

Racial Differences in Adolescent Mental Health Care within the Military Health System

by

Raquel Martin, MS

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Name of Candidate: Raquel Martin
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DISSERTATION AND ABSTRACT APPROVED:

DATE:

28 MAY 2019

Dr. Andrew Waters
DEPARTMENT OF MEDICAL & CLINICAL PSYCHOLOGY
Committee Chairperson

28 MAY 2019

Dr. David S. Riggs
DEPARTMENT OF MEDICAL & CLINICAL PSYCHOLOGY
Dissertation Advisor

28 MAY 2019

Dr. Tracy Sbrocco
DEPARTMENT OF MEDICAL & CLINICAL PSYCHOLOGY
Committee Member

28 MAY 2019

Dr. Tracey Koehnmoos
DEPARTMENT OF PREVENTIVE MEDICINE AND BIOSTATISTICS
Committee Member

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DEDICATION

This body of work is dedicated to my mother, Mrs. Yolanda Marie Wearing, MSW, who has reared me, supported me, and emboldened me with the mantra, that I am the exception, not the rule.

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Raquel Martin

June 17, 2019

ABSTRACT

Racial Disparities in Adolescent Mental Health Care within the Military Health System

Raquel Martin, MS

Thesis directed by: David S. Riggs, PhD, Department Chair, Professor, Department of Medical and Clinical Psychology

Background: Mental health disparities (MHD) have been found amongst all age ranges, including adolescence. However, disparity research primarily investigates adults and civilian health care settings. The Military Health System (MHS) is a universal health care system for military personnel and their dependents. Research has indicated that the MHS removes many of the barriers that contribute to health disparities, in particular removing differences in access to care. Additional investigations with this population would greatly contribute to our understanding of diagnostic differences and health services delivery without the barrier of access to care. *Studies:* The current dissertation examined differences in mental health diagnosis and treatment of adolescents among a national sample of children of active duty military parents. Paper 1 provided information about the MHS including an overview of the benefits of the health care system and possible limitations. The subsequent studies utilized the Effectiveness and Provider Induced Demand Collaboration (EPIC) database to investigate mental health among adolescents with an emphasis on investigating minority health disparities in diagnoses and treatments. Study 1 investigated diagnostic differences for anxiety, depressive, and impulse control disorders. When compared to White Americans, minority patients had a

higher likelihood of being diagnosed with an impulse control disorder (OR = 1.44; CI 1.39-1.48) and a decreased likelihood of being diagnosed with a depressive disorder (OR = 0.98; CI 0.95 -1.00), or anxiety disorder (OR = 0.80; CI 0.78 – 0.83). Study 2 investigated adherence to clinical guidelines regarding treatment and medication prescription for African Americans and White Americans diagnosed with depressive disorders. When compared to White Americans, African American adolescents had a lesser likelihood of receiving pharmacotherapy only for treatment of depression (OR = 0.59; CI 0.56-0.63), a greater likelihood of receiving psychotherapy only following a depression diagnosis (OR = 1.26; CI 1.20-1.32), a lesser likelihood than White adolescents of receiving both pharmacotherapy and psychotherapy following a depression diagnosis (OR = 0.69; CI 0.64 – 0.74), and a greater likelihood than White adolescents of receiving no treatment (i.e., psychotherapy and/or medication) following a depression diagnosis (OR = 1.35; CI 1.29-1.41).

Implications: There are differences in the diagnosis and treatment of mental health disorders among minority adolescents despite the elimination of disparities in access to care. Based on the current findings it would be helpful to identify contributing factors to the health disparities outside of access to care which may include cultural competence, perceived biases, etc. Future research should include specific examination of data regarding treatment outcomes including depression screeners and other mental health measures. There should also be further investigation regarding significant stressors that may be unique to this population.

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CHAPTER 1: Introduction

BACKGROUND

Individuals that are minorities have different experiences than individuals within the majority population regarding health care access and health outcomes. Large differences between the minority population and the majority population in access to health care, treatment and health outcomes of physiological and psychological problems define the concept of a minority health disparity (66). Minority health disparities are the result of multiple factors, such as differences in socioeconomic status (SES) (126), education (19; 234), and health care (125; 138) that disrupt the basic human right of health equity. The current papers focused on the differences in health care that minority individual's experience within the military adolescent population. The papers specifically investigated disparities in diagnoses of mental health disorders and adherence to clinical guidelines regarding treatment and the use of FDA approved prescriptions. To better understand factors associated with health care disparities, it is useful to determine whether adolescents are being diagnosed and treated appropriately within a universal health care system, such as the Military Health System (MHS). The MHS is a worldwide health care system that provides services to active duty service members and their eligible family members (146). The MHS attempts to maintain health equity through its global delivery system that includes hospitals and clinics in the military and civilian sector of health care.

Health Equity

Achieving and maintaining an adequate level of health is a basic human need. The right to health is a standard that has been set forth in the World Health Organization (WHO) Constitution (244). Health is not limited to the absence of disease, but also includes adequate physical and psychological health (18; 26; 181). In 1992 Margaret Whitehead published “The Concepts and Principles of Equity and Health” in which she defined health inequities as inequalities that are unjust, unfair, and unavoidable. Health equity has been defined as the absence of socially unjust or unfair health disparities (26) that support an unequal distribution of resources (195). The MHS establishes resources and policies to uphold health equity, including access to prevention, treatment services, and established standards of care, for all active duty military members and their beneficiaries (38). Two models of health equity will be discussed in detail here — one developed by Whitehead (240) and a later model proposed by Braveman (23).

Whitehead Model of Health Equity

Whitehead described a model of health equity defined according to seven main determinants of health differentials(240). These determinants are still relevant today and are often cited when investigating methods to improve health equity (240). The majority of Whiteheads determinants of health inequity can be divided into two categories: those that are unavoidable and those that are avoidable. Unavoidable determinants are related to damage or harm that cannot be avoided by society. Avoidable determinants are barriers that society could mitigate that prevent a disadvantaged group from attaining their full health potential.

Whitehead categorized three factors as unavoidable determinants of health. One of these factors was natural or biological variation involving genetic and hereditary

factors. For example, previous research of monozygotic and dizygotic twins indicates that 15% to 20% of the differences in human longevity is accounted for by heredity (21). Additionally, genetic factors impact the body's response to stressors, which can ultimately have negative effects on health (189). In Whitehead's model, health-damaging behavior if freely chosen by the person is also an unavoidable determinant (240). This determinant can include participation in certain sports and pastimes, such as football, soccer, and rugby, that involve higher incidence of traumatic brain injuries (111; 193). The final unavoidable determinant is the transient health advantage of one group over another when that group is the first to adopt a health promoting behavior (240). For example, it is well known that smoking cigarettes leads to detrimental effects such as cancer, chronic lung diseases, and cardiovascular diseases (222). However, if Africa adopted smoking cessation programs and North America did not. Then Africans would be at a health advantage over Americans because they were the first to adopt this health promoting behavior.

Whitehead identified three determinants as avoidable or open to influence by society. One avoidable determinant of health disparities is health damaging behaviors where the degree of choice of lifestyle is severely restricted. (240). For example, individuals may participate in health damaging behaviors such as eating a poor diet or not participating in physical activity due to restrictions of income, lack of fresh healthy foods, or lack of leisure facilities. Another avoidable determinant is exposure to unhealthy, stressful living and working conditions (240). For example, childhood exposure to lead is well documented to be associated with impaired educational attainment (143), inattention and hyperactivity (218), juvenile delinquency (151), and

behavioral problems (30). Lead exposure has been found to be a particularly significant issue among minorities and disadvantaged groups. Sociodemographic factors previously found to be associated with higher blood lead levels included children living in old houses, belonging to minority groups, and living in families with low incomes (216). The last avoidable determinant is inadequate access to essential health or other public services (240). For example, residential areas known as food deserts have a lack of healthy choices and an abundance of unhealthy choices of food, which can contribute to obesity (35).

The final determinant of health is natural selection or health-related social mobility, which involves the tendency for people who are ill to move down the social scale. Whitehead addressed this determinant stating that although it may be deemed as unavoidable by others, the low income of individuals who are ill also makes it preventable and unjust (240).

Braveman Model of Health Equity

The Braveman model refined the Whitehead model of health equity (26). Braveman defined health equity as “minimizing avoidable disparities in health and its determinants, including but not limited to health care, between groups of people who have different levels of underlying social advantage or disadvantage (23) p2.” Underlying social advantage or disadvantage refers to wealth, power, and/or prestige that contribute to how individuals are classified into social hierarchies. There are multiple groups upon which social advantage or disadvantage can be conferred including socioeconomic groups, racial/ethnic groups, and religious groups. Additionally, social advantage or disadvantage can be placed upon groups according to their gender, age,

disability, sexual orientation, geography, and other features relevant to the where they reside (242). Regarding health care, Braveman states that health care equity is characterized by the allocation of health services according to need and the payment for health services according to the ability to pay (23). Braveman argues that equity is synonymous with social justice or fairness because it is an ethical concept that is based on principles of distributive justice (132).

Braveman also discusses the difference between health equity and health equality. The terms *health inequity* and *health inequality* are often used interchangeably within the literature (26; 37), however, they are different concepts. Health inequity emphasizes the distribution of resources that contribute to health inequalities, also known as health disparities (26). Braveman argues that inequity and inequality are different because equity is value based while equality is not. Health inequity is based on values related to justice and fairness, which are more open to interpretation, and thus more difficult to measure. Conversely, health inequality can be defined according to specifically measurable outcomes which enables the use of an instrument to measure any differences (37). Therefore, health inequalities are indicators of health inequities.

It is often individuals that are in higher positions of power that determine whether a situation may be deemed equitable or not, particularly in reference to the allocation of services, such as health care (26). This difference in power is especially important because the determination of health inequity can also lead to determining the presence of a health disparity. According to this model, a health disparity is an unjust or unfair difference in health that is present between more and less advantaged social groups (26). It is also important to acknowledge that some health disparities are expected. For

example, one would expect young adults to be healthier than the elderly, and males to have prostate problems while females do not (26).

The Braveman model highlighted the need to create not only an operational definition of health equity, but also to identify primary components for the measurement of a health disparity to guide measurement and accountability (26). By approaching health inequity and health disparities from a systematic standpoint through identifying measurable components there is a greater likelihood of reducing the gap (24). According to Braveman, the measurement of a health disparity requires three basic components: an indicator of health, a method of categorizing people into different groups based on social advantage/disadvantage, and a method for comparing the health indicator across the different social groups (24).

Additionally, Braveman described a systematic approach to studying and monitoring disparities in health, health equity, and health care. This approach includes first choosing the health or health-related indicators of concern and categorizing people into social strata. Following the selection of a social advantage factor the researcher should next calculate rates of the health indicator in each social stratum and display this graphically. Providing the information in a visual format, such as a bar graph, helps the reader to easily identify the difference across social groups. Next, it is necessary to calculate rate ratios (e.g., relative risks) and rate differences to compare each stratum with the *a priori* determined “most advantaged” stratum of that characteristic (e.g., all other income groups compared to the highest income group). Then changes must be examined over time in the rate ratios and rate differences; if feasible, use a summary measure to assess multiple parameters at the same time. Finally, multivariate analyses should be

conducted in the overall sample and within strata shown to be at elevated risk compared to the most advantaged stratum, to identify particular issues warranting further attention through research or action (27). For example, if there was an interest in social disparities in prenatal care, the analyses would involve the comparison of prenatal care between lower income and higher income groups. This information can easily be disseminated to policy makers, advocates, or even the public to highlight efforts to reduce disparities.

The current papers followed the Braveman approach by researching health inequities. The health-related indicators of concern are the assessment and diagnoses of mood and behavioral disorders among adolescents, in particular anxiety, depressive, and impulse control disorders. The analyses in the current papers examined the prevalence of mental health diagnoses, psychotherapeutic treatment, and psychopharmacological treatment with children of military personnel. The individuals within the study were categorized according to their race/ethnicity and ages and comparisons were made along these dimensions.

It has been suggested that the military health care system eliminates minority health care disparities (38; 103; 167). This is due to the fact that military health care system eliminates a commonly identified contributor to minority health care disparities, access to care. However, it is hypothesized that there will still be minority health disparities within adolescent mental health, particularly among mood disorders, such as anxiety and depression. If this hypothesis confirmed, this study will provide support for the need to make changes to training programs for medical professionals and to conduct additional research to ensure that providers are accurately assessing adolescents and adhering to clinical guidelines.

Although the conceptualization of health equity was introduced by Whitehead and refined by Braveman, they are not the only researchers who have tried to define health equity. For example, WHO cited Murray and colleagues' definition of health inequalities in the 2000 World health report (245). Murray and colleagues defined health inequalities as any avoidable difference in health among individuals, who should not be grouped beforehand, according to social characteristics (24). Murray and colleagues opined that health differences between social groups according to biological, social, economic, or geographical characteristics stem from the differences with other socioeconomic variables (145). These researchers stated that social group differences are measures within a subgroup and as such, mask part of the range of inequality present within the rest of the population. Therefore, individual health inequalities should be measured instead of health inequities (145). This definition provided a new view because health inequalities are often approached according a priori group differences. However, it did not acknowledge the ethical or social justice aspects of health inequalities that are addressed in the Braveman model (24). In 2004, Graham defined health inequalities as systematic differences in the health of groups and communities occupying unequal positions in society (82). This definition is precise and also covers many key concepts, however, it does not specify health determinants as the other models do (24).

Although a number of definitions and models of health disparities exist, the Braveman model is superior for a number of reasons. Whitehead, previously provided a well-known definition for health equity, as well as a health disparity; however, she did not identify methods to measure these discrepancies, and ultimately reduce them (240). The Braveman model provides an approach to measuring disparities within health care by

establishing a step-by-step model for this measurement which included a step to disseminate the information and help to reduce disparities. Additionally, Braveman made an important point regarding Whitehead's definition when she stated that avoidability should not be a criterion for inequity. Whitehead defined avoidability as any inequity that is unjust or unfair. Braveman stated that avoidability should not be a criterion of the inequity because it was not accompanied by an operational definition and as such can be open to multiple interpretations. There are also certain health inequities that may not be deemed as avoidable because they would require fundamental changes in the underlying social and economic structures to be addressed, such as access to health care by individuals with low incomes which was targeted by the Affordable Care Act. Furthermore, the statement of avoidability would ultimately result in the argument of "avoidable by whom (24)?" Braveman's model addresses measurement of health inequities and disparities as well as providing a concise operational definition of the two concepts. Health equity and health disparities are concepts that are connected. The presence of health disparities reveal a lack of health equity within a given population. Therefore a reduction in health disparities is progress towards achieving greater health equity (25). Study 1 investigates the possibility of health differences that might indicate the presence of health inequities.

Minority Health Disparity

A minority health disparity is defined as the differences in the prevalence, morbidity, and/or survival rates of diseases and illnesses. Within the United States, even with the apparent increase in access to affordable health care (120), there is still an inequity in health status among different races. Individuals that are members of minority

racers tend to report greater health problems and suffer higher mortality rates than the members of the majority race for many conditions (66). For example, the mortality rate for strokes, prostate cancer, and cervical cancer is 50% higher for African American (AA) individuals than for White American (WA) individuals (66). Minority health disparities occur as a result of differences in many contributors including socioeconomic status, education, and income (243).

Socioeconomic Status

Socioeconomic status (SES) is often cited as a contributor to minority health disparities because it is a strong predictor of differences in health (73; 126; 199). SES is a broad concept that encompasses many factors such as the placement of persons, families, and households in concordance with capacity to create or consume goods (199). Individuals with a lower SES suffer from higher rates of illness, infectious diseases, and malnutrition (127). SES affects an individual's ability to respond to environmental challenges, such as poor housing, that can affect health (235). For example, asthma excessively affects minority and disadvantaged children. Racial and ethnic minorities and children of a low SES are more likely to live in substandard housing with greater exposure to allergens. These housing conditions also result in higher asthma sensitization rates due to crowding, pest infestations, poor ventilation, deteriorated carpeting, excessive moisture and dampness, poor ventilation, and structural deficits (35). Although SES explains some racial disparities within health, it does not explain all (243).

Income

Income has an impact on the ability to afford material conditions needed for biological survival (clean water and good sanitation), and provides an individual with an

opportunity to control life circumstances (adequate nutrition and housing) (126).

Individuals that reside in the lowest income households are five times more likely to report their health as fair or poor than people in the highest income households (225). As of 2013, there were 10.6 million low income working families in America. Racial and ethnic minorities constituted 58% of this population, although they are only 40% of working families nationwide (170). There is also a large amount inequality of wealth among minority versus WA households. For example, as of 2013 the median net worth in WA households was 13 times higher than Black American households and 10 times higher than Latino households (170).

Education

In addition to SES, education is a contributing factor to minority health disparities. Minority individuals tend to have attained lower levels of education when compared to individuals that belong to the majority race (19; 234). Individuals with higher levels of education are more likely to engage in preventive health measures and less likely to engage in negative health behaviors. For example, smoking prevalence varies according to level of education completed. Individuals with the highest smoking prevalence include individuals who have attended or completed high school but not completed college or other postsecondary education (234). Similarly, Black American and American Indian/Alaskan Native men and woman have higher rates of obesity than the general population. The prevalence of obesity also varies with education. For example, obesity prevalence ranges from 12.4% in women with more than 16 years of education to 32.1% in women with eight or fewer years of education (234). Disparities in

education and income are associated with disparities in a multitude of health outcomes including diabetes, obesity, heart disease, and elevated lead levels (225).

Health Care

In addition to demographic and economic factors, differences in access to quality care are a well-established contributor to health inequities and, as a result, health disparities. Specifically, characteristics of the medical provider, individual patient qualities, and factors related to the health care delivery system may affect the quality of care that is provided. The focus of the current project is identification of possible mental health disparities within the health care system. Utilization of the military health system within study 1 and study 2 provides the ability to research the possible presence of health differences without the barrier of differences in access to health care. However, these factors can only be understood in conjunction with other variables that contribute to minority health care disparities such as characteristics of the patient and the health care system.

Minority Health Care Disparity

A minority health care disparity has been defined as a difference in health insurance coverage (125; 138), access to and use of health care (76), or quality of health care (73) provided to minorities versus the majority population. Lack of health insurance is prevalent among minorities. In 2003, although minorities made up 34% of the U.S. population, they accounted for 52% of the uninsured population (125). Significant disparities with health insurance rates persisted in 2010 with 41% of Hispanic adults (ages 18-64) and 26.2% AA adults (ages 18-64) uninsured versus 16% WA adults (ages

18-64) (138). Lack of health insurance affects access to and use of health care.

Individuals without health insurance are less likely to seek out health care due to the large cost. The current paper addresses this impeding factor by utilizing the MHS which is a worldwide health care system that provides services to active duty service members and their eligible family members (146).

Additionally, poor quality in the health care that minorities receive may make them less likely to use the health care that is available to them (175). There is a significant difference in the quality of health care that minorities receive. For example, when compared to WA elderly patients, AA elderly patients are seen less often by specialists, receive less appropriate preventive care, and receive lower quality hospital care (73). Poor access to health care is a barrier that is frequently faced within the minority community (8; 175). Poor access to health care can be affected by lack of transportation (2). Poor transportation causes patients to miss or reschedule medical appointments, delay health care, and miss or delay medication use (212). Transportation to health care appointments is especially difficult for minorities. For example, American Indian parents and Hispanic parents are respectively 20 times and 6 times more likely than WA parents to report lack of transportation as a reason for unmet medical care for their children (212).

