems, as well as lack of education in regards to resources (Smalley et al., 2012). Consequently, rural residents with mental health disorders enter mental health care later and with more serious symptoms (Smalley et al., 2012). Specifically, for ethnic and racial minorities in underserved areas these challenges are exacerbated due to various external factors.

As with all rural populations, rural minorities face challenges in accessibility, availability, and acceptability of services; however rural minorities are more impacted by acceptability. Despite the tight-knit nature of rural communities, rural residents with mental health concerns face increased burdens of isolation and loneliness because of high levels of stigma (Smalley et al., 2012). For instance, African Americans have been

shown to be less likely to seek mental health services due to stigmatization of mental health issues and a distrust of professionals. Racial and ethnic groups living in underserved areas are faced with challenges and disparities every day. Minority groups face disparities on many mental health conditions. The rural minority groups face a disproportional burden of poverty and underutilization of mental health services that leads rural minorities to have an increased use of mental health emergency services due to delays in recipient treatment (Smalley et al., 2012). Consequently, rural residents with mental health disorders enter mental health care later and with more serious symptoms, which require more intensive treatment from an already resource and access restricted setting. When examining non-emergency care, African American and Latino populations receive less mental health treatment, when age, gender, and insurance status are controlled.

Purpose of the Study

The purpose of the present study is to examine the levels and rates of probable depression and anxiety in African Americans and Latinos in an underserved area. The current study is an extension and replication of a previous study conducted by Brossart, Wendel, Elliott, Cook, Castillo and Burdine (2013) that examined the severity of depressive symptoms and rates of probable depression assessed by different instruments, the CESD-5 and PHQ-9, in two separate surveys (2006, 2010) of residents in predominately rural regions of South Central Texas. The previous results showed that African American respondents reported higher rates of depression on both instruments from both time periods. In addition, the 2010 regional health survey showed African

Americans and women had the highest percentage reporting depressive symptoms, followed by men. There was no meaningful relationship found between residential status, rural or urban, and depression.

Given that there is a pervasive problem within the rural residing communities in terms of access to healthcare, and documented associations between minorities, rural residents, and reports of depression and anxiety, generally, the present study examined the levels and rates of probable depression and anxiety by gender, race/ethnicity, and residence. The information could provide suggestions for future assessment, research, programming, planning, and policy in rural residing areas.

We expect to find the same pattern in the rates of depression that were found in the Brossart et al. (2013) study. Reasoning from the Brossart et al. work, it is likely that the same factors associated with the different levels of depression will be present in the current study. With the addition of anxiety the present study extends further investigation into the social and community factors that may affect the mental health and wellbeing of ethnic minorities in rural and underserved areas.

CHAPTER II

LITERATURE REVIEW

> Many of the 61 million people who live in rural America have limited access to health care. Almost a quarter of the nation's population lives in rural places yet only an eighth of our doctor's work there. There is an imbalance in government programs that promote the placement of doctors and the operation of hospitals in rural places while paying them less to treat Medicare and Medicaid beneficiaries. There are differences in rates of death and disease between rural areas. (Ricketts, 1999, p. 166)

The health of a population can be measured along many dimensions by indicators that reflect mortality, morbidity, overall wellbeing, lifestyle behaviors, and other health related risk factors (Eberhardt & Pamuk, 2004). While there are differences among health measures, mental health services in rural areas are in short supply in America (Weisgrau, 1995). Eberhardt and Pamuk (2004) found residents of rural areas far worse than residents of urbanized areas. Many factors are related to rural health disparities, including demographic and socioeconomic characteristics, health risk factors, and health care access. The authors discovered that the greatest differences usually occur between rural and suburban areas. One's residence among other factors is an indicator of an individual's ability to receive, have access to, and provide adequate health care.

Several pieces of literature such as the article written by Gustafson, Preston, and Hudson (2009) revealed that living and working in rural America presents a variety of distinct stresses and strains as varied as rural America itself. Almost 20% of the United States population lives in rural areas (McCord, Elliott, Brossart, & Castillo, 2012) facing barriers of low accessibility, availability, and acceptability of health care. Three limitations of mental health care that play a role in the reasons behind rural Americans

not receiving proper care include limitations to access to services, availability of services, and acceptability of services (Smalley et al., 2012). Specifically, rural communities face higher rates of poverty, health disparities, low income, employment opportunities, educational opportunities, elderly, and practitioner shortages than many urban areas. Consequently, rural residents with mental health disorders enter mental health care later and with more serious symptoms, resulting in a need for more intensive treatment in an already underserved area. Rural areas are not alone in reports of health disparities.

Although several studies report higher rates of issues to health care in rural areas it does not diminish issues with health care in urban areas. Eberhardt and Pamuk (2004) found health problems, conditions, and behaviors often do not have a monatomic relationship with rural residence. A variety of health problems have a curvilinear relationship to rural residence. As a result, the most isolated areas often look more like central cities than areas or small towns. Many individuals view rural regions to be synonymous with open plains, farmland, and primarily agricultural but this is not the case. In reality, the percentage of individuals involved in traditional work has decreased, while work in areas of tourism, manufacturing, and service account for a majority of employment in rural areas (Hart, Salsberg, & Lishner, 2002; Ricketts, 1999). Urban Americans experience disparities, as well, but rural residents are more likely than their urban peers to experience conditions, circumstances, and behaviors that challenge health and may increase mental illness (Glover et al., 2004). Hartley (2004) supports these findings, the author discussed and examined specific regional differences that rural

communities face, based upon The Health United States 2001, Urban and Rural Health Chartbook. The book shows a pattern of risky health behaviors among rural populations that suggest a "rural culture" health factor. These patterns suggest that there may be environmental and cultural factors that affect health behavior. Thus, data was presented from various regions in the United States (i.e., northeast, Midwest, south, west), the findings showed that rural residents in each region were worse off than those in other regions on one or more population health indicators. For example, rural residents who lived in the west had higher rates of alcohol abuse and suicide; and rural residents who lived in the northeast had higher rates of total tooth loss. Applicable to our research, rural residents who lived in the south have higher rates of poverty, physical inactivity, adult smoking, death due to ischemic heart disease, and birth to adolescents. Hartley (2004) stated that these regional differences reinforce the need for a difference-based rural health policy.

Regardless of residence it is apparent that rural health care continues to face numerous challenges in areas of accessibility, availability, and acceptability in a continuously growing and changing population. The literature reinforces the idea that the reduction and elimination of health disparities among rural populations will require a population approach that is sensitive to local variations in physical and cultural realities (Hartley, 2004). There have been various health care improvements with general and mental health; however, racial and ethnic disparities still exist in the healthcare system. Compelling evidence suggest that our nation's racial and ethnic minority Americans suffer increasing disparities in the incidence, mortality, prevalence, burden of diseases,

and diverse health outcomes compared to white Americans (Copeland, 2005). In comparisons with Whites, African-Americans work in jobs that do not provide health insurance, thus are less likely to have a usual source of health care. Specifically, African Americans are less likely to have private or employment-based insurance, instead they are more likely to be covered by Medicaid or other publicly funded insurance (Smedley, Stith, & Nelson, 2003). For the present study it is important to be aware that racial and ethnic health disparities in health care occur in several population and subpopulation groups: Alaska Natives, Native Americans, Pacific Islanders, and Hispanic Americans (Copeland, 2005). These health care issues are prevalent in rural areas.

Rural Disparities for African Americans and Latino Americans

Our nation has witnessed dramatic changes in civil rights, housing, education, and income, but the inequity of health care services continue. These health disparities are rooted in the larger social, economic, and political structures of our society (Copeland, 2005). Given the historical and continued disparities witnessed in the health care system, minorities living within rural areas may be more vulnerable to both health conditions that are preventable and manageable with early intervention. Racial and ethnic minorities may have an increased risk for mental health issues and general medical conditions because of perceived racial discrimination, limited access to healthcare, and socioeconomic hardships (Hartley, 2004). Minority and White differences in socioeconomic status, community conditions, differing cultural values, health, and ecological resources also contribute to racial differences in disease and disability (Hartley, 2004).

Depression and Anxiety in African Americans and Latino Americans

Depression is a common and disabling psychiatric disorder in the United States and elsewhere. Worldwide it is the fourth leading cause of nonfatal disease burden, accounting for 12% of total years lived with disabilities. In 2000, the estimated burden of depression was estimated to be $83 billion (Greenberg, Kessler, Birnbaum, Leong, Lowe, Berglund, & Corey-Lisle, 2003; Jackson, Neighbors, Torres, Martin, Williams, & Baser, 2007). Depression is often correlated with another common disorder, anxiety. In the literature the comorbid relationship of anxiety and depression is somewhat controversial, but disorders are highly prevalent. Individuals with panic disorder, generalized anxiety disorder, social phobia, and other anxiety disorders are also frequently clinically depressed (Diala & Muntaner 2003). Nearly 85% of patients with depression also experience symptoms of anxiety. Similarly, comorbid depression occurs in about 90% of patients with anxiety disorders (Gorman, 1996). Unfortunately, the literature regarding risk factors associated and/or impacting depressive and anxiety related symptoms on African American/Black and Latino individuals is limited and controversial compared to the research that has been conducted with other ethnicities, such as Whites. The National Comorbidity Survey (NCS) found that although Blacks and Latinos had a lower lifetime risk of mood disorder than whites, once diagnosed they were more likely to be persistently ill (Atdjian & Vega, 2005; Mayberry, Mili, & Ofili, 2000; Smedley et al., 2003). In addition, the research shows only 16% African Americans with a diagnosable mood disorder saw a mental health practitioner, and less

than one third consulted a health care provider of any kind. For the Latino population there is no difference found in regards to the utilization of services. The literature shows immigrants are unlikely to use mental health services, but may use general practitioners, which raises questions about appropriateness, accessibility, and mental health care (Vega, Kolody, Aguilar-Gaxiola, & Catalano, 1999). Racial and ethnic disparities in psychiatric treatment have been well established in the psychiatric literature. There is a gap in the utilization of services between minorities and the White population (Breslau, Kendler, Gaxiola-Aguilar, Kessler, 2005; Diala et al., 2003; Smedley et al., 2003).

The literature concerning depression and anxiety often tends to focus more on distinct aspects (i.e., depression in elders, women with physical disabilities, general medical conditions, social stratification, role impairment). One example of this research is a study conducted by Evangelista, Ter-Galstanyan, Moughrabi, and Moser (2009) that examined correlates of prevalence of anxiety and depression in a sample of African Americans, Hispanics, and non-Hispanic White adults with advanced systolic heart failure. Results from the investigation revealed that anxiety and depression, measured by (Generalized Anxiety Disorder and Patient Health Questionnaire), was common among ethnic minorities than their counterparts. In addition, the researchers found that a patient's anxiety and depression related symptoms among adults with chronic heart failure were autonomously associated with health-related and life-related stressors.

