ASSESSING THE MENTAL HEALTH STATUS AND NEEDS OF VETERANS IN A PREDOMINANTLY RURAL REGION

A Dissertation

by

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ABSTRACT

Background: Rural veterans represent an understudied population, particularly as it relates to mental health. This study hypothesized that the relationships between demographic factors (race, employment status, insurance status) and well-being outcomes (depression, anxiety, unhealthy days) are mediated by perceived access to mental health care, utilization of services when needed, and delayed access to mental health care due to transportation barriers. This study also investigated the relationships between age, sex, and warzone experience and the three aforementioned mental health outcomes.

Methods: A path analysis was used to examine a model consisting of six demographic predictor variables, three access-related mediator variables, and three mental health outcome variables in the 2013 Regional Health Assessment survey of the Brazos Valley region of Texas.

Results: Contrary to the hypothesis, there were no statistically significant indirect effects involving the mediator variable (perceived access) retained in the final model. Female veterans reported higher anxiety symptom levels than males, and veterans without warzone experience reported lower levels of anxiety than those with warzone experience.

Discussion: Although the primary study analysis revealed no significant mediating effect of perceived access on the relationship between demographic factors and mental health and well-being, this study provides valuable insight for better understanding mental health among veterans in the rural Brazos Valley region. Future studies are needed to further elucidate the role of access-related factors as mediators between demographic factors and mental well-being.

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CHAPTER I

INTRODUCTION

The mental health and well-being of U.S. veterans continues to be a prominent focus in empirical literature and clinical practice. As the knowledge base grows, psychologists gain incremental understanding of the unique mental health needs of this underserved population. Rural veterans comprise a subset within this group that warrants further study in order to better meet their psychological needs. Much of the literature to date asserts that rural veterans continue to face increased barriers to care and experience poorer mental health outcomes compared to urban veterans, while other empirical studies suggest the disparity between the groups is shrinking. Examining veterans in the predominantly rural Brazos Valley region of Texas using the Brazos Valley Regional Health Assessment will illuminate trends involving mental health, well-being, access-related variables, and demographic factors.

Approximately one-fourth (4.7 million) of all veterans in the United States reside in rural areas following their active duty military careers (U.S. Department of Veterans Affairs, 2019). More than 10% (3 million) of Texas residents live in rural areas, and Texas has the second largest veteran population in the United States with more than 1.4 million veterans (U.S. Department of Agriculture, 2019; Texas Workforce Investment Council, 2016). Therefore, studying the demographics and mental health needs of veterans in Brazos Valley is relevant and important with potential social and public policy implications.

Rural veterans face additional barriers in access to care in contrast to their urban counterparts. Veterans often receive healthcare treatment from Veterans Affairs (VA) clinics, but veterans in the Brazos Valley may live up to 80 miles from the nearest VA. The VA established

community-based outpatient clinics (CBOCs) to serve the health needs of rural veterans, though these are often understaffed and not equipped to provide specialized mental health services (e.g., trauma-focused interventions, inpatient care, psychiatric services). There is a CBOC facility located in College Station, Texas, but this location may be more than 60 miles away from residents in Brazos Valley communities. As such, there is a great deal of uncertainty about the mental health status of veterans in the Brazos Valley, including their psychological needs and their use of mental health services.

Although there is increasing empirical study on mental health in Brazos Valley, much of this literature has been characterized by a focused scope (e.g., county or clinic level, particular diagnoses, treatment modality) (Tarlow et al., 2014; Wendel et al., 2011). A wider scope is illustrated by the Brazos Valley Regional Health Assessment, which provides a range of health-related data from residents across the seven counties that comprise the region. The survey, administered every few years, has been utilized in an array of empirical studies to describe the health status and trends of the largely rural Brazos Valley. However, very few of these studies focus on the intersectionality between rurality and mental health. Brossart et al. (2013) used two editions of the Brazos Valley Regional Health Assessment to provide wide-ranging insight into the mental health landscape of rural residents in the region. Armstrong et al. (2016) utilized the same surveys to describe mental health concerns associated with persons with disabilities. The overall empirical knowledge base involving mental health and rural residents in this region is diverse and continues to grow. However, to this writer's knowledge, no study has been conducted on veteran mental health in the Brazos Valley.

The current study utilizes the Brazos Valley Regional Health Assessment from 2013 to examine a mediation model of rural veteran mental health and well-being. Within this model, we

aim to determine the extent to which access-related factors (perceived access, service utilization, delayed mental health care due to transportation) mediate relationships between demographic factors (race, employment, insurance) and mental health and well-being outcomes (depression, anxiety, and unhealthy days) among rural veterans. Within the same overall model, we seek to evaluate the extent to which age, sex, and warzone experience directly impact mental health and well-being of rural veterans. It is hypothesized that the three access factors significantly mediate the effects between demographic factors and mental health outcomes, as well as that age, sex, and warzone experience significantly impact mental health outcomes.

Unfortunately, the 2019 Brazos Valley Regional Health Assessment was unable to be used in this study due to items asking about veteran status being excluded from the survey. Even so, this study has the potential to add to the existing literature about well-being and mental health status in the Brazos Valley by determining the needs of the veterans who reside in these communities. If we do not know who our veteran population consists of (e.g., age, sex, race, employment, mental health symptoms, access to care), our existing interventions and community support may be misdirected or fail to effectively reach veterans in the Brazos Valley.

CHAPTER II

LITERATURE REVIEW

Veteran Health

Research has long suggested that the veteran population experiences more physical health diagnoses, greater medical comorbidities, and poorer physical health than nonveterans (Agha et al., 2000; Almond et al., 2008; Bumgarner et al., 2017; Hoerster et al., 2012). Given the interplay between physical and psychological pathology, it is not surprising that mental health problems follow the same trend. Veterans face higher rates of psychiatric disorders and alcohol/substance use disorders than their civilian counterparts (Bumgarner et al., 2017; Olenick, Flowers, & Diaz, 2015). Psychological concerns are highlighted by greater posttraumatic stress and traumatic brain injury compared with the general population. A detailed exploration into veteran mental health and well-being will be a primary objective in this study, with hopes of better informing veteran health initiatives.

Veteran health not only remains a focus of the Veterans Health Administration, but represents an issue with economic and public policy implications for U.S. society at large. Certainly, the term *veteran health* is highly complex in itself, as it comprises a vast array of components and subcategories. As such, when addressing this topic, it is important to examine veteran health as a heterogenous construct. For the purposes of this study, the mental health of rural veterans will represent the focus of the empirical investigation.

Rural Veterans

Consistent with approaching veteran health as a heterogenous construct, distinctions should be made between urban and rural veterans when it comes to mental health and well-being.

This study's emphasis on rural veterans aligns with the U.S. Department of Veterans Affairs' designation of this particular group as a "population of interest" that requires individualized attention (Holder, 2017, p. 1). Before discussing these issues in detail, it is important to understand the interaction between cultural facets of veterans and rurality. Living in a rural area serves as an attractive option for many veterans for a multitude of reasons. Veterans originating from rural locations may have family and friends who still reside there, and they may wish to live in close proximity to these individuals after being away as part of their military service (U.S. Department of Veteran Affairs, 2019). In fact, the most recent data from the Department of Defense asserts that 8.8% of all active duty military personnel originally come from a rural area (U.S. Department of Defense, 2017). Residing in rural settings also includes opportunity for recreational activities, increased privacy, reduced crowds, and generally a lower cost of living. For these and other reasons, nearly one-fourth of veterans choose to live in a rural area following their military careers.

Discrepancies exist in the demographics between rural veterans and their urban veteran and rural nonveteran counterparts. Rural veterans tend to be older in age, have higher rates of disability, and are more likely to be unemployed (Bumgarner et al., 2017; Holder, 2017). They also endorse poorer physical health in general than urban veterans, with notable conditions including musculoskeletal and cardiovascular problems (Weeks et al., 2006). Interestingly, rural veterans are typically diagnosed with relatively equal or less mental health disorders than urban veterans; however, these psychological disorders tend to have a more serious impact when they do occur, as physical and mental quality of life are significantly reduced (Weeks et al., 2004; Weeks et al., 2006). For example, PTSD symptoms have been shown to be more severe in rural veterans (Bumgarner et al., 2017; Elhai et al., 2004). Given the unique physical and mental

health challenges faced by rural veterans, thorough consideration and attention should be given to the specific needs of this group.

Race and Ethnicity

Research has shown that persons of racial and ethnic minority status often face increased challenges in the arena of mental health. These individuals are less likely to receive mental health care and face additional access barriers (American Psychiatric Association, 2017). Factors that play a role in health disparities among racially and ethnically diverse populations include lack of insurance, greater stigma towards mental illness, language barriers, and mistrust in providers and the health care system at large, among others. Although studies suggest that racial and ethnic minorities experience lower rates of depression, the depression is more likely to be persistent when present. This can negatively impact mental health status, functioning, and quality of life.

The aforementioned health disparities are certainly experienced by veterans of racial and ethnic minorities (Bumgarner et al., 2017). Unfortunately, much of the published studies have focused on rural veterans as a homogenous group; there is lacking research on diversity, specifically racial and ethnic minorities, within the subgroup of rural veterans. As such, the current study aims to add incremental knowledge by examining race and mental health among a sample of predominantly rural veterans.

Use of Mental Health Services

Research has demonstrated a disparity in the use of psychotherapy and other mental health services among rural and urban veterans. A study conducted by Cully et al. (2010) using VA data from the 2004 fiscal year found that rural veterans were less likely than their urban counterparts to be exposed to mental health treatment, regardless of psychiatric diagnosis. Rural

veterans had fewer psychotherapy sessions than urban veterans, which included both individual and group formats. Furthermore, rural veterans were significantly less likely to receive specialized mental health treatment. Overall, the results of this study suggest that rural veterans are substantially less likely to utilize or receive psychotherapy than urban veterans.

Later research by Mott et al. (2015) found seemingly contradictory results to the aforementioned study about service utilization. Mott et al. examined the use of VA mental health services by urban and rural veterans in fiscal years 2007 and 2010. The results suggest that between the years of 2007 and 2010, psychotherapy utilization among rural veterans substantially increased and that this population received more recommended care for their psychological concerns. The authors assert that the disparities in the utilization of VA psychotherapy services between rural and urban veterans are decreasing. They also credit VA initiatives on improving rural mental health coincided with the timeline of the study, thus potentially serving as a reason for the observed growth in service utilization. Despite these promising results, rural veterans were still found to receive significantly less psychotherapy services or other mental health treatment (e.g., medication). Although utilization of VA mental health treatment appears to be on the rise for rural veterans, it appears that they still face reduced exposure to services compared to their urban counterparts.