Previous research has revealed that AA patients suffer from disparities in treatment and outcome of multiple health problems including traumatic brain injury (87), hypertension (132), obesity (132), and cardiovascular disease (110; 142). More generally, minority health care disparities are associated with poorer health and shortened survival (24; 73; 110; 142; 202). Additional research has established that there is a

disparity in mental health treatment for minorities. African Americans have less access to mental health treatment and often receive poorer quality treatment (5; 204). For example, a study analyzed 10 years of office-based outpatient visits regarding anxiety and depressive disorders. Results of the study indicated that while disparities among depression diagnoses, counseling referrals, and medications were eliminated in psychiatric visits, disparities in care for depression and anxiety among African American and Hispanic patients persisted in primary care visits (206). Furthermore, in regards to depression, there are disparities in access and receiving quality care for minorities including AA, Hispanic, and Asian patients when compared to WA patients (4). Compared to WA patients, AA and Hispanic patients have a longer course of mental illness and a higher risk of disability from mental illness (4; 129).

The MHS has been presented as a health care system that has the potential to prevent health care disparities (167). For example, research assessing health disparities in the MHS have found no minority health care disparities in treatment outcomes for colon cancer, lung cancer, prostate cancer, or breast cancer (38). Additionally, Chaudhary and colleagues conducted a study regarding treatment outcomes for African American and White American Patients receiving care for a traumatic injury within the MHS. Results of the study established a lack of minority of health care disparities, such as an increase in mortality rates (38). However, it is important to note that the aforementioned studies were conducted with active duty military members. This is a significant issue because although the MHS covers active duty military and their beneficiaries, active duty members are a priority (62). Therefore, beneficiaries, such as children and adolescents, often seek care within the purchased care system (104). The

population of active duty beneficiaries has increased by approximately 400,000 since 2007 (104). However, hospitals within the direct care system have decreased from 70 in 2004 to 59 in 2009 (104). As a result, beneficiaries aren't able to be seen in the direct care system because there aren't as many health care physicians available for appointments.

Diagnostic Disparities

Notably, there are disparities in the diagnoses that are received by minorities, such as AA and Hispanic/Latinx patients. These are further identified as disparities because the differences reflect a higher burden of illness experienced by one group versus another. Minorities are more likely to be misdiagnosed and underdiagnosed with mental disorders. For example, AA patients with an affective disorder are more likely to be misdiagnosed with schizophrenia than WA patients (129). Additionally, Hispanic patients are more likely to be diagnosed with affective disorders than WA patients (129). In 2003, Strakowski and colleagues conducted an experiment to investigate the difference in diagnoses of affective disorders in AA patients versus WA patients (207). They recruited patients with at least one psychotic symptom and provided them with three independent DSM-IV diagnoses via a clinical assessment, structured interview, and an expert-consensus diagnosis. The expert consensus involved psychiatrists listening to edited recordings of the structured interviews with ethnic cues eliminated and reviewing medical records. AA men with an expert-consensus affective disorder diagnosis were significantly more likely than their WA counterparts to be diagnosed with Schizophrenia via the clinical assessment and structured interview (207).

CAUSES OF HEALTH CARE DISPARITIES

The causes of minority health care disparities are multifactorial. Some contributing factors can occur at the individual level, such as the effects of patient and physician characteristics. Other contributing factors occur on a global level, such as within the system of the institutions that are providing health care like hospitals, clinics, and pharmacies. To fully understand the complexity of minority health care disparities, it is necessary to examine the contributing factors across multiple levels. Dr. Brian Smedley's publication, *Unequal Treatment*, divides variables that contribute to minority health care disparities into health care system variables, patient variables, and care-process variables (202). The author developed figure 2 as a visual representation of the variables identified by Dr. Smedley. Examples for each variable represented in squares.

Health care System Level Variables

Health care system level variables are features of the health care system that may contribute to different effects on patient care, mainly for racial and ethnic minorities (see figure 2). These features may include lack of receiving quality evidence based care to treat their medical problems (202). The geographic availability of health care institutions is another health system level variable that can influence treatment outcomes for minority patients. Lack of health care institutions is not limited to the absence of hospitals and clinics. For many minorities the neighborhood pharmacy can also contribute to a disparity in treatment outcomes (84; 140; 172; 202). For example, although the MHS is one of the largest health care organizations in the United States, facilities are not equally distributed. Healthcare disparities between individuals that reside in rural and urban areas remain (104).

In addition to the lack of geographic availability there are also discrepancies with the quality of care that minority patients are receiving at the health care institutions available to them. AA patients have also had persistent issues regarding the quality of care they are receiving that contributes to their health disparities. This is consistent with previous findings that AA people tend to live in parts of the country that have a large share of low-quality health care providers. Although AA and WA patients receive low quality health care in these hospitals, AA individuals are overrepresented in these areas. Therefore, the poor quality of health care causes a greater detriment in the AA community (12).

Patient Level Variables

Patient level variables are individual attributes of a patient that may contribute to health care disparities (see figure 2). These patient attributes are often based in their values, fears, or hopes and can manifest themselves in behaviors that influence the type and level of health care they receive (202). These behaviors include things such as treatment refusal, poor adherence to medical treatment, and mistrust of health care providers (202). For example, a patient's level of trust or doubt regarding medical advice can have an effect on their treatment adherence. It is well-established that minority patients' distrust towards their health care provider can affect the interaction with the health care provider and the level of care that is received (10; 18; 74; 91; 155; 169; 205).

Medication Adherence

Poor treatment adherence and treatment refusal have also been suggested as possible reasons for minority health disparities (202). Poor medication treatment adherence has been found within minority patients versus WA patients regarding asthma

medication, specifically inhaled corticosteroids (ICS) (123). Although pharmacotherapy is frequently used to treat depression in primary care, non-adherence is a significant obstacle for successful treatment (43; 187). Poor antidepressant medication adherence can be divided into two categories. First, there is the premature discontinuation of medication. Secondly, inconsistency with the prescribed regimen (43). For example, although treatment guidelines advise continuous use of antidepressant medication for 6 months (149), nearly 1/3 of depressed patients that are prescribed medications discontinue medications in their first month of treatment(43). Identified reasons for antidepressant nonadherence include forgetfulness, delayed onset of medication action, poor instruction by the clinician, and side effects (187).

Adherence to medication treatment may also have a cultural aspect. Although research has not been conducted regarding the racial disparities in antidepressant medications, there has been research regarding non-adherence to other medications. Poor medication treatment adherence has been found within minority patients versus WA patients regarding asthma medication, specifically inhaled corticosteroids (ICS) (123). A contributing factor to the racial disparity in medication treatment adherence was minority patients possessing negative asthma medication beliefs (123). Although the researchers stated that they were unclear of the reasons behind the observed racial disparity in medication beliefs, it was found that AA patients expressed more fear of and lower knowledge about ICS (123). Additionally, a research study indicated that African Americans living with HIV show worse medication adherence than their White counterparts due to general medical mistrust (57). Unfortunately, even when minority patients overcome these barriers to quality health care, they often encounter factors that

contribute to disparities in health care during their visits with physicians. These factors have been identified as care process-level variables (202).

Care Process-Level Variables

Care process level variables are characteristics of an individual medical provider, as well as the interaction between the provider and the patient, that may contribute to minority health disparities (see figure 2). Provider variables include communication style, preferred model of care (e.g., patient centered), and attitudinal factors such as racial and ethnic biases (217). Racial and ethnic biases, whether implicit or explicit, can influence physician assumptions regarding patient treatment adherence, likelihood to abuse substances, and the probability that a patient will follow medical advice (33). These biases may have serious implications on patient care (83; 202; 229; 239). The behavior of health care providers strongly contributes to the disparities within health care treatment (9; 20; 93; 180; 202). Physicians are responsible for recommending the most viable treatment option, which may be the difference between life and death for some patients. Previous research has revealed that physicians are more likely to recommend more advanced and potentially more effective medical procedures for WA patients than for AA patients (66; 238).

Cultural Competence

Cultural competence is another example of a care process level variable. It is important for physicians to grasp the culture and background of their patients that can contribute to their health decisions. If physicians were able to understand the cultural beliefs held by their patients, they may be better able to mitigate patient distrust and have

a more substantial influence on their health behavior (174). This type of understanding within the health care system is known as cultural competence. Cultural competence is defined as acknowledgment and incorporation of the importance of culture, assessment of cross-cultural relations, vigilance toward the dynamics that result from cultural differences, expansion of cultural knowledge, and adaptation of services to meet culturally unique needs (19). Cultural competence also refers to a set of behaviors, attitudes, and policies that enable individuals to work effectively in cross-cultural situations (102). Clinical psychologists have identified three different types of cultural competence models, which are also applicable for other health care professionals. These models are skill-based models, adaptation models, and process-oriented models (102).

Skill based cultural competence models define cultural competence according to the health care provider's cultural self-awareness and knowledge of other cultures (102). Skills based models also include the health care provider's ability to recognize how the patient's values and perspectives impact the relationship between the provider and the patient (185). A widely cited example of a skills based model was proposed by Sue and colleagues in 1992 (210). This model stated that a culturally competent health care provider should possess three primary characteristics (210). The first characteristic was an awareness of their own assumptions, values, and biases (210). The second characteristic is an understanding of the worldview of the culturally different client (210). The third characteristic is an ability to develop culturally appropriate interventions and techniques (210). Skills based cultural competence models also emphasize the importance of health care professionals seeking out the appropriate training in cultural competence (102).

In 2009, Ngo et al. conducted a study investigating the effectiveness of an intervention for depressed youth (154). This study utilized a skills-based approach to cultural competence by training therapists in cultural sensitivity, tailoring examples to fit the cultural context of each youth and family, ensuring the care manager and participant spoke the same language (when possible), and providing consultation with cultural researchers (154). The care managers within the study were also encouraged to acknowledge and attend to cultural issues that presented during the study, and were reminded of the importance of cultural competence. The results of this study demonstrated a significant improvement in the treatment effects on AA and Latino youths (154). Specifically, AA youths experienced significant reductions in depression symptoms and had higher rates of use of specialty mental health care at the six-month follow-up, and Latino youths had significantly greater satisfaction with care.

Adaptation models of cultural competence involve modifications to the system of health care delivery to be more congruent with the client's cultural beliefs, attitudes, or behaviors (102). A popular adaptation model framework for cultural competence was developed by Bernal et al. (102). This framework was developed to be a guidebook for the adaptation of existing interventions (102). The Bernal model includes eight major dimensions including language, metaphors, persons, content, concepts, goals, methods, and context (17). The language dimension places emphasis on ensuring that there is an appropriate linguistic match between the patient and the physician (17). The persons dimension refers to ethnic matching or discussion of racial issues (17). The metaphors dimension encourages physicians to use culturally familiar symbols and concepts when using metaphors with patients (17). The content dimension refers to the incorporation

and application of cultural knowledge (17). The concepts dimension involves presenting the medical problem to the patient in a manner that is consistent with his/her belief system (17). The goals dimension focuses on the physician and patient establishing congruent goals (17). The methods dimension places an emphasis on ensuring that there is compatibility with the proposed treatment methods and procedures and the patient's culture (17). The context dimension considers the impact of the contextual processes on the patient (17). Research has been conducted on the effectiveness of adaption models in health care settings such as therapeutic treatment (17). For example, the Bernal framework was used to adapt Cognitive Behavioral Therapy (CBT) and interpersonal therapy for Puerto Rican adolescents (177). The study found that the adapted psychotherapies showed significant symptom improvement when compared to the wait-list control (177). The Bernal framework is an example of how cultural competence can be used to improve upon the experience that minority patients have with their practitioners.

The process-oriented model is different from the previous models because it focuses on the dynamic mechanisms underlying the treatment such as physician-patient interactions (102). Process-oriented models place consideration on the cultural implications of specific behaviors and not what culture means for individuals from diverse backgrounds (102). Within this model it is believed that acknowledging and integrating the patient's perspective with the physician's perspective throughout evaluation and treatment helps the physician to better engage the patient in treatment (102). The effectiveness of utilizing a process-oriented model within health care was studied among a population of opiate-addicted individuals (58). This study used node-

link mapping to allow the health care professional to communicate with the patient regarding their treatment plan (58). Node-link mapping is a communication tool that is presented to the patient visually and allows the patient and the physician to collaboratively develop a visual representation of the patient's issues (163). Node-link mapping has previously been used to assist students with English as a second language achieve academic success (163). The research study found that node-link mapping was significantly more effective for AA and Mexican American patients than for WA patients in treatment retention and drug abstinence. Node-link mapping was integral in helping reduce cultural, racial, and class communication barriers among minority patients (163).

Increasing cultural competence among providers has been proposed as a strategy to address and possibly reduce minority health care disparities and improve health care quality (19; 22; 183). Cultural competence contributes to successful clinical encounters and appropriate diagnoses (15; 19; 32; 102). Cultural competence within health care allows for attitudes and policies to come together in a system or agency to work effectively with a diverse patient base (173). As with a patient centered orientation, cultural competence is based on the ability of health care providers to treat each patient according to their individual needs and characteristics, maintain unconditional positive regard, build effective rapport, and use the biopsychosocial model. Use of the biopsychosocial model is imperative because the model addresses biological (genetics), psychological (behavior), and social (culture) factors for disease outcomes (68).

Cultural competence is a necessary skill for medical providers because they will work with a diverse set of patients. Therefore, it is important for physicians to be equipped to understand the sociocultural dimension underlying a patient's health values,

beliefs, and behaviors (19). Patients are more satisfied with physicians who reported more motivation to learn about other cultures. This satisfaction translated to the patient seeking and sharing more information with their physicians during medical visits (162). The use of cultural competence helps clinicians to explore and integrate patient beliefs, values, and meaning of illness to collaborate regarding effective treatment plans (15). Cultural competence is incredibly important when making diagnoses due to the difference in clinical presentation of symptoms for different races.

Clinical Presentation of Symptoms

Another factor for consideration regarding mental health diagnoses is clinical presentation. For example, depression symptoms can be categorized as somatic presentation, such as fatigue or weight loss, cognitive presentation, such as the inability to concentrate and recurrent thoughts of death, or mood presentation, such as depressed mood and loss of interest in activities. Somatic symptoms of depression are commonly reported for minority patients and patients that earn a lower income (220). This difference may be due to the cultural variations in the regulation and expression of emotions and display rules (118). Display rules are defined as learned ways to express emotions both verbally and through facial expressions. Because display rules are learned, they can vary from culture to culture (44).

Parents have a significant impact on the development of display rules for their children and their expression of positive emotions, such as happiness, and negative emotions, such as anxiety and depression. For example, Nelson and colleagues conducted a study investigating the difference in mother's beliefs about negative emotions and emotion socialization for AA mothers and WA mothers (153). Results of

the study indicated that AA mothers felt that it was less appropriate for children to display negative emotions, such as anger, fear, sadness, and crying in public and private settings than WA parents. Furthermore, there was an additional interaction observed regarding gender differences of emotion expression among AA males and females. Specifically, mothers of young men felt that there would be more negative social consequences for their child displaying negative emotions than mothers of young women. This difference between the acceptability of male versus female emotional expression likely arise due to the belief that AA males have to adhere to sociocultural norms of being strong, and expression of emotion would jeopardize this. Additionally, previous research has indicated that African American mothers are less supportive of males expressing negative emotions than White American mothers (29). As a result, African American children and adolescents, particularly males, may be less likely to express cognitive mental health symptoms as it represents expressing emotions versus somatic symptoms which may appear to be more medical based. If a clinician is not culturally competent in the differences in display rules and mental health disorder symptom presentation, there is a greater likelihood that a minority adolescent will be inaccurately diagnosed.

Differences versus Disparities

It is important to note that the presence of differences within diagnostic categories does not necessarily constitute a disparity. The Whitehead and Braveman models of health inequity state that health inequities are differences in the health status of a population as a result of social determinants (25; 26; 240). The presence of health equity is the absence of health disparities. However, differences in diagnoses may be the result of other unavoidable factors. For example, Sickle Cell Anemia and Sickle Cell trait is

particularly common among individuals of African descent (90). Therefore, it is understandable that there would be a higher prevalence of Sickle Cell Anemia in the African American community than in other racial communities. A health difference only becomes a disparity when it has been found to be unnecessary, avoidable, unfair, and unjust (92). A primary goal of study 1 and study 2 is to identify whether health differences exist.

ADOLESCENT MENTAL HEALTH

Adolescents are the population of interest for two out of three of the papers presented. Adolescence is a critical time period for youths and mental health problems affect 49.5% of youths (224). Additionally, 22.2% of adolescents suffering from a mental health disorder have severe impairment as a result (224). The proportion of adolescents that suffer from mental health disorders, such as anxiety and depression, has increased over time (159; 160). For example, a study utilizing the medical expenditure panel surveys revealed that outpatient mental health services for adolescents increased from 9.2% to 13.3% from 1996 to 2012 (160). When compared to the mental health of adults, adolescents were found to have a significantly faster increase in mental health diagnoses, psychiatrist visits, and psychotherapy visits (159). Anxiety and depression are the most diagnosed mental health disorders in adolescents (224). Anxiety disorders occurring in approximately 32% of adolescents ages 13-18, and depressive disorders occurring in approximately 13% of adolescents ages 12-17 (224). However, the majority of adolescents are not receiving the appropriate treatment. For example, although 1 out of 5 adolescents suffer from a mental health disorder resulting in severe impairment, only 50% of these adolescents have received mental health treatment (55). Each of the

previously referenced studies were conducted with civilian populations. The results of the current studies utilizing adolescent mental health care data within a military population will assist in identifying possible concerns that can be addressed by researchers, policy, and practitioners. For example, researchers can identify factors contributing to the disparities, such as inaccurate clinical assessment. Policy makers could introduce bills that will allocate resources for training. Finally, practitioners translate research and policies into effective strategies with patients.

Clinical Practice Guidelines

The American psychiatric association has developed clinical practice guidelines for many mental health disorders such as major depressive disorder (149). These clinical guidelines state the importance of completing an assessment, evaluating the safety of the patient, and establishing the appropriate treatment for the patient. Completing an assessment is required for making an appropriate diagnosis of a depressive disorder. When making a diagnosis the mental health professional must address many factors including history of the present illness and current symptoms, personal and family history, and completing a mental status examination. Diagnostic tests are often used to provide greater clarification regarding the impact of the symptoms on the patient's life. Evaluating the safety of the patient includes completing assessment of suicide risk. Finally, establishing the appropriate treatment setting increases the likelihood of treatment adherence. Mental health clinicians should consider the patient's support systems, symptom severity, and harm to self. There are additional treatment guidelines that are specific for adolescent depression in primary care.

Adolescent Depression

Depressive disorders were the focus of Study 1 and Study 2, specifically, Major Depressive Disorder. Diagnostic criteria for Major Depressive Disorder involve a depressed mood or loss of interest or pleasure. It is important to note that in children and adolescents a depressed mood may be replaced by an irritable mood (7). Further identifying symptoms of depression include changes in many behaviors such as eating or weight, energy, the ability to concentrate, thoughts of death, sleep quality/quantity, and feelings of worthlessness (7).