Other literature suggests that ethnic minorities' experience depression at lower rates while others state that the rates of mood or anxiety related disorders are found to have no racial differences (Brown, Schulberg, & Madonia, 1996). However, there are

unique challenges that ethnic minorities face that may make them more prone to experiencing symptoms of depression (Brown et al., 1996; Das, Olfson, McCurtis, & Weismann, 2006; Warren, 1994). In addition, there is still much controversy surrounding the idea of under recognition and misdiagnosis of mood and anxiety related disorders among ethnic minorities. Investigators suggest that racial differences in help-seeking patterns and symptom presentation produce under recognition and misdiagnosis of clinical disorders (Brown et al., 1996).

In reviews of depression and anxiety-related disorders among Latinos (Swanson, 1996; Watkins, Green, Rivers, Rowell, 2006) several risk factors identified align with ethnic minorities, including African Americans. The risk factors included: poverty levels, age, gender, language barriers, interpersonal conflict between sexes, employment status, economic status, social support, general medical conditions, racial/discrimination stigma, residential status, substance abuse, and violence. The risk factors most frequently acknowledged consistently within the literature include: economic status, racism/discrimination stigma, and environmental stressors.

Overlaps in Depression and Anxiety in African Americans and Latino Americans

Many people who develop depression have a history of an anxiety disorder earlier in life (Barbee, 1992). Although, there is no evidence that one disorder causes the other, there is clear evidence that many people suffer from depression and anxiety disorders (Barbee, 1992). Anyone can experience clinical depression, regardless of race, gender, age, creed or income. Nearly 15 million Americans suffer from some type of depressive illness and about two-thirds don't get the help they need (www.nami.org).

Specifically, depression and anxiety related disorders in women have often been cited in literature: women are found to be more likely to not only be diagnosed with these particular psychiatric disorders, but also endorse symptoms of the disorders (Barbee, 1992). From the time a female reaches puberty until the age of 50, she is twice more likely to have an anxiety disorder than a man. Anxiety disorders tend to occur earlier in women than in men (Byrne, Davies, & Morrison, 2010). Also women are more likely to have multiple psychiatric disorders during their lifetime than men. The most common to co-occur with anxiety is depression (Barbee, 1992; Regier, Rae, Narrow, Kaelber, Schatzberg, 1998).

Women experience twice the rate of depression then men, regardless of race or ethnic background. An estimated one in eight women will contend with major depression in their lifetimes (www.nami.org). The National Comorbidity Study Replication supports this fact by reporting, women are 1.5 times more likely than men to develop major depression over the course of their lives (Kessler, Berglund, Demler, Jin & Walters, 2005). Some research has identified African American and Latina women as a group at high risk for mood disorders and anxiety related symptoms (Warren, 1994).

The literature is consistent in its findings behind the rationale for ethnic minorities delaying treatment or withdrawing from treatment early due to their ethnic, cultural, and/or gender needs not being recognized (Cannon, Guy, & Higginbotham, 1989; Warren, 1994). Specifically, Warren (1994) indicated that assessment, diagnosis, treatment, and prevention require special sensitivity. Researchers and theorists have documented that many women may become depressed in response to their stressful

psychosocial environments (Barbee, 1992; Brown, Brody, & Stoneman, 2000; Jones & Ford, 2008).

In addition, studies of depression in different ethnic groups began to appear. Specifically, a previous investigation by Raskin, Crook, and Herman (1975) found that black, depressed patients reported increased hostility and irritability, increased negativism, a tendency to internalize anger, to receive less treatment prior to hospitalization, and to be brought to treatment by family members because of agitation and suicidal threats or attempts compared to White depressed patients. Many African American women fulfill multiple roles within their lives as they strive and work to provide for their family, as well as attempt to advance in mainstream society (Jones et al., 2008). In turn, when families begin to notice changes in their matriarch they are the ones to admit or suggest treatment for the individual. African Americans and Latinas fulfill different, but similar roles in their families, which can cause family life burden, one of the many risk factors found in the literature. Studies of ethnic minority women show racial/ethnic discrimination, low social support, financial strain, occupational stress, poor health, larger family sizes, single parenthood, and/or martial stress. The emotional strain of these roles is associated with depressive and anxiety related symptoms (Brown, Parker-Dominguez, & Sorey, 2000; Cutrona, Russell, Brown, Clark, Hessling, & Gardner, 2005; Fogarty, 2004; Gibbs & Fuery, 1994; Israel, Farquhar, Schulz, James, & Parker, 2002; Kessler et al., 2003; Raskin et al., 1975).

There is also evidence that ethnic minorities are less likely than whites to receive appropriate treatment when they do seek it (Barbee, 1992; Young, Klap, Sherbourne, &

Wells, 2001). In reviewing depression and anxiety disorder research with ethnic minorities Brown et al. (1996) concluded that African Americans are more likely than whites to seek treatment in general medical rather than mental health specialty settings. Ethnic minorities tend to rely on family, religion, and social communities for emotional support rather than turning to health care professionals, even though this may at times be necessary. The health care providers they seek may not be aware of the patient's cultural characteristics (Aguilar-Gaxiola, Kramer, Resendez, & Magana, 2008). Furthermore, compared with whites, depressed African-American primary medical care patients report more severe somatic symptoms and a different pattern of psychiatric comorbidity (Brown et al., 1996). This pattern suggests the need to examine possible racial differences in the rates or clinical presentation of anxiety disorders. Although ethnic minority women tend to be affected disproportionately due to their severe social circumstances, statistics on depression in African American and/or Latino women either do not exist or are uncertain (Barbee, 1992; McGrath, Keita, Strickland, & Russo, 1990).

There is some documented inconsistency concerning the prevalence of psychiatric disorders, anxiety and depression, among ethnic minorities and whites. For instance, some researchers have reported equal rates of prevalence of depression among ethnic minorities and Whites (Brown et al., 1996; Kessler et al., 1994), and others (Jackson et al., 2007) have reported lower prevalence rates of depression in minorities than in Whites. There is little known about the relationship between race/ethnicity and psychiatric disorders among African Americans (Jackson et al., 2007). I deleted a space below here

Other Factors Associated with Depression and Anxiety

The relationship between psychiatric disorders, depression and/or anxiety, gender, and some environmental stressors have been examined. Social circumstances often serve as an indicator for the likelihood of developing a mental illness. African Americans may be disproportionately more likely to experience social circumstances that increase their chances of developing a mental illness (Barbee, 1992). In a review of the research on depression among African Americans, Brown et al. (1999) concluded that factors that increase African American women's vulnerability for depression are being poor, being between 18 and 45 years of age, being unemployed having less than a high school education, and the presence of minor children in the household (Barbee, 1992). In 2001, it was reported that among the 10 leading diseases for global disease burden, unipolar depressive disorders were ranked third in high-income countries and seventh in low- and middle-income countries (Lopez, Mathers, Ezzati, Jamison, & Murray, 2006). The relationship between economic status and depression and/or anxiety is positively correlated. There is considerable evidence that men or women who live below the poverty line are at a higher risk for depression and anxiety related symptoms. According to the U.S. Census Bureau, 21.5 % of Latinos live below the federal poverty line, compared with 8.2 % of Caucasian Americans. Women who are considered to have a low-income status are at higher risk for depression, low-income African American women report elevated rates of depression across several studies (Bassuk, Buckner, Perloff, & Bassuk, 1998; Brown et al., 1999; De Groot, Auslander, Williams, Sherraden,

& Haire-Joshu, 2003; Hall, Williams, & Greenberg, 1985; Heneghan, Silver, Bauman, Westbrook, & Stein, 1998; Hobfoll, Ritter, Lavin, Hulsizer, & Cameron, 1995).

Overall, poverty contributes to the higher rates of depressive symptoms. Only 21 % of Latina women seek mental health help and/or treatment (De Groot et al., 2003; Miranda & Green, 1999; Meltzer, 2013). African Americans are often at a socioeconomic disadvantage in terms of accessing both medical and mental health care: In 2006, one-third of the working adult African Americans were uninsured in the preceding year (www.nami.org). Men and women who tend to fall below the poverty line are individuals living in residential areas with limited access to health care. The previous findings of social circumstances that increase depression and anxiety are evidence of the importance of continuing the investigation and development of programs for the ethnic minority population.

Issues in Diagnosing Depression and Anxiety among African Americans and Latinos

The findings on the diagnosis of mood disorders indicate that anyone can experience clinical depression, regardless of race, gender, age, or income (www.nami.org). However, there is evidence that minorities are often misdiagnosed (Neighbors, Trierweiler, Munday, Thompson, Jackson, Binion, & Gomez, 1999). The literature gives the impression that misdiagnosis of African Americans is a well-documented fact. However, the data on this topic is neither clear nor definitive. There are minimal studies of misdiagnosis directly related to African American patients. Many

of the studies in this area are in relation to correspondent studies and reviews of literature (Neighbors et al., 1999).

According to Neighbors et al. (1999), the hypothesis of misdiagnosis stems from clinicians being more likely to yield conflicting diagnostic conclusions for African Americans than Whites. Clinicians use semi-structured instruments, along with careful application of criteria published in the Diagnostic and Statistical Manual (DSM) of the American Psychiatric Association, yet yield conflicting diagnostic conclusions for African American patients (Neighbors et al., 1999). Even though the conflicting diagnostic conclusions draw a misdiagnosis hypothesis, it does not clarify why clinicians implementing the same set of diagnostic criteria on the same patient often come to divergent diagnostic conclusions. In 2003, Neighbors et al. conducted a study to look at contributing factors to misdiagnosis; clinicians used semi-structured instruments and DSM criteria to assess for mood disorders in various racial/ethnic groups. The study found minimal race differences in diagnosis of mood disorders. The semi-structured diagnostic instrument and DSM criteria used by clinicians did not eliminate the hypothesis of misdiagnosis (Neighbors et al., 2003). However, the use of semi-structured instruments and DSM criteria for diagnosis was still supported in the study due to the reliability and validity of both assessments (Mezzich, Kleinman, Fabrega, & Parron, 2002; Neighbors et al., 1999). The previous findings show that the hypothesis of misdiagnosis remains unclear, while it remains a plausible explanation.