A third piece to the literature on service utilization includes the research of Teich et al. (2017). In this case, a national dataset issued by the Substance Abuse and Mental Health Services Administration (SAMHSA) was used rather than VA data. Specifically, data from 2012-2014 was used from the National Survey on Drug Use and Health, which is administered annually. Items on this survey inquired about veteran status and *any mental illness* (AMI), which is a term used for any mental, behavioral, or emotions disorder meeting criteria in the *Diagnostic*

and Statistical Manual of Mental Disorders, Fourth Edition (excluding developmental and substance use disorders). The methodology used by Teich et al. (2017) is similar to the current study in that they used a non-VA health survey to examine rural veteran mental health. Results of the study found that rural veterans were considerably less likely to receive any mental health treatment than urban veterans. Veterans with AMI experienced greatly reduced rates of obtaining outpatient care and psychiatric medication. The study by Teich et al. (2017) provided a valuable piece to rural veteran mental health literature as it examined treatment utilization in a non-VA sample, thereby illuminating characteristics and patterns of this group through a different channel. More information about the importance of this feature will be discussed later in this study. The status of the disparity between urban and rural veterans' use of mental health services continues to create discrepancy in the literature, especially when examining VA versus non-VA data sources.

Barriers in Access to Care

One collective explanation as to why rural veterans utilize less mental health services than urban veterans includes barriers in access to care. Mental health providers and specialists tend to be disproportionately distributed in urban and nonrural locations (Ellis et al., 2009; Kirchner et al., 2011). For rural veterans in Texas and across the nation, this translates to less mental health care options and often a scarcity in specialized care. In an effort to improve rural mental health for veterans, the VA established community-based outpatient clinics (CBOCs) as satellite extensions of VA services. However, some estimates indicate that 55% of CBOCs are actually in urban areas (Weeks et al., 2008). Furthermore, mental health conditions are often treated by a primary care provider as only an estimated 26% of rural CBOCs have mental health specialists (Chapko et al., 2002; Cully et al., 2010). Recruitment of mental health professionals

to rural areas continues to be a major challenge despite VA requirements that all CBOCs must have mental health providers (Cully et al., 2010; Merwin et al., 2003). A prominent reason for this is that providers experience disincentives for rural relocation, including professional isolation and reduced supervision opportunities (Roberts, Battaglia, & Epstein, 1999; Wallace et al., 2006). The same challenge applies to attracting non-VA providers to rural locations, as a transition to rural practice often means reduced wages, heightened ethical risk, and increased rates of professional burn-out (Hastings & Cohn, 2013). In consideration of using technology to reach rural veterans, many providers have been shown to hold skeptical attitudes about the effectiveness of telemental health services despite contradictory research (Jameson et al., 2011). Relatedly, a significant amount of providers felt they lacked the appropriate training to use telemental health services. With the challenges of luring mental health providers to rural areas and the attitudes of providers towards telemental health, rural veterans are often left with scarce resources and treatment opportunities. Although progress appears to continue with various initiatives, rural veterans still face formidable barriers in access to services.

Perhaps the most salient barrier that rural veterans experience is distance. This particular barrier is a challenge recognized by patients, providers, and VA staff alike (Buzza et al., 2011). Long travel time due to distance was identified as a particular problem involving common diagnostic services, specialty care, and emergency services. Rural veterans are more likely to live greater distances from both VA and non-VA facilities, and experience increased transportation issues (Bumgarner et al., 2017). Other collateral barriers are often encountered in association with distance. For example, a greater distance likely means higher travel cost to attend mental health appointments (Buzza et al., 2011). Some veterans cannot afford the money nor the time to travel great distances for care. Functional impairment and poor health status may prevent or

complicate successfully getting to the facility for care; in these cases, the veteran may lack available social support to help facilitate transportation when they are unable to transport themselves. Public transportation is often scarce in rural areas. When a ride service is available, some veterans experience difficulty in reaching pick-up locations. As a result of distance-related barriers, services are often delayed or avoided altogether.

In an effort to reach rural, underserved veterans, the VA has launched initiatives to expand service delivery of evidence-based psychotherapies via telehealth (Gros et al., 2013). Despite hopeful aspirations to reduce health disparities, this modality is not without its own unique challenges. For example, home internet speed and general availability are typically lower in rural areas, thereby disrupting audio and video of psychotherapy sessions. Providers new to telehealth require training which utilizes a great deal of VA resources in order to ensure competency and proficiency through this medium. Patients, too, must be trained in how to use telehealth software and, in many cases, must be trained in how to use the technological device that is often issued to them by the VA. Telehealth also inherently adds another layer to confidentiality and data security issues, which requires increased resources (i.e., finances) to enhance security via encryption, which slows internet connection speed. Thus, the VA is faced with a difficult balance between security and session quality. Traveling to a CBOC for a telehealth session represents an alternative option for veterans, but even then patients may face other barriers such as limited provider availability, not having sufficient private space at the CBOC for sessions, and travel/transportation challenges to the CBOC.

Stigma and rural culture also have the potential to create barriers for veterans receiving treatment. Rural culture often promotes independence and values self-reliance, which may dissuade veterans from seeking mental health help (Cully et al., 2010; Fox, Merwin, & Blank,

1995). Social networks in rural areas are typically smaller, denser, and have more robust duration than nonrural relationships (Kirchner et al., 2011). This can bolster the influence of relationships on the individual, especially as anonymity becomes greatly reduced. When stigma involving mental health treatment enters the equation, a lack of anonymity increases the chances that a person who seeks mental health care will be labeled with a negative connotation, such as being "crazy," (Rost, Smith, & Taylor, 1993). It is often the case that less populated areas yield greater levels of stigma against mental health care, which may translate to lower utilization of services (Hoyt et al., 1997).

On the topic of barriers to care, it is necessary to examine the intersectionality of stigma found in rural culture and stigma associated with veteran culture. Despite shared characteristics among rural areas, there is certainly a great deal of heterogeneity between them. Similarly, veterans share many commonalities in values, norms, and beliefs; however, the veteran population does not represent a homogeneous cultural group (Strom et al., 2012). In fact, the veteran population consists of diverse backgrounds and intersecting identities such as religion, SES, and cohort differences. However, the shared aspects that comprise the veteran population are significant and distinct enough to designate veteran/military culture as a unique subculture that deserves individualized clinical attention.

A major facet of military culture is the concept of collectivism, which is essential for survival in combat and functioning of the military as an organization (Steiner, 2018). The military subscribes to an ethos that group identity comes before individual desires; "the mission comes first, and expectations are held that others and the group take priority before the individual self (Strom et al., 2012). Despite collectivism being a necessary aspect in military operations, it may also influence mental health symptomology or produce barriers to care (Steiner, 2018). For

example, when a servicemember experiences a traumatic event, he or she may experience guilt and self-blame for not doing more to protect their comrades. A veteran may minimize their own legitimate mental health problems in an effort to put aside their needs, and ultimately return their focus to the group (e.g., family, friends, work colleagues); unaddressed symptomology likely worsens over time and the individual may have chronic and severe mental health concerns when finally deciding to seek treatment.

The stigma against mental health in the military is substantial and has been a prominent, chronic issue (Steiner, 2018). There are several factors contributing to this stigma, one being that an admission of mental health problems can pull an active duty servicemember out of their daily roles with their unit. Implicit views about the affected servicemember often ensue, such as they may be perceived as weak or unreliable. This stigma often persists after discharge and carries through to mental health care, as this attitude becomes a solidified and reinforced piece of the veteran's world view. Another reason veterans may not seek care stems from their time on active duty when they may feel that they are letting down their fellow soldiers, marines, airmen, or sailors. This sense of shame is typically a product of the aforementioned stigma and limited duty enforcements, which can cause a servicemember to feel as though they are not "pulling their own weight" or fulfilling their contribution as a team member. This engrained attitude often persists after discharge and is applied throughout the veteran's life, and may serve as a cultural barrier in seeking mental health care.

The literature contains a wealth of support identifying and explaining barriers to care among rural populations. Even as measures are taken to address these challenges in the veteran population, data continues to suggest that rural veterans continue to encounter problems in receiving mental health care and utilize services at lower rates than their urban counterparts. It is

important to understand these various barriers and challenges in order to better address the mental health needs of rural veterans. Although not part of this study, stigma is further revisited in the discussion section of this paper along with ideas for how it may functionally explain relationships among variables relating to rural veteran mental health.

Veteran Employment and Mental Health

Research on the relationship between employment and mental health among veterans is surprisingly scarce (Zivin et al., 2011). Employment plays a vital role in a veteran's readjustment to civilian life following separation from the military. Mental distress may serve as a barrier to the successful acquisition and maintenance of a job. Veterans with a mental health disorder often receive disability benefits from the VA, which may dissuade the active pursuit of employment for fear of losing these benefits, among other reasons. This resistance to seek employment persists even when a veteran is considered to be physically and emotionally capable of earning a job (Greenberg & Rosenheck, 2007). Veterans who would likely experience improvement to their mental health by entering the workforce instead elect to remain unemployed, as they fear their compensation and resources would be reduced as a result (Zivin et al., 2011). Therein lies one possible explanation for the negative relationship between having a mental disorder and being employed. These findings are particularly relevant as rural veterans are more likely to have a disability than urban veterans (Holder, 2017).

Just as psychiatric diagnoses can affect employment status, employment has been shown to have an impact on mental health and well-being in general (Harnois, Gabriel, & World Health Organization, 2000). Having a job may positively influence mental health through providing financial stability, contributing to the formation of one's personal identity, opportunities for social interaction and interpersonal connection, and increasing self-worth and purpose. These

factors are not fully explored in the literature within the scope of the veteran population, but some generalizability may be applied to veteran employment and mental health with a moderate degree of caution.

Urban veterans experience higher employment rates across all ages compared to rural veterans (Holder et al., 2017). Employment status also has a more indirect role in veteran mental health, as health insurance is often received through one's employer. Unemployed veterans who do not receive VA benefits may be more likely to be uninsured, which creates another barrier in access to mental health treatment. Furthermore, employment rates among rural veterans decrease as level of rurality increases, suggesting that fewer job opportunities may exist in rural areas compared with nonrural or urban areas. Given the various associations between mental health, employment, and rural veterans along with gaps in the literature, these factors require further empirical investigation.

Sample Considerations

Studies involving veteran samples have largely included male and older adult populations with a range of warzone experiences; more recent research has increased focus on female and younger veterans as the military broadens who is eligible to serve, due to recent wars and conflicts, and recognition of heterogeneity of the veteran population. As such, these factors are likely important to consider in the current sample as they relate to mental health outcomes. Research suggests that women report higher levels of depressive and anxiety symptoms (Albert, 2015; McLean et al., 2011), but sex-specific effects related to these areas remain relatively understudied in veterans (Runnals et al., 2014). Research has found increasing rates of mental illnesses among older adults despite the historical underdiagnosis and underutilization of services in this population (Wiechers et al., 2015). Additionally, warzone experience should be

considered as it relates to mental well-being given its documented association with greater psychological distress and symptoms (Aldwin et al., 2018; Shea et al., 2017).

Notable Gaps in the Literature

Many individuals may assume that most veterans go to the VA for mental health services, and that the long arm of the VA soundly reaches veterans who live in remote areas. Data suggests that only 58% of rural veterans are enrolled in the VA health care system (U.S. Department of Veteran Affairs, 2019). An important gap to address in the literature is understanding rural veterans' use of VA and non-VA services, and understanding the factors contributing to their selection of mental health services outside the VA system (Weeks et al., 2008). CBOCs established to help reach this population appear to be less convenient than anticipated as veterans may still have significant travel barriers in reaching these satellite facilities. Furthermore, additional research needs to examine the mental health characteristics involving the high volume of rural residents who served in OEF/OIF that have returned home and separated from the military. The need for further scientific investigation continues to be highlighted by more recent and ongoing military campaigns (e.g., Operation Freedom's Sentinel).