It is recommended that adolescents be screened annually for depression due to the high prevalence rate of adolescent depression. Appropriate assessment for depression should include the use of a clinically validated screening tool and interviews with family members and caregivers of the adolescents. Adolescents with depression risk factors should also be identified and monitored for the possible development of depression. Risk factors for the development of depression include a family history of depression, trauma, substance use, significant psychosocial stressors, frequent somatic complaints, and adverse child events (250). Following the initial diagnosis of mild depression it is recommended that clinicians should provide nondirective support therapy and symptom monitoring for approximately 6 to 8 weeks before initiating an evidence based therapy (41).

Adolescents are in the care of adults and require a strong familial support system while dealing with depression. This support system should include any caregivers that are salient members of the patient's life. Family members should be properly educated regarding the various options for management of the depression according to symptom severity. Additionally, it is important that the patient and the family understand the limits

of confidentiality and the difference between consent versus assent for treatment (250). Adolescents are also required to attend school; therefore, their treatment goals must include additional areas of functioning such as peer and school setting. Treatment goals should focus on both improving the patient's functioning as well as the decrease in depressive symptoms (235). There should be regular tracking of the progress of the achievement of therapeutic goals to ensure ongoing management of symptoms (41). If the patient does not make an improvement after 6 to 8 weeks of treatment, then the diagnosis and initial treatment should be reassessed. Furthermore, if the patient partially improves the mental health clinicians should consider the inclusion of an additional consultation or modification of the treatment plan (41). For example, if the patient is being treated solely with medication, it may be helpful to include psychotherapy to the treatment plan (41).

Multi-disciplinary treatment plans are always encouraged for the treatment of mental health disorders. School can be a significant stressor for adolescents; therefore, collaboration of health professionals is always encouraged, and treatment plans should integrate school counselors, therapists, psychologists, or social workers when applicable. Furthermore, the patient's treatment plan should be established with all caregivers. Communication with the patient is the key component in ensuring treatment adherence. Although adolescents are minors, they should still have some aspect of autonomy regarding their treatment to improve treatment outcomes (250). Successful therapeutic treatments for depression in adolescents include cognitive behavioral therapy (40; 98; 100; 248), interpersonal therapy (40; 52; 98; 141; 248), and acceptance and commitment therapy (1; 88; 211; 219). Management of depression may also include the use of

evidence-based pharmacotherapies are SSRIs, SNRIs, Mirtazapine, and Bupropion (215). Finally, there should be the establishment of a safety plan for the adolescent. This safety plan should include steps and procedures that will be taken by the patient and their family if they feel that they are a danger to their self or others. Treatment recommendations following the diagnosis of a depressive disorder is the focus of Study 2.

Anxiety Disorders

Anxiety disorders are the most commonly diagnosed mental health for children and adolescents (16; 99). Anxiety disorders also have an early onset, often in childhood (70). Anxiety disorders also have a high comorbidity rate with depression onin children and adolescents (54). There are many types of anxiety disorders and they are often categorized according to what is causing the fear. For example, social anxiety disorder is a fear of social situations, while Agoraphobia is the fear of certain places or situations, such as public transportation (7). Study 1 investigates anxiety disorders. Primary diagnostic criterion for an anxiety disorder include excessive anxiety and worry occurring frequently for at least six months. Additionally, symptoms include restlessness, being easily fatigued, difficulty concentrating, irritability, muscle tension, and sleep disturbance (7). Evidence based treatments for anxiety disorders in children and adolescents are cognitive behavioral therapy (100; 108; 114; 194) and cognitive behavioral therapy with medication (16; 99; 105). Additionally, the Coping Cat program is a manualized CBT program that utilizes psychoeducation, relaxation strategies, cognitive restructuring, and exposure therapy to successfully treat anxiety (147; 165; 236).

Impulse Control Disorders

Impulse control disorders manifest as difficulties with the control of emotions and behaviors and adherence to the rules of society. These behaviors do not have to occur in more than one environment. For example, this type of behavior can occur only in the home or school but is still diagnosable because it causes a significant impairment in the child's ability to function (7). Different types of impulse control disorders include oppositional defiant disorder and conduct disorder. Oppositional defiant disorder involves extremes in mood such as an angry mood, oppositional behavior, and verbal and/or physical aggression (7). Conduct disorder is identified by aggression towards people and animals, destruction of property, deceitfulness or theft, and serious violations of rules. Although oppositional defiant disorder and conduct disorder are both impulse control disorders a longitudinal study revealed that they have different developmental pathways (178). Specifically, youth diagnosed with conduct disorder were more likely to have behavioral disorders later in life, whereas youth with oppositional defiant disorder were more likely to suffer from emotional disorders later in life (178). Additionally, The diagnosis of conduct disorder in childhood also predicts later problems in adolescence and adulthood such as substance abuse, an increased risk for arrest, and educational and school problems (77). Successful treatments for conduct disorder target multiple risk factors and are individualized according to the difference in presentation of symptoms (77). Additionally, multisystemic therapy, which utilizes a systems orientation to family therapy, and functional family therapy have also been identified as successful treatments for oppositional defiant disorder and conduct disorder (34; 94; 95; 117; 231).

CURRENT SERIES OF PAPERS

The three included papers addressed the previously stated issues of health equity and the presence of differences among minority mental health care among adolescents treated in the MHS. The MHS was chosen due to the universal nature of the health care and the previous research that has reported the possibility of decreased minority health disparities within that system. The current series of studies provided the opportunity to research mental health among adolescents among a national sample of children of active duty military parent or parents.

Paper 1 is a review paper and provided information about the military health care system with a thorough review of the current literature, providing an overview of the benefits of the health care system and possible limitations. For example, although there is an extensive military data record system for healthcare, it is not often used in research. Additionally, the first paper provided the argument for reduced health care disparities within the MHS. The subsequent studies utilized the Effectiveness and Provider Induced Demand Collaboration (EPIC) database to investigate mental health among adolescents with an emphasis on investigating minority health disparities among diagnoses and treatments. The EPIC database provides information on the provision of care in the MHS across the globe.

Study 1 investigated the possible presence of diagnostic differences for anxiety, depressive, and impulse control disorders. These disorders were chosen for investigation because they are often diagnosed among adolescents with a difference in the prevalence of diagnoses when compared to White adolescents. Specifically, the tendency to provide minority children with a behavioral disorder versus an affective disorder in the civilian

population (137). The purpose of the study was to assess whether this difference disappeared within the MHS.

Study 2 expanded upon study 1 by investigating provider adherence to clinical guidelines regarding treatment and medication prescription for African Americans and White Americans diagnosed with anxiety and depressive disorders. The purpose of Study 2 was to learn more about the current therapeutic practices for adolescents suffering from depressive disorders. Affective disorders are the most highly diagnosed among adolescents (224). Although there has been substantial research regarding average practices with civilian adolescents, this is not often investigated with military children/adolescents (5; 11; 46; 56; 116). For example, a survey of mental disorders from 2002-2004 was conducted with a nationally representative sample of 6,483 adolescents aged 13-18 years. This survey revealed that approximately one-third of adolescents with mental disorders received services for their illness. Additionally, although disorder severity was significantly associated with an increased likelihood of receiving treatment, approximately 50% of adolescents suffering from a severely impairing mental disorder did not receive mental health treatment for their symptoms (134). This is an important gap because military children have to deal with the added stressors of deployment of parents and frequent relocation more than civilian children (69; 104).

Study 1 and study 2 can be further understood through the lens of the previously identified contributing factors to minority health care disparities, health care system level variables, patient level variables, and care process level variables (202). Figure 3 is a visual representation of how variables investigated in study 1 and study 2 fit into each of these categories. For example, there are two care settings investigated within study 1 and

study 2, purchased care, and direct care. These are examples of health care system level variables.

CHAPTER 2: Paper 1 - Lessons for Health Equity: Military Medicine as a Window to Universal Health Insurance

INTRODUCTION

The National Academies of Sciences, Engineering, and Medicine's Board on Children, Youth, and Families held a Social Justice and Health Equity meeting on May 11, 2016, which brought together people with the common goal of reducing disparities in health outcomes. The panels emphasized that the poor, jobless, addicted, and mentally ill all experience justice differently than the majority groups in America, while acknowledging the culmination of systemic discrimination in the poor black community. The need for evidence-based policy ran throughout the event and the military medical system was identified as a system of universal health care that may identify areas of disparity that could be addressed when resources and access to care are equal across groups.

DIVERSE DEMOGRAPHICS OF MILITARY MEMBERS, THEIR FAMILIES, AND PROVIDERS

The most recent demographics report over 3.6 million military personnel which include Department of Defense (DoD) active duty military personnel (1,326,273), active duty Coast Guard (39,454), DoD Ready Reserve and Coast Guard Reserve members (1,101,939), the Retired Reserve (214,784) and Standby Reserve (13,700), and DoD civilian personnel (856,484) (62). The following total military force demographics represent the 2.5 million members who are active duty and Selected Reserve. The Army

accounts for 47 percent of the total military force. The Air Force, Navy and Marine Corps constitute 21, 17, and 12 percent, respectively, with the remaining 2 percent members of the Coast Guard. The total military force is mostly male with 16.2 percent female. The majority are white (71.0 percent), followed by black (16.8 percent), Asian (3.8 percent), American Indian or Alaska Native (1.2 percent), and Native Hawaiian or Other Pacific Islander (0.9 percent). The 2013 demographic report identifies 2.4 percent of the military members as multiracial, with 11 percent identified as having Hispanic ethnicity. The majority of the total military force is married (51 percent), and the largest age group is 25 years or younger (40 percent). There are more family members (2.98 million) than Active Duty and Selected Reserve (2.20 million) members. Active Duty members' children are mostly between birth and 5 years (42 percent), followed by 6 to 11 years (31 percent), then 12 to 18 years (22 percent), and finally 19 to 22 years (4 percent).

There were 9.53 million beneficiaries eligible for DoD medical care including TRICARE Reserve Select , TRICARE Young Adult, and TRICARE Retired Reserve in 2014(13) . Providers who care for military members and their families are required to maintain the national standards for credentialing and certification in all military treatment facilities (MTFs) and civilian facilities where care is purchased. The quality of care in MTFs is held to the same national benchmarks as in civilian organizations. There are no copayments in the Veteran's Administration (VA) or Military Health System (MHS), and procedure and treatment approvals are based on medical justification. The use of an electronic medical record (EMR) that can share information across the United States and internationally distinguishes care in and out of military facilities and the VA. The racial, gender, and ethnic background of providers in these systems should mirror the national

provider demographics. Uniformed providers embody the additional diversity of experience and geographic relocation associated with the mobility of service. Awareness of military service and a positive bias toward military members and their families is a common thread for providers in these systems.

TWO DISTINCT SYSTEMS OF MILITARY HEALTH CARE

Although frequently confused by nonmilitary personnel, the MHS is separate from the VA health services. MHS primarily serves the active duty population, their family members as well as some retirees, whereas the VA exclusively treats veterans, an older cohort. The VA system is part of the Department of Veterans Affairs, and MHS is overseen by DoD. Not all veterans receive their health care through the VA system, and many who are of working age and in good health opt for private health insurance through their employer.

The Senate Appropriations Committee estimates that the Department of Veterans Affairs is responsible for providing care to approximately 48.3 million Americans, or 15 percent of the nation's population. The VA has the nation's largest integrated health care system, consisting of 167 medical centers, 1,018 community-based outpatient clinics, 300 vet centers, and 135 community-based living centers.

The mission of the VA is to fulfill President Lincoln's promise "To care for him who shall have borne the battle, and for his widow, and his orphan" by serving and honoring the men and women who are America's veterans. According to its mission statement, America's Military Health System (MHS) is a unique partnership of medical educators, medical researchers, and health care providers and their support personnel worldwide. It is prepared to respond anytime, anywhere with comprehensive medical

capability to military operations, natural disasters and humanitarian crises around the globe, and to ensure delivery of world-class health care to all DoD service members, retirees, and their families. The MHS promotes a fit, healthy and protected force by reducing non-combat losses, optimizing healthy behavior and physical performance, and providing casualty care (158).

The differences in health outcomes are influenced by the different patient populations, organizational structure, and priority. The similarities in decreased disparities are most likely the result of electronic medical record use, similar provider cohorts, and a single insurer.

CHALLENGES OF THE VA HEALTH CARE MISSION

A veteran is defined as anyone who has served in the Armed Forces. The current veteran population is approximately 21 million and expected to decrease to approximately 14 million by the year 2040, while the percentage of minority and female veterans are expected to increase (148). The black veteran population is expected to experience the greatest increase, from 12 percent to 16 percent, followed by the Hispanic veteran population growing from 7 percent to 11 percent; other races are expected to grow from 4 to 6 percent by the year 2040 (148). Health benefits in either the VA or MTF are prioritized to those who retire from active duty service and those with conditions related to service. Priority at VA facilities goes to veterans with an illness possibly related to their service in combat operations identified within 5 years after discharge and those with greater than 50 percent disability. There is no enrollment fee, monthly premium, or deductibles, and out-of-pocket costs are low or nonexistent (226). There are several performance measure topics of interest for the Veterans Health

Administration (VHA), including quality, timely access, patient-centered satisfaction and function, equitable community health, and efficient cost-effectiveness (166). Although the VHA has made great strides to improve its services, there are still barriers to health care for veterans, including availability to rural populations and individual perceptions of the quality of care that affect the utilization of services. The distance to services and provider shortage in rural areas have been previously identified as barriers for veterans seeking health care within the VA system, specifically for common diagnostic services, routine specialty care, and emergency services.

HEALTH DISPARITIES FOR SERVICE MEMBERS AND VETERANS

Center for Health Equity Research and Promotion (CHERP) investigators have published over 445 scientific manuscripts in peer-reviewed journals, including at least 241 related to research on improving health quality and equity and care for vulnerable veteran populations since 2009. Mental health care is a known disparity. Military personnel have a high risk of developing psychological problems, especially when exposed to combat, and mental health services are not used by all personnel (113; 179). Fewer than half experiencing mental health problems are likely to seek professional mental health care for fear of stigma or other related barriers to care (161). For example, there is an underuse of mental health care services among Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF) personnel, although there is a high prevalence of posttraumatic stress disorder (PTSD) within this population (230). In 2011, Dawne Vogt conducted a review on empirical articles about mental health beliefs in military and veteran populations and found concerns about public stigma and personal mental health-related beliefs that may serve as important barriers to mental health care

use (144). Military members and veterans have been categorized as underutilizers of mental health services, thought primarily to stem from cultural influences and a pervasive stigma associated with the appearance of being “weak.” African American veterans have been far less likely than Caucasian veterans and those of other racial and/or ethnic groups to be classified as PTSD in order to receive medical treatment for a service-connected disorder (89; 150). Similar disparate care in the treatment of African American veterans for cardiac care, laparoscopic cholecystectomy, and carotid artery imaging has also been shown (48; 89).

ACCESS TO HEALTH CARE ELIMINATES SOME DISPARITY

Traditional definitions of disparities include those differences in outcomes that persist when access is equal. The Institute of Medicine study, *Unequal Treatment*, defined disparities as racial or ethnic differences in health care that were not due to access-related factors or clinical needs, preferences, and appropriateness of intervention (202). Thus, we would expect to see a lack of disparities in the military health care system because it provides universal coverage for all active duty service members, their families, many retirees, and the families of deceased service members. A recent example demonstrating the lack of disparities includes a rigorous look at emergency general surgery (EGS) outcomes over a 5-year period. The study found that risk-adjusted survival analyses found a lack of significant mortality and readmission differences at 30, 90, and 180 days. Although overall morbidity was higher among black versus white patients (HR [95% CI])—30-day HR = 1.23[1.13-1.35], 90-day HR = 1.18 [1.09-1.28], 180-day HR = 1.15 [1.07-1.24] this finding seemingly was driven by appendiceal disorders (HR = 1.69-1.70) (249). This lack of disparities in EGS is a situation not reflected in the general U.S.

population. Thus, as many minority patients are also uninsured, increasing access to care such as through universal coverage like the MHS is thought to be a viable solution to mitigate inequities.

Ongoing research by the Comparative Effectiveness and Provider Induced Demand Collaboration (EPIC) team at the Uniformed Services University of the Health Sciences and Brigham & Women's Hospital indicates a lack of disparities across a variety of health- and surgery-related access and outcomes including maternal, cancer, and heart surgery procedures. Where racial disparities may be eliminated or insignificant, caution must be taken to search for rank-related disparities that may be unique to the military culture or may be more reliant on health literacy and training.

ADDRESSING BIAS MAY FURTHER DECREASE HEALTH DISPARITIES

Recent evidence of a lack of racial disparities in MHS may reflect the military value of “taking care of our own,” which can serve as a unique equalizer among active duty patients and providers in this closed, universal coverage system. Provider variability and geographic variation likely impact health care disparities after eliminating the variables of insurance and access to care.

Cultural factors of disparities arise from gender, religion, race, ethnicity, and any shared group experience (89). Race-based cultural distrust of military medicine is not eliminated immediately upon entering the service. Howard Ross has stated that “Bias is like breathing” to emphasize that everyone has bias (176). Several biases remain in place even after universal coverage eliminates access and resource discrepancies.

The “bandwagon effect” happens when our decisions are influenced by a larger group's decision (51). Military medicine is particularly prone to this bias with a culture

founded on discipline and standardization. Sick call was once organized by having every sick person report early in the morning between 5:00 and 6:00 a.m., for providers to quickly identify those who were “really” sick. The low compassion and the belief that the majority were trying to miss duty contributed to errors in triage by both nonmedical supervisors and medical personnel and the eventual elimination of the system. Family members may also experience a bandwagon effect when providers see encounters as patients abusing a system that they consider free. For example, during a deployment, children are brought in to be seen more frequently (81) which may negatively influence provider compassion. The transition to the medical home model for beneficiaries may reduce this effect as providers develop continuity with their patients.

Another bias is the clustering illusion, which happens when we see groupings, streaks, or clusters of a condition and apply the condition to a group (51). New military recruits, officers, different branches of the service, and units with unique reputations are often seen as homogeneous. When several patients present with a sexually transmitted infection, the racial assumptions apply but also the assumptions associated with their military designation. The military medical system adds another potential categorization to patients that may be grouped together.

Health care providers in a system with universal coverage no longer have the heuristic of poor health caused strictly by being poor without access to health care and may look to personality or behavioral traits to attribute a condition.

FUTURE RESEARCH OR POLICIES

The federal health care system provides an excellent vehicle for objectively exploring the underlying determinants of health disparities. Factors that have been

explored in other settings may be verified as dependent upon access. Other areas that continue to demonstrate disparity require exploration of new variables that contribute to health disparities such as rank and service to improve military and veteran health care. Theoretically, the traditional barriers of access, patient and provider economic concerns, and provider shortages should explain disparate outcomes. When differences remain, other sources require investigation. The expansion of telehealth within the DoD and VA to provide care and virtual advanced specialty care is another potential area in which to evaluate disparate outcomes in similar settings. The more subtle, and therefore traditionally less studied, cultural, social, and emotional factors may be playing a more critical role than appreciated. Future exploration is needed of the extent that different subpopulations possess differential health literacy capabilities, as well as the influence of patient and provider preconceived expectations and the effects of an illness-oriented system versus a wellness-oriented system. Can universal care shift the focus from treating disease to preventive medicine and healthy life style factors such as sleep, exercise, nutrition, and systematic stress reduction?