There is variation in opinions concerning misdiagnosis among racial/ethnic minorities. There is, however, agreement concerning the need for a culturally sensitive competent

treatment and service delivery. There is unfamiliarity with the cultural aspects of racial/ethnic minorities' behavior and language, which leads to the misinterpretation and misdiagnosis of racial/ethnic minority patients (Jones & Gray, 1986; Lawson, 1986; Mezzich et al., 2002; Neighbors et al, 1999). The overall premise of the misdiagnosis hypothesis is that clinicians are not sensitive to racial and ethnic differences in symptom expression. The unfamiliarity with the cultural norms of ethnic minorities' behaviors leaves clinician's vulnerable to their own personal biases (Jones & Gray, 1986; Lawson, 1986). The literature suggests that there is not enough attention paid to sociocultural differences in the interpretation of psychopathology, which results in misdiagnosis (Neighbors et al., 2003; Smedley et al., 2003). The previous findings of potential causes for misdiagnosis of ethnic minorities are evidence for the importance of continuing the investigation and development of programs sensitive to the racial/ethnic minority populations. The present study intends to provide important information that may be used to develop programs for racial/ethnic minority populations in an underserved, predominately rural area who may be experiencing self-reported problems with depression and anxiety.

Issues in Measuring Depression and Anxiety among African Americans and Latinos

Taking the issues with diagnosing racial/ethnic minorities a step further, there are also concerns in measuring depression and anxiety among racial/ethnic minorities. Solely based on the literature, the relationship for depression and anxiety measures remains unclear (Tanaka-Matsumi & Kameoka, 1986). The psychometric relationship of

the two psychiatric disorders dates back to 1972, when researchers administered a set of anxiety and depression scales to female psychiatric patients. The study demonstrated that all correlations between common assessment scales, such as Beck Depression Inventory (Beck, Steer, & Carbin, 1988), Beck Anxiety Inventory (Beck, Epstein, Brown, & Steer, 1988), and Center for Epidemiological Studies Depression (Radloff, 1977) scales were statistically significant and internally consistent (Dobson, 1985; Mendels, Weinstein, & Cochrane, 1972). The anxiety and depression measures correlated significantly. However, researchers felt that the strong relationship of the anxiety and depression scales called into question the suitability of self-report measures. Therefore, caution needs to be employed in interpretation of self-report measures of anxiety or depression severity (Dobson, 1985; Tanaka-Matsumi et al., 1986; Radloff, 1977). The implications of the study show that discrepancies may be due in part to the varied responses of individuals, research objectives, and population.

Two studies conducted in 1985 and 1995 proposed that social desirability and scale discriminability were potential contributory factors in the issue of interpretation and suitability of self-report measures. In the Dobson (1985) study, the component of social desirability was assessed with the use of the Emotional Self-Disclosure Scale (Snell, Miller, Belk, & Garcia-Falconi, 1988) and Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1960). There were negative correlations between depression, anxiety, and the social desirability scales (Dobson, 1985). The researchers did not prove that social desirability was an influential factor for self-report measures, but the results did call into question the discriminant validity of self-report instruments used in

screening mildly depressed subjects among diverse populations (Abramson, Seligman & Teasdale, 1978; Dobson, 1985; Beck et al., 1988; Tanaka-Matsumi et al., 1986). It was argued that an individual's self-ratings indicated general emotionality or attitudinally dysfunctional conditions rather than specific constructs of depression or anxiety among diverse populations (Dobson, 1985; Tanaka-Matsumi et al., 1986). The study illustrated that the self-report measures suitably depend on the research objectives and diverse populations.

In a study conducted by Santor et al. (1995) examining how effectively a scale or inventory discriminates among individuals ordered along some continuum for both the CES-D and BDI in both college students and depressed outpatient samples, the results suggested that the CES-D was more discriminating of individual differences in depressive severity than the BDI (Santor et al., 1995). The CES-D scale showed distinction in results for various individual demographics, such as race and gender differences. Consequently, the CES-D may be more desirable for investigating individual differences in depressive severity in both sample populations, where small individual differences in depressive severity must be detected (Elkin, Parloff, Hadley, & Autry, 1985; Santor et al., 1995). The results also suggest that the CES-D may be less specific than the BDI depending on the researchers' purpose; in the same way the results of the study illustrated the issue of each scale's suitability being dependent on the population and one's research objectives (Santor et al., 1995; Tanaka-Matsumi et al., 1986).

In 2012, Schinka addressed the issue of suitability being dependent on the population by proposing that readability of patient materials for depression and anxiety self-report measures needs to be considered. Schinka's (2012) comments described the weaknesses of readability and emphasized the importance of the development of improved strategies for assessing readability to maximize the validity of self-report measures in applied settings. The majority of self-report measures are written at a reading grade level that exceeds the reading abilities of target populations, which happen to be a majority of the time racial/ethnic minorities (McHugh & Behar, 2009). According to McHugh & Behar (2009), the common depression and anxiety self-report symptom measure such as the CES-D and BDI, fail to account for vocabulary difficulty. Schinka (2012) suggested that newer readability measurement approaches assessing multiple elements of linguistic difficulty should be considered for the evaluation of reading grade level of respondents. Readability is critical to the validity of these measures in both clinical practice and research settings (McHugh & Behar, 2009; McHugh & Behar, 2012; Schinka, 2012). The literature highlights the need to maximize the ability to accurately detect symptoms and to offer beneficial treatment suitable for diverse populations and research settings.

The literature is consistent in its reports of depression measures having the highest internal consistency, acceptable test-retest stability, excellent concurrent validity by clinical and self-report criteria, and substantial evidence of construct validity (Radloff, 1977; Santor et al., 1995). These properties have been found to hold across the general population subgroups (Radloff, 1977; Santor et al., 1995). In addition, self-report

scales are suitable for the use of English-speaking American populations of both sexes with a wide range of age and socioeconomic status for the study of the symptoms of depression and anxiety. Despite the varied opinions on the suitability of each self-report scale, the literature has found that self-report measures are valuable tools in identifying the relationships between depressive and anxiety related symptoms (Beck et al., 1988; Radloff, 1977; Santor et al., 1995; Tanaka-Matsumi et al., 1986).

Rationale for the Present Study

Although there are numerous studies that document the limitations and difficulties that ethnic minorities face in regards to health care in the United States, there remains a gap in the literature relaying the specific experiences of ethnic minorities as it relates to the issue. The literature regarding the relationship between ethnic minorities and psychiatric disorders are usually pinned with health related and environmental stressors. The literature regarding the African American and Latin American experience with psychiatric disorders in relation to residence and gender is inconsistent. Furthermore, it is suggested that certain cultural and contextual factors may also cofound our understanding of depression and anxiety related symptoms in rural communities. In a recent investigation of data from the 2006 and 2010 *Brazos Valley Health Survey* Brossart et al. (2013) found that race/ethnicity and gender were the only factors significantly associated with symptoms of depression. Regardless of the instrument used African Americans and women responded with high levels of self-reported depression. However, there were no unique differences for residency. Although these results revealed important relationships a major concern of this study was the instruments have

a possibility of not being culturally sensitive to the complex ways in which African American and Latino men and women may experience depression.

The current study was a replication and extension of the Brossart et al. (2013) study. In the previous study, the levels and rates of probable depression assessed by different instruments in two separate surveys of residents in predominately rural regions of the United States were examined. The Brossart et al. (2013) study gathered data from the 2006 and 2010 Regional Health Status Assessment. The 2006 included the five-item Center for Epidemiologic Studies of Depression and 2010 included the nine-item Patient Health Questionnaire. The previous study found that African American women responded with higher levels of self-reported depression. However, there were no significant interactions between rural status and gender, rural status and ethnicity, or gender and ethnicity.

Overall, the current study replicated the Brossart et al. (2013) study, by examining the level and rate of probable depression, and the link between depression, race/ethnicity, gender, and residence. The study expanded on the Brossart et al. (2013) study, by examining the level and rate of probable anxiety, and the link between anxiety, race/ethnicity, gender, and residence. The study examined the links between race/ethnicity, gender, residence, and the two psychiatric disorders with the use of two reliable and valid measures of depression (Patient Health Questionnaire-2) and anxiety (Generalized Anxiety Disorder-7). The information from the current study provided suggestions for future assessment, research, programming, planning, and policy in rural residing areas.

Research Questions and Hypothesis

1. Will the level of depression in the 2013 Brazos Valley Regional Health Assessment vary by gender, race/ethnicity, and residence?
2. Will the percent of depression (as measured by PHQ-2) in the 2013 Brazos Valley Regional Health Assessment be similar to the rates reported by Brossart et al. (2013)?
3. Will the level of anxiety (as measured by GAD-7) in the 2013 Brazos Valley Regional Health Assessment vary by gender, race/ethnicity, and residence?
4. Will the percent of anxiety (as measured by the GAD-7) in the 2013 Brazos Valley Regional Health Assessment vary by gender, race/ethnicity, and residence?

CHAPTER III

METHODOLOGY

This chapter describes the design and research methodology for the study. It includes description of sample size and characteristics, the research settings, the procedures for sample recruitment, instrumentation, data collection, and human rights protection. Finally, this chapter will propose data analytic procedures.

Participants

Participants are individuals from six rural residing counties and three metropolitan residing counties in the area that comprises the Brazos Valley in South Central Texas who responded to a health survey of the region. Approximately 5,230 individuals responded to the survey. Participants included individuals from various ethnic groups including White, Black/African American, Hispanic/Latino, Asian or Pacific Islander, and Native American. Participants ranged in age from 18-99 years old.

The study relied upon a secondary data set that resulted from regional health survey of the Brazos Valley conducted by the Regional Healthcare Partnership-Region 17 (RHP-17) and its community outreach program. The procedure for disseminating the surveys will be described in detail later. The completed surveys did not include identifying information such as name or address. The survey is conducted every four years to inform and improve policies and services for residents of the Brazos Valley who face disparities resulting from geographic isolation, limited availability of services, poor socioeconomic services, lack of insurance, health impairments, and a host of other contributing factors within these counties.

Procedures

In the spring of 2013, The Brazos Valley Health Partnership (BHVP) and the Center for Community Health Development (CCHD) at the Texas A&M Health Science Center School of Rural Public Health conducted their fourth regional health assessment. The 2013 Regional Health Assessment covered the Brazos Valley region as well as Montgomery and Walker Counties, which together make up the Regional Healthcare Partnership – Region 17 that was organized in March 2012 as a mechanism to participate in the new Texas 1115 Medicaid Waiver Program.

The health status assessment was designed to measure the health of residents of the nine-county region and identify the factors contributing to the health of local communities. The regional assessment consisted of three components: a household survey, community discussion groups, and an examination of existing data from a variety of other reliable sources. The random sample household survey consisted of phone calls placed to residents, selected at random, of the nine-county region to determine if they were willing to participate in a health survey, which covered a wide array of health-related topics including individual and community concerns. Those who agreed to participate received a survey and a self-addressed stamped envelope for return of the survey. The second component, community discussion groups, provided documentation, which was incorporated in the overall assessment. Community discussion groups were held throughout each county to capture the various perspectives of community members that may have been more difficult to obtain in a survey format. Discussions were held with various human service providers, community leaders, and

the general public. In the groups, participants were encouraged to discuss their views and concerns related to community resources and challenges that may either directly or indirectly relate to health care in their community.