Upon review of the literature, it appears that much of the research is VA-driven or uses VA data (see Buzza et al., 2011; Cully et al., 2010; Jameson et al., 2011; Mott et al., 2015; Weeks et al., 2006). When studies are limited to using VA data, utilization patterns are often misrepresented and the use of health services is underestimated (Weeks et al., 2006). Moreover, understanding access to care for rural veterans is impeded by a lack of information about non-VA services and their patterns of use within this demographic. In addition to the high volume of VA-based data and studies, a review of the literature by Weeks et al. (2006) determined most

studies on rural veteran health were small in size, frequently used older data, and rurality was often not a primary focus.

Teich et al. (2017) examined rural veteran mental health using a non-VA national survey. More studies with similar methodology exploring the mental health status and needs of this population are needed to bring a more balanced view to this topic. Additionally, further investigation is needed for policy and economic reasons. The financial impact associated with rural veteran mental health problems creates a systemic problem, as some estimates assert that rural veterans with psychiatric conditions will generate health care costs up to 4% higher than their urban counterparts (Wallace et al., 2006). Continued investigation into rural veterans and their mental health is needed to better inform policy and appropriately direct resources (Weeks et al., 2006). The current study focusing on rural veterans throughout the Brazos Valley using a regional health survey presents an opportunity to provide incremental knowledge to the literature base and inform public policy or mental health initiatives.

Brazos Valley Mental Health

The Brazos Valley is a predominantly rural region in south central Texas comprised of seven counties. This underserved region is characterized by federally designated Health Professional Shortage Areas (HPSAs), and Texas only trails California among states with the highest number of Mental Health HPSAs (Health Resources and Services Administration, 2019). In other words, access to care presents a major barrier for these rural residents. Brossart et al. (2013) examined mental health among residents in this region across two time points, using separate surveys in 2006 and 2010. They found that women and African Americans were at greater risk for depression, though rural residence was not a significant factor.

The Brossart et al. (2013) study served as an initial examination of this largely rural and underserved region, though there are directions for further investigation using the survey in the Brazos Valley. The Brossart et al. study is the first to examine the Patient Health Questionnaire (PHQ)-9 among the rural residing sample. Widespread, continued use of the PHQ-9 across this sample could add valuable information to the empirical literature. Furthermore, the health surveys used by Brossart et al. have been updated and administered multiple times since 2006 and 2010, suggesting that more recent investigation is warranted. Lastly, the surveys denote veteran status, but to this writer's knowledge no studies have been conducted examining this population in the Brazos Valley.

Summary of Presented Literature

Research has shown that veterans experience greater physical and psychological diagnoses and conditions compared to nonveterans (Agha et al., 2000; Almond et al., 2008; Bumgarner et al., 2017; Hoerster et al., 2012; Olenick et al., 2015). Within the veteran population, rural veterans in particular face higher severity in symptomology, increased challenges in receiving appropriate care, and are more deeply impacted by medical and psychiatric conditions which contribute to reduced quality of life (Bumgarner et al., 2017; Weeks et al., 2004; Weeks et al., 2006). Given these concerns, the U.S. Department of Veterans Affairs has designated rural veterans as a "population of interest" that requires individualized attention and research (Holder, 2017, p. 1).

Much of the research involving rural veterans to date involves the use of VA-sourced data. In other words, a great deal of our understanding about the mental health status and needs of rural veterans is based on individuals who are actively enrolled in VA services. There is a gap in the literature regarding mental health, service utilization, and other contributing factors to

health status involving rural veterans outside the VA system. These veterans may not be receiving the care they need, and public health policies and initiatives have the potential for improvement to better address the health disparities faced by this particular group.

The current study aims to examine factors of mental health and well-being among rural veterans by utilizing path analysis. A model of mental health and well-being for rural veterans is proposed where sex, age, race, employment status, warzone experience, and insurance status significantly influence rural veteran PHQ-2, GAD-7, and CDC Healthy Days measure scores. Additionally, the relationships from race, employment status, and insurance to the outcome variables are mediated by veteran perceived access to mental health care, utilization of services when needed, and delayed access to mental health care because of transportation barriers. The impact of sex, age, and warzone experience on the outcomes are not mediated in the model. Investigating these relationships is important to better understand the rural veteran sample in this health survey.

CHAPTER 3

METHODS

Participants

Participants for the current study were adult residents of the Brazos Valley. The Brazos Valley region of Texas is composed of the following seven counties: Brazos, Burleson, Grimes, Leon, Madison, Robertson, and Washington. Brazos County has the largest population with an estimated population of slightly less than 200,000. The populations of the other six counties range from 13,000 to 33,000 (Center for Community Health Development, 2016). The total population of the Brazos Valley was approximately 325,000 in 2013. The overall region has an estimated median age of 34.7 years, though this value is significantly higher in several counties. The Brazos Valley is approximately 48.6% female, and has a racial/ethnic composition of 60.7% White, 12.2% Black/African American, 22.0% Hispanic, and 5.1% Other. Intriguingly, the Brazos Valley has a slightly lower unemployment rate (4.1%) compared to the state of Texas, yet a significantly higher percentage of people in this region live below the federal poverty level (21.9%).

Participants completed the regional health survey in 2013. The survey was developed by the Center for Community Health Development at the Texas A&M Health Science Center. These assessments are administered approximately every four years with the intention of better informing public health policies and services for Brazos Valley residents, who face a myriad of health disparities and barriers (Center for Community Health Development, 2013). The 2019 Brazos Valley Regional Health Assessment was not used for the current study due to its omission of an item inquiring about respondent veteran status. For the 2013 survey, as shown in Table 1, the sample size for all respondents was n = 3,312 and 422 (12.7%) identified themselves

as veterans. The average age of the total sample was 58.9 years old (*SD* = 12.4) and 34.1% (*n* = 1,129) male and 65.7% (*n* = 2,117) female. Participants were 85.3% (*n* = 2,826) White, were mostly unemployed (52.7%, *n* = 1,745), and most had health insurance (90%, *n* = 2,980).

Table 1

Participant Characteristics – Total Sample

	***n* (%)**	**M**	**SD**
Age (years)		58.9	12.4
Sex			
Male	1,129 (34.1%)		
Female	2,177 (65.7%)		
Missing responses	6 (0.2%)		
Race			
White	2,826 (85.3%)		
Non-White	352 (10.6%)		
Asian/Pacific Islander/Hawaiian	28 (0.9%)		
Native			
Black/African-American	222 (6.7%)		
Native American/Alaskan Native	17 (0.5%)		
More than one race	85 (2.6%)		
Missing responses	134 (4.1%)		
Employment			
Yes	1,509 (45.6%)		
No	1,745 (52.7%)		
Missing responses	58 (1.8%)		
Insurance			
Yes	2,980 (90.0%)		
If yes, type of insurance			
Through employer	1,945 (58.7%)		
Insurance company	277 (8.4%)		
Medicaid only	53 (1.6%)		
Medicare only	147 (4.4%)		
Medicare and other	476 (14.4%)		
Student	7 (0.2%)		
Military/VA	46 (1.4%)		
Other	29 (0.9%)		
No	232 (7%)		
I don't know/no response	96 (2.9%)		

Missing responses	4 (0.1%)		
Delayed Mental Health Care			
No	2,761 (83.4%)		
Yes, I couldn't miss work	19 (0.6%)		
Yes, it was too expensive	118 (3.6%)		
Yes, I didn't have transportation	8 (0.2%)		
Yes, for another reason	150 (4.5%)		
Missing responses	256 (7.7%)		
Utilization of Services			
Did not need	2,924 (88.3%)		
Needed and used	207 (6.3%)		
Needed but did not use	81 (2.5%)		
Missing responses	100 (3.0%)		
Perceived Access to Mental Health Care			
Very poor	128 (3.9%)		
Poor	109 (3.3%)		
Fair	289 (8.7%)		
Good	607 (18.3%)		
Very good	792 (23.9%)		
Excellent	1,021 (30.8%)		
Missing responses	366 (11.1%)		
PHQ-2		0.8	1.4
GAD-7		3.0	4.2
Unhealthy Days		7.0	10.2

Note. n=3,312.

In alignment with study aims to examine a model of rural veteran mental health and well-being, inclusion criteria were applied. Survey participants who indicated that they were a veteran on a survey item asking veteran status were selected for inclusion. Additionally, criteria for rurality were determined (see below) and veteran respondents from rural counties in the Brazos Valley were selected for further study.

Criteria for Rurality

Criteria for rurality at the county level were selected due to the current study's goal to examine rural veteran mental health. Rurality has been defined in a multitude of ways, and different mechanisms can be used to determine an area's designation on the spectrum from rural to urban (Hart, Larson, & Lishner, 2005). Even considering this variability, a review of articles focusing specifically on rural populations found that only 45% of studies identified the specific definition of rurality that was used (Bumgarner et al., 2017). A partnership between the

Economic Research Service and the Health Resources and Services Administration (HRSA) produced two classification systems: the Urban Influence Codes (UICs) and the Rural-Urban Continuum Codes (RUCCs). UICs are based on the population of the largest city or town in a county, whereas RUCCs focus on the aggregate population in a given county (Farley et al., 2002). Despite the popularity of these two methods, Bennett et al. (2019) outline associated drawbacks of using UICs and RUCCs, and also speak to the greater problems in defining rurality. UICs, RUCCs, and similar methods that primarily focus on geography or population are limited in that they fail to capture several other factors that contribute to rural health disparities, such as culture, access to services, demographic considerations, and economic opportunities.

To illustrate RUCC limitations, consider that multiple counties in the Brazos Valley (e.g., Burleson, Robertson) share the same RUCC designation code as Brazos County, indicating a metropolitan, non-rural status. However, these same counties are much less populated, qualify for funding from both the Centers for Medicare & Medicaid Services (CMS) Rural Health Clinic Program and the Federal Office of Rural Health Policy (FORHP), and are considered rural by these organizations (Rural Health Information Hub, 2021). Furthermore, these counties are designated as Mental Health Professional Shortage Areas (HPSA) by HRSA, who collaborate with state partners and apply criteria beyond population to identify HPSAs. General criteria used to examine whether a population group, geographic area, or health care facility is considered a health professional shortage area include the population to provider ratio, the percentage of the population below 100% of the Federal Poverty Level, and travel time to the nearest source of care outside the HPSA designation area (Health Resources and Services Administration, n.d.). To uniquely specify mental health shortage areas, HRSA additionally considers age group ratios and alcohol/substance abuse prevalence. The current study is focused on factors beyond

population size; thus, it is meaningful for this research to examine features that are closely related to the health disparities associated with rurality rather than UIC or RUCC codes.