SUMMARY OF LESSONS LEARNED

The health disparities assumed to relate to a socioeconomic system that is separate and unequal should resolve in a universal health system like the MHS and VA. Some evidence exists that mandated care such as dental care for service members does eliminate disparities, but other areas remain. The delivery of the care contributes to the quality of the care, such as sick call versus a medical home. Lastly, culture exists outside of the military system and the culture from the military system is more likely to mix with instead of replace the effects of society outside of the military. Treatment and outcome

improvement should be seen when care is both available and mandated yet the discrepancies that remain in a universal health system highlight the impact of culture, bias, and a focus on illness rather than wellness and prevention.

PAPER INVOLVEMENT AND STATUS

This paper has been completed and the manuscript has been published (103). I am second author on the manuscript. I was directly involved in the development of the sections entitled: health disparities for service members and veterans, challenges of the VA health care mission, and diverse demographics of military members, their families, and providers and generation of the manuscript. Within these sections I was responsible for conducting the literature review, developing, and editing. Email documentation is available upon request.

CHAPTER 3: Study 1 - Minority Adolescent Mental Health Diagnosis Disparities in a Nationally Representative Sample

INTRODUCTION

The goal of the current study was to investigate the possible presence of diagnostic differences for mental health disorders among adolescents. If differences are identified, further investigation may also reveal the presence of a minority health disparity. A minority health disparity is defined as the difference in the prevalence, morbidity, and survival rates of diseases and illnesses, and access to care within the minority community versus the majority race(227). Within the United States multiple studies have revealed minority health disparities in mental health (4; 80; 122; 130; 204; 233). These disparities exist amongst diagnosis/assessment (42; 152; 201), and intervention(4; 221; 237). For

example, African American adults are more likely to be diagnosed with Schizophrenia and psychotic disorders (14; 42; 61; 152; 191) while White Americans are more likely to be diagnosed with mood disorders (14; 65; 152). Although mood disorders may also be severe, they are considerably less stigmatizing than Schizophrenia. The presence of stigma regarding Schizophrenia has been well established within in the community (135; 208) as well as internally by individuals diagnosed with the disorder(79; 247). Additionally, when compared to non-Hispanic White Americans, minorities are significantly less likely to have access to or receive adequate care for mental health conditions such as depression(4), active alcoholism, or drug abuse(237).

Mental Health Differences and Disparities

Diagnostic and intervention disparities have been found amongst all age ranges, including adolescence (109; 156; 237). However, the majority of research regarding diagnostic disparities has investigated these disparities among adults. The current study contributed to existing research by analyzing diagnostic trends of mental health disorders during adolescence. Adolescence was the developmental stage chosen because it is integral critical time that involves stressors that contribute to an increase in psychological disorders (67; 116; 124; 131).

Mental health problems affect 49.5% of youths (224). Additionally, 22.2% of adolescents suffering from a mental health disorder have severe impairment as a result (224). Among US adolescents, anxiety disorders are the most commonly diagnosed condition (31.9%), followed by behavior disorders (19.1%), mood disorders (14.3%), and substance use disorders (11.4%) (133). The prevalence of adolescents that suffer from mental health disorders, such as anxiety and depression, has increased over time (159;

160). For example, a study utilizing the medical expenditure panel surveys revealed that outpatient mental health services for children and adolescents increased from 9.2% to 13.3% from 1996 to 2012 (160). When compared to the mental health care of adults, adolescents were found to have a significantly faster increase in mental health diagnoses, psychiatrist visits, and psychotherapy visits (159). Therefore, it is imperative that adolescents receive appropriate mental health care. Unfortunately, this is made more difficult by apparent disparities in the treatment and diagnosis of adolescents. For example, minority adolescents are significantly less likely than White Americans to receive treatment or medication for major depression (56). In contrast, minority adolescents are more likely to be diagnosed with disruptive behavioral disorders (45; 156).

Although there has been research conducted regarding diagnostic disparities among adolescents, the studies have not been recent. Previous research conducted investigating and revealing diagnostic disparities among adolescents were published in 2007 and 2010 (56; 156). The current study provides an opportunity to further analyze the diagnostic trends for adolescent health with a population that has full access to health care, such as that within the Military Health System (MHS). The MHS is a comprehensive system that spans the globe and involves integrated medical services such as health care, education and training, and research and development (192). Furthermore, it is one of the largest health care systems in the United States of America and includes the universal health care system known as TRICARE.

TRICARE

TRICARE is the health care system for uniformed service members and their families. It is responsible for comprehensive coverage including health, dental, and prescription plans. TRICARE should not be confused with VA Health Care System. TRICARE is overseen by the Department of Defense and provides coverage to approximately 9.4 million beneficiaries across the United States and overseas. These beneficiaries include active-duty service members, retirees, and their dependents, including a nationally representative sample of more than 3 million children (103; 190). The VA system is solely for Veterans who are usually older in age(103).

Within TRICARE there are two different service delivery systems, direct care, and purchased care. The direct care system are military treatment facilities. The purchased care system is primarily a fee-for-service system utilizing civilian hospitals and clinics. A unique aspect of TRICARE coverage is that beneficiaries are able to seek care in both military treatment facilities (direct care) or in civilian treatment centers (purchased care). The TRICARE system has a database, the Military Health System Data Repository, that collects information about all inpatient and outpatient visits, procedures, and prescriptions reimbursed using TRICARE within the United States. The Military Health System Data Repository is ideal for research because the racial, gender, and ethnic background of providers within the TRICARE system are also representative of national provider demographics(103).

The presence of minority mental health differences and disparities amongst adolescents has been consistently found in research in civilian health care settings. However, there is almost no research regarding whether the presence of differences amongst mental health diagnoses exists amongst the military dependent population.

Additionally, previous research has revealed that the universal health care system within the military removes many of the health disparities that are often found in the civilian health care system (103). The purpose of this study was to determine whether there were racial differences in diagnoses of depressive disorders, anxiety disorders, and impulse control disorders among adolescents within the TRICARE system. Given that this study was a secondary data analysis if differences are identified in the study it is not possible to state whether they also constitute a disparity. A significant difference must be identified as unnecessary, avoidable, unfair, and unjust (92) to be defined as a disparity.

METHODS

This retrospective study utilized 2006 to 2014 data in the Military Health System Data Repository (MDR) for adolescent patients ages 13 to 18 who are TRICARE Prime/Prime Plus beneficiaries. We queried the MDR by International Classification of Diseases, Ninth Revision (ICD-9) diagnosis code and identified 230,571 adolescents aged 13 to 18 years old who received an initial diagnosis of at least one of the mental health disorders targeted in the study between fiscal years 2006 and 2014. Because the data set is compiled using medical record data, a patient cannot be identified for inclusion in the study unless he/she has received an ICD-9 or ICD 10 code. The mental health disorder diagnoses were categorized according to depressive disorders (296.21, 296.22, 296.23, 311), anxiety disorders (309.21, 300.23, 300.02, 300.09, 300.00), or impulse control disorders (313.81, 312.34, 312.81, 312.82, 312.89, 312.9).

Patients were organized according to anxiety only, depression only, and impulse control only diagnoses. Additionally, there is a possibility that patients within the data set will be diagnosed more than one mental health disorder at the initial encounter. These

patients were categorized in the concurrent disorders group. Patients with multiple disorders, such as anxiety and depression, will exhibit different symptoms than a patient that is diagnosed with depression only or anxiety only. Therefore, it is necessary to divide this group into its own category so that appropriate conclusions can be developed following data analysis. Sociodemographic data identified for patients included age, biologic sex, race, marital status, sponsor rank (junior enlisted [lowest 4 ranks in any branch], senior enlisted [noncommissioned officers], junior officer, senior officer, warrant officer, or other [cadets and others eligible for TRICARE benefits]), branch of service (Army, Coast Guard, Air Force, Marine Corps, Navy, Navy Afloat, other), and race. The care setting, direct (at Military Treatment Facilities) or purchased care (care provided in the civilian setting), was also documented.

The MDR categorizes race as White, Asian/Pacific Islander, African American, American Indian/Alaskan Native, Other, and Unknown. Dependent race is frequently under reported in the MHS, and 90% of our study population had a missing race variable. While it is a requirement for military personnel to report their race, dependent race is not a requirement and is therefore often omitted. To resolve this issue, the patient's race was imputed with their sponsor's (parent's) race and reweighted during analysis.

Reweighting Method

Race was an important variable in the study. Therefore, the reweighting estimating equations (RWEE) method was utilized in the study to account for missing patient race. This method was created specifically for use with complex data and is especially useful for work with large databases, such as in health services research. When compared to other methods for handling missing data in large databases, the

reweighting estimating method has been proven to be the least biased and most effective (96; 139; 198). The RWEE method utilizes a logistic regression to calculate the probability race is observed and includes completely observed variables related to race (97). In this case, variables used for adjustment were sponsor's rank and marital status, gender, and care setting (direct or purchased care). The original survey weights, the probability patients are selected from the population, are multiplied by the inverse of the estimated probability that race is observed. Records with missing data are deleted and analyses (cross-tabulations and logistic regressions with a weight statement) are performed with the new adjusted weights (96).

In this study, and before applying the RWEE method, any record with missing or unknown child race was imputed with the parent/sponsor's known race. The first step in the RWEE method was to flag any record with a known race as observed, and any record with an unknown or missing race as unobserved. Next, a logistic regression was used to calculate and output the probability of observed race to a new dataset with gender, sponsor's rank, sponsor's marital status, and care setting as predictors. From the newly created dataset, we then calculated the weighted race as 1 divided by the probability of observed race. Once weighted race is calculated, all records with missing and unknown race are deleted from the analytical dataset.

We performed cross-tabulations and multivariate logistic regressions with the analytical dataset containing weighted race. Our multivariate logistic regression models were the probability of receiving a diagnosis (depression, anxiety, impulse control, and multiple concurrent disorders) with predictor variables gender, race, sponsor's rank and marital status, and care setting of diagnosis; and the regressions deployed a 'weight'

statement to factor in the calculated weighted race. The above outlined steps for the RWEE method were used on both minority race—white race was considered non-minority and minority race consisted of African American, Asian, Native American/Alaskan Native, and Other races—and stratified race.

For the current study, sponsor race is incredibly relevant as the missing patient race because the patient is the child of the identified sponsor. Therefore, it is highly likely that sponsor race is indicative of patient race. Following the use of the reweighting method, all cases with missing or unknown sponsor (parent) race were dropped from data analyses, resulting in a study population of 183,409 adolescents. This resolved the issue of 19% of our study population missing sponsor's service, rank, and marital status by reducing missing-ness to zero for sponsor's service and marital status, and to less than 1% for sponsor's rank. Parallel analyses with unweighted data were also conducted for sensitivity analyses.

STATISTICAL ANALYSES

Cross-tabulations were utilized to examine racial/ethnic differences in psychiatric diagnoses. Multivariate logistic regressions were conducted to estimate the probability of receiving a diagnosis of an anxiety disorder, depressive disorder, and impulse control disorder, and multiple concurrent disorders for grouped minority race first, and then for each stratified minority race. White race was used as the reference group. An odds ratio (OR) greater than 1 indicates a higher likelihood of receiving the analyzed diagnosis relative to the reference group, an OR less than 1 indicates a decreased likelihood of receiving the analyzed diagnosis relative to the reference group. Sponsor rank was used as a proxy for SES and controlled for throughout the analyses.

The independent variables (minority race, race, gender, care setting, and marital status) in the multivariate regression models were categorical. Minority race included African American, Asian, American Indian/Alaskan native, and other as minorities and White as non-minority. Gender included male and female. Care setting included direct care or purchased care. Marital status included married or single.

All data analyses were performed using Stata statistical software, version 14.1 (StataCorp. College Station, TX), and SAS/STAT software, version 9.4 (SAS Institute Inc., Cary, NC). A $p < .05$ was considered significant. Our work was considered exempt by the USUHS Institutional Review Board.

RESULTS

Our final sample consisted of 183,409 adolescents who had a diagnosis of an anxiety disorder, depressive disorder, an impulse control disorder, or multiple disorders (see Table 2); their demographics can be found in Table 1. It should be noted that the sample is limited to adolescents that have at least one mental health disorder (AD, DD, ICD). The most commonly diagnosed mental health disorder was depressive disorders ($n=82,812$), followed by anxiety disorders ($n=60,269$), and impulse control disorders ($n=31,115$). The sample study was 80.46% White ($n=147,580$), 13.10% African American ($n=24,023$), 1.86% Asian/Pacific Islander (3,414), >1% American Indian/Alaskan Native ($n=1,474$), and 3.77% Other (6,918). The study population was 57.85% female ($n=106,099$) and 42.15% male ($n=77,310$). Regarding age distribution, 22.65% of the adolescents were 13 ($n=41,549$), 15.65% were 14 ($n=28,709$), 16.50% were 15 ($n=30,265$), 16.52% were 16 ($n=30,300$), 14.77% were 17 ($n=27,082$), and

13.91% were 18 (n=25,504). There were substantially more patients who utilized purchased care, 74.44% (n=136,536), versus direct care, 25.56% (n=46,873).

The final sample of patients within the study did differ (See Table 5) from the demographics of total population of adolescents who are TRICARE beneficiaries (comparison population). When compared to the comparison population, the study population had more females (57.85% vs 50.29%), a more even distribution of ages, and a difference in the distribution of races among the population. Specifically, within the study population there were more White American and American Indian/Alaskan Native adolescents and fewer African American, Asian/Pacific Islander, and adolescents that identified as Other. The comparison population was developed by identifying all healthcare claims from fiscal year 2006-2014 for patients aged 13-18 not found in our study population due to lack of mental health diagnoses of interest. The comparison population utilized the same beneficiary category exclusion as used for the study population. Finally, the child's race was substituted with sponsor's race if child's race was missing or unknown and subsequently removed any patients with unknown race after imputation.

The logistic regression models for diagnosis appears in Table 3. When compared to White Americans, minority patients had a higher likelihood of being diagnosed with an impulse control disorder (OR = 1.44; CI 1.39-1.48) and a decreased likelihood of diagnosed with a depressive disorder (OR = 0.98; CI 0.95 -1.00) (the 1.00 in the confidence interval occurs due to rounding), or anxiety disorder (OR = 0.80; CI 0.78 – 0.83).

Further analyses examining sub-groups of minorities (see Table 3), revealed that when compared to White Americans, African American adolescents have a much higher and statistically significant likelihood of receiving a diagnosis of an impulse control disorder (OR = 1.66; CI 1.61-1.72). In comparison, other groups had a lower likelihood than White adolescents of receiving an impulse control diagnosis as in the case of Asian/Pacific Islander (OR = 0.90; CI 0.81-0.98), or were not significantly different than White adolescents in the case of American Indian/Alaskan Native (OR = 0.98; CI 0.85-1.13), and Other categories (OR = 1.05; 0.98-1.12).

Statistical significance was also observed when comparing African Americans, to White Americans, on the likelihood of receiving a diagnosis of a Depressive Disorder (OR = 0.93; CI 0.90 – 0.96). In contrast, when compared to White Americans, American Indian/Alaskan Natives had a greater likelihood of receiving a diagnosis of a Depressive Disorder (OR = 1.22; CI 1.10-1.35) as did Asian/Pacific Islanders (OR = 1.21; CI 1.05-1.20) . Adolescents that identified as Other did not significantly differ from White adolescents in the rate of a depressive diagnosis (OR 1.02; CI 0.97-1.07).

African Americans also had a significantly lower likelihood than White Americans of receiving a diagnosis of Anxiety Disorder (OR = 0.75; CI 0.72 – 0.77) as did American Indian/Alaskan Native (OR = 0.81; CI 0.72-0.91). The remaining minority groups did not significantly differ from White adolescents in the rate of an anxiety diagnosis: Asian/Pacific Islander (OR = 0.94; CI 0.88-1.01) and Other (OR = 0.95; CI 0.90-1.00).

When compared to the direct care setting, adolescents within purchased care had an increased likelihood of being diagnosed with an impulse control disorder (OR = 1.35;

CI 1.31 - 1.40), an increased likelihood of receiving an anxiety disorder diagnosis (OR = 1.06; CI 1.03 – 1.08), and a decreased likelihood of receiving a Depressive Disorder diagnosis (OR = 0.81; CI 0.80 - 0.83), with all results statistically significant.

When compared to married households, adolescents within single parent households had a statistically significant increased likelihood of being diagnosed with a depressive disorder (OR = 1.07; CI 1.04 – 1.10), and a decreased likelihood of being diagnosed with an anxiety disorder (OR = 0.91; CI 0.88 – 0.94). They did not differ significantly regarding the likelihood of being diagnosed with an impulse control disorder (OR = 1.03; 0.99 – 1.07).

DISCUSSION

The majority of mental health disorders that are diagnosed in adulthood began during adolescence including anxiety disorders, behavioral disorders, mood disorders, and substance use disorders(115; 119). The current study investigated racial differences in the diagnosis of depressive disorders, anxiety disorders, and impulse control disorders in a large, nationally representative sample of TRICARE beneficiary adolescents treated in the MHS from 2006 to 2014. Results of the study indicated that adolescents that belong to a racial minority are significantly more likely than White patients to be diagnosed with an impulse control disorder, and significantly less likely to be diagnosed with a depressive or anxiety disorder. When compared to White adolescents, African American adolescents differed from White American adolescents on all diagnoses, whereas this was not the case for othe racial minority groups.

Minority Diagnostic Differences

Previous studies have found adolescents that belong to a racial/ethnic minority have a greater likelihood of being diagnosed with an Impulse Control Disorder(137). For example, African American and Native Hawaiian youth have been found to be more likely than White youth to be diagnosed with disruptive behavioral disorders after controlling for age, gender, functional impairment, and socioeconomic status(156). Additionally, African American Adolescent males are more likely to be diagnosed with Conduct Disorder whereas White Adolescent males are more likely to be diagnosed with Attention Deficit-Hyperactivity Disorder (ADHD)(45). It has been opined that these diagnostic differences occur because teachers are more likely to attribute restlessness and inattentiveness in African American adolescent males as disruptive and aggressive. Similar behaviors in White males result in a diagnosis of ADHD(45). As a result, White Adolescent males are provided with additional accommodations in school while African American adolescent males are not (45). Although ADHD is not included in the diagnoses for the present study, the previous study brings attention to the fact that diagnostic disparities occur over multiple diagnostic categories. In the current study minority adolescents had a higher likelihood of being diagnosed with impulse control disorder and a decreased likelihood of being diagnosed with anxiety and depressive disorders.

The present results highlight the important finding that minority diagnostic differences for mental health disorders are contributed to by health care providers as well as teachers. Further, this result was found in a population where access to care essentially equal among the adolescents included in the study. The use of the MHS dataset provided a unique opportunity to investigate the possibility of the presence of

health disparities when access to care is virtually equal. It is clear that ethnicity and gender influence clinical diagnoses, but it is important to consider ways to ameliorate this problem. For example, lack of cultural competence can lead to inaccurate diagnoses(5; 85; 171). Clinical judgment is an important factor in accurate diagnoses, therefore clinical training programs have been suggested to reduce ethnocentric bias in mental health diagnoses (152). If there is a significant difference in the clinical judgement when working with minority adolescents versus White adolescents, then it would be a disparity, instead of a difference, because additional training would make the difference avoidable.