Previous surveys were conducted in 2002, 2006, and 2010 in the seven-county Brazos Valley region, which includes Brazos, Burleson, Grimes, Leon, Madison, Robertson, and Washington Counties. The survey asks a range of questions in various domains. The survey includes measures of individualized self-rated health; engagement in physical activities, access to health care services, medical history and health habits, transportation issues, housing, food and nutrition, health insurance, psychological well-being, community services and community demographics, and other personal information. Although the survey is quite extensive, it effectively allows investigators to understand participants' health habits, problem areas with the community, and what issues are likely most important within that region for the individual, solely based off of the participants' responses to the provided questions.

Independent Variables

There are several outside influences that may impact the relationship between probable anxiety and depression. This study examined the role of demographic factors found in the regional health survey. The survey provided items from various demographic areas. The demographics of our interest were: race/ethnicity, gender, and residence. Each of these demographics provided information on the link between outside influences and psychological factors (anxiety and depression). Basically, foretelling if

race/ethnicity, gender, and residence impact an individual's psychological domain, anxiety and depression related symptoms.

Race/Ethnicity

Recognizing that outside influences may impact the relationship between race/ethnicity and probable depression and anxiety. The survey instrument provided items from various race/ethnicity groups. Respondents were asked to choose out of six responses, "Which of the following best describes your race/ethnicity?" The responses were coded as the following: 1= Asian/Pacific Islander/Hawaiian Native, 2 = Black/African American, 3 = Native American/Alaskan Native, 4 = White, 5 = More than one race, 9 = no response. To account for Hispanic, Latino, and Spanish origin an additional question was added to the regional health survey, "Are you of Hispanic, Latino or Spanish origin?" The responses were coded as the following: 1= No, Not of Hispanic, Latino, or Spanish origin and 2 = Yes, Hispanic, Latino, or Spanish origin. The demographics of our interest were: race/ethnicity (White, Black, and Latino).

Gender

Gender was assessed using responses to the question inquiring if the respondent was male or female. The responses were coded as the following: 1 = male and 2 = female.

Residence

The terms urban, urbanized area, and rural are the Census Bureau's definitions; other Federal agencies, State agencies, local officials, and private groups may use these same terms to identify areas based on different criteria (U.S. Census Bureau, 2014).

Urbanized areas (UA) are continuously built up areas with a population of 50,000 or more. The UAs comprise one or more places and the adjacent settled surrounding area (urban fringe) consisting of other places. Rural areas (RU) are territory, population, and housing that are not classified as rural. Based on those terms a rural area is any incorporated place or census designated place (CDP) with fewer than 2,500 inhabitants that is located outside of a UA. A place is either entirely urban or entirely rural except for those designated as an extended city, also known as metropolitan areas. For our study, this classification was used because it was the only system that uses county level codes. The community health survey assessed seven counties of Brazos Valley with the addition of Montgomery and Walker counties; of these, three qualify as an urban and the other six qualify as rural areas. In the regional healthy survey respondents were asked to write in a blank space, "in which county do you currently live?" The responses were coded as the following: BRA=Brazos, LEO=Leon, ROB=Robertson, BUR=Burleson, MAD=Madison, WAL=Walker, GRI=Grimes, MON=Montgomery, and WAS=Washington.

Dependent Variables

Dependent variables were taken from measures of depression and anxiety included in 2013 Health Survey.

Patient Health Questionnaire-2

A short version of the Patient Health Questionnaire (PHQ-2) was used in the 2013 regional health survey to assess depression (Kroenke, Spitzer, & Williams, 2003). The PHQ-2 inquires about the frequency of depressed mood and anhedonia over the past

two weeks, it features two items, each scored on a 4-point Likert-type scale, ranging from 0 (*Not at all)* to 3 *(Nearly Every Day)*, that parallels the Diagnostic and Statistical Manual of Mental Disorders (DSM-IVTR) diagnostic criteria for major depression. The two items on the PHQ-2 consist of the first two items of the PHQ-9, and constitute the two core DSM-IVTR criteria items for major depressive disorder (Kroenke et al., 2003). The PHQ-2 was designed for use in clinical and medical settings. The scale was developed and validated in primary care settings. However, the PHQ-2 is recommended for obtaining normative information about depression rates among general population individuals who usually present their concerns about depressive symptoms in primary care settings (Lowe et al., 2008).

Reliability and validity studies of the PHQ-2 have yielded results indicating sound psychometric properties. The initial validation study involved 6,000 patients from eight primary care clinics and 7 obstetrics-gynecology clinics. The criteria validity was established with a subsample, by conducting 580 structured interviews by a mental health professional. The health professional was blinded to the results of the patient's PHQ-2 scores. Results from these interviews showed that individuals who scored high (≥ 3) on the PHQ-2 reported a sensitivity of 83% and specificity of 92% (Kroenke et al., 2003). Additionally, the internal consistency of the PHQ-2 has been shown to be high. A study involving work-disabled patients in a primary care setting produced Cronbach alpha of .83 (Lowe et al, 2008). A receiver operating characteristic (ROC) analysis produced an area under the curve for the PHQ-2 when diagnosing depression of .90 suggesting a test that discriminates well between persons with and without depression

(Kroenke et al, 2003). Given the quick administration, acceptable validity, and its availability in many languages, the PHQ-2 has been widely used as a screening tool for depression in several countries (i.e. Germany) and across a wide array of clinical settings with African Americans, Asian Americans, Latinos, and Non-Hispanic Whites (Lowe et al., 2008).

The PHQ-2 total score can range from 0 to 6. In this study, we scored the PHQ-2 using the most popular scoring method. We used a scoring method simply uses a cutoff score of 3 or greater, which is to be considered a "red flag", suggesting that further follow-up is needed that prompt a thorough assessment of depression and/or clinical intervention if warranted (Kroenke et al., 2003). Regardless, the PHQ-2 was chosen based on its effectiveness in detecting, measuring, and monitoring of depression in diverse populations (Kroenke et al., 2013). Thus, the PHQ-2 total was used for the study and a cutoff score of 3 indicated depression within the sample. This cutoff seems appropriate and allowed for a conservative analysis.

Generalized Anxiety Disorder-7

A short version of Generalized Anxiety Disorder scale (GAD-7) was used on the 2013 survey (Spitzer, Kroenke, Williams, & Löwe, 2006). The GAD-7 is a criterion-referenced measure that features seven items, each scored on a 4 point Likert-type scale, ranging from 0 (*Not at all)* to 3 *(Nearly Every Day)*, that parallel the Diagnostic and Statistical Manual of Mental Disorders (DSM-IVTR) diagnostic criteria for generalized anxiety disorder. The format and temporal framework of the items also correspond to DSM-IV TR criteria (Spitzer et al., 2006). The GAD-7 was designed for use in clinical

and medical settings. The scale was developed and validated in primary care settings. However, the GAD-7 is recommended for obtaining normative information about anxiety rates among general population individuals (Lowe, Deceker, Muller, Brahler, Schellberg, Herzog, Herzberg, 2008).

The initial validation study involved 2,740 patients from fifteen primary care clinics located in 12 states (13 family practice, 2 internal medicine). When the GAD-7 was compared with the diagnoses made in clinical interviews by mental health professionals, the overall accuracy was 83%, sensitivity 89%, and specificity was 82% (Spitzer, Kroenke, Williams, & Lowe, 2006). Given the quick administration, acceptable validity, and its availability in many languages, the GAD-7 has been widely used as a screening tool for anxiety in several countries (i.e. Germany) and across a wide array of clinical settings with African Americans, Latinos, Asian Americans, and Non-Hispanic Whites (Lowe et al., 2008).

Reliability and validity studies of the GAD-7 indicate the instrument has sound psychometric properties. The internal consistency of the GAD-7 was shown to be high producing a Cronbach alpha of .92. Additionally, test-retest reliability had a high correlation at .83 and a receiver operating characteristic (ROC) analysis produced an area under the curve for the GAD-7 when diagnosing depression of .906, suggesting a test that discriminates well between persons with and without anxiety (Spitzer et al, 2006). Moreover, the GAD-7 has been shown to be highly correlated with the Mental Health Inventory administered versions of the same scale yielding similar results (Spitzer et al, 2006) indicating high construct validity. As mentioned, the initial

validation study involved 2,740 patients from fifteen primary care clinics located in 12 states (13 family practices, 2 internal medicines). For criterion and construct validity, GAD-7 self-report scale diagnoses were compared with independent diagnoses made by mental health professionals; functional status measures; disability days; and health care use (Spitzer et al., 2006).

Results from these interviews show as the cut point increases, sensitivity decreases and specificity increases in a continuous fashion. At a cut point of 10 or greater, sensitivity and specificity exceed 0.80, and sensitivity is nearly maximized. Results were similar for men and women and for those aged less and those aged more than the mean age of 47 years. The proportion of primary care patients who scored at this level is high (23%) (Spitzer et al., 2006). A cut point of 15 or greater maximized specificity and approximated prevalence (9%) more in line with current epidemiologic estimates of GAD prevalence in primary care. However, sensitivity at this high cut point is low (48%). Most patients (89%) with generalized anxiety disorder (GAD) had GAD-7 scores of 10 or greater, whereas most patients (82%) without GAD had scores less than 10 (Spitzer et al., 2006). The overall accuracy of the GAD-7 was 83%, sensitivity 89%, and specificity was 82% (Spitzer et al., 2006).

The GAD-7 can be scored in a variety of ways. In this study, we scored the GAD-7 using two popular scoring methods to maximize our understanding of anxiety among rural residents. One method assigns a level of anxiety severity based on the total score (5 = mild anxiety, 10 = moderate anxiety, 21 severe anxiety; Spitzer et al., 2006). Since each of the items is scored from 0 to 3, the GAD-7 scale score ranges from 0-21.

Although the GAD-7 is designed primarily as a screening and severity measure for generalized anxiety disorder, it also has moderately effective characteristics for three other common anxiety disorders (panic disorder, social anxiety disorder, and post-traumatic stress disorder), when screening for anxiety disorders the recommended cutoff point is a score of 10, indicating further evaluation (Spritzer et al., 2006). Thus, the GAD-7 total was used for the purposes of this study and a cutoff score of 10 is indicative of anxiety within the sample. This cutoff score and scale are appropriate and allow for a conservative analysis.