Bennett et al. (2019) also bring attention to the discrepancies in definitions of rurality across research. They assert that "it is not unusual for a location to meet the rurality criteria for one program...but not another," such as between CMS and FORHP (Bennett et al., 2019, p. 1,987). Resulting contraindications lead to often confusing methodology. In an effort to increase clarity, the authors suggest that researchers distinctly outline an operationalized definition of rurality in their study, and recommend that a multi-component definition be used in order to best capture important features of rurality. Due to these factors, the current study uses the following criteria for identifying rural counties: 1) a total population fewer than 50,000 people (consistent with excluding urbanized areas, which the United States Census Bureau (2019) defines as 50,000 or more people); 2) designation as a health professional shortage area (Health Resources and Services Administration, 2021); and 3) rural status according to HRSA (Health Resources and Services Administration, 2021). This definition aims to capture several pieces of interest by integrating population factors with important and pragmatic rural factors. Brazos County was the only county out of the seven in the Brazos Valley region that did not meet these criteria for rurality. Despite its designation as a health professional shortage area, it had a population greater than 50,000 and was designated as non-rural. Therefore, Brazos County was excluded from the current analysis in order to focus findings in the rural population.

Rural Veteran Sample

Two hundred seventeen participants were retained based on the selection criteria and characteristics of the sample are presented in Table 2. The average age of the rural veteran sample was 66.5 years old (*SD* = 9.1; range 36-90 years) and the sex composition was 90.8% (*n*

= 197) male and 8.8% female (*n* = 19). The rural veteran sample was predominantly White (*n* = 185, 85.3%), insured (*n* = 201, 92.6%), and unemployed (*n* = 136, 62.7%). Warzone experience was reported by 41% (*n* = 89) of the veterans.

Table 2

Participant Characteristics – Rural Veteran Sample

	n (%)	M	SD
Age (years)		66.5	9.1
Sex			
Male	197 (90.8%)		
Female	19 (8.8%)		
Missing responses	1 (0.5%)		
Race			
White	185 (85.3%)		
Non-White	25 (11.5%)		
Asian/Pacific Islander/Hawaiian	0 (0.0%)		
Native			
Black/African-American	14 (6.5%)		
Native American/Alaskan Native	1 (0.5%)		
More than one race	10 (4.6%)		
Missing responses	7 (3.2%)		
Employment			
Yes	80 (36.9%)		
No	136 (62.7%)		
Missing responses	1 (0.5%)		
Insurance			
Yes	201 (92.6%)		
If yes, type of insurance			
Through employer	89 (41.0%)		
Insurance company	21 (9.7%)		
Medicaid only	3 (1.4%)		
Medicare only	21 (9.7%)		
Medicare and other	49 (22.6%)		
Student	0 (0%)		
Military/VA	15 (6.9%)		
Other	3 (1.4%)		
No	11 (5.1%)		
Don't know/no response	4 (1.8%)		

Missing responses	1 (0.5%)		
Warzone experience			
Yes	89 (41.0%)		
No	127 (58.5%)		
Missing responses	1 (0.5%)		
Delayed Mental Health Care			
No	185 (85.3%)		
Yes, I couldn't miss work	0 (0%)		
Yes, it was too expensive	2 (0.9%)		
Yes, I didn't have transportation	1 (0.5%)		
Yes, for another reason	10 (4.6%)		
Missing responses	19 (8.8%)		
Utilization of Services			
Did not need	190 (87.6%)		
Needed and used	15 (6.9%)		
Needed but did not use	4 (1.8%)		
Missing responses	8 (3.7%)		
Perceived Access to Mental Health Care			
Very poor	16 (7.4%)		
Poor	4 (1.8%)		
Fair	9 (4.2%)		
Good	42 (19.4%)		
Very good	42 (19.4%)		
Excellent	66 (30.4%)		
Missing responses	38 (17.5%)		
PHQ-2		.9	1.5
GAD-7		2.7	4.5
Unhealthy Days		7.5	11.0

Note. n=217.

Procedures

2013 Regional Health Assessment

The 2013 Regional Health Assessment was developed by the Texas A&M University Center for Community Health Development. ECT Institute, a research firm from Kansas, was used to collect the survey data from residents throughout the Brazos Valley (Center for Community Health Development, 2013). Based on population, a target number of completed surveys was set for each county. A total of 36,000 residential households were randomly selected and were mailed letters informing them of their selection. Potential participants received phone calls one week after the letter. Respondents were subsequently randomized by requesting the adult resident in the household whose birthday would be occurring next. Once identified, this

individual was informed of the purpose of the survey and was mailed the survey packet. The packet, available in English or Spanish, included instructions and a self-addressed stamped envelope. Of the 36,000 selected, 24,768 were reached. Of these successful contacts, 12,177 (49%) agreed to participate and complete a survey. The actual amount of completed surveys returned was 5,230 (43%). The overall response rate was 21% (5,230/24,768).

Predictor Variables

The predictor variables for the study are race, employment status, insurance status, age, sex, and warzone experience. The 2013 Regional Health Assessment survey asked participants to describe their "race/ethnicity" by selecting one of 5 responses; survey response information is presented in Table 1. Race was selected as a predictor variable in the current study due to empirical evidence that those who identify as racial and ethnic minorities often face increased mental health disparities, as well as to fill a gap in the literature for studies with rural veterans of minority status populations. Employment status was selected as another predictor variable. Unemployment has been associated with poorer mental health status among veterans, and employment rates in rural regions are typically lower than in urban areas. Furthermore, despite some research findings in the area, there is still a significant void in the literature examining the relationship between employment and mental health among veterans; including employment status in this study as a predictor variable for mental health may contribute to the knowledge base. The survey asked for binary yes/no responses for employment status, and a response of being retired was coded as "no" and was coded as being unemployed. Insurance was selected as a third predictor variable in the model because insurance often dictates how and where an individual can access mental health care. Depending on insurance status (e.g., TRICARE, private, uninsured), a veteran may have greater or fewer mental health treatment options, which

can significantly impact symptom severity and overall well-being. An item on the survey asked respondents to select their insurance type, which included an option of being uninsured.

Age, sex, and warzone experience were also examined in the sample. Participants were asked "How old are you?" to capture age, and were asked to identify their sex as male or female. Age and sex were important to include in the model as they represent understudied subpopulations among veterans, and can provide additional context among overall paths in the model. Trends among mental health status and well-being of female rural veterans are still largely unknown, and the literature is also limited when it comes to age effects relating to psychological symptoms in rural veterans. Veteran participants in the health survey were also asked "Have you ever been on active duty in a war zone?" with response options of either "Yes" or "No" to indicate warzone experience. It was important to include warzone experience in the model to help convey the impact of deployment to a combat area on rural veterans' mental health and well-being.

Mediating Variables

The three mediators in the study were 1) perceived access to mental health care, 2) transportation access for mental health services, and 3) utilization of mental health services when needed. To measure perceived access, health survey participants were asked about their access to mental health care if they need it with possible responses including "Very Poor," "Poor," "Fair," "Good," "Very Good," and "Excellent." It is hypothesized that race, employment, and insurance relate to rural veteran mental health and well-being due to how each of these influence individuals' perceptions of service accessibility. For example, having a current job or insurance may increase one's perception that services are available and accessible. Alternatively, marginalization that may be encountered toward one's racial group may decrease a person's

perception of access to culturally-informed and effective treatment options. In general, individuals may resort to maladaptive coping strategies or experience deteriorating symptoms if they perceive legitimate treatment options as scarce or unavailable.

Veterans were asked about reasons for delayed mental health care, and responses to this item included “No”, “Yes, because I couldn’t miss work,” “Yes, because it was too expensive,” “Yes, because I didn’t have transportation,” and “Yes, for another reason.” Delayed mental health care due to transportation specifically was selected for its salience in representing a barrier for rural veterans in receiving mental health treatment. Race, employment, and insurance can each contribute to delayed mental health care due to transportation issues, and in turn affect mental health and well-being outcomes. Lack of employment may impact an individual’s ability to obtain consistent travel options to attend mental health appointments. Insurance type often dictates where veterans can receive services, and these options may be particularly limited in rural settings leading to the need for longer travel distances to services and more challenges involving transportation. Similar to the potential relationship between racial identity and perceived access, the added consideration of seeking culturally competent care may result in traveling longer distances for services and encountering more transportation barriers.

Utilization of mental health services represents the third mediator in the model. The health survey asked participants if they went to a mental health care provider when they felt they needed to go. Participants could respond to the health survey with “Did not need,” “Needed and used,” and “Needed but did not use" mental health services. Both unemployment and lack of insurance can reduce available mental health services for veterans, resulting in decreased utilization and increased psychological distress if services are not accessed when needed. Additionally, individuals from racial minority groups endorse higher levels of stigma about

mental illness, which may affect both perceived need and use of these services and can result in poorer mental health and well-being (American Psychiatric Association, 2017).

Outcome Variables

PHQ-2

The Patient Health Questionnaire-2 (PHQ-2) was used in the 2013 survey and is a commonly used depression screener that is based on the PHQ-9. To better understand the PHQ-2, it is highly encouraged to familiarize oneself with the structure and psychometrics of the PHQ-9. The PHQ-9 is a brief depression assessment extracted from the larger PHQ measuring a variety of psychological diagnostic criteria (Kroenke, Spitzer, & Williams, 2001). Its administration is relatively efficient, as it can be self-administered by the patient and requires minimal time to complete and score. This nine-item instrument measures the presence and severity of symptoms congruent with major depression. The original study involving validation of the PHQ-9 was conducted with a sample of 3,000 patients in primary care clinics. When the PHQ-9 measure was compared with diagnoses made by mental health professionals in structured interviews, the scale yielded strong sensitivity (75%), specificity (90%), and overall accuracy (85%) (Spitzer et al., 1999).

Each item on the PHQ-9 contains a set of responses ranging from 0 to 3, which the PHQ-2 parallels (0=Not at all, 1=Several days, 2=More than half the days, 3=Nearly every day; Kroenke et al., 2001). Scores on the PHQ-9 can range from 0 to 27, with cut points of 5, 10, 15, and 20. These cut points may be used to differentiate between mild, moderate, moderately severe, and severe depression. A cutoff point of 10 appears to be appropriate in determining probable depression in community samples (Gilbody et al., 2007). In order to meet criteria for major depression in the fourth edition of the Diagnostic and Statistical Manual of Mental

Disorders (DSM-IV), the first two items (i.e., “Little interest or pleasure in doing things,” “Feeling down, depressed, or hopeless”) must have responses of two or greater, and a total of five items on the measure must have responses of two or greater. Criteria for other depression diagnoses can also be met depending on responses given.

A shorter version of the PHQ-9 is the PHQ-2, which contains only the first two items of the nine-item measure (Kroenke, Spitzer, & Williams, 2003). The PHQ-2 is often used as a screening tool with adequate sensitivity but reduced specificity (Arroll et al., 2010). However, lower specificity can be expected when comparing a two-item measure with a nine-item measure that is capable of more depth in its assessment. Even so, there is empirical support for the validation of the PHQ-2 as an appropriate tool in assessing depression. In relation to the Structured Clinical Interview for DSM-IV, the PHQ-2 has been demonstrated to yield a sensitivity of 87% and a specificity of 78% for major depressive disorder (Lowe, Kroenke, & Grafe, 2005). It also demonstrated a sensitivity of 79% and a specificity of 86% for any depressive disorder. The diagnostic performance of the PHQ-2 is strongly supported, even when compared with the PHQ-9. A comparison of sensitivity to change revealed no significant differences between the two measures, and the PHQ-2 has similar accuracy as the PHQ-9 in identifying any depressive disorder. The PHQ-9 remains a diagnostically superior assessment due to its depth and number of items, but research suggests the PHQ-2 has clinical utility and strong validity as a brief alternative to the PHQ-9 and other measures. A total score of three or greater on the PHQ-2 indicates endorsement of some depressive symptomology and that additional assessment or investigation is warranted.