Under diagnosis of affective disorders, as evidenced in the current study, decreases the likelihood that adolescents will receive the appropriate care. Although it is common for major depression to occur during adolescence, it often goes untreated (56). For example, in 2011 Cummings & Druss conducted a study regarding the racial/ethnic differences in mental health services use among adolescents with major depression. The study investigated a national sample from 2004 to 2008. Results from the study indicated that when compared to White Americans, minorities, including African American, Hispanic, and Asian adolescents, were significantly less likely to receive treatment for Major Depression (56). Similarly, a study investigating service utilization of mental health disorders among adolescents revealed that ethnic/racial minorities also have lower treatment rates for mood and anxiety disorders when compared to non-Hispanic White Americans(134). The present results documenting a decreased likelihood that minority adolescents will be diagnosed with mood and anxiety disorders increase the likelihood that there will a disparity in the appropriate treatment of mental health disorders.

Additional considerations must be taken regarding the interpretation of the odds ratios within the current study. Although the results of the study indicated clinically significant differences in receiving certain diagnoses, these analyses were under the conditional nature of being diagnosed with an anxiety disorder, depressive disorder, impulse control disorder, or multiple concurrent disorders. Therefore, different results may present themselves when compared to the entire population of adolescents within the TRICARE system without the selected diagnoses. For example, if one examines the number of adolescents diagnosed with ICD (see table 4) with the total population of youth in the TRICARE system (see table 5) it would appear that a smaller proportion of all AA adolescents receive diagnoses of ICD than White adolescents. At first glance, it may seem as though this is counter to the narrative regarding the increased odds that African Americans will be diagnosed with impulse control disorder. However, it is important to note that this result arises because AA adolescents are underrepresented in the population of youth receiving mental health diagnoses relative to their presence in the overall MHS population of youth. This may arise because of a reticence of AA parents to present their children for mental health case as described above or it may arise because AA adolescents are overall more resilient to mental health issues examined in this study. Future research is needed to further examine the factors that impact the rate of overall mental health diagnosis and the relative rate of specific diagnoses in AA and WA adolescents. The present results highlight the potential that once a mental health diagnosis is made, the probability of a specific diagnosis differs across racial categories.

Racial Variations

There were also variations in diagnoses among minority groups including Asian/Pacific Islander and American Indians/Alaskan Native for depressive disorders. Specifically, the aforementioned groups had a greater likelihood of being diagnosed with depressive disorders than White adolescents. These findings are consistent with previous research with these populations regarding mental health difficulties. For example, within the 2013 Youth Risk Behavior Surveillance System 8% of American youth reported at least one suicide attempt within the 12 months preceding the survey (246). However, 11.8% of Native Hawaiian and Pacific Islander adolescents and 9.5% Asian/Pacific Islander population reported at least one suicide attempt within the same time period (246). Additionally, American Indian/Alaskan Native adolescents have a multitude of mental health disparities. For example, in 2010, they had the highest rate of suicide among 15-24 year-olds in the United States (80). Furthermore, substance use is also a significant problem within the Asian/Pacific Islander (86; 112; 213) and American Indian/Alaskan Native adolescent population (60; 64; 241). The prevalence of substance use within these populations is relevant given that substance use is often used as a maladaptive coping method to manage mental health difficulties, such as depression.

Direct Care vs Purchased Care

In addition to the above racial disparities, there were significant differences in diagnosis with direct care versus purchased care. The primary aim of the MHS is to provide medical treatment to active duty military personnel through the direct care system(192). Dependents of active duty military personnel, such as adolescents, are not a priority for the direct care system and are only entitled to medical care on a space-available basis. Therefore, parents of adolescents are more likely to seek services through purchased care

to ensure that they can receive treatment a timely manner. As a result, children of active duty military personnel are more likely to be seen by a civilian provider than by a military provider.

The authors of the study acknowledge that children of Active Duty Military Personnel may have additional stressors as opposed to children of parents with jobs within the civilian sector. This difference in stressors likely impacts the prevalence of mental health diagnoses. However, it is the opinion of the authors that this limitation does not take away from the salience of the study. Specifically, as approximately 74% of the patients identified in the study received care and diagnoses from civilian providers, the results of the study are likely generalizable to the care that would be received by adolescents in the general population.

Current Study

The current paper significantly contributed to the broader knowledge regarding differences in mental health diagnosis among minority adolescents in the United States. Although the presence of differences in mental health diagnoses have been researched previously in smaller samples, the current study revealed the disparity in a nationally representative sample of TRICARE beneficiaries over 5 years. Additionally, using the MHS provided an opportunity to conduct research regarding the possible presence of differences within a population that has equal access to care. Additional research with the population can reveal whether these differences are avoidable or unjust, which would change this finding from a difference to a disparity. The causes of health care disparities are multifactorial and can be divided into multiple levels including health care system variables, patient variables, and care-process variables (202). The MHS dataset allows

for research while controlling for a significant health care system level variable, access to care. Future directions regarding mental health among adolescents should seek to identify additional clinical factors that may reveal whether the difference is a disparity or not. Additionally, the significant difference between the direct and purchased care settings indicates the need for further investigation into policies and procedures that may create the variation between the two sectors.

Limitations

As with any single study, the findings of current study should be interpreted with caution in light of several limitations. The use of the administrative claims data and ICD-9-CM to identify cases and procedures is a limitation within the study because the claims data are prone to coding error. However, any misclassification errors are assumed to be non-differential across racial groups. The dataset also lacked clinical details such as presenting symptoms which have been shown to impact provider decision regarding diagnoses (121; 136). Finally, a significant proportion of the sample was missing race information. While the weighted method that was used to account for the missing race is sophisticated and validated, it is necessary to acknowledge the possibility of possible lingering effects of missing race. Further, the use of the weighting method is a limitation because there is a possibility that biracial children will be classified as a target parent's race that the child does not identify with. However, the child's identified race according to their individual preference is beyond the capability of the present data to address. Additionally, patients were identified for inclusion in the study according to their diagnosis of an AD, DD, or ICD. Therefore, results of the study are primarily generalizable to adolescents with a current diagnosis of an AD, DD, or ICD.

Finally, provider level variables, such as level of training have been researched regarding contributing factors to minority health disparities. There are a multitude of clinicians that have the capability of providing a mental health diagnosis including primary care physicians, psychologists, psychiatrists, psychiatric nurse practitioners, etc. However, within the current study it was not possible to identify the type of clinician that made the diagnosis. The provider type can be of importance due to the variability in diagnoses that have been found in previous mental health studies, specifically, regarding minority patients. For example, a study investigating the differences in treatment outcomes for depression and anxiety diagnoses indicated that treatment outcomes were different according to the type of provider and the race of the patient (121).

FUTURE DIRECTIONS

The military health care system has been proposed as a system that eliminates minority health care disparities (38; 103; 167). Lack of health insurance affects access to and use of health care. Individuals are less likely to seek out health care without health insurance due to the large cost. However, health care is provided to all active duty military and their dependents. Therefore, the current study is able to combat this impeding factor by utilizing the MHS which is a worldwide health care system that provides services to active duty service members and their eligible family members (146). Nevertheless, results of this study reveal the presence of diagnostic disparities among adolescents. As a result, future research should be conducted regarding factors contributing to the health care disparities other than access to care, such as factors that lead to inaccurate diagnoses. The causes of minority health care disparities are multifactorial. Some contributing factors can occur at the individual level, such as the

effects of physician characteristics. For example, the level of physician cultural competence has been proposed as a strategy to address and possibly reduce minority health care disparities and improve health care quality (19; 22; 183). Cultural competence is defined as acknowledgment and incorporation of the importance of culture, assessment of cross-cultural relations, vigilance toward the dynamics that result from cultural differences, expansion of cultural knowledge, and adaptation of services to meet culturally unique needs (19). Cultural competence contributes to successful clinical encounters (15; 19; 32; 102). As with a patient centered orientation, cultural competence is based on the ability of health care providers to treat each patient according to their individual needs and characteristics, maintain unconditional positive regard, build effective rapport, and use the biopsychosocial model.

STUDY INVOLVEMENT AND STATUS

This study has been completed and the manuscript is currently under review with the Journal of Pediatrics. I am the first author on the manuscript. I conceived the idea for the study under the guidance of Dr. Tracey Koehlmoos and Dr. David Riggs. I was directly involved in the design of the study, consulting on data analyses, interpreting findings, and generating the manuscript. Email documentation is available upon request.

Chapter 4: Study 2 – Adherence to treatment guidelines for depressive disorders

INTRODUCTION

A previous data analysis conducted utilizing the EPIC database revealed that anxiety and depressive disorders were most prevalent for the adolescents of active duty military. These results are consistent with epidemiological research conducted by SAMSHA (209) that revealed that anxiety disorders and depressive disorders were the

most highly diagnosed within a national sample of adolescents. Additionally, the previous EPIC study revealed that African Americans were more likely than White Americans to be diagnosed with an impulse control disorder and less likely to be diagnosed with an anxiety or depressive disorder. This provides an interesting opportunity to investigate additional disparities among treatments following a diagnosis of anxiety or depressive disorders--specifically, whether practitioners within the MHS have an increased or decreased likelihood to of enacting treatment plans involving therapy, medication, or both depending on the race of the patient.

The American Academy of Pediatrics has recently updated the guidelines for adolescent depression in primary care (228). These guidelines include the appropriate methods for identification, assessment, and management of adolescent depression. It is recommended that assessment occur annually for adolescents given the prevalence of adolescent depression. Additional consideration must also be taken for adolescents that possess risk factors for the development of depression such as a family history of depression and significant psychosocial stressors (250). Assessment for depression should include a clinically validated self-report scale and direct interviews with family and caregivers of the adolescent (203). Treatment goals should be individualized for the patient and include psychoeducation of family members regarding depression and treatment options and consultation with other disciplines if necessary (41). If progress is not seen in the decrease of depressive symptoms approximately 6 to 8 weeks following the initial diagnosis, then it is necessary to re-evaluate the patient. Patients suffering from depression should also establish a safety plan with their clinician that is shared with

the family/caregivers to ensure that it is utilized if the patient feels that they are a danger to themselves or others (41).

It has been well researched that the appropriate treatment for depressive disorders involves therapy, medication (59; 101; 108; 114; 200), or a combination of medication and therapy (47; 53; 78; 106; 232). Successful therapeutic treatments for depression in adolescents include cognitive behavioral therapy (40; 98; 100; 248), interpersonal therapy (40; 52; 98; 141; 248), and acceptance and commitment therapy (1; 88; 211; 219). Research has indicated that the effectiveness of certain therapeutic and pharmacological treatment choices for depression is different for children and adults (214). For example, tri-cyclic antidepressants are not as effective for children as they are for adults (214). The previously mentioned therapies are also appropriate adjuvant treatments to medication in those with moderate to severe depression.

The FDA utilizes stringent guidelines to research and approve medications for mental health disorders to ensure that they are safe and effective. Pharmacotherapy is recommended for patients with moderate or severe depression. However, antidepressants such as selective serotonin reuptake inhibitors, have a black-boxed warning for the increased risk of suicide for adolescents (39; 46; 188). This warning was initiated in 2004 following the publication of an FDA-sponsored meta-analysis with results indicating that, when compared to the placebo, children assigned to the anti-depressant group had twice the rate of suicidal ideation (31). Due to this warning by the FDA clinicians are advised to treat adolescents using SSRIs to decrease depressive symptoms with caution, and preferably a low dosage (28). The VA/DOD practice guidelines for mild to moderate MDD recommend evidence-based psychotherapy or evidence-based

pharmacotherapy. The evidence-based psychotherapies are acceptance and commitment therapy, behavioral therapy, behavioral activation, CBT, IPT, mindfulness-based cognitive therapy, and problem-solving therapy (215). The evidence-based pharmacotherapies are SSRIs, SNRIs, Mirtazapine, and Bupropion (215).

The EPIC data set provides data on the diagnosis and treatment modalities provided. Unfortunately, the data do not include the specific psychotherapeutic approaches that were used. Therefore, it is not possible to identify what types of therapeutic treatments (e.g., cognitive-behavioral therapy, interpersonal therapy) were used with patients in the current analyses. It is, however, possible to determine the type(s) of medication prescribed for a patient. Therefore, the current paper examined the presence or absence of psychotherapy and the prescription of appropriate anti-depressant medications (see Table 9) for the mental health disorder of interest, depression.

The American psychiatric association has developed clinical practice guidelines for the treatment of major depressive disorder (250). Within these guidelines are directives for appropriately assessing and treating adolescents following the diagnosis of a depressive disorder. Due to the developmental stage of adolescents it is necessary to take into consideration additional factors. These factors include a strong familial support system, proper psychoeducation, and an appropriate understanding of the limits of confidentiality (250). Additionally, treatment plans that include school counselors, therapists, psychologists, or social workers are especially helpful when working with adolescents (250). Finally, management of depression may also include the use of evidence-based pharmacotherapies are SSRIs, SNRIs, Mirtazapine, and Bupropion (215).

Medication Adherence

Although pharmacotherapy is frequently used to treat depression in primary care, non-adherence is a significant obstacle for successful treatment obstacles (43; 187). Unfortunately, while we were able to identify whether medication was prescribed for the study population, we were unable to examine the adherence/compliance with treatment including medication and/or therapy in the present study.

Current Study

This study investigated the differences in therapeutic treatments and psychotropic medications prescribed for adolescent children of active duty US military personnel. Analyses were conducted to examine the possible presence of minority health disparities within these treatments. The current paper utilized data from the Military Health System (MHS), a nationally representative health care system. This global health system has been proposed as method for ending health care disparities among adults (38; 167). Therefore, the study contributed to the research by further researching the presence or lack thereof of health care disparities within the MHS.

METHODS

This retrospective study utilized 2011 to 2015 fiscal year data in the Military Health System Data Repository (MDR) for adolescent patients ages 13 to 18 who were TRICARE Prime/Prime Plus beneficiaries. We queried the MDR by International Classification of Diseases, Ninth Revision and 10th revision (ICD-9, ICD-10) diagnosis code for adolescents aged 13 to 18 years old, diagnosed from 2011 to 2015 with at least one of the mental health disorders targeted in the study. For ICD-9 the mental health disorder diagnoses were categorized according to depressive disorders (296.20, 296.21,

296.22, 296.23, 300.4, 311). The author included additional ICD-9 codes for study 2 versus study 1. The codes added to study 2 were 296.20 (Unspecified Major Depressive Disorder) and 300.4 (Dysthmic Disorder). These codes were added to further research the impact of severity rating for depressive disorders. For ICD-10 the mental health disorder diagnoses were categorized according to depressive disorders (F32.0, F32.1, F32.2, F32.9, F32.89, F34.1).

The medications included in the data analyses are stated in Table 9. The FDA approved antidepressant medications, Clomipramine, Duloxetine, Escitalopram, Fluoxetine, Imipramine, and Sertraline (36), were included in the data analysis as well as other SSRIs, SNRIs, and anti-depressants. These medications were identified within the data set according to first fill medication adherence. First fill medication adherence is defined as the patient filling the first prescription after it is given by the physician. The time period for first fill medication adherence was 30 days from the diagnosis date. This specific time period was selected because it has been deemed an appropriate length of time by a multitude of research studies investigating the likelihood that patients would follow physician guidelines for medication (75; 107; 186; 196; 197).

Sociodemographic data identified for patients included age, biologic sex, race, sponsor's rank (junior enlisted [lowest 4 ranks in any branch], senior enlisted [noncommissioned officers], junior officer, senior officer, warrant officer, or other [cadets and others eligible for Prime benefits]), branch of service (Army, Coast Guard, Air Force, Marine Corps, Navy, other), and race. The care setting, either direct (at Military Treatment Facilities) or purchased care (at civilian fee-for-service treatment facilities), was also documented.

The MDR categorizes race as White, Asian/Pacific Islander, African American, American Indian/Alaskan Native, Other, and Unknown. Dependent race is frequently under reported in the MHS and it is likely that adolescents will have a missing or unknown race variable. To resolve this issue, the patient's race was imputed with their sponsor's known race if the patient's race was missing or unknown. Subsequently, patients with missing or unknown race (<3%) and sponsor's rank (<1%) were removed from analyses; which eliminated the need for further methodology—such as RWEE—to handle missing data.

Statistical Analyses

Cross-tabulations were utilized to calculate the descriptive statistics such as age, sex, race, diagnoses, SES, sponsor's service, and care setting by treatment type received for the sample (see table 1). Chi square analyses were conducted to investigate whether there is a difference for treatment type for age, sex, race, and diagnosis (see table 2). Incidence of diagnosed depression in sample were graphed over time (see graph 1). Multivariate logistic regressions were conducted to estimate the probability of receiving different types of treatments for each patient as indicated by their race, age, sex, and care setting, and degree of diagnosed depression (see table 13). White race was used as the reference group. An odds ratio (OR) greater than 1 indicates a higher likelihood of receiving the treatment type relative to the reference group, an OR less than 1 indicates a decreased likelihood of receiving the treatment type relative to the reference group. Sponsor rank was used as a proxy for SES and controlled for throughout the analyses. All data analyses are multivariate models and were performed using SAS/STAT software, version 9.4 (SAS Institute Inc., Cary, NC). A $p < .05$ was

considered significant. Our work is considered exempt by the USUHS Institutional Review Board.

RESULTS

Our final sample consisted of 67,276 adolescents who had a diagnosis of a depressive disorder. Table 10 displays sample demographics. It should be noted that the sample is limited to adolescents that have at least one diagnosis of a depressive disorder.

The sample was 74.1% White (n=49,885), 14% African American (n=9,428), 5.5% Asian/Pacific Islander (3,730), 1% American Indian/Alaskan Native (n=704), and 5.4% Other (3,529). The study population was 62.5% female (n= 42,060) and 37.5% male (n=25,216). Regarding age distribution, 18.7% of the adolescents were 13 (n=12,594), 16.2% were 14 (n=10,897), 17.6% were 15 (n=11,851), 17.7% were 16 (n=11,928), 15.5% were 17 (n=10,457), and 14.3% were 18 (n=9,549). There were also substantially more patients utilizing purchased care, 71.7% (n=48,227), versus direct care, 28.3% (n=19,049).

Logistic Regression Models - Race

The multivariate logistic regression models for treatment type appear in Table 13. When compared to White Americans, African American adolescents had statistically significant lesser likelihood of receiving pharmacotherapy only for treatment of depression (OR = 0.59; CI 0.56-0.63). Additionally, other racial groups also had a lesser likelihood than White adolescents of receiving pharmacotherapy only, such as Asian/Pacific Islander adolescents (OR = 0.86; CI 0.79-0.94), and adolescents identified as Other (OR = 0.77; CI 0.71-0.84). American Indian/Alaskan Native did not differ from

White adolescents in the likelihood of receiving pharmacotherapy only following a depression diagnosis (OR = 0.88; CI 0.73-1.06).

Statistical significance was also observed in African Americans, when compared to White Americans, of having a greater likelihood of receiving psychotherapy only following a depression diagnosis (OR = 1.26; CI 1.20-1.32). Additionally, other groups also had a greater likelihood than White adolescents of receiving only psychotherapy as in the case of adolescents identified as Other (OR = 1.18; CI 1.09-1.27) and Asian/Pacific Islander (OR = 1.09; CI 1.01-1.17). American Indian/Alaskan Native did not differ from White adolescents in the likelihood of receiving only psychotherapy only following a depression diagnosis (OR = 0.99; CI 0.84-1.17).