Statistical Analysis

The methods of data analysis that were used included: descriptive statistics, multivariate analysis of variance and a series of chi-square analysis. Descriptive information such as mean of race/ethnicity, gender ratio, and residence was calculated. Other statistical analysis such as a series of chi-square analysis was performed in order to understand the sample and the relationships that exist between variables and their impact on psychological factors.

A multivariate analysis of variance (MANOVA) was performed to evaluate the relationship between the three predictor variables, race/ethnicity, gender, and residence and the two outcome variables, anxiety and depression. The previous study by Brossart et al. (2013) used a standard analysis of variance (ANOVA) to evaluate the relationship between depression and similar predictor variables. Given the unequal cell sizes and kurotic and mildly skewed nature in the 2006 and 2010 samples, the researchers believed it was best to compare an ANOVA to two robust methods (F* and E test), test that do

not inflate Type 1 errors in these situations (Brossart et al., 2013; Wilcox, 1989). The results were similar across methods, so only the standard ANOVA results were presented.

The current study uses a MANOVA, which allows for comparison of multivariate means of several groups. Unlike the ANOVA, it uses covariance between variables in testing the statistical significance of mean differences (Warton & Hudson, 2004). A MANOVA is used when there are several dependent variables (depression and anxiety), and one desires a single, overall statistical test on this set of variables instead of performing multiple individual tests. Unlike an ANOVA, the MANOVA uses the variance-covariance between variables in testing the statistical significance of the mean differences. Basically, it is a generalized form of an ANOVA. The MANOVA helped to answer several questions of interest: do changes in the independent variables have significant effects on the dependent variables? what are the interactions among the dependent variables and among the independent variables?. The statistical reports provide individual p-values for each dependent variable, which indicated whether differences and interactions are statistically significant. For our purposes, we explored how independent variables influence some patterning of response on the dependent variables.

The independent variables for the study are as follows: race/ethnicity, gender, and residence. On the other side the dependent variables are: depression and anxiety total scores from the PHQ-2 and GAD-7. We used the total scores on the dependent variables to test the hypotheses about how the independent variables differentially predict the

dependent variables. Taking into consideration the high correlation between the two dependent variables, there is an indication of a high co-morbidity between anxiety and depressive disorders, which could result in dependent variables measuring the same variable (Kroenke et al., 2006).

In addition, the study included an secondary analyses. A series of chi-square analyses of the rates of probable depression and anxiety were conducted. A chi-squared test examines the sampling distribution (Satorra & Bentler, 2001). The chi-square test examined two null hypothesis for our study: does depression vary by gender, race/ethnicity, and residence? and does anxiety vary by gender, race/ethnicity, and residence? The test provided the deviations of observed frequencies. These chi-square analyses examined the percentage of depressed/no-depressed individuals by gender, race/ethnicity, and residence. The same analyses were conducted to examine the rates of individuals with and without clinical levels of anxiety by the independent variables.

In these analysis the clinical levels of depression and anxiety were determined by recommended cut-off scores rather than total scores (which were used as dependent variables in the MANOVA). In addition, the chi square statistic was used to investigate whether distributions of categorical variables differ from one another. Basically, categorical variables yield data in categories and the numerical variables yield data in numerical form (Satorra et al., 2001). We had an adequate sample size to ensure the sampling distribution could approximate a chi-squared distribution as closely as desired.

CHAPTER IV

RESULTS

The purpose of the present study was to examine the levels and rates of probable depression and anxiety in African Americans and Latinos in a mental health professional shortage area. The current study is an extension and replication of a previous study conducted by Brossart et al. (2013) that assessed the severity of depressive symptoms and rates of probable depression assessed by different instruments, the CESD-5 (Shrout & Yager, 1989) and PHQ-9 (Spitzer, Kroenke, & Williams, 1999), in two separate surveys (2006, 2010) of residents in the predominately rural, Brazos Valley area in South Central Texas. The following research questions guide the present study:

1. Will the level of depression in the 2013 Brazos Valley Regional Health Assessment vary by gender, race/ethnicity, and residence?
2. Will the percent of depression (as measured by PHQ-2) in the 2013 Brazos Valley Regional Health Assessment be similar to the rates reported by Brossart et al. (2013)?
3. Will the level of anxiety (as measured by GAD-7) in the 2013 Brazos Valley Regional Health Assessment vary by gender, race/ethnicity, and residence?
4. Will the percent of anxiety (as measured by the GAD-7) in the 2013 Brazos Valley Regional Health Assessment vary by gender, race/ethnicity, and residence?

Participants

A total of 5,230 individuals responded to the survey. Respondents ranged in age from 18 to 99 years of age. On average, the amount of missing data across variables was 4%, which was similar to the rates of missing data reported by Brossart et al. (2013). This pattern of missing data in the present study resulted in different sample sizes across variables.

A majority of the respondents were White, 81.9% (*n* = 4282); while others were Latino, 6.1% (*n* = 319) and Black/African American, 4.5% (*n* = 236). There was also a small percentage of participants who identified as "other" (2.4%; n = 126). The amount of missing data for race/ethnicity was 5%, producing a final sample size of N = 4963. The majority of participants (65.9%; *n* = 3198) were women. The amount of missing data for gender was .3%, producing a final sample size of N = 5214.

All respondents were residents of counties that constitute the Brazos Valley of Texas including Brazos (31%; *n* = 1622), Burleson (4.6%; *n* = 239), Grimes (4.8%; *n* = 252), Leon (4.6%; *n* = 241), Madison (3.1%; *n* = 161), Robertson (4.4%; *n* = 231), Washington (10.8%; *n* = 566), Montgomery (29.1%; *n* = 1522), and Walker (7.6%; *n* = 396) counties. The majority of the participants resided in metropolitan (60.1%; *n* = 3144) rather than rural areas (39.9%; *n* = 2086).

The majority of respondents were married (75.1%; *n* = 3930) and others reported being widowed (8.4%; *n* = 440), divorced/separated (8.9%; *n* = 468), single/never married (4.1%; *n* = 214), or living with partner/not married (1.5%; *n* = 79). In addition, most respondents reported having more than a high school education (70%; *n* = 3661)

followed by having a high school education (21%; n = 1110), and those with less than a high school education (6%; n = 327).

Examining Patterns of Missing Data

Missing data can occur completely at random (MCAR), missing at random (MAR), or missing not at random (MNAR; Enders, 2011). In order to assess whether or not data was MNAR, MAR or MCAR a Pearson χ^2 test of independence was calculated to examine the dependent variables for participants with and without missing data. A comparison of the probability of depression and anxiety among participants with missing data (PHQ-2: n = 5090; GAD-7: n = 5021) and without missing data (PHQ-2: n = 140; GAD-7: n = 209) with incomplete data sets from demographic predictor variables (gender, race/ethnicity) included in the analysis revealed similar results. A series of chi-square analyses indicated no statistically significant associations between depression and race/ethnicity, χ^2 (2) = 3.28, p = .19, or by gender χ^2 (2) = .02, p = .99. In addition, there were no statistically significant associations between anxiety and race/ethnicity, χ^2 (2) = 8.29, p = .2, or gender χ^2 (2) =1 .09, p = .60. These analyses suggest missing data on the depression and anxiety measures were not meaningfully associated with gender, race/ethnicity, and residence.

Levels of Depression and Anxiety among Respondents

We interpreted the results of the multivariate analysis of variance (MANOVA) only if the group Wilks' Λ statistic obtained a p-value less than .05. The assumptions of independence of observations and homogeneity of variance/covariance were checked and met. A MANOVA was conducted examining the effect of race/ethnicity (White,

Black/African American, Latino) on PHQ-2 and GAD-7 scores. The effect of race/ethnicity was statistically significant, Wilks' Λ =.991, F (6, 9666) = 7.09, $p < .001$, multivariate η^2 = .004. Follow-up ANOVAs indicated statistically significant differences between PHQ-2 scores and race/ethnicity, F (3,4834) = 12.38, $p < .001$. There were statistically significant differences between GAD-7 scores and race/ethnicity, F (3,4834) = 11.53, $p < .001$. Black/African American respondents had higher PHQ-2 (M = 1.1, SD = 1.6) and GAD-7 (M = 4.1, SD = 5.3) total scores than White (PHQ-2: M = 0.7, SD = 1.3; GAD-7: M = 2.8, SD = 4.0) and Latino respondents (PHQ-2: M = 0.9, SD = 1.4; GAD-7: M = 3.6, SD = 4.4).

A MANOVA was conducted to examine the effect of residence (rural, metropolitan) on PHQ-2 and GAD-7 scores. A significant effect was found, Wilks' Λ = .998, (2,4833), $p < .05$. Follow-up ANOVAs indicated that PHQ-2 scores were significantly associated with residence, F (1,4834) = 7.62, $p < .01$. GAD-7 scores were also significantly associated with residence, F (1,4834) = 7.29, $p < .01$. The statistical analysis revealed rural residence respondents had higher scores on the PHQ-2 (M = .84, SD = 1.4) and the GAD-7 (M = 3.2, SD = 4.4) compared to metropolitan residence respondents (PHQ-2: M = .67, SD = 1.3; GAD-7: M = 2.8, SD = 4.1).

A MANOVA was conducted to examine the effect of gender (male, female) on PHQ-2 and GAD-7 scores. A significant effect was found, Wilks' Λ = *.998, F* (2,4833), $p < .05$. Follow-up ANOVAs indicated that PHQ-2 scores were not significantly associated with gender, F (1,4834) = .33, p = .56. However, GAD-7 scores were significantly associated with gender, F (1,4834) = 4.71, $p < .05$. Women had higher

scores on the PHQ-2 (M = .79, SD = 1.4) and the GAD-7 (M = 3.4, SD = 4.4) compared to men (PHQ-2: M = .64, SD = 1.2; GAD-7: M = 2.3, SD = 3.7).

Chi-square Analysis

Results of Pearson χ^2 tests of independence and *t*-tests were performed to examine the rates of depression by the independent variables. When multiple variables were examined, the percentage of missing data typically changed across variables producing different sample sizes. A series of chi-square analyses examined the percentage of depressed/no-depressed individuals by gender, race/ethnicity, and residence. The same analyses were conducted for rates of anxiety by the independent variables. These chi-square analyses were based on recommended cut-off scores. Thus, the PHQ-2 cutoff score of 3 was indicative of rates of depression within the sample. A score of 3 or greater indicated depressed respondents and a score of 2 or less indicated respondents were not depressed. In the same way, the GAD-7 cutoff score was used. A score of 10 or greater was indicative of anxiety within the sample and a score of 9 or less was indicative of no anxiety.