GAD-7

Generalized Anxiety Disorder (GAD) is one of the most common psychiatric concerns encountered in clinical practice and in the general population (Spitzer et al., 2006). A seven-item self-report assessment was devised in order to effectively screen and assist in the diagnosis of GAD. Like the PHQ-9, the GAD-7 is characterized by efficient administration, requiring only minimal time to complete and score the measure. Initial testing with a sample of 2,739 individuals yielded excellent internal consistency (Cronbach $\alpha = .92$), good test-retest reliability (intraclass correlation = .83), and good procedural validity when scores were compared across two administration methods (intraclass correlation = .83).

Each item on the GAD-7 scale contains a set of responses ranging from 0 to 3 (0=Not at all, 1=Several days, 2=More than half the days, 3=Nearly every day; Spitzer et al., 2006) from which respondents select. The items are direct representations of DSM diagnostic criteria for GAD, allowing for efficient clinical assessment. The GAD-7 scale was included in the 2013 survey and was specifically linked to DSM-IV criteria. A total score of 10 on the measure serves as a cut point for identifying probable cases of GAD. Cut points of 5, 10, and 15 may be used to differentiate between mild, moderate, and severe levels of anxiety.

CDC Healthy Days Measures

Health-related quality of life (HRQOL) refers to "perceived physical and mental health over time," and is a construct that is commonly used in public health, clinical research, and numerous related professions (Moriarty, Zack, & Kobau, 2003). To measure HRQOL, the 2013 health survey used the CDC Healthy Days Measures. The CDC Healthy Days Measures consist of four core questions. The first question asks the participant to describe their general health, with response options being "excellent," "very good," "good," "fair," or "poor." The second

question asks the participant to determine the number of days over the past 30 days in which their physical health (includes physical illness and injury) was "not good." The third question asks the participant to determine the number of days over the past 30 days in which their mental health (includes stress, depression, and problems with emotions) was "not good." The fourth question asks the participant to determine the number of days over the past 30 days in which poor mental or physical health kept them from engaging in usual activities, such as self-care, work, and recreation. According to the CDC, the overall number of recent days in which physical or mental health was not good is estimated based on the second and third questions, and thus yields an "unhealthy days" summary measure, which was used in the current study. The core items of the CDC Healthy Days Measures exhibit moderate to strong test-retest reliability along with adequate validity, thus contributing to its common use in assessing HRQOL in the general population (Andersen et al., 2003; Moriarty et al., 2003).

Statistical Analyses

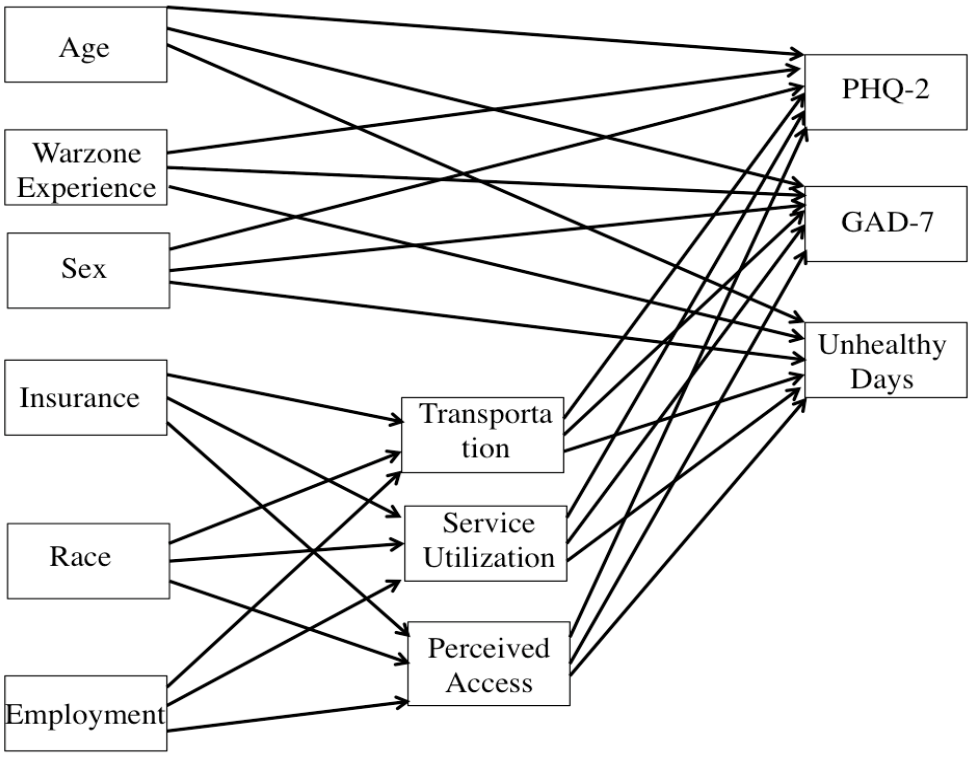
A multitude of statistical analyses were used to test the overall model of factors of rural veteran mental health and well-being in the sample. First, descriptive statistics on demographic variables including age, sex, race, employment status, and insurance status are provided to describe both the total sample and subsample of rural veterans (see Tables 1 & 2). All following analyses focus on the rural veteran subsample.

Path analysis was used to examine an initial model consisting of six predictor variables, three mediator variables, and three mental health outcome variables. In the initial model, the relationships between three of the six predictor variables and the outcome variables are mediated by access-related factors. The predictor variables that pass through mediation are race, employment status, and insurance status. The three mediators in the study are 1) delayed mental

health services due to transportation, 2) utilization of mental health services when needed, and 3) perceived access to care. The three predictor variables that do not pass through mediation and have direct paths to outcomes are age, sex, and warzone experience. The outcome measures depicting mental health and well-being are the PHQ-2, GAD-7, and CDC Healthy Days measures, which are reflective of depression, anxiety, and unhealthy days respectively. See Figure 1 for a graphic illustration of the initial model.

Figure 1

Initial Mediation Model



Note. Direct effects from insurance, race, and employment to outcome variables (PHQ-2, GAD-7, Unhealthy Days) are included in the model, though not shown in the figure.

Stata version 16.1 was used to test the hypothesized path model. Parameter estimate standard errors were estimated from 5,000 bootstrap samples. For mediation models, bootstrapping is the recommended approach for testing indirect effects by using bias-corrected bootstrap confidence intervals (Hayes, 2009). The Stata bootstrap command was used to assess indirect effects of predictor variables on outcome variables via mediators with bias-corrected 95% confidence intervals. Confidence intervals that did not include 0 in the interval were considered evidence of significant indirect effects of predictors on outcomes through mediators; confidence intervals including 0 in the interval were interpreted as not statistically significant.

There were missing values among the measures collected in the rural veteran sample, with missing data ranging from 0.5% to 17.5% across variables. As such, a full information maximum likelihood (FIML) method was used to address missing data. FIML has been recommended over other approaches such as listwise deletion due to less biased parameter estimates and more efficient standard errors (Enders & Bandalos, 2001).

Two predictor variables, race and insurance, were collapsed into dichotomous categories to bolster model stability. Employment was already collected as a binary variable. Due to the veteran sample being 85.3% White, the race variable was dichotomized into White and non-White groups. It would be challenging to make inferences about several different racial groups with the low numbers of respondents in each group; for the current sample, it was considered to be more helpful to dichotomize race in order to better illustrate disparities and barriers often faced by racial minority groups. Similarly, the insurance variable was also collapsed into insured and non-insured groups as 92.6% of the veteran sample had insurance. The primary reason for dichotomizing insurance was that the current study specifically focuses on effects from insured vs uninsured status. Furthermore, there were 8 different options specifying insurance type for

those who had it; by collapsing these several response options, effects and results in the model are clearer to interpret. Please see Table 2 for the original response items for these aforementioned variables for rural veterans.

CHAPTER 4

RESULTS

Descriptive statistics are listed in Table 1 for the total sample (including both non-veterans and Brazos County residents) and Table 2 for the rural veteran subsample (excluding non-veterans and Brazos County). Correlations for all measured variables in the rural veteran sample are listed in Table 3.

Table 3

Correlation Matrix for All Measured Variables in Rural Veteran Sample

	1	2	3	4	5	6	7	8	9	10	11	12
1. Race	1.00											
2. Employment	-0.07	1.00										
3. Insurance	-0.32*	-0.02	1.00									
4. Age	-0.07	-0.45*	0.14*	1.00								
5. Warzone Experience	0.01	-0.01	-0.02	0.09	1.00							
6. Sex	0.02	0.01	-0.14*	-0.34*	-0.13	1.00						
7. Perceived Access	-0.06	0.12	0.06*	-0.01	0.05	-0.13	1.00					
8. Transportation	-0.08	-0.07	0.05	-0.11	0.06	0.04	-0.21*	1.00				

9. Utilization	0.06	-0.04	-0.10	-0.06	-0.04	0.13	-0.04	0.11	1.00			
10. PHQ-2	0.07	-0.20*	0.03	-0.01	0.04	0.20*	-0.22*	0.29	0.34	1.00		
11. GAD-7	0.19	-0.10	0.02	-0.08	0.19*	0.25*	-0.13*	0.23	0.27	0.78	1.00	
12. Unhealthy Days	0.02	-0.14*	0.11	0.07	0.02	0.07	-0.23*	0.15	0.16	0.59	0.51	1.00

*Statistically significant at $p < .05$

Note. n=217.

For the rural veteran subsample, 0.5% reported they delayed access to mental health services due to lack of transportation and 1.8% reported not using services when they felt they needed them. Additionally, 13.4% described options for mental health services as fair, poor, or very poor (see Table 2). The average depression score on the PHQ-2 was .90 (*SD* = 1.5) out of a range from 0 to 6. The average anxiety score on the GAD-7 was 2.7 (*SD* = 4.5) out of a range from 0 to 21. The average number of unhealthy days on the CDC Healthy Days measure was 7.5 (*SD* = 11.0) out of a range from 0 to 30 days. Overall, respondents in the sample reported low levels of depression, anxiety, and quality of life concerns.