African Americans also had a statistically significant lesser likelihood than White adolescents of receiving both pharmacotherapy and psychotherapy following a depression diagnosis (OR = 0.69; CI 0.64 – 0.74). The remaining minority groups did not differ from White adolescents in the likelihood of receiving both pharmacotherapy and psychotherapy following a depression diagnosis: Asian/Pacific Islander (OR = 1.00; CI 0.91-1.10), American Indian/Alaskan Native (OR = 1.14; CI 0.93-1.40), and adolescents identified as Other (OR = 0.93; CI 0.84-1.03).

African Americans had a statistically significant greater likelihood than White adolescents of receiving no treatment following a depression diagnosis (OR = 1.35; CI 1.29-1.41). The remaining minority groups did not differ from White adolescents in the likelihood of receiving no therapy following a depression diagnosis: Asian/Pacific Islander (OR = 1.03; CI 0.96-1.11), American Indian/Alaskan Native (OR = 1.04; CI 0.88-1.21), as well as adolescents identified as Other (OR = 1.08; CI 1.00-1.16).

Logistic Regression Models – Age

Adolescents age 13 had a decreased likelihood of receiving pharmacotherapy only (OR = 0.70; CI 0.66-0.75) and both pharmacotherapy and psychotherapy (OR = 0.65; CI 0.60-0.71) when compared to 18-year-old adolescents. There was also an increased likelihood of receiving psychotherapy only (OR = 1.41; CI 1.32-1.50) and no treatment (OR = 1.22; CI 1.15-1.29) when compared to 18-year-old adolescents.

Adolescents age 14 had a decreased likelihood of receiving pharmacotherapy only (OR = 0.56; CI 0.53-0.60) when compared to 18-year-old adolescents. There was also an increased likelihood of receiving psychotherapy only (OR = 1.75; CI 1.65-1.87). They did not differ significantly regarding the likelihood of receiving both pharmacotherapy and psychotherapy (OR = 0.95; CI 0.87-1.02) and no therapy (OR = 0.98; CI 0.93-1.04) when compared to 18-year-old adolescents.

Adolescents age 15 had a decreased likelihood of receiving pharmacotherapy only (OR = 0.58; CI 0.54-0.62) and no therapy (OR = 0.89; CI 0.84-0.95) when compared to 18-year-old adolescents. There was also an increased likelihood of receiving psychotherapy only (OR = 1.81; CI 1.70-1.92). They did not differ significantly regarding the likelihood of receiving both pharmacotherapy and psychotherapy (OR = 1.02; CI 0.95-1.10) when compared to 18-year-old adolescents.

Adolescents age 16 had a decreased likelihood of receiving pharmacotherapy only (OR = 0.63; 0.59-0.67) and no therapy (OR = 0.93; 0.88-0.99). There was an increased likelihood of receiving psychotherapy only (OR = 1.66; 1.56-1.76) when compared to 18-year-old adolescents. They did not differ significantly regarding the likelihood of receiving both pharmacotherapy and psychotherapy (OR = 1.00; CI 0.93-1.08) when compared to 18-year-old adolescents.

Adolescents age 17 had a decreased likelihood of receiving pharmacotherapy only (OR = 0.78; 0.73-0.83) and no therapy (OR = 0.92 0.86-0.97) when compared to 18-year-old adolescents. There was an increased likelihood of receiving psychotherapy only (OR = 1.44; CI 1.35-1.54). They did not differ significantly regarding the likelihood of receiving both pharmacotherapy and psychotherapy (OR = 0.98; CI 0.91-1.06) when compared to 18-year-old adolescents.

Logistic Regression Models - Sex

When compared to males, females had an increased likelihood of receiving pharmacotherapy only (OR = 1.15; CI 1.11-1.20), psychotherapy only (OR = 1.05; CI 1.01-1.08), and both pharmacotherapy and psychotherapy (OR = 1.35; CI 1.29-1.42). There was also a decreased likelihood of receiving no therapy (OR = 0.75; CI 0.72-0.77).

Logistic Regression – Care Setting

When compared to direct care, adolescents that received purchased care had a decreased likelihood of receiving pharmacotherapy only (OR = 0.88; CI 0.84-0.92) and both pharmacotherapy and psychotherapy (OR = 0.66; CI 0.63-0.69). There was also an increased likelihood of receiving psychotherapy only (OR = 1.13; CI 1.09-1.17) and no therapy (OR = 1.25; CI 1.20-1.29).

DISCUSSION

There were multiple minority mental health treatment disparities found within the current study. We hypothesized that minority adolescents diagnosed with depression would receive less or insufficient treatment compared with majority race counterparts. Our results provided some support for this hypothesis. The study identified multiple

treatment differences among adolescents of minority when compared to White American adolescents. However, there were no significant differences found between the American Indian/Alaskan Native and White adolescents. Adolescents that identified as African American, Asian, and Other were less likely to receive pharmacotherapy only following a depression diagnosis. However, African Americans were the only adolescents that were generally less likely to be receiving any treatment that involved pharmacotherapy, including when it was combined with psychotherapy. Additionally, when compared to White American adolescents, African American adolescents had a greater likelihood of receiving no treatment following a diagnosis of depression. This decreased likelihood of treatment with medication could be the result of physicians or parents deciding that pharmacotherapy is not appropriate for African American adolescents. However, it would be important to find out contributing factors to this decision. For example, if it is due to lack of education among African American parents regarding the effectiveness of pharmacotherapy in treating depression, then an education intervention could be especially helpful. The increased likelihood that adolescents that identify as Asian, African American, and Other will participate in psychotherapy only following a depression only diagnosis further supports the possible aversion of the use of pharmacotherapy for minority adolescents. Overall, it appears that either parents of adolescents of military personnel or clinicians that are working with this population are more likely to follow treatment plans that have a decreased emphasis on pharmacotherapy in the case of AA patients with depression.

Across the different treatment approaches, AA adolescents consistently had greater disparities when compared to White adolescents than did other minority groups.

This finding indicates that AA adolescents may be a distinct group when considering depression diagnoses and treatment. Therefore, it would be helpful to conduct greater research with this population to develop culturally relevant treatments.

Males vs Females

Within the current study more female adolescents (n=42,060) were diagnosed with depression than male adolescents (n=25,216). When compared to male adolescents, females were significantly more likely to participate in all treatment types (71; 72). Additionally, females were less likely to participate in no therapy following a depression diagnosis. The distribution of the diagnoses and treatment results are consistent with the current literature. Women are twice as likely than men to experience depression (157). Specifically, women have a 21.3% risk of being diagnosed with major depressive disorder in their lifetimes compared to the 12.9% risk of men (63). The difference in diagnoses has been found consistently across different cultures and age ranges including adolescence and adulthood (49; 63).

It is possible that the difference in diagnoses may be the result of inaccurate assessments of depression in males (3). Dr. Michael Addis developed an alternative approach to justify the depression diagnosis disparity in men (3). This framework hypothesizes that men may experience alternative depressive symptoms that are not currently diagnostic criteria in the DSM-5 for depression including, but not limited to self-destructive behavior, anger reactions, and the numbing of pain through substance use (3). A research study investigating the difference in depression diagnoses according to this framework found that a higher proportion of men met the criteria for depression than women (128).

Age Differences

Results of the current study revealed a consistent pattern regarding the age of initial diagnosis of depression. Specifically, adolescents of each age group (13-17) were less likely than 18-year-olds to receive pharmacotherapy only following a depression diagnosis. Additionally, adolescents of each age group were significantly more likely than 18-year-olds to receive psychotherapy only. These results may represent a reticence to prescribe adolescents medication for the treatment of their depression.

Pharmacotherapy is recommended for patients with moderate or severe depression.

However, antidepressants such as selective serotonin reuptake inhibitors, have a black boxed warning for the increased risk of suicide for adolescents (39; 46; 188). These results appear to indicate that providers take age into consideration when recommending treatments.

Direct Care vs Purchased Care

There were significant differences in the proportion of the sample utilizing direct care versus purchased care. Specifically, 28.3% of the study population utilized direct care, while 71.7% of the population utilized direct care. This difference is due to the availability of health providers for adolescents in the direct care system. The primary aim of the MHS is to provide medical treatment to active duty military personnel through the direct care system(192). Dependents of active duty military personnel, such as adolescents, are not a priority for the direct care system and are only entitled to medical care on a space-available basis. Therefore, parents of adolescents are more likely to seek services through purchased care to ensure that they can receive treatment a timely

manner. As a result, children of active duty military personnel are more likely to be seen by a civilian provider than a military provider.

When compared to direct care, adolescents that received purchased care had a decreased likelihood of receiving pharmacotherapy only and both pharmacotherapy and psychotherapy. There was also an increased likelihood of receiving psychotherapy only and no therapy. Taken together, results indicate that in comparison to adolescents treated by military providers, adolescents in civilian settings are less likely to get treatment (and less likely to get medications when they do get treatment. Although it is unclear which is the most effective treatment, it is clear that treatment is likely different if it is provided through the direct or purchased care systems.

Limitations

The findings of current study should be interpreted with caution in light of several limitations. The use of the administrative claims data, ICD-9-CM, ICD-10-CM to identify cases and procedures is a limitation within the study because the claims data are prone to coding error. However, any misclassification errors are assumed to be non-differential across racial groups. The dataset also lacked clinical details such as presenting symptoms which have been shown to impact provider decision regarding diagnoses. Additionally, patients were identified for inclusion in the study according to their diagnosis of a Depressive Disorder. Therefore, results of the study are primarily generalizable to adolescents with a current diagnosis of a Depressive Disorder. Nevertheless, it is also possible that adolescents within the TRICARE system may have been treated for depressive symptoms without receiving a depression diagnosis. This may occur for many reasons such as misdiagnosis, off-label use of treatment, or the

treatment for symptoms that fall below diagnostic threshold. Unfortunately, the current paper would not be able to speak to this population.

The current study identified a number of minority health disparities regarding treatment types. However, these findings should be interpreted in conjunction with additional literature considerations such as the difference in depression diagnoses among men versus women and cultural considerations that may lead to under diagnosis of depression among minority adolescents. The analyses in the current study reveal the necessity to delve deeper into the data set and work within the military population. There are consistently confirmed disparities in treatment, which may mean disparities in outcomes. However, the causes of these disparities are unknown due to the lack of access to the individual providers that made the diagnoses and symptoms measures that drove the diagnoses.

Finally, the current study did not account for the effect of severity level of depression diagnoses. When a patient is diagnosed with a major depressive disorder a specifier regarding the severity level depression will also be given. This specifier is chosen based on the number of symptoms the patient possesses, the severity of those symptoms, and the degree of functional disability (7). Severity specifiers include mild, moderate, severe, persistent, and other/unspecified. The current study did not examine the severity level of depression diagnoses due to the large number of cases in which severity was not specified.

Future Directions

Minority mental health disparities have been identified within the current study. If symptoms of depression go untreated it is likely that they will increase in severity and

have a more prominent impact on the life of the adolescent. However, additional research is needed to identify what factors, such as gender or race, contributed to these disparities. Additional research should be conducted regarding contributing factors to the differences in treatments for minority versus White adolescents. The current study used data from medical records. However, it would be helpful to conduct research with qualitative data to identify the decision-making process of clinicians who recommend specific treatment options for adolescents suffering from depression. Provider level factors are just as important as client and system level factors in contributing to the development of health disparities. For example, provider biases and lack of cultural competence have been identified as contributing factors to diagnostic disparities (66; 83; 174; 239).

Furthermore, it is important to understand more details regarding minority patients that did not participate in therapy, medication, or a combination of the two following a diagnosis of depression. Specifically, whether this was the result of the lack of provider recommendation or patient follow-through with the prescribed treatment plan. Qualitative studies of families and health care providers would be helpful for addressing these questions. Clinicians could be queried to identify whether or not therapy was recommended, and if not, contributing factors to the lack of treatment recommendation. Researchers could investigate reasons families decided not to participate in therapy if it was offered following a depression diagnosis. If families are being provided with quality resources and are choosing not to use them within the MHS, it would be beneficial to identify and address the reasoning behind this decision making.

It would also be helpful to conduct a time to treatment research study to investigate the difference in adherence to medication treatment following administration of a prescription. Research into this topic could provide further information regarding patient level variables that may contribute to lifetime prevalence of a mental health disorder, such as poor adherence to treatment or treatment refusal. Finally, future directions should also research the effect of treatment disparities among minority adolescents and their families. For example, do military adolescents fair differently based on the treatment differences, and if so, how much worse off are they? Following minority families over time and administering measures could address this question. Additionally, it may be possible to gain further access to outcome measures that are often used within the MHS (e.g., PHQ-9, BASIS, etc) to compare outcome measures.

STUDY INVOLVEMENT AND STATUS

I am the first author on the manuscript. I conceived the idea for the study under the guidance of Dr. Tracey Koehlmoos and Dr. David Riggs. I was directly involved in the design of the study, consulting on data analyses, interpreting findings, and generating the manuscript. Email documentation is available upon request.

Overall Discussion

The current papers suggest a need to place a greater emphasis on provider bias, provider knowledge, and patient characteristics as contributors to mental health disparities. This is because one of the greatest barriers to health equity, access to care, is removed within the current study populations, but disparities persisted. Therefore, greater care must be taken to examine other factors that are taken into consideration, whether implicitly or explicitly, when making diagnoses and recommending treatment plans for patients. Furthermore, treatment recommendations are also limited to the

knowledge and biases of the provider. Although treatment providers complete a wealth of education before they are licensed, there is also a need to consistently educate oneself to become aware of contributing factors to mental health difficulties and symptom presentation. For example, it may take additional training to become aware of the differences in symptom presentation for depression among minority adolescents. Lack of this knowledge can lead to inaccurate assessment of symptom presentation and inappropriate diagnoses as a result.

Also, a treatment recommendation is only valid if a patient adheres to it. Previous research has indicated that there can be multiple barriers to a patient's decision to adhere to a prescribed regimen. For example, the patient may not trust the provider. Lack of trust in the health care provider can negatively impact the interaction between the health care provider and the patient as well as the level of care that is received (13; 22; 70; 84; 139; 153; 183). Additionally, a patient may not understand or agree with the recommendations provided and may not adhere to the treatment as a result. For example, previous research has indicated a disparity regarding adherence to medication among minorities due to negative beliefs regarding medication (123) and general medical mistrust (57).

There is an additional factor within the current population that significantly affects the results of the study, the age of the population. The population within the current papers are adolescent children of military personnel. Adolescents are not often researched within the military population, although they are a considerable portion of patients within the military health system. Therefore, the current studies fill a significant research gap regarding both the military and adolescent populations. Adolescence is a

developmental stage of interest due to the significant changes that occur among this age versus childhood (164). For example, the onset of anxiety and depressive disorders peak during adolescence and early adulthood (6). The relationship between adolescence and the onset of mental health diagnoses has been attributed to many factors such as the significant changes within the brain and neural systems. These changes lead to higher cognitive functions, reasoning and interpersonal interactions, cognitive control of emotions, risk-vs-reward appraisal and motivation. As a result, the risk of cognitive, addictive, and affective disorders are increased (164). Adolescents are a special population because of the difficulties that are specific to this developmental stage such as peer pressure, the maintenance of hormones, school, etc. Additionally, the adolescents require strong familial support while dealing with mental health difficulties (250).

Health Disparities

The current series of studies can be understood in the context of the previously identified contributing factors to minority health care disparities (figure 2). Access to care is a contributor to minority health care disparities (76). The current series of studies utilized the MHS, a universal health care system for military personnel and their dependents. Research has indicated that the MHS removes many of the barriers that contribute to health disparities, such as access to care (103). There is not much research conducted regarding the mental health of adolescents within the MHS. Therefore, this study is a first step to understanding the prevalence of mental health diagnoses and documenting identified mental health disparities in this population. Identification of these disparities will lead to further investigation into the underlying causes of these disparities. Although, I have spoken at length about the considerations that must be taken

regarding the results, there are still factors that have not been mentioned. Contributing factors can be divided into three categories, health care system level variables, patient level variables, and care process level variables (see figure 2). These variables provide a framework for future investigation into the underlying causes of the identified disparities.

Health Care System Level Variables

Health care system level variables were the primary focus of the series of studies. Health care system level variables are features of the health care system that may contribute to different effects on patient care, mainly for racial and ethnic minorities. Although the MHS has been successful in eliminating minority health disparities for some health concerns including a variety of health- and surgery-related access and outcomes including maternal, cancer, and heart surgery procedures (103). This was not the case for mental health diagnoses among adolescents within the MHS. Specifically, results of study 1 indicated that adolescents that belong to a racial minority are significantly more likely than White patients to be diagnosed with an impulse control disorder, and significantly less likely to be diagnosed with a depressive or anxiety disorder. African American adolescents had the greatest likelihood of receiving an Impulse Control Disorder and the least likelihood of being diagnosed with an Anxiety Disorder or Depressive Disorder.

There were also multiple minority mental health treatment differences found within study 2. While Study 1 revealed differences in diagnostic patterns across races, Study 2 revealed differences in treatments reported by different age, sex, and service provider (direct care or purchased care). Identified differences found within study 2 appear to reflect different treatment considerations made by the clinicians. For example,

adolescents of each age group (13-17) were less likely to receive pharmacotherapy only following a depression diagnosis. This difference may be the result of clinicians taking into consideration the black boxed warning for the increased risk of suicide for adolescents for antidepressants such as selective serotonin reuptake inhibitors (39; 46; 188). Due to this warning by the FDA clinicians are advised to treat adolescents using SSRIs to decrease depressive symptoms with caution, and preferably a low dosage (28).

Additionally, within study 2 African American adolescents were the only minority to have consistent differences within each treatment category when compared to White adolescents. This finding suggests that within the current population although disparities were found amongst the majority of minority adolescents, African American adolescents are at the greatest risk for suffering from treatment disparities following a depression diagnosis. This is an especially concerning result given the previously stated barriers that African Americans face when dealing with the health care system. These barriers ultimately contribute to the maintenance of the differences in the prevalence, morbidity, and/or survival rates of diseases and illnesses. For example, results of study 2 indicated that African American adolescents were the most likely to receive no therapy following a diagnosis of depression. This is a disservice given that minorities, especially African Americans, are sorely in need of therapeutic interventions due to the specific stressors of oppression, poverty, and biases they face (168). These stressors are likely contributing factors to depression diagnoses. The lack of therapeutic treatment following a diagnosis may lead to an increase in severity of symptoms or an even greater problem. For example, while African American adolescents are less likely than White adolescents

to die from suicide, African Americans teenagers are more likely to attempt suicide than are White adolescents (223).

It is important to remember that none of these differences identified in the data driven studies are based off of ability to pay for care because everyone has the same insurance in these studies. A helpful way to display the results identified within the current papers are with an example scenario. For example, treatment differences identified within the current study reveal that an African American adolescent has a decreased likelihood of being appropriately diagnosed with an affective disorder, such as depression. Furthermore, if this adolescent in question is appropriately diagnosed then there is a risk that they will not receive the appropriate treatment especially if the depression is severe and requires medication. This is in comparison with a White adolescent that will likely receive the appropriate diagnosis and treatment. The possibility that the African American adolescent in question will receive the appropriate diagnosis may also be affected by the gender of the patient. Male adolescents are at a greater risk for being misdiagnosed when they have an affective disorder due to the decreased likelihood that they will feel comfortable expressing negative emotions in front of clinicians (33; 137). Inaccurate diagnoses may also lead to inappropriate treatment if the patient in question is believed to have an impulse control disorder instead of depression.