Percentage of Depression among Respondents

A Pearson χ^2 test of independence was calculated to examine the distribution of individuals classified as depressed and not depressed in rural and metropolitan counties. The Pearson χ^2 test revealed a statistically significant association between residence and depression, $\chi^2(1) = 13.772$, $p < .001$, Cramer's V = .05. There was a lower percentage of metropolitan residents classified as depressed (8.3%) than observed among rural

residents (11.4%; see Table 3). It should be noted that the Cramer's $V = .05$ indicates a weak relationship.

A Pearson χ^2 was calculated to examine the distribution of individuals classified as depressed and not depressed between White, Black/African American, and Latino respondents. Table 2 contains PHQ-2 cut-off scores by race/ethnicity with 7% of total data from the survey missing from the table, producing a final sample size of N = 4850. There was a statistically significant association between race/ethnicity and depression, $\chi^2(3) = 27.645$, $p < .001$, Cramer's $V = .08$. There was a higher percentage of Black/African American (17.5%) and Latino respondents classified as depressed (11.1%) than observed among Whites (8.4%; see Table 2).

A Pearson χ^2 test of independence was calculated to examine the distribution of individuals classified as depressed and not depressed for male and female respondents (see Table 4). Table 4 contains PHQ-2 cut-off scores by gender with 2.9% of total data from the survey missing from the table, producing a final sample size of N = 5079. There was a statistically significant difference found, $\chi^2(1) = 6.471$, $p < .05$, Cramer's $V = .04$. There were a lower percentage of male respondents classified as depressed (8.1%) than observed among female respondents (10.3%; see Table 4).

To summarize, these results display a complicated picture that is not fully consistent across samples. Black/African Americans and female respondents had a higher percentage of depression. Respondents who lived in rural areas had a slightly higher percentage of self-reported depression. These results are consistent with the Brossart et al. (2013) finding that African Americans reported higher rates of depression,

and White respondents reported the lowest rates of depression across the three ethnic groups in the 2013 survey.

Percentage of Anxiety among Respondents

A Pearson χ^2 test of independence was calculated to examine the distribution of individuals classified as anxious and not anxious in male and female respondents. Table 4 contains GAD-7 cut-off scores by gender with 1.5% of total data from the survey missing from the table with N = 5154. A significant difference was found between gender, χ^2 (1) = 21.286, $p < .001$, Cramer's $V = .06$. There was a lower percentage of male respondents classified as anxious (6%; $p < .001$) than observed among female respondents (9.7%; see Table 4).

A Pearson χ^2 was calculated to examine the distribution of individuals classified as anxious and not anxious between White, Black/African American, and Latino respondents. Table 2 contains GAD-7 cut-off scores by race/ethnicity with 6% of total data from the survey missing from the table with N = 4912. The Pearson χ^2 test revealed a significant association between race/ethnicity and anxiety, χ^2 (3) = 17.705, $p = .001$, Cramer's $V = 0.060$. There was a higher percentage of Black/African Americans (14.0%) and Latinos (11.5%) classified as anxious than observed among Whites (7.6%; see Table 2).

A Pearson χ^2 test of independence was calculated to examine the distribution of individuals classified as anxious and not anxious in rural and metropolitan counties. Table 3 contains GAD-7 cut-off scores by residence with 1.2% of total data from the survey missing from the table with N = 5165. A statistically significant relationship was

found χ^2 (1) = 7.726, p = .005. A higher percentage of rural respondents were classified as anxious (9.8%) than observed among metropolitan residing respondents (7.6%; see Table 3).

In summary, results revealed that Black/African American, Latino, female respondents had higher percentages of anxiety. Further, respondents who lived in rural areas had a higher percentage of self-reported anxiety.

CHAPTER V

CONCLUSION

The purpose of the present study was to examine the levels and rates of probable depression and anxiety by gender, race/ethnicity, and residence in a predominately rural area of Texas. The current study was a replication and extension of a previous study conducted by Brossart et al. (2013) that assessed for the severity of depressive symptoms and rates of probable depression by instruments, the CESD-5 (Shrout & Yager, 1989) and PHQ-9 (Spitzer, et al., 1999) in two separate surveys (2006, 2010) in the same region of South Central Texas. The results of the Brossart et al. (2013) study showed that African American respondents reported higher rates of depression on both instruments at both time periods.

The findings from the current study of about 5,230 respondents indicated that the PHQ-2 and GAD-7 scores were significantly associated with race/ethnicity (White, Black/African American, Latino), gender (men, women), and residence (rural, metropolitan). Black/African Americans, women, and rural residence reported more depressive symptoms than other subgroups. In addition, Black/African Americans, women, and rural residents reported more anxiety-related symptoms than other subgroups.

In this chapter these findings and their implications will be discussed. Specifically, the following will be examined: the observed rates of depression and anxiety in the current study; the residence differences in depression and anxiety in community research; the racial and ethnic differences in depression and anxiety in

community research; and gender differences in depression and anxiety in community research. Last, implications for future research and mental health services for underserved communities will be discussed.

Rates of Depression and Anxiety in the Current Study

The present study proposed race/ethnicity, gender, and residence could be associated with higher rates of probable depression and anxiety. The results were consistent in support of this assertion: race/ethnicity, gender, and residence were associated with depression and anxiety.

There are notable differences between the present study and other related studies including sample sizes, the diagnostic instrument, and overall rates. Several studies have shown that rates of depression and anxiety happen to be higher or similar to the present results depending on the setting (Brown et al., 1996; Kessler et al., 2003; Kroenke et al., 2003; Probst et al., 2004; Probst et al., 2006). Research has shown that socio-demographic variables and settings can have an impact on the rates of self-reported depression symptoms, which may explain the pattern. For instance, a study examining the rate of depression screening among patients, aged 19 and older, seen at a community health center revealed rates that varied for gender and race/ethnicity in comparison to the present study. The rate of depression for gender was slightly higher with men at 8.4% and women at 17.5%. The rate for race/ethnicity was lower in comparison to the present study for Black/African Americans at 15% (Maimone & Marhatta, 2015). The rates of depression in the present study mirror those observed in community health centers serving underserved populations. A majority of community health centers provide

services to underserved individuals. The present study recruited a sample from an underserved population. According to Mitchell and Coyne (2007), the rates of depression across different settings will vary between 5% and 37%. An analysis of National Ambulatory Medical Care Surveys from 2003 to 2006 revealed low rates of depression ranging from 2% to 4%, despite the high prevalence of depression in primary care settings (Schappert & Rechsteiner, 2008). Previous research has shown that rates of depression will vary in settings with a higher prevalence of depression, such as underserved areas (Kroenke et al., 2003).

Prior studies have found differences in depression rates as a function of race and ethnicity. A study examining racial/ethnic differences among middle-aged women found that depressive symptoms amongst Latino and African American women were higher compared to those from other ethnicities (Riolo, Nguyen, Greden, & King, 2005). Socioeconomic indicators such as education, income, martial status, and health status are associated with depressive symptoms and in some cases may explain some of the variance in racial/ethnic differences in rates of depression (Maimone et al., 2015). High rates of depressive and anxiety symptomology have been found among patients with medical or health concerns (Wheaton, Perry, Chapman, & Croft, 2012). For example, studies examining the rate of depression among adults with health-related issues find higher rates of depressive symptoms among minorities compared to Whites (Maimone et al., 2015; Smith, Gotman, Lin, & Yonkers, 2010). Similarly, a study that assessed for the prevalence of depression among a population with type 2 diabetes mellitus (T2DM) revealed that T2DM individuals exhibit high rates of depression (Mezuk, Eaton, Albreht,

& Golden, 2008). Consistent with this probability, estimated rates of depression comorbid with other mental health disorders or medical conditions around 3.1% based on an Epidemiological Catchment area study (Kessler, Berglund, Demler et al., 2003). In general, the rates of depression are lower in the present study than found in clinic-based studies that focus on health-related issues, but similar to studies that rely on community-based samples.

The rates of clinical depression in the current study varied between rural and metropolitan residents. The rates observed were consistent with other studies of community-based samples that have found a higher prevalence of major depression amongst rural (6.1%) than among urban (5.1%) populations (Probst et al., 2004; Probst et al., 2006). A study revealed that the rates of depression tended to be higher in rural and underserved areas with individuals who struggle with socioeconomic issues (Auchincloss & Hadden, 2002). The individuals scoring positive for depression reported that their symptoms interfered with their daily functioning (Probst et al., 2006). Research indicates that depression scores in rural areas tend to be higher on the self-reported questionnaires due to socioeconomic indicators or limited access to mental health resources (Jameson & Blank, 2010). Further study is needed to establish whether or not socioeconomic indicators can partly explain this association.

Few studies have focused specifically on the demographic, diagnostic, and treatment characteristics of patients with anxiety disorders. Similar to depression, studies have focused on comorbidity between anxiety and medical conditions. Prior research has indicated that prevalence of anxiety differs significantly by race/ethnicity, but that

comparative rates depend on comorbidity with medical conditions. For example, a recent study found that minorities exhibited elevated rates of anxiety depending on the type of medical condition (Asnaani, Rickey, Dimaite, Hinton, & Hofman, 2010; Watkins, Assari, & Johnson-Lawrence, 2015). Despite the consideration of comorbidity of medical conditions, the rates of anxiety from the study in comparison to the present study were quite similar. In general, research has continually shown that anxiety is the most commonly treated psychiatric condition in ambulatory mental health settings in rural and non-rural areas (Jameson et al., 2010). The disorder has an estimated current prevalence in general medical practice of 2.8% to 8.5%, and in the general population of 1.6% to 5.0% (Spitzer et al., 2006). The rates of anxiety observed were generally consistent with rates found in other studies of community-based samples.

Although anxiety is as common as depression it has received less attention and is often undetected and untreated (Blank et al., 2010; Kroenke et al., 2007; Shao, Richie, & Bailey, 2016). Previous research has shown that anxiety is as prevalent as depression, as well as retains socioeconomic indicators that can contribute to differences in rates (Shao et al., 2016). The results of the present study findings appear to mirror current rates of anxiety by race/ethnicity and gender (Eaton, Keyes, Krueger, Balsis, Skodol, Markon, & Grant, 2012; Lowe et al., 2008). In our sample, women and Black/African Americans exhibited higher rates, which is comparable to other studies showing rates between 6.2% and 14.5% (Kroenke et al., 2007; Vasiliadis, Chudzinski, Gontijo-Guerra, & Preville,, 2015). Specifically, women scored higher on the GAD-7 than men. A study examining the prevalence, impairment, and comorbidity of anxiety disorders with the GAD-7

determined that minorities and women were more likely to have higher GAD-7 anxiety scores (Kroenke et al., 2007). Women are likely to experience social and economic pressures to a larger degree than their counterparts, and African American women are susceptible to mental distress because they fulfill multiple roles as they strive and work to support their family as they attempt to advance in mainstream society (Jones et al., 2008; Probst et al., 2004).