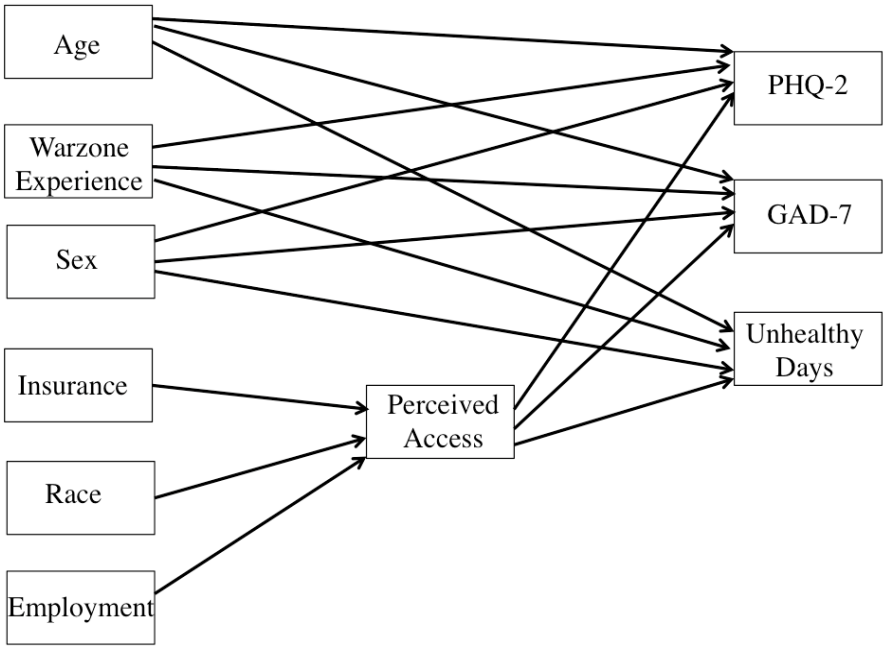
Mediation Model

The initial model included six predictors, three mediators, and three outcome variables. However, two of the proposed mediators - service utilization and delayed mental health care due to transportation - were removed due to low variance. Only 1.8% (*n* = 4) of the rural veteran sample reported not using mental health services when they needed them; as a result, the service utilization variable was dropped as a mediator in the model. Additionally, just 0.5% (*n* = 1) of veterans delayed seeking mental health care due to transportation issues, thus the transportation

variable was also dropped as a mediator. The decision to remove the aforementioned mediators was based on the rationale that any results from such few responses would produce minimally helpful results; making inferences on such a small number would be difficult and would unlikely yield much meaning. Although the predictor variable insurance also had low variance (92.6% insured vs 5.1% uninsured), this was left in the model for two primary reasons: theoretically, it is important to examine the role of insurance status in the current model, and electing to retain the predictor variable despite low variance did not significantly impact the model. Results concerning the insurance variable are included in the adjusted model, though this represents a limitation to the study as findings are likely limited due to minimal variance. See Figure 2 for the final mediation model.

Figure 2

Final Model Representation



Note. Direct effects from insurance, race, and employment to outcome variables (PHQ-2, GAD-7, Unhealthy Days) are included in the model, though not shown in the figure.

The final model was fully saturated using all available degrees of freedom, which does not allow for analysis of fit (n = 217; $\chi 2$ = 2.40; p = 0.50; RMSEA = .00; CFI = 1.00; TLI = 1.02). Contrary to the hypothesis, there were no statistically significant indirect effects involving the mediator variable, perceived access to mental health care. There were also no significant direct effects from race, employment status, or insurance status to perceived access. However, there were two significant direct effects from perceived access, to outcome variables, with perceived access negatively related to the PHQ-2 and Unhealthy Days ($p < .05$ for both).

Regarding the three predictors that pass through mediation in the model - race, employment, and insurance - there were two significant direct effects from predictors to the outcome variables. Employment negatively predicted depression ($p < .05$) and unhealthy days ($p < .05$), such that being actively employed predicted lower depression levels and fewer unhealthy days. All other direct effects from race, employment, and insurance to outcomes were not significant.

Direct relationships from the remaining predictors - age, sex, and warzone experience - to the three outcome variables were also examined. Sex positively predicted GAD-7 scores, indicating females reported higher anxiety symptom levels ($p < .05$). There was a positive prediction between the warzone variable and GAD-7, indicating that those with warzone experience reported higher levels of anxiety ($p < .05$). All other direct effects from these predictors to outcomes were not statistically significant. The residual covariance between the outcome variables (PHQ-2, GAD-7, Unhealthy Days) was positive and statistically significant, implying that there may be remaining association between the outcome variables after controlling for the effects of all variables included in the model. Standardized path coefficients

are displayed in Figures 3 and 4. All possible indirect and direct unstandardized path coefficients are presented in Table 4.

Figure 3

Mediation Effects in the Final Model with Standardized Path Coefficients

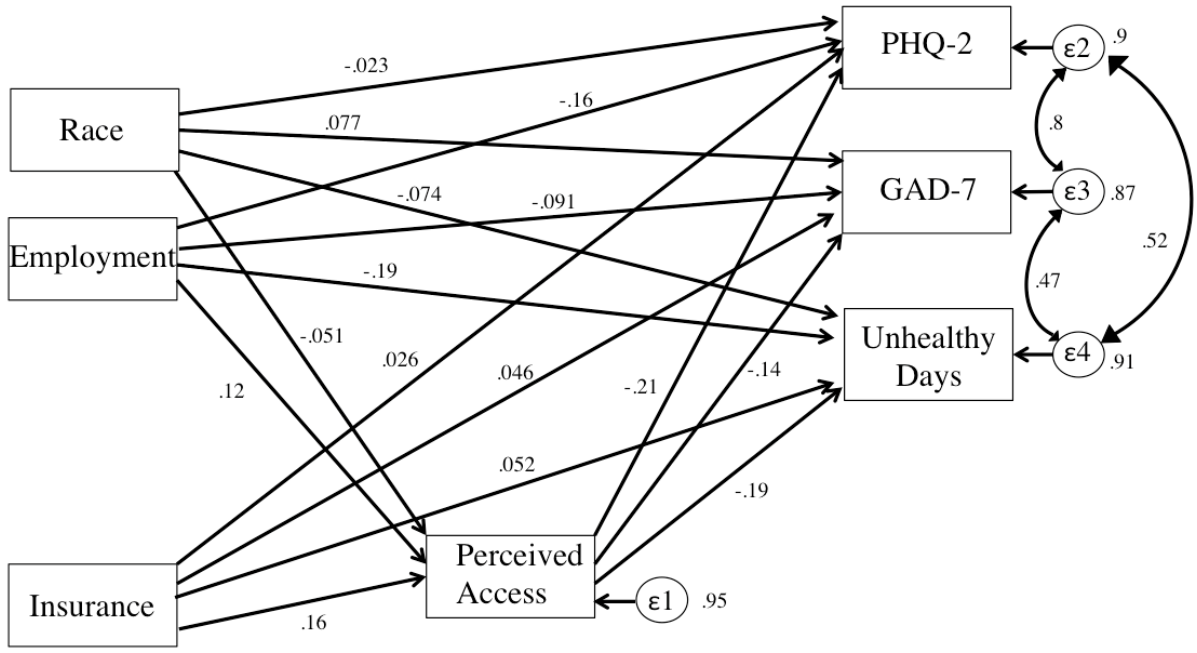


Figure 4

Direct Effects of Age, Warzone Experience, and Sex on Outcome Variables in the Final Model with Standardized Path Coefficients

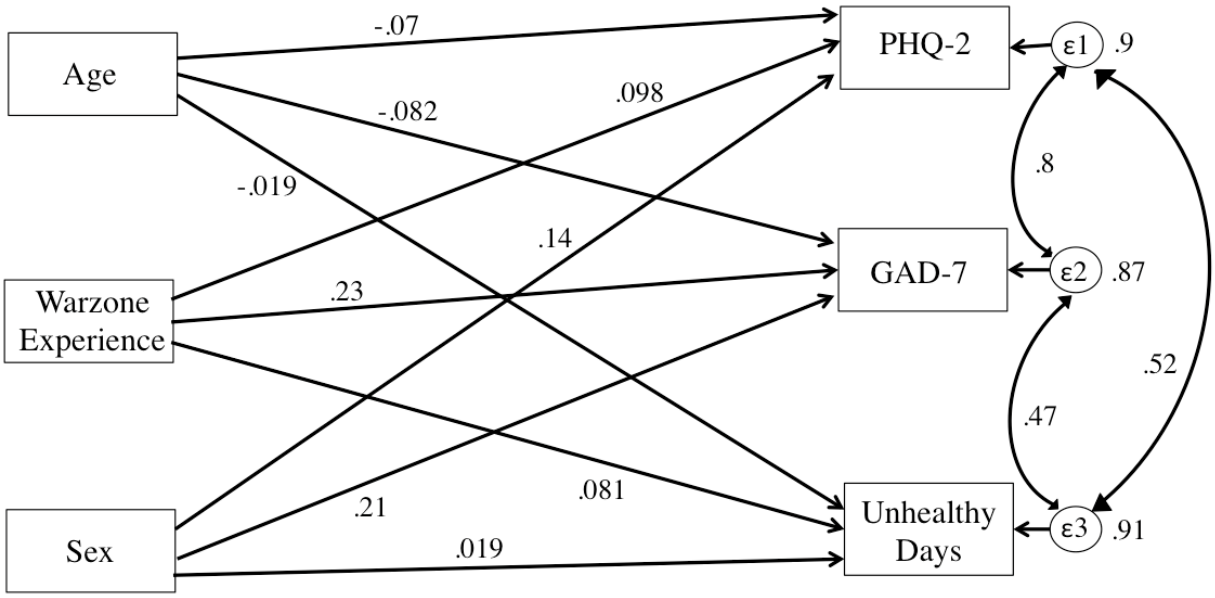


Table 4

All Measured Unstandardized Effect Estimates in Rural Veteran Sample (n = 217)

			Maximum Likelihood Estimation From 5000 Bootstrap Samples		
Dependent Variable	**Independent Variable**	***Estimate***	**Standard Error**	**95% CI**	***p* value**
Indirect Effect Estimates					
PHQ-2					
	Race	0.05	0.11	-0.16, 0.26	0.65
	Employment	-0.08	0.06	-0.20, 0.04	0.20
	Insurance	-0.23	0.20	-0.63, 0.16	0.25
GAD-7					
	Race	0.10	0.24	-0.36, 0.56	0.67
	Employment	-0.16	0.14	-0.44, 0.12	0.26
	Insurance	-0.47	0.45	-1.35, 0.41	0.29
Unhealthy Days					
	Race	0.33	0.76	-1.16, 1.83	0.66
	Employment	-0.53	0.45	-1.42, 0.35	0.24
	Insurance	-1.56	1.46	-4.42, 1.30	0.29
Direct Effect Estimates					
Perceived Access					
	Race	-0.24	0.47	-1.16, 0.68	0.61
	Employment	0.38	0.22	-0.05, 0.81	0.08
	Insurance	1.11	0.79	-0.43, 2.65	0.16
GAD-7					
	Perceived Access	-0.43	0.24	-0.90, 0.05	0.08

GAD-7					
	Race	1.09	1.21	-1.30, 3.48	0.37
	Employment	-0.86	0.67	-2.17, 0.44	0.19
	Insurance	0.94	1.52	-2.05, 3.92	0.54
	Age	-0.04	0.04	-0.11, 0.03	0.27
	Sex	3.32	1.45	0.47, 6.17	0.02*
	Warzone Experience	2.16	0.63	0.92, 3.40	0.001**
PHQ-2					
	Perceived Access	-0.21	0.08	-0.37, -0.05	0.01*
PHQ-2					
	Race	-0.11	0.40	-0.89, 0.67	0.79
	Employment	-0.51	0.22	-0.94, -0.09	0.02*
	Insurance	0.17	0.49	-0.78, 1.13	0.72
	Age	-0.01	0.01	-0.03, 0.01	0.29
	Sex	0.75	0.48	-0.19, 1.70	0.12
	Warzone Experience	0.30	0.20	-0.10, 0.70	0.14
Unhealthy Days					
	Perceived Access	-1.40	0.68	-2.73, -0.07	0.04*
Unhealthy Days					
	Race	-2.50	2.58	-7.57, 2.55	0.33
	Employment	-4.43	1.61	-7.58, -1.28	0.01*
	Insurance	2.58	3.40	-4.08, 9.23	0.45
	Age	-0.02	0.09	-0.20, 0.15	0.79
	Sex	0.74	3.17	-5.48, 6.96	0.82
	Warzone Experience	1.82	1.53	-1.18, 4.82	0.23