An increase in the recruitment of minority physicians is a possible health systems variable that could decrease minority health disparities. Patient racial preferences may contribute to disparities with treatment. Patients that belong to racial and ethnic minority groups tend to prefer to be cared for by health care providers of their own race (50; 182;

184; 185). African American and Hispanic patients in concordant relationships with their physicians were more likely to rate their physicians highly (149; 147). Therefore, a greater push to increase the number of minority physicians could prove to be helpful. Diversity in the representation of medical providers has also been connected to greater patient satisfaction, better practitioner and patient communication, and better educational training experiences for all students (203).

Furthermore, within the TRICARE system there are two service delivery systems, purchased care and direct care. The direct care system includes military treatment facilities, while purchased care includes civilian treatment facilities. Study 2 revealed that adolescents treated in the purchased care system were less likely to be treated with pharmacotherapy. This may be due to a reticence of clinicians within the purchased care system to prescribe medication. Also, individuals within the purchased care may take longer to prescribe medications. Pharmacotherapy was only included after the first 30 days following a depression diagnosis. Therefore, if it takes the clinician longer to decide that medication is appropriate, or it takes the family greater than 30 days to decide upon medication, it was not included in the study.

Patient Level Variables

Patient level variables are individual attributes of a patient that may contribute to health care disparities. These patient attributes are often based in their values, fears, or hopes and can manifest themselves in behaviors that influence the type and level of health care they receive (202). For example, study 2 investigated treatments following a diagnosis of depression. Minority health disparities were found, indicating that there is a difference in treatment participation among minority adolescents. A patient level

variable that may contribute to this disparity is the level of trust toward the health care provider. Multiple studies have revealed that minority patients had less trust in their physicians than non-Hispanic White American patients (10; 205). Trust between a patient and physician contributes to patient adherence to treatment, satisfaction with care, greater use of preventive clinical services, quality of life, and better health outcomes (18; 74). Therefore, there is a possibility that if the patient had a lack of trust in the physician, they did not return for additional services. Within study 2, there was a pattern in the results that indicated that AA adolescents were less likely to be treated with medications. Cultural views regarding medication may contribute to the decreased likelihood that African American adolescents received medication following a depression diagnosis. Previous research has indicated that minority patients may exhibit non-adherence to medication due to lack of knowledge regarding the diagnosis (123) and general medical mistrust (57). Therefore, the difference in AA patients being treated with anti-depressant medications may be due to treatment refusals by the parents of the adolescents.

A method for combatting mistrust towards health care providers may be to provide additional psychoeducation regarding mental health services and treatment options for families. Additional education may decrease their possible misconceived notions about the use of medication for patients when necessary. Providing patients with health education about their medication and self-care has been found to be an effective intervention that improved treatment adherence in patients with heart failure (228).

Care Process Level Variables

Care process level variables are characteristics of an individual medical provider, as well as the interaction between the provider and the patient, that may contribute to

minority health disparities. Cultural competence is an example of a care process level variable and is defined as acknowledgment and incorporation of the importance of culture, assessment of cross-cultural relations, vigilance toward the dynamics that result from cultural differences, expansion of cultural knowledge, and adaptation of services to meet culturally unique needs (19). Cultural competence also refers to a set of behaviors, attitudes, and policies that enable individuals to work effectively in cross-cultural situations (102). Cultural competence is especially important for accurate clinical assessment. Before an adolescent is given a mental health diagnosis they participate in intake procedures to ensure that their treatment plan is tailored to them. For example, study 2 revealed that African American adolescents were more likely to be diagnosed with an impulse control disorder and less likely to be diagnosed with affective disorders. A clinician that is culturally competent would have knowledge about display rules in minority communities versus White communities and how it impacts the manifestation of emotions. Lack of cultural competence can be a reason behind the identified health disparities within the current studies. Therefore, a way to combat this barrier may be to ensure that diversity and cultural competence trainings are an additional requirement when working with minority adolescents.

Overall the studies presented in the current paper were able to address different levels of variables that contribute to minority health disparities. Health care system level variables were able to be addressed in paper 1 by providing a review of the current military health care system. This system is able to address many contributing factors such as geographic ability by providing a worldwide network of healthcare. However, despite the access to care, health disparities still presented themselves. The results in

papers two and three provide insight into care process level variables that may account for the interaction. Specifically, the difference in diagnoses that were provided to minority patients versus white patients.

Alternative Explanations

There are also a multitude of alternative explanations for the differences in diagnoses among racial minority adolescents and White adolescents. Regarding diagnoses specifically, there may be the possibility that there are fewer minority patients being taken to psychological appointments and as a result a lesser likelihood that a diagnosis will be made. Affective disorders, such as, anxiety and depression, may not be appropriately given to minorities because the clinicians do not have the appropriate cultural competence to decipher through display rules to understand that emotions are displayed differently. There also may be a barrier regarding which professionals are making the mental health diagnoses. The data set did not provide information regarding who made the diagnosis, such as psychologists or physicians. Given the difference in training it is possible that individuals that have more training in psychological disorders are able to more appropriately identify the disorders in adolescents, no matter the race. Regarding the differences in treatments following a depression diagnosis, the decreased likelihood of teenagers to be given pharmacotherapy when compared to 18-year-olds may be due to the black box warning with antidepressants. Additionally, the differences in treatments can be due to treatment refusals by patients. For example, parents may not be comfortable giving their children medication given their developmental stage.

Future Directions

Next, we should look at more specific data regarding patient outcomes. The MHS routinely uses depression screeners and other mental health measures. Future studies might explore matched pairs (i.e., families matched on the basis of diagnosis and rank) to identify possible race-based disparities. This could be important given the fact that sponsor rank can be an additional contributor to familial stressors. Specifically, as sponsor rank increases so does the level of responsibility and income. In addition, qualitative approaches might elucidate military minority families' experience of the healthcare system. For example, factors such as how they perceived the clinicians to be engaging with them, whether they were able to receive care in a timely manner, etc. This information would be helpful to clarify what patient level and system level variables are contributing to disparities within treatment outcome such as provider mistrust and quality of care.

Research regarding adolescent dependents in the military is extremely limited. The lack of research with this population is an immense gap in intellectual knowledge given the multitude of adolescents within the military population combined with the vital time adolescence represents in the development of mental health disorders. Future research should investigate significant stressors that may be unique to this population such as the difficulty with switching duty stations or the change in household dynamic when a significant caregiver is deployed. Additionally, qualitative research among providers and families would be beneficial in identifying treatment outcomes and contributing factors to the minority health care disparities that were observed in the current series of studies. The current results are limited to the medical record data which is significant but provides only one part of the story. Specifically, we are unable to

gather treatment specific information regarding the therapeutic approach that was chosen for the patients. Additionally, it is not possible to identify contributing factors that led to treatment decisions for the adolescents, such as symptom presentation. Further qualitative investigation would lead to results that could bring about the development of more culturally competent treatments and assessments with this population.

Conclusion

The current series of studies provided a wealth of information from a relatively untapped source. Research regarding adolescent mental health within the military health care system is rarely conducted, especially with such a large and rich data set. Minority mental health disparities were found among diagnoses and treatment types. However, the results also leave much unanswered due to the lack of accompanying qualitative information such as the types of providers that made the diagnoses, treatment outcomes, and the decision-making process of the provider when making the diagnoses. These research studies represent the initial steps in developing a programmatic line of research to contribute to the study of adolescent mental health and decrease minority health disparities within the MHS.

Table 1. Study 1: Demographics

Study Population Demographics, n = 183,409	
Gender	Count (%)
Female	106,099 (57.85)
Male	77,310 (42.15)
Age	
13	41,549 (22.65)
14	28,709 (15.65)
15	30,265 (16.50)
16	30,300 (16.52)
17	27,082 (14.77)
18	25,504 (13.91)
Race	
White	147,580 (80.46)
African American	24,023 (13.10)
Asian/Pacific Islander	3,414 (1.86)
American Indian/Alaskan Native	1,474 (0.80)
Other	6,918 (3.77)
Care Setting of Diagnosis	
Purchased Care	136,536 (74.44)
Direct Care	46,873 (25.56)
Sponsor's Service	
Army	78,961 (43.05)
Air Force	47,559 (25.93)
Navy	29,400 (16.03)
Marines	12,899 (7.03)
Navy Afloat	10,076 (5.49)
Coast Guard	3,896 (2.12)
Other	618 (0.34)
Sponsor's Rank	
Junior Enlisted	22,556 (12.30)
Senior Enlisted	122,500 (66.79)
Junior Officer	21,535 (11.74)
Senior Officer	11,769 (6.42)
Warrant Officer	4,675 (2.55)
Unknown/Missing	374 (0.20)
Sponsor's Marital Status	
Married	154,440 (84.21)
Single	28,969 (15.79)

Table 2. Study 1: Mental Health Diagnosis in Adolescents ages 13 - 18 by Fiscal Year

Fiscal Year	Diagnosis Group				
	Depressive Disorders Only	Anxiety Disorders Only	Impulse Control Disorders Only	Multiple Concurrent Disorders	Total
2006	13516	5878	5368	1305	26067
2007	8764	4815	3555	710	17844
2008	8344	5180	3418	795	17737
2009	8531	5935	3499	848	18813
2010	8467	6318	3337	927	19049
2011	8630	6803	3170	959	19562
2012	8708	7658	3234	1052	20652
2013	8967	8333	2916	1247	21463
2014	8885	9349	2618	1370	22222
Total	82812	60269	31115	9213	183409

Table 3. Study 1: Regression model results with weighted “ race”

	Depressive Disorders	Anxiety Disorders	Impulse Control Disorders	Multiple Concurrent Disorders
	OR (95% CI), p-value	OR (95% CI), p-value	OR (95% CI), p-value	OR (95% CI), p-value
Minority Race				
No (ref)	-	-	-	-
Yes	0.98 (0.95 – 1.00), 0.0337*	0.80 (0.78 - 0.83), <.0001*	1.44 (1.39 - 1.48), <.0001*	0.88 (0.83 - 0.93), <.0001*
Race				
White (ref)	-	-	-	-
Asian/Pacific Islander	1.11 (1.05 - 1.20), 0.0012*	0.94 (0.88 - 1.01), 0.1070	0.90 (0.81 – 0.98), 0.0206*	1.06 (0.91 – 1.23), 0.4785
African American	0.93 (0.90 - 0.96), <.0001*	0.75 (0.72 - 0.77), <.0001*	1.66 (1.61 - 1.72), <.0001*	0.83 (0.78 – 0.89), <.0001*
American Indian/Alaskan Native	1.22 (1.10 - 1.35), 0.0002*	0.81 (0.72 - 0.91), 0.0003*	0.98 (0.85 - 1.13), 0.7952	0.77 (0.59 – 0.99), 0.0428*
Other	1.02 (0.97 - 1.07), 0.4165	0.95 (0.90 - 1.00), 0.0599	1.05 (0.98 - 1.12), 0.1725	0.98 (0.87 – 1.09), 0.6591
Gender				
Male (ref)	-	-	-	-
Female	1.51 (1.48 – 1.54), <.0001*	1.35 (1.32 – 1.37), <.0001*	0.31 (0.31 – 0.32), <.0001*	1.10 (1.06 – 1.15), <.0001*
Care Setting of Diagnosis				
Direct Care (ref)	-	-	-	-
Purchased Care	0.81 (0.80 - 0.83), <.0001*	1.06 (1.03 - 1.08), <.0001*	1.35 (1.31 - 1.40), <.0001*	2.42 (2.28 - 2.58), <.0001*
Sponsor’s Marital Status				
Married (ref)	-	-	-	-
Single	1.07 (1.04 - 1.10), <.0001*	0.91 (0.88 - 0.94), <.0001*	1.03 (0.99 - 1.07), 0.1164	1.00 (0.94 - 1.06), 0.8990

*statistically significant with a p-value <0.05

Table 4. Study 1: Mental Health Diagnosis by Race
n=183,409

	Depressive Disorders Only n=82,812 count (%)	Anxiety Disorders Only n=60,269 count (%)	Impulse Control Disorders Only n=31,115 count (%)	Multiple Concurrent Diagnoses n=9,213 count (%)
White	66,635 (80.47)	49,949 (82.88)	23,376 (75.13)	7,620 (82.71)
African American	10,592 (12.79)	6,549 (10.87)	5,859 (18.83)	1,023 (11.10)
Asian	1,651 (1.99)	1,093 (1.81)	496 (1.59)	174 (1.89)

American Indian/Alaskan Native	743 (0.90)	432 (0.72)	239 (0.77)	60 (0.65)
Other	3,191 (3.85)	2,246 (3.72)	1,145 (3.68)	336 (3.65)

Table 5. Study 1: Demographics of Study Population vs Comparison Population

	Study Population n=183,409	Comparison Population n=958,983
Sex	Count (%)	Count (%)
Female	106,099 (57.85)	482,235 (50.29)
Male	77,310 (42.15)	476,748 (49.71)
Age		
13	41,549 (22.65)	489,418 (51.04)
14	28,709 (15.65)	114,856 (11.98)
15	30,265 (16.50)	89,127 (9.29)
16	30,300 (16.52)	82,180 (8.57)
17	27,082 (14.77)	81,533 (8.50)
18	25,504 (13.91)	101,869 (10.62)
Race		
White	147,580 (80.46)	638,150 (66.54)
African American	24,023 (13.10)	214,823 (22.40)
Asian/Pacific Islander	3,414 (1.86)	38,011 (3.96)
American Indian/Alaskan Native	1,474 (0.80)	7,267 (0.76)
Other	6,918 (3.77)	60,732 (6.33)
Care Setting of Diagnosis		
Purchased Care	136,536 (74.44)	-
Direct Care	46,873 (25.56)	-
Sponsor's Service		
Army	78,961 (43.05)	406,317 (42.37)
Air Force	47,559 (25.93)	249,467 (26.01)
Navy	29,400 (16.03)	157,643 (16.44)
Marines	12,899 (7.03)	72,587 (7.57)
Navy Afloat	10,076 (5.49)	51,531 (5.37)
Coast Guard	3,896 (2.12)	18,066 (1.88)
Other	618 (0.34)	3,372 (0.35)
Sponsor's Rank		
Junior Enlisted	22,556 (12.30)	116,441 (12.14)
Senior Enlisted	122,500 (66.79)	634,801 (66.20)
Junior Officer	21,535 (11.74)	111,097 (11.58)
Senior Officer	11,769 (6.42)	69,282 (7.22)
Warrant Officer	4,675 (2.55)	24,508 (2.56)
Unknown/Missing	374 (0.20)	2,854 (0.30)

Sponsor's Marital Status		
Married	154,440 (84.21)	884,754 (92.26)
Single	28,969 (15.79)	72,254 (7.53)
Missing	-	1,975 (0.21)

Table 6. Study 2: Sex Logistic Regression

	Male	Female
Medication Only (MO)	MO x Male	MO x Female
Therapy Only (TO)	TO x Male	TO x Female
Medication and Therapy (MT)	MT x Male	MT x Female
Any Treatment (AT)	AT x Male	AT x Female
No Treatment (NT)	NT x Male	NT x Female

Table 7. Study 2: Age Logistic Regression

	13	14	15	16	17	18
Medication Only (MO)	MO x 13	MO x 14	MO x 15	MO x 16	MO x 17	MO x 18
Therapy Only (TO)	TO x 13	TO x 14	TO x 15	TO x 16	TO x 17	TO x 18
Medication and Therapy (MT)	MT x 13	MT x 14	MT x 15	MT x 16	MT x 17	MT x 18
Any Treatment (AT)	AT x 13	AT x 14	AT x 15	AT x 16	AT x 17	AT x 18
No Treatment (NT)	NT x 13	NT x 14	NT x 15	NT x 16	NT x 17	NT x 18

Table 8. Study 2: Race Logistic Regression

	Asian/Pacific Islander	African American	American Indian/ Alaskan Native	Other
Medication Only (MO)	MO x Asian/Pacific Islander	MO x African American	MO x American Indian/ Alaskan Native	MO x Other
Therapy Only (TO)	TO x Asian/Pacific Islander	TO x African American	TO x American Indian/ Alaskan Native	TO x Other

Medication and Therapy (MT)	MT x Asian/Pacific Islander	MT x African American	MT x American Indian/ Alaskan Native	MT x Other
Any Treatment (AT)	AT x Asian/Pacific Islander	AT x African American	AT x American Indian/ Alaskan Native	AT x Other
No Treatment (NT)	NT x Asian/Pacific Islander	NT x African American	NT x American Indian/ Alaskan Native	NT x Other

Table 9. Study 2: Medications included in data analysis

Depression Medications
fluoxetine (Prozac)
escitalopram (Lexapro)
citalopram (Celexa)
sertraline (Zoloft)
paroxetine (Paxil)
fluvoxamine (Luvox)
Desvenlafaxine (Pristiq, Khedezla)
Duloxetine (Cymbalta)
Levomilnacipran (Fetzima)
Venlafaxine (Effexor XR)
Amitriptyline
Amoxapine
Desipramine (Norpramin)
Doxepin
Imipramine (Tofranil)
Nortriptyline (Pamelor)
Protriptyline (Vivactil)
Trimipramine (Surmontil)

Table 10. Study 2: Study Population Demographics
n=67,276

	N (%)
Age	
13	12,594 (18.7)
14	10,897 (16.2)
15	11,851 (17.6)
16	11,928 (17.7)
17	10,457 (15.5)
18	9,549 (14.3)
Sex	

Female	42,060 (62.5)
Male	25,216 (37.5)
Diagnosed Depression	
Mild	1,119 (1.7)
Moderate	3,520 (5.2)
Severe	2,379 (3.5)
Persistent	9,759 (14.5)
Other/Unspecified	50,499 (75.1)
Race	
White	49,885 (74.1)
African American	9,428 (14.0)
Asian	3,730 (5.5)
American Indian/Alaskan Native	704 (1.0)
Other	3,529 (5.4)
Sponsor's Service	
Army	29,568 (44.0)
Air Force	17,065 (25.4)
Navy	14,080 (20.9)
Marines	4,824 (7.2)
Coast Guard	1,479 (2.2)
Other/Unknown	260 (0.3)
Sponsor's Rank	
Junior Enlisted	5403 (8.0)
Senior Enlisted	46,569 (69.2)
Junior Officer	7,697 (11.4)
Senior Officer	5,356 (8.0)
Warrant Officer	2,251 (3.4)
Care Setting of Diagnosis	
Direct Care	19,049 (28.3)
Purchased Care	48,227 (71.7)