The rates of anxiety varied between rural and metropolitan residency in this underserved sample. The rates observed were generally consistent with rates found in other studies, but slightly higher at times (Kessler et al., 2005). Researchers reported that rates of anxiety vary across several states, as well as residence. The rates tend to be higher in areas that possess socio-demographic factors that influence or are related to depressive and anxiety symptoms (Breslau, Aguilar-Gaxiola, Kendler, Su, Williams, & Kessler, 2006) For instance, a study assessing mental illness in different populations (e.g., socio-demographics and residence) found significantly higher rates in rural areas than metropolitan areas. However, research has also concluded that anxiety and mood disorders vary according to socio-demographic factors among metropolitan, rural, and urban samples (Barslau et al., 2006; Reeves, Lin, & Nater, 2013). Although research has typically varied in findings of associations in differences in the rates of psychiatric disorders between rural and urban populations, research continues to show that an individuals' social and physical environment is a potential risk factor in depression and anxiety. Studies assessing residential differences in rates of psychiatric disorders still remain close to rates from the present study after adjusting for socio-demographic

variables differing residential differences (Reeves et al., 2013; Romans, Cohen, & Forte, 2011). Based on prior studies socio-demographics and environmental influences can attribute to the rates of anxiety reported in rural or non-rural areas, which is an area to draw attention to in future studies.

In the Brossart et al. (2013) study there was a significant association between gender, race/ethnicity, and depression. Brossart et al. (2013) found higher rates of probable depression (17.9% for CESD-5; 10.9% for PHQ-9) than observed in the present study. Additionally, the present study found the rates of depression appeared to significantly vary between rural and metropolitan residency; this was not observed in the Brossart et al. study. The differences in these rates may be attributable, in part, to the use of the PHQ-2 in the present study. The PHQ-2 is a shortened version of the PHQ-9 designed for screening purposes in primary care settings and as such, it has slightly different psychometric qualities than the PHQ-9 (Lowe et al., 2005; Osorio, Vilela, Crippa, & Loureiro, 2009).

A meta-analytic review conducted by Mitchell and Coyne (2007) concluded that short two or three-question self-reported measures of depression (e.g., PHQ-2) have better accuracy than a 1-item questionnaire, but not a nine-item instrument (e.g., PHQ-9). For instance, a PHQ-2 is accompanied by a number of false positive cases, which may be inappropriately referred or treated if the questionnaires were relied on alone (Mitchell et al., 2007). A study by Kroenke et al. (2003) showed that individuals who scored high (≥ 3) on the PHQ-2 reported a sensitivity of 83% and specificity of 92%. In comparison, individuals who scored high (≥ 10) on the PHQ-9 reported a sensitivity of

88% and specificity of 88% (Kroenke, Spitzer, & Williams, 2001). Thus, the PHQ-9 has a higher probability of accurately capturing individuals with depression. The purpose of PHQ-2 is not to establish final diagnosis or to monitor depression severity, but rather to screen for depression. Individuals who screen positive for depression should be further evaluated with the PHQ-9 to determine whether they meet criteria for a depressive disorder (Jimenez et al., 2013; Mitchell et al., 2007; Santor et al., 1995). Studies have shown the PHQ-2 can have wide variability in sensitivity, which could account for some of the variance in reported depression (Gilbody, Richards, Brealey, & Hewitt, 2007; Jimenez et al., 2013). Regardless of the instrument used, the rates suggest that Black/African Americans and women may be at greater risk for depression. The findings continue to illustrate the need for resources in this underserved region.

The GAD-7 was developed with a large primary care patient sample. A study aimed at investigating the reliability and validity of the GAD-7 in the general population concluded that it was a reliable and valid measure of anxiety for this purpose (Lowe et al., 2008). However, support for the GAD-7 varies across studies. For example, a study of the psychometric properties of two screening measures of depression and anxiety found the GAD-7 had questionable psychometric properties than would be expected from prior work with the instrument (Sawaya, Atoui, Hamadeh, Zeinoun, & Nahas, 2016). The GAD-7 is not exclusive to measuring anxiety as some items overlap with depressive symptoms (Noel-Hoeksema et al., 2001; Schuch, Roest, Willem, Nolen, Penninx, & De Jonge, 2013). There is evidence that GAD-7 correlates strongly with

measures of depression (e.g., CES-D-10 depression and PHQ-9 depression; Tanaka-Matsumi et al., 1986; Lowe et al., 2008).

The varying accuracy of anxiety measures across different studies could be explained by differences in patient population. Previous research indicates that there are possible cultural and environmental factors that may be associated with differences in rates across samples, which can contribute to the difference in scores (Breslau et al., 2006; Jameson et al., 2010).

Residence Differences in Depression and Anxiety

Previous research has suggested a significant association between increased mood disorders and residence (Barbee, 1992; Jones et al., 2008; Kessler et al., 2005), but evidence regarding the association has been consistent. Some studies report that individuals in rural areas are more likely than urban residents to report poor health, lack of health insurance, have a chronic health condition and live in low-income areas (Cook, 2012; Wagenfeld 1990). Other literature indicates that residence is a nominal predictor of increased mood disorders in comparison to economic burden, which can occur in rural and urban areas. Subsequently, this results in a lack of personal and social resources and inadequate access to healthcare for both rural and urban residents (Israel et al., 2002; Winchester, Watkins, Brahm, Harrison, & Miller, 2013).

One of the challenges throughout the United States is the shortage of health care. As a result, both rural and urban residents who lack access to health care providers are more vulnerable to both health conditions that are preventable and manageable with early intervention, such as depression and anxiety (Hartley, 2004). Findings also suggest

that the relationship between residence and self-reported depression and anxiety is more likely to occur in rural residents, as individuals may be more likely than their urban peers to experience challenging conditions, which may increase the risk for depression and anxiety (Glover et al., 2004). Research continually shows that individuals residing in mental health shortage areas tend to be more prone to exhibiting symptoms of depression and anxiety, as observed in the present study. These reported rates of depression and anxiety could be attributed to minorities entering into and/or receiving treatment later on when symptoms are more severe (Probst et al., 2004).

Racial and Ethnic Differences in Depression and Anxiety

The degree of racial/ethnic differences in depression and anxiety symptoms among adults in the United States has been consistent: Minorities tend to have higher rates of depression and anxiety (Brown et al., 1996; Kessler et al., 2005; Watkins et al., 2015). There have been several possible explanations for these differences. Minorities face challenges in accessibility, acceptability, and availability that make them more prone to mood disorders (Brown et al., 1996; Das et al., 2006; Smalley et al., 2012; Warren, 1994). A significant barrier of care for ethnic minorities, particularly those in rural areas, is availability to ethnic minority providers and/or providers with cultural awareness. African Americans have been found to be less likely to seek mental health services due to stigmatization of mental health issues and a distrust of professionals (Alegria et al., 2008; Smalley et al., 2012). The lack of culturally sensitive care programs contributes to the underutilization of care for mood disorders by ethnic minorities (Miranda, Lawson, & Escobar, 2002). Available mental health treatment may not match

the preferences and beliefs of racial/ethnic minorities (Jimenez, Cook, Bartels, & Alegria, 2013). As a result, minority groups are less likely than whites to use services and receive poorer quality of mental health care. Similar prevalence with lower utilization and poorer quality of healthcare, suggesting that minorities have a higher quantity of individuals with unmet mental health needs (Chen & Dagher, 2016). Disparities tend to stem from historical and present struggles individuals from minority groups experience lack of education, stigma, and discrimination, which impact their utilization of mental health resources (Alegria et al., 2008; Alegria & McGruire, 2005).

Prior studies have established that racial/ethnic minorities face different levels of discrimination due to various environments, and being exposed to discrimination is associated with mental health issues such as depression and anxiety (Isasi, Rastogi, & Molina, 2016). Studies focusing on acculturation show that Latino immigrants report lower rates of mental health problems compared to Whites, but the rate increases as Latinos experience discrimination (Ghafoori, Barragan, Tohidian, & Plinkas, 2012; Isasi et al., 2016). The discrimination and racism associated with systems, acting unintentionally or intentionally and lack of trust of the systems by ethnic minorities can result in increased levels of stress and the development of mood disorders (Miranda et al., 2002). As a result, the greater the exposure to racial discrimination, the greater the likelihood of mental distress and underutilized resources of care.

A related barrier faced by ethnic minorities may be cultural and language based differences in expression of psychopathology. Specifically, there is a significant association between depression, anxiety, and health-related issues (Parkerson,

Thibodeau, Brandt, Zvolensky, & Asmundson, 2015). According to Isasi et al. (2016), Latinos have consistently reported higher rates of feeling sad or hopeless in comparison to racial/ethnic groups. Specifically, Latinos have been found to report higher rates of anxiety due to connecting more with the language of anxiety related symptoms. Latinos tend to report their symptoms with the use of somatic complaints, which can sometimes be misconstrued by medical providers as health issues. Several racial/ethnic groups tend to report more persistent somatic symptoms to describe their present mood. Anxiety and depressive disorders often co-occur with somatic symptoms or medical comorbid conditions (Kroenke et al., 2007). Such somatic symptoms include complaints of fatigue, cognitive dysfunction, sleep disturbance, and bodily pain (Romero-Acosta et al., 2014; Umana-Taylor & Updergraff, 2007). Latino respondents tend to show higher rates of somatic anxiety and depressive related symptoms than any other cultural group, and they report the symptoms as distressing (Pina & Silverman, 2004). Prior research shows minorities are likely to link physical health conditions to their present mood (Watkins et al., 2015). There is evidence that individuals frequently do not recognize their own illness as depression and they may not disclose psychosocial problems to an unfamiliar practitioner. Thus, individuals will present with somatic complaints to medical care providers instead (Mitchell et al., 2007; Romero-Acosta et al., 2014).