*Statistically significant at $p < 0.05$, **Statistically significant at $p < 0.01$

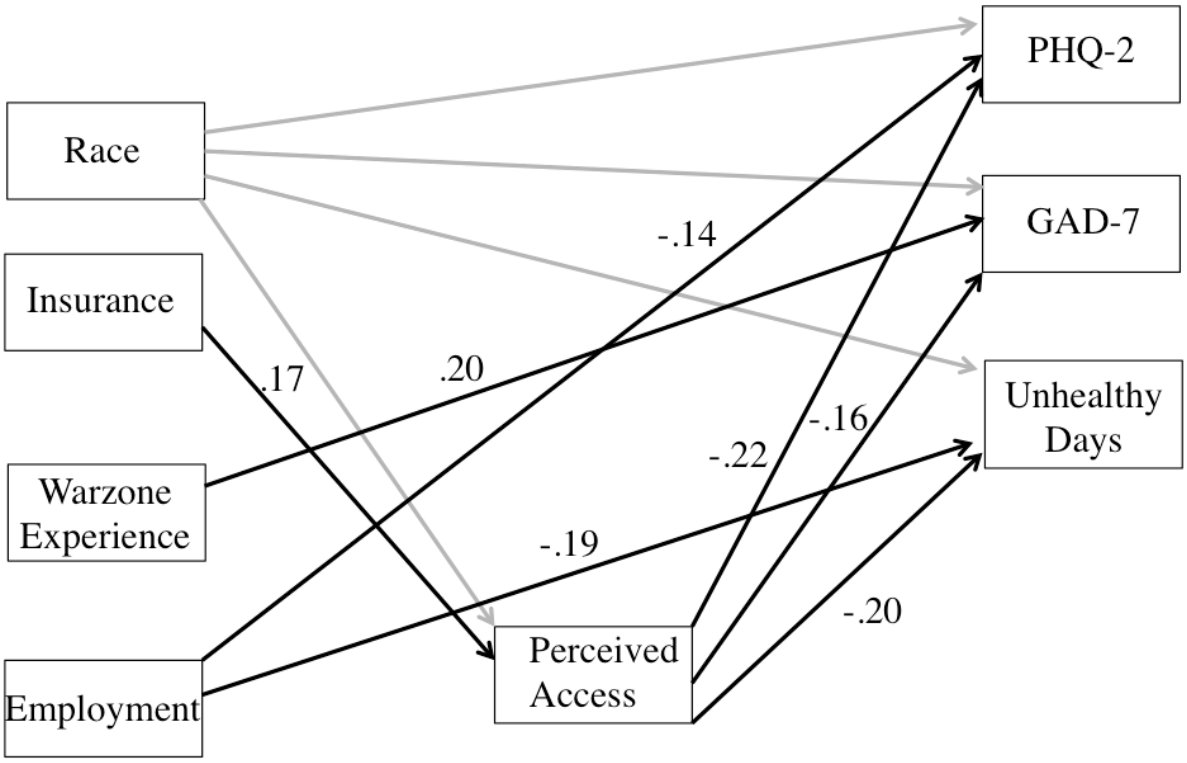
Post Hoc Analysis

Based on results of the current study, a post hoc alternative model was proposed to further increase parsimony in the original model. The post hoc submodel included four predictor

variables (race, employment, insurance, and warzone experience) with paths passing through a mediator (perceived access) to the three outcome variables (PHQ-2, GAD-7, Unhealthy Days) (see Figure 5).

Figure 5

Post Hoc Analysis: Initial Model with Standardized Path Coefficients



Note. Only significant paths - with the exception of race - are shown in the figure.

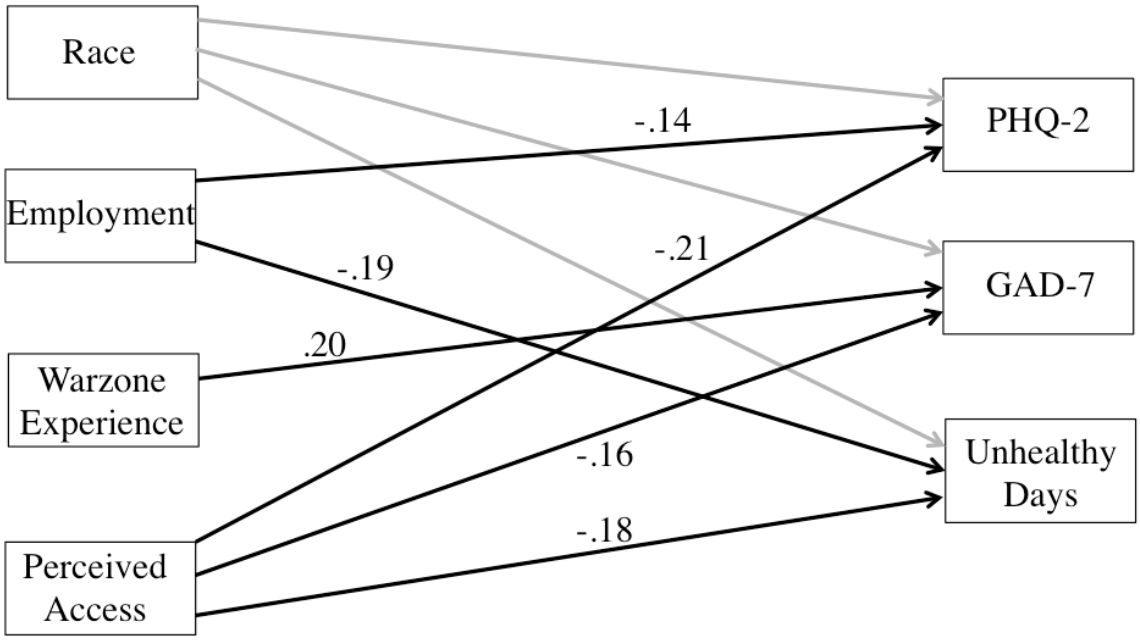
There were no significant indirect effects in the model. There were significant direct paths from insurance to perceived access, employment to depression and unhealthy days, warzone experience to anxiety, and from perceived access to all three outcomes. Race yielded no significant effects, but was included in each of the following model revisions to help control for

its effects within the model. The submodel asserts that anxiety symptoms increased with the presence of warzone experience.

Despite a lack of significant paths between predictors and perceived access, this mediator had its own significant direct paths to each of the outcomes; as such, perceived access was more appropriately categorized as a predictor rather than a mediator. The post hoc submodel was further refined to include perceived access as a predictor variable alongside race, employment, insurance, and warzone experience. Paths from these variables did not pass through any mediation and directly connected to the three outcome variables. Of these relationships, paths were significant from employment to depression and unhealthy days, warzone to anxiety, and perceived access to depression, anxiety, and unhealthy days; insurance did not produce any significant direct effects and was excluded from the final submodel. The final post hoc submodel consists of race, employment, warzone experience, and perceived access as predictors. Significant effects were found from employment to depression and unhealthy days, warzone experience to anxiety, and perceived access to each of the three outcomes. This represents the most parsimonious version of the original model. A depiction of the final post hoc submodel can be found in Figure 6, in which all paths that are shown are statistically significant, except for the paths stemming from the race variable.

Figure 6

Post Hoc Analysis: Final Model with Standardized Path Coefficients



Note. Only significant paths - with the exception of race - are shown in the figure.

CHAPTER 5

DISCUSSION

To this author's knowledge, this is the first study to look at the relationship between demographic factors, access-related variables, and mental health outcomes among veterans in the Brazos Valley region. Much of the literature in general concerning veteran mental health is conducted using data from the Veterans Health Administration, whereas the present study examines this construct through sampling in a community setting. This allows for inclusion of veterans in the study who may not be connected to VA services. Although research examining mental health in the Brazos Valley region continues to increase, the area remains characterized by a population that is largely underserved and understudied. The present study adds incremental knowledge to the literature base of rural veterans, whom the U.S. Department of Veterans Affairs has designated as a "population of interest" that requires individualized attention (Holder, 2017, p. 1).

This study explored how several factors impact mental health and well-being among rural veterans. First, we examined the extent to which perceived access to mental health care mediated the relationships between demographic factors (race, employment, and insurance) and mental health and well-being outcomes (depression, anxiety, unhealthy days). Contrary to the hypothesis, results suggest that perceived access to care was not a significant mediator among these relationships. Low variance across several variables in the model, including perceived access, may contribute to reasons for non-significant indirect effects in the sample. For example, the majority of rural veterans did not report symptoms of depression and anxiety. This constrained variance among variables of interest is not optimal for path analysis that aims to examine how much variance in outcomes is explained by the mediators. If variance is increased

through efforts such as focused participant recruitment, the model may yield significant mediation or further confirm that perceived access is truly not a mediator in the current model.

The current study also examined the direct relationships between the variables age, sex, and warzone experience and the outcome variables of depression, anxiety, and unhealthy days. Age did not yield any significant predictive relationships. Female rural veterans were more likely to report higher levels of anxiety than male rural veterans, but not depression or unhealthy days. Rural veterans with warzone experience endorsed higher anxiety than veterans without warzone experience. Although the magnitudes of these relationships were small, the results provide useful information about trends within the veteran sample and offer new incremental knowledge about an understudied subgroup (female, rural veterans).

Two of the initial mediators, service utilization and delayed mental health services due to transportation barriers, were not included in the final model because of low variance within each variable. The majority of the responding veteran sample reported not needing mental health services and did not delay seeking mental health care if they felt they needed it. Theoretically, it may still be important to examine the roles of these mediators in a more diverse sample as results may differ in a sample with higher need or barriers to care. Notably, low reported mental health care utilization in this study is consistent with findings among older U.S. veterans more generally (Blais et al., 2015). The findings highlight the need to incorporate targeted recruitment strategies toward underserved populations in order to better understand the relationship among demographic variables, access-related factors, and mental health factors. It is interesting to note the lack of reported barriers to care in this sample given widespread research outlining consistent access issues in rural communities (Gamm, Stone & Pittman, 2010). This may indicate that transportation to services in this geographic region is a less important barrier than indicated by

the larger literature on rural barriers, and it may also be explained as those with barriers to care may be less likely to complete the survey in the first place. Additional research is needed to explore these possibilities.