Table 11. Study 2: Population Demographics by Treatment
n=67,276

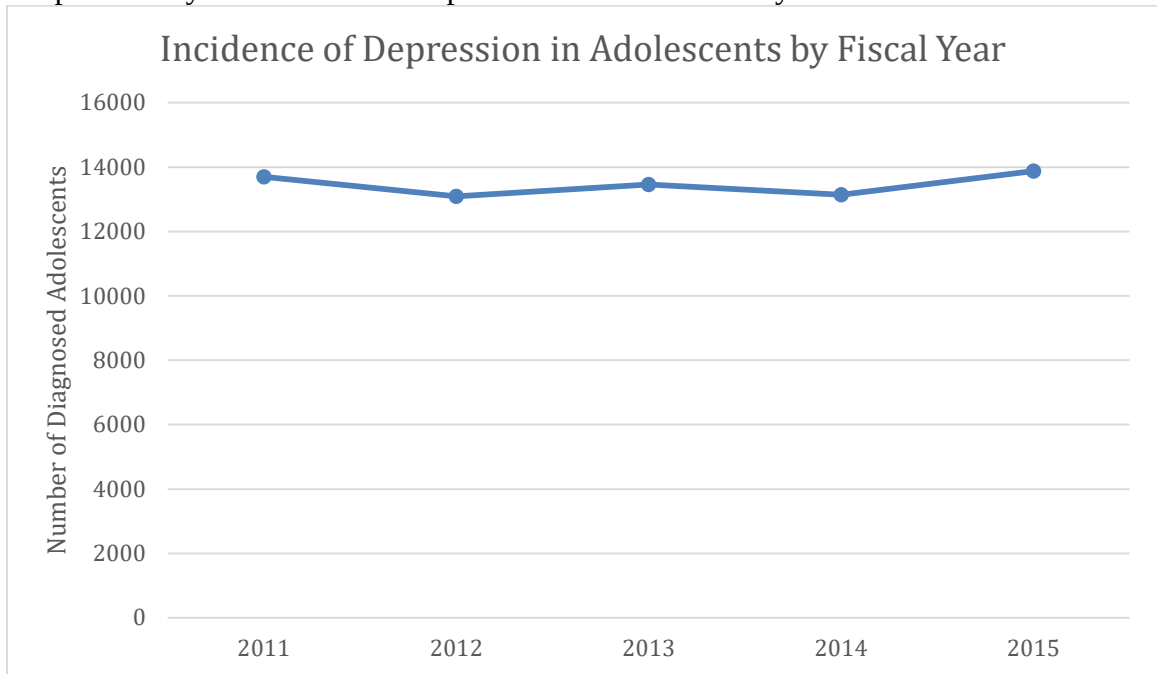
	Pharmacotherapy Only n(%)	Psychotherapy Only n(%)	Both Pharmacotherapy & Psychotherapy n(%)	No Therapy n(%)
Total	14,257	20,343	9,382	23,294
Age				
13	2678 (18.8)	3638 (17.9)	1277 (13.6)	5001 (21.5)
14	1954 (13.7)	3646 (17.9)	1556 (16.6)	3741 (16.1)

15	2172 (15.2)	4045 (19.9)	1805 (19.2)	3829 (16.4)
16	2334 (16.4)	3849 (18.9)	1772 (18.9)	3973 (17.1)
17	2433 (17.1)	3057 (15.0)	1535 (16.4)	3432 (14.7)
18	2686 (18.8)	2108 (10.4)	1437 (15.3)	3318 (14.2)
Sex				
Female	9295 (65.2)	12821 (63.0)	6451 (68.8)	13493 (57.9)
Male	4962 (34.8)	7522 (37.0)	2931 (31.2)	9801 (42.1)
Diagnosed Depression				
Mild	148 (1.0)	507 (2.5)	99 (1.1)	365 (1.6)
Moderate	673 (4.7)	1301 (6.4)	586 (6.2)	960 (4.1)
Severe	571 (4.0)	665 (3.2)	578 (6.2)	565 (2.4)
Persistent	2021 (14.2)	3189 (15.7)	1175 (12.5)	3374 (14.5)
Other/Unspecified	10844 (76.1)	14681 (72.2)	6944 (74.0)	18030 (77.4)
Race				
White	11307 (79.3)	14643 (72.0)	7232 (77.1)	16703 (71.7)
African American	1399 (9.8)	3210 (15.8)	999 (10.6)	3820 (16.4)
Asian	756 (5.3)	1129 (5.5)	551 (5.9)	1294 (5.6)
American Indian/Alaskan Native	143 (1.0)	204 (1.0)	111 (1.2)	246 (1.1)
Other	652 (4.6)	1157 (5.7)	489 (5.2)	1231 (5.2)
Sponsor's Service				
Army	6357 (44.6)	8710 (42.8)	4000 (42.6)	10501 (45.1)
Air Force	3714 (26.1)	5208 (25.6)	2545 (27.1)	5598 (24.0)
Navy	2821 (19.8)	4421 (21.7)	1904 (20.3)	4934 (21.2)
Marines	958 (6.7)	1483 (7.3)	693 (7.4)	1690 (7.3)
Coast Guard	358 (2.5)	446 (2.2)	194 (2.1)	481 (2.0)
Other/Unknown	49 (0.3)	75 (0.4)	46 (0.5)	90 (0.4)
Sponsor's Rank				
Junior Enlisted	1158 (8.1)	1451 (7.1)	748 (8.0)	2046 (8.8)
Senior Enlisted	9680 (67.9)	14144 (69.5)	6316 (67.3)	16429 (70.5)
Junior Officer	1727 (12.1)	2366 (11.6)	1104 (11.8)	2500 (10.7)
Senior Officer	1206 (8.5)	1659 (8.2)	901 (9.6)	1590 (6.8)
Warrant Officer	486 (3.4)	723 (3.6)	313 (3.3)	729 (3.2)
Care Setting of Diagnosis				
Direct Care	4355 (30.5)	5348 (26.3)	3304 (35.2)	6042 (25.9)
Purchased Care	9902 (69.5)	14995 (73.7)	6078 (64.8)	17252 (74.1)

Table 12 Study 2: Depression Type by Fiscal Year

Depression Type by Fiscal Year						
Fiscal year	mild	moderate	other	persistent	severe	Total
2011	245	751	10130	2072	504	13702
2012	222	719	9811	1888	452	13092
2013	203	680	10262	1851	468	13464
2014	235	666	9853	1907	482	13143
2015	214	704	10443	2041	473	13875
Total	1119	3520	50499	9759	2379	67276

Graph 1. Study 2: Incidence of Depression in Adolescents by Fiscal Year



Graph 2. Study 2: Incidence of Depression Diagnosis Type in Adolescents by Fiscal Year

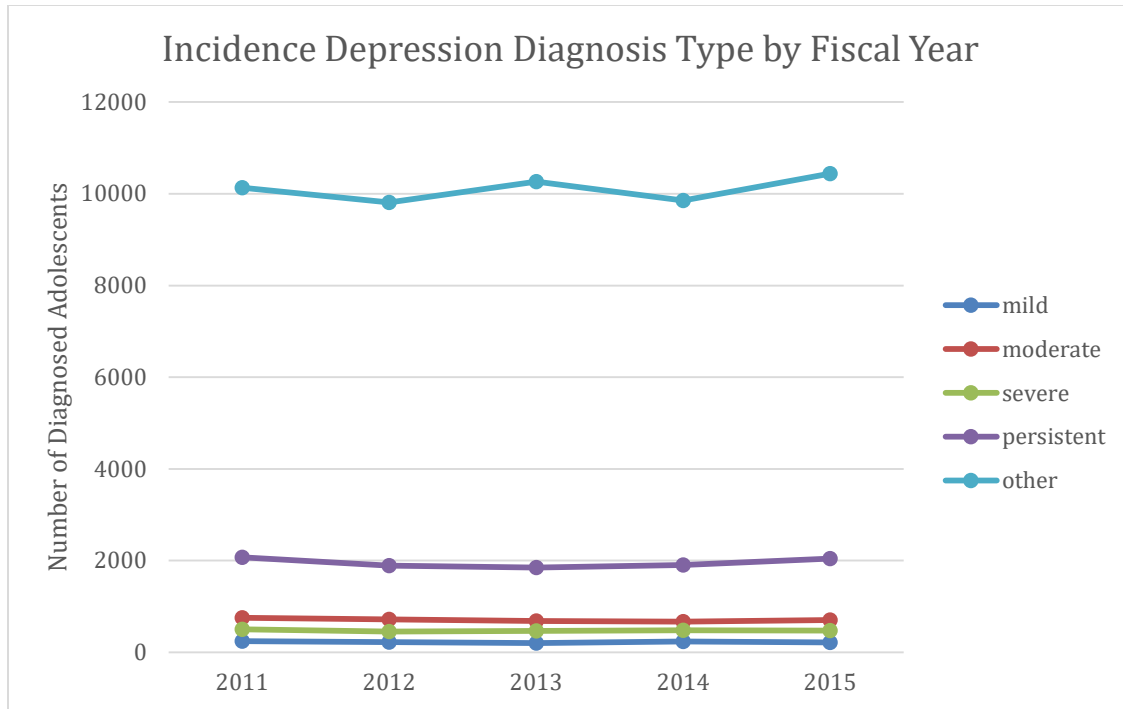


Table 13. Study 2: Multivariate Logistic Regression Results for Treatment Type
n=67,276

	Pharmacotherapy Only OR (95% CI), pvalue	Psychotherapy Only OR (95% CI)	Both Pharmacotherapy & Psychotherapy OR (95% CI)	No Therapy OR (95% CI)
Age				
13	0.70 (0.66-0.75), <.0001*	1.41 (1.32-1.50), <.0001*	0.65 (0.60-0.71), <.0001*	1.22 (1.15-1.29), <.0001*
14	0.56 (0.53-0.60), <.0001*	1.75 (1.65-1.87), <.0001*	0.95 (0.87-1.02), .1674	0.98 (0.93-1.04), .5247
15	0.58 (0.54-0.62), <.0001*	1.81 (1.70-1.92), <.0001*	1.02 (0.95-1.10), .5530	0.89 (0.84-0.95), .0001*
16	0.63 (0.59-0.67), <.0001*	1.66 (1.56-1.76), <.0001*	1.00 (0.93-1.08), .9267	0.93 (0.88-0.99), .0157*
17	0.78 (0.73-0.83), <.0001*	1.44 (1.35-1.54), <.0001*	0.98 (0.91-1.06), .6900	0.92 (0.86-0.97), .0032*
18 (ref)	-	-	-	-
Sex				
Male (ref)	-	-	-	-
Female	1.15 (1.11-1.20), <.0001*	1.05 (1.01-1.08), .0107*	1.35 (1.29-1.42), <.0001*	0.75 (0.72-0.77), <.0001*
Race				

White (ref)	-	-	-	-
Asian/Pacific Islander	0.86 (0.79-0.94), .0005*	1.09 (1.01-1.17), .0280*	1.00 (0.91-1.10), .9256	1.03 (0.96-1.11), .3764
African American	0.59 (0.56-0.63), <.0001*	1.26 (1.20-1.32), <.0001*	0.69 (0.64-0.74), <.0001*	1.35 (1.29-1.41), <.0001*
American Indian/Alaskan Native	0.88 (0.73-1.06), .1684	0.99 (0.84-1.17), .8935	1.14 (0.93-1.40), .2196	1.04 (0.88-1.21), .6712
Other	0.77 (0.71-0.84), <.0001*	1.18 (1.09-1.27), <.0001*	0.93 (0.84-1.03), .1488	1.08 (1.00-1.16), .0480
Depression Diagnosis				
Mild (ref)	-	-	-	-
Moderate	1.56 (1.29-1.89), <.0001*	0.70 (0.61-0.80), <.0001*	2.07 (1.65-2.60), <.0001*	0.78 (0.67-0.90), .0007*
Severe	2.15 (1.76-2.62), <.0001*	0.46 (0.39-0.53), <.0001*	3.47 (2.76-4.35), <.0001*	0.63 (0.54-0.74), <.0001*
Persistent	1.62 (1.36-1.95), <.0001*	0.61 (0.54-0.69), <.0001*	1.28 (1.03-1.59), .0264*	1.14 (1.00-1.30), .0503
Other/Unspecified	1.73 (1.46-2.07), <.0001*	0.51 (0.45-0.58), <.0001*	1.49 (1.21-1.84), .0002*	1.20 (1.06-1.36), .0050*
Care Setting of Diagnosis				
Direct Care (ref)	-	-	-	-
Purchased Care	0.88 (0.84-0.92), <.0001*	1.13 (1.09-1.17), <.0001*	0.66 (0.63-0.69), <.0001*	1.25 (1.20-1.29), <.0001*

*statistically significant, $p < .05$. OR=odds ratio, CI=confidence interval.

Figure 1. Contributing Factors to Minority Health Disparities

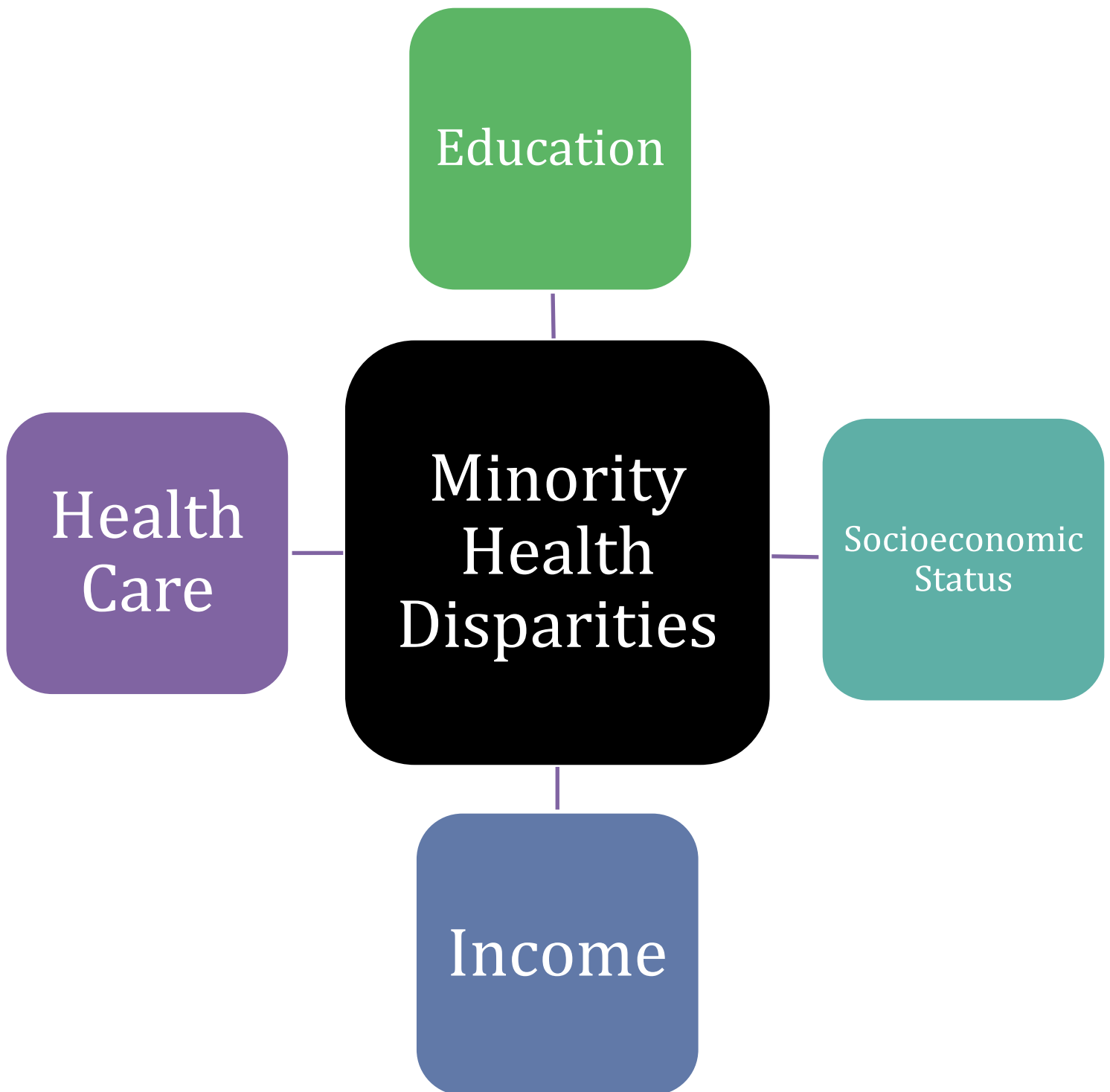


Figure 2. Contributing Factors to Minority Health Care Disparities

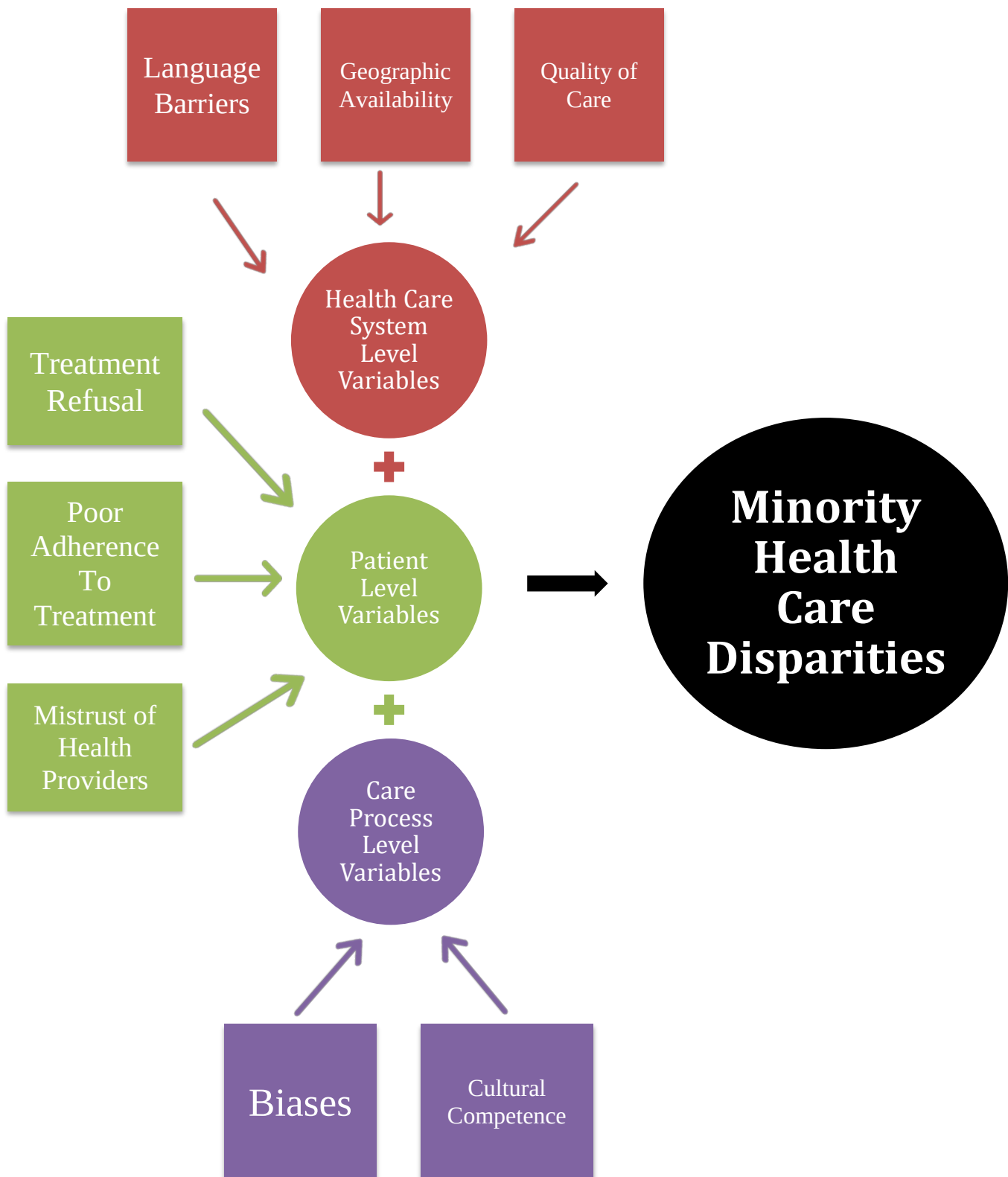