Prior studies examining brief measures of depression and anxiety have consistently shown that minority groups tend to report higher levels of depression and anxiety symptoms compared to Whites (Ghafoori et al., 2012; Gonzalez et al., 2010; Riolo et al., 2005). Studies examining racial/ethnic differences among minorities groups

found that Latino and Black/African American women exhibited higher rates of major depression relative to Whites (Gonzalez, Tarraf, Whitfield, & Vega, 2010; Riolo et al., 2005). In the present study, we also found that Black/African Americans and Latinos were more likely to report higher rates and levels of depressive and anxiety symptoms than Whites. Minorities reporting higher rates and levels of depressive and anxiety symptoms on brief measures assessing for depression and anxiety has been a common theme, which researchers attribute to inadequacy of care, misdiagnosis, and limited access to care (Gonzalez et al., 2010; Parkerson et al., 2015). Depressive disorders are frequently misdiagnosed or under-diagnosed in mental health shortage areas because of the inability of healthcare providers to recognize depressive and anxiety symptomatology and lack of access to mental health care (Kroenke et al., 2007; Ghafoori et al., 2012). Previous research has found low rates or adequacy of care, suggesting the need to improve the retention of mental health patients across health care systems. In particular, this raises the probability that mentally ill individuals with low levels of distress and depressive symptoms are underrepresented (Cook et al., 2014; Garcia-Campayo, Enric Zamorano, Ruiz, Perez-Paramo, Lopez-Gomez, & Rejas, 2012; Maimone et al., 2015). The results of the present study mirror current differences in race/ethnicity in mental health shortage areas.

Gender Differences in Depression and Anxiety

Minority women fulfill roles in their families that may contribute to family burden, one of the many factors that makes this population more prone to mood disorders (Barbee, 1992; Raskin et al., 1975; Warren, 1994). Similar observations have

been reported in other studies comparing anxiety and depression. Generally, women report significantly higher depressive symptoms than men (Eaton et al., 2012; Warren, 1994). Similarly, in the present study women reported significantly higher depression and anxiety symptoms than men.

Research has continually shown women to report higher rates of depression and anxiety in comparison to men. This higher rate of depression has been attributed to gender differences in responses to items. Research has shown that men and women respond differently to an item despite being similar on the trait assessed by the item (Nolen-Hoeksema, 2001; Parkerson et al., 2015). Researchers have tested gender-based differential item functioning in depression and anxiety tools in a variety of samples including individuals with spinal cord injuries (Graves & Bombardier, 2008), traumatic brain injuries (Fann, Bombardier, Dikmen, Esselman, Warms, Pelzer, Rau, Holly, & Temkin, 2005), and heart failure (Evangelista et al., 2009). The findings have been consistent, indicating that men and women respond differently to items in self-reported questionnaires. The way one identifies their emotional and physical well-being can differ their response to items (Graves et al., 2008; Jimenez et al., 2013). Some studies report that women are more likely to report certain symptoms than men due to environmental and cultural factors (Jimenez et al., 2013; Nolen-Hoeksema, 2001; Xu et al., 2012).

There is evidence that women who are more likely to endorse depression choose higher options on the Likert scale for items 1 (“little interest or pleasure in doing things”) and 2 (“feeling down, depressed, or hopeless”) on the PHQ-9; these are the items on the PHQ-2 (Bhugra, 2006; Graves et al., 2008; Jimenez et al., 2013). Yet the

tendency for women to report more depressive symptoms than men may be attributed to their greater likelihood of meeting criteria for depressive disorder, even though men and women with depressed mood report similar levels of social and occupational impairment (Bhugra, 2006; Piccinelli & Wilkinson, 2000). The content of the items may contribute to the consistency in regards to the statistically significant differences between gender, anxiety, and depression. Many women may become depressed in response to their stressful psychosocial environments (Barbee, 1992; Brown et al., 2000; Jones et al., 2008). For example, women fulfill multiple roles within their lives as they strive and work to provide for their family, as well as attempt to advance in mainstream society (Jones et al., 2008). The emotional strain of these roles is associated with depressive and anxiety related symptoms (Brown et al., 2000; Jones et al., 2008). Cultural aspects can impact the way an individual answers an item on a self-reported questionnaire that assess for mood (Jones et al., 2008; Parkerson et al., 2015). The gender differences in depression and anxiety are consistent across age groups, implying the importance of studying women's responses to depression and anxiety items (Chen et al., 2016; Xu, et al, 2012).

Missing Data

Missing data was evident in the present study. On average the amount of missing data across variables was 4%, similar to the rate experienced by Brossart et al. (2013). However, there was no indication that rates of missing data were associated with participant gender, race/ethnicity, and residence. There are other factors that may

influence responses to community survey data, but it is unclear what variables may have contributed to missingness in the present study.

Limitations

This study has several important limitations. The researcher did not have control over which constructs were assessed in the survey. Two psychologists had input on the measures that were included in the survey. The psychologists selected the two brief screening measures, PHQ-2 and GAD-7, based on the brevity of the measure, need, and information from prior studies. In retrospect, however, the PHQ-2 may not have been the best choice for this community research. Although the methodology was designed to increase representation of this particular region, there is a possibility that this could have resulted in biases that influenced participation. In addition, we cannot be sure if individuals with mood disorders were more or less likely to return surveys.

The self-report nature of the data also limits the results. Self-report instruments are a subjective measure of a person's experience and may not accurately reflect the true status of that person. For example, the literature reports an emerging notion that irritability and aggression are potential symptoms of depression in men and women in rural areas, but these are not included in standard diagnostic criteria for depression (Meyrueix, Durham, Miller, Smalley, & Warren, 2015).

There are other variables with a potential influence on anxiety and depressive symptoms that were not incorporated in this study (e.g., social support, coping). Measures of barriers, accessibility issues, disabilities, and chronic illness were not studied. These factors have been significantly related to depressive and anxiety related

symptoms (Jackson et al., 2007; Laditka, Laditka, & Probst, 2009). Consideration of physical and social conditions will be important for future research into psychiatric conditions.

Although this study shows that several African Americans were willing to report levels of distress, it does not imply that they relay this to their health care providers. Individuals living in rural, underserved areas tend to seek care later, with more severe symptoms due to distrust and miscommunication of symptoms to healthcare providers. Those who responded to the survey disproportionally represented older residents, Whites, and those more educated and affluent. To account for some of this bias, the survey committee weighted the responses to match age and gender distribution by county based on current census estimates.

Recommendations for Future Research

Further research is still needed to explore the relationship between depression, anxiety, race/ethnicity, gender, and residence in underserved areas like South Central Texas.

This specific population is continually disregarded and much of the research that exists for the rural populations does not adequately issues specific to race/ethnicity (i.e. African Americans and Latinos). More research is needed to understand specific mental health issues like depression and anxiety among individuals from these groups. There are certain cultural and contextual factors that may cofound our understanding of depression and anxiety related symptoms in rural communities.

Anxiety among minority respondents in this underserved area may illustrate the need for culturally sensitive and competent treatment. There are cultural and language based differences in expression of psychopathology to take into consideration. Also there is a shortage of providers with cultural awareness providing treatment in rural and underserved areas. These issues raise questions about appropriateness, accessibility, and acceptability. As a result, the results of the present study should prompt further investigation of social and community aspects that affect the mental health of ethnic minorities in rural and underserved areas.

Future studies of self-reported anxiety in underserved communities are recommended. The present study provides an interesting "baseline" for understanding the rates of anxiety in this under-served region, but more research is needed to appreciate the extent of this problem throughout our communities. In terms of research design, questions geared toward mental health issues, services provided, and utilization of services would be beneficial to gain a general understanding of the target population. In addition, it could provide a more in-depth understanding of factors that may not be identified through survey methodology. This information illustrates that we need to develop services that cater to these underserved areas and minorities.

Conclusion

Even though the present study documents the limitations, disparities and difficulties in health encountered by ethnic minorities in the United States, more research is needed to understand specific mental health issues like depression and anxiety among

individuals from these groups. Certain cultural and contextual factors may confound our understanding of depression and anxiety related symptoms in rural communities.

The information from the current study will provide suggestions for future assessment, research, programming, planning, and policy in rural residing areas. Given that minorities face unique challenges daily, rising rates of mood disorders, particularly for African Americans, future research in these areas is needed.

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APPENDIX

Table 1.

Means, Standard Deviations and Sample Cell Size for PHQ-2 Total Score and GAD-7 Total Score by Residential Status, Race/Ethnicity, and Gender

	Rural		Metropolitan	
Race/Ethnicity	Female	Male	Female	Male
PHQ-2 Total Score				
White	.79(1.4) *1065*	.71(1.3) *580*	.69(1.3) *1658*	.50(1.1) *889*
Black/African American	1.2(1.6) *79*	.85(1.6) *41*	1.1(1.7) *81*	1.1(1.7) *27*
Latino	.88(1.5) *75*	1.8(1.9) *23*	.80(1.4) *167*	.54(.90) *41*
GAD-7 Total Score				
White	3.3(4.4) *1065*	2.4(3.8) *580*	3.0(4.2) *1658*	2.1(3.4) *889*
Black/African American	4.2(5.1) *79*	2.8(4.7) *41*	4.1(5.0) *81*	3.7(5.9) *27*
Latino	3.5(4.1) *75*	6.1(5.9) *23*	3.6(4.3) *167*	2.7(4.0) *41*

Note. First number is the *M*, followed by *SD* in parentheses. The cell sample size follows and it is in italics.

Table 2.

Percentages of Depression and Anxiety Categories for Race/Ethnicity

Race/Ethnicity	*N*	*%*
PHQ-2 cut-off score		
White		
Depressed	353	8.4
Not Depressed	3839	91.6
Black/African American		
Depressed	40	17.5
Not Depressed	188	82.5
Latino		
Depressed	34	11.1
Not Depressed	272	88.9
GAD-7 cut-off score		
White		
Anxious	321	7.6
Not Anxious	3923	92.4
Black/African American		
Anxious	32	14.0
Not Anxious	197	86
Latino		
Anxious	36	11.5
Not Anxious	278	88.5

Note. Cut-off scores of depression (PHQ-2 ≥ 3) and anxiety (GAD-7 ≥ 10)

Table 3.

Percentages of Depression and Anxiety Categories for Residence

Residence	*N*	*%*
PHQ-2 cut-off score		
Rural		
Depressed	231	11.4
Not Depressed	1794	88.6
Metropolitan		
Depressed	254	8.3
Not Depressed	2811	91.7
GAD-7 cut-off score		
Rural		
Anxious	201	9.8
Not Anxious	1858	90.2
Metropolitan		
Anxious	235	7.6
Not Anxious	2871	92.4

Note. Cut-off scores of depression (PHQ-2 ≥ 3) and anxiety (GAD-7 ≥ 10)

Table 4.

Percentages of Depression and Anxiety Categories for Gender

Gender	*N*	*%*
PHQ-2 cut-off score		
Male		
Depressed	140	8.1
Not Depressed	1594	91.9
Female		
Depressed	344	10.3
Not Depressed	3001	89.7
GAD-7 cut-off score		
Male		
Anxious	104	6.0
Not Anxious	1641	94
Female		
Anxious	332	9.7
Not Anxious	3077	90.3

Note. Cut-off scores of depression (PHQ-2 ≥ 3) and anxiety (GAD-7 ≥ 10)