Predictive relationships between demographic factors and mental health outcomes in the current sample may also be better explained by variables other than perceived access. For example, stigma and beliefs about mental health were not captured in the health survey, but may serve as a possible mediator between predictor variables and mental health outcomes in the current model. Service utilization was dropped as a mediator from the model due to low variance, with respondents overwhelmingly reporting they did not need mental health services. Given assertions from empirical literature that stigma often impacts mental health service utilization (Michalopoulou et al., 2017), and the widespread research documenting stigma in rural communities, unhelpful beliefs about mental health may have an impact on responses to the utilization question in the current study through underreporting. Accordingly, stigma may serve to mediate the relationship between demographic factors and mental well-being, and more targeted questions about this area may help elucidate mechanisms of action in the current model.

Although perceived access was not a significant mediator, there were statistically significant, direct predictive relationships among certain variables within the model. Perceived access exhibited significant direct effects with the PHQ-2 and CDC Healthy Days measure, suggesting that as veterans' perceived access increased, their reported depressive symptoms and unhealthy days decreased. This is a promising relationship, and may indicate that those with perceived good access to care are also using these services when needed and addressing psychological distress. However, given the low overall symptom levels and exclusion of utilization from the current model, future research is needed to further investigate this. There was

no significant direct relationship between perceived access and anxiety symptoms. The model also revealed significant direct effects between employment and depression and unhealthy days, where being employed related to lower depressive symptoms and fewer reported unhealthy days for veterans. This is consistent with research in this area about the relationship between employment and mental health and well-being among veterans (Zivin et al., 2011).

An adjusted post hoc submodel was proposed in an attempt to make the original model more parsimonious. Multiple adjustments revealed that perceived access is more appropriately depicted as a predictor variable rather than a mediator in the model. Insurance and race yielded nonsignificant effects in the final submodel; insurance was excluded as a result, and race was retained in order to account for its effects in the model. Significant direct paths were present from employment to depression and unhealthy days, from warzone experience to anxiety, and from perceived access to depression, anxiety, and unhealthy days. Although this final submodel did not include mediation as was hypothesized in the original model, significant direct effects among the aforementioned variables suggest that they may play important roles in the mental health and well-being of rural veterans in this geographical area. This post hoc exploration of the data may help future models and future studies examining similar research questions.

Of note, there is discussion in the scientific community over the role of mediation in cross-sectional and longitudinal study design. Scholars acknowledge that mediation can be successfully demonstrated in cross-sectional studies, however this research design tends to lack explanation as to why mediation occurs causally (Winer et al., 2016). This is primarily because cross-sectional research that is atemporal does not "draw from either longitudinal data or previous results that have established a causal relationship among the variables of the model," (Winer et al., 2016, p. 4). In cross-sectional studies that do not consist of clear temporal order,

scholars encourage investigators to refrain from concluding that a causal relationship has been established through mediation. If the current study did demonstrate significant mediation, interpretation of results would have adhered to these suggestions as the present study is not of longitudinal design.

Given the volume of veterans who endorsed warzone experience in the current sample, along with the relationship between warzone experience and anxiety, efforts to understand and assist these individuals should continue to be developed. Ensuring that veterans have sufficient social support and access to mental health services post-deployment is vital to their functioning. A qualitative study by Brenner et al. (2015) provided insight into veterans' experiences when returning home from deployment. One veteran shared the following experience involving reintegration with his family and community in Texas:

> "We came back, and they put us on a 3-day pass right away. My parents came down to Texas, came over to my aunt's house, and I couldn't sit still to save my life. We went to church that Sunday, I freaked out and I walked out halfway through, because I was surrounded by people I hadn't been with an entire year, and I was not comfortable with that. Because just my platoon, just the guys I had been with. You know . . . that was hard to go out in public for a while." (Brenner et al., 2015, p. 282).

Returning home and resuming relationships can be difficult for veterans. As in the previous anecdote, veterans may feel uncomfortable with the drastic differences between their civilian and military social support. Other times, veterans feel misunderstood by family, friends, and community members, and may perceive them as unsupportive, unhelpful, or even hostile. In turn, veterans may isolate themselves from others, which can lead to the development or exacerbation of mental health problems. This highlights the need for a community's sensitivity

and appropriate outreach to veterans. Even if a veteran has been separated from the military for years, their surrounding community can have a significant impact on their well-being. This is especially true for veterans residing in rural communities, which are often more tight-knit and less anonymous.

It is of particular importance that we not underestimate the impact of community on veterans, including social support, VA- and non-VA- affiliated resources, and access to such resources. People may often think that most veterans go to the VA for all their physical and mental health care needs; this is not the case, as a significant amount of both urban and rural veterans are not enrolled in VA services of any kind. This information underscores the importance of community services being made known and available to veterans. Intentional efforts to provide support at a community-wide level must be made, as the community is often the most salient adjustment for veterans upon reintegration. One veteran described transitioning to civilian life as "It's being kind of pushed to the side of everybody's life, you know. I had to come back into their life, not them come back into mine," (Brenner et al., 2015, p. 282). Another veteran shared:

> "Not only dispensable in the Army but also in civilian life – I was young, I came back after a whole year, and I realized that life goes on without me. And people would, you know, get married and die, and everything goes on without me," (Brenner et al., 2015, p. 282).

These experiences illustrate the need for effective outreach to all veterans. Community efforts to engage this population must be proactive, utilize effective communication, and must be easy to access. Veterans may struggle with mental health problems because they are not enrolled in VA

care, are unaware services in the community are available, or may hold stigma and biases against seeking mental health treatment.

In order to better inform policies, community outreach, and mental health services for rural veterans, this population must first be understood. As previously described, it is all too often that veterans feel alone and uncared for, and they may conclude they have to face their problems with little help. The current study provides an opportunity to better understand rural veterans in the Brazos Valley region, better inform public health policies and survey procedures involving veterans, and to better inform community outreach and clinical services ultimately leading to increased access to care.

Limitations

A strength of the present study is that it is one of the first to explore the relationship between demographics, access-related factors, and mental health outcomes in the Brazos Valley region among rural veterans. Nevertheless, this study does have important limitations. The final sample was relatively homogenous and largely consisted of White, employed, and insured veterans with low levels of symptom distress. Although the racial demographic makeup is not inconsistent with the region's predominantly White population, the low diversity in this sample does limit the ability to answer one of the study's primary questions relating to racial and ethnic factors for rural veterans. The average age of participants was 66.5 years and was relatively clustered (SD = 9.1). This reflects another instance of diminished diversity in the veteran sample, especially when it comes to the evolution of military culture throughout the years. Older veterans served in eras in which psychiatric issues were, in general, not openly discussed and these veterans historically experienced a great deal of stigma surrounding mental health; conversely, focused efforts to reduce mental health stigma in the military have increased in recent years

(Acosta et al., 2014). Older veterans may answer questions about their mental health differently (e.g., underreport symptoms or service utilization) compared to younger servicemembers. A sample with a more diverse age range may help illustrate important effects due to age.

An additional limitation relates to the binary measurement of another predictor variable, employment. Individuals who reported being unemployed captured both retired and otherwise unemployed veterans. These are qualitatively important distinctions that are not captured in this study. Additionally, the average PHQ-2 and GAD-7 total scores were low across the sample, indicating low overall distress. It will be important for future studies to target a veteran sample experiencing a larger range of mental health distress in order to better examine the relationship of demographic factors and access-related factors to mental health outcomes in this region.

Furthermore, the current study used the Regional Health Assessment conducted in 2013 instead of the assessment completed in 2019 due to the removal of the question about veteran status in the 2019 survey. This change not only limits the current study from investigating research questions in the most recent sample, but also prevents longitudinal study design and more advanced evaluation of veteran mental health trends across time points. Despite limitations, this research provides important and novel insight into better understanding the mental health status and needs of veterans residing in rural Brazos Valley.

Future Directions

In order to advance the empirical investigation of the heterogeneity of the veteran population and factors of mental health and well-being in this group, research designs involving strategic recruitment of participants are encouraged. Targeted recruitment of veterans from rural communities, diverse racial and ethnic backgrounds, sex and gender identities, as well as otherwise underserved populations, would be most informative for better understanding what

access-related factors help explain the relationships between important demographic factors and mental health and well-being. Such recruitment would promote a more balanced, culturally-sensitive research program considering that studies have predominantly utilized samples skewed towards experiences of White, male, and urban veterans. Further research with this perspective would lead to more diverse implications and effective intervention. It is critically important to better understand the factors that affect and help explain the relationship between racial minority status and disparities in mental health and well-being outcomes, particularly in rural populations. In order to do so, research design could be intentional about recruiting and may consider oversampling underrepresented groups to ensure sufficient sample size for analyses of interest.

Additionally, developing a survey item asking about beliefs about mental health would likely help capture the extent to which stigma in rural and veteran culture may be influencing the relationships between variables. Current items on the survey inquire about utilization of mental health services along with numerous questions about mental health symptoms; each of these areas may be subject to underreporting as stigma often dissuades open and transparent responses. The model of the current study may be further strengthened if future studies incorporate beliefs about mental health as a mediator.

Future studies may also wish to evaluate the role of telehealth as it relates to rural mental health. For example, the increased availability and use of telehealth services due to the COVID-19 pandemic may influence factors examined in the current study (e.g., service utilization, perceived access, transportation barriers). Although findings on these factors were limited in the current study, the sample may be characterized differently now than in 2013. Coupled with a targeted recruitment or sampling approach, this may have significant potential to contribute to

our understanding of mental health related utilization patterns and barriers experienced by rural veterans.

Implications

Although findings from the current study were relatively limited, it is important to synthesize relevant findings to bridge science and practice. One important illustration from this research is the understanding that there are numerous factors that contribute to rurality status, such that limiting the consideration of rurality to criteria of geographic location and population likely undermines our understanding and ability to intervene in health disparities. Just because a veteran may live relatively close to an urban area, such as Brazos County, does not necessarily mean they are aware of available treatment options, connected with VA services, or that they face reduced barriers. This is an example of one assumption that a provider in professional psychological practice might make when interacting with this population. As perceived access to mental health care yielded significant predictions to mental health and well-being in the sample, it may be useful to focus on avenues of assessment and intervention in psychological practice at the individual and community levels. Recommendations include increasing perceptions of available treatment options among rural veterans in Brazos Valley, such as discussing the prevalence of telemental health services. Additionally, boosting focused outreach programs to veterans residing in rural areas using an approach that is mindful of rural and veteran culture, mental health stigma, and one that presents clear communication of different treatment options or settings may be helpful and build trust. It may also be fruitful to focus outreach efforts to unemployed rural veterans, as unemployment predicted greater depression and unhealthy days in the study sample. Further research involving rural veterans across the Brazos Valley, and in other

rural or predominantly rural regions, would likely help us better understand their mental health needs and how to more effectively address them.

Conclusion

Although the primary study analysis revealed no significant mediating effect of perceived access on the relationship between demographic factors and mental health and well-being, this study provides valuable insight for better understanding mental health among veterans in the rural Brazos Valley region. To date, a handful of studies have investigated mental health in the Brazos Valley region, and the present research is the first known study to examine veteran mental health in the area. Although the current study adds to this literature base, future studies are needed to further illuminate the role of access-related factors as mediators between demographic factors and mental well-being. The Regional Health Assessment is a useful tool for measuring and evaluating mental health related variables in rural Texas, and this study underscores the importance of including veteran status on the survey going forward in order to continue conducting high-quality research on veteran mental health.

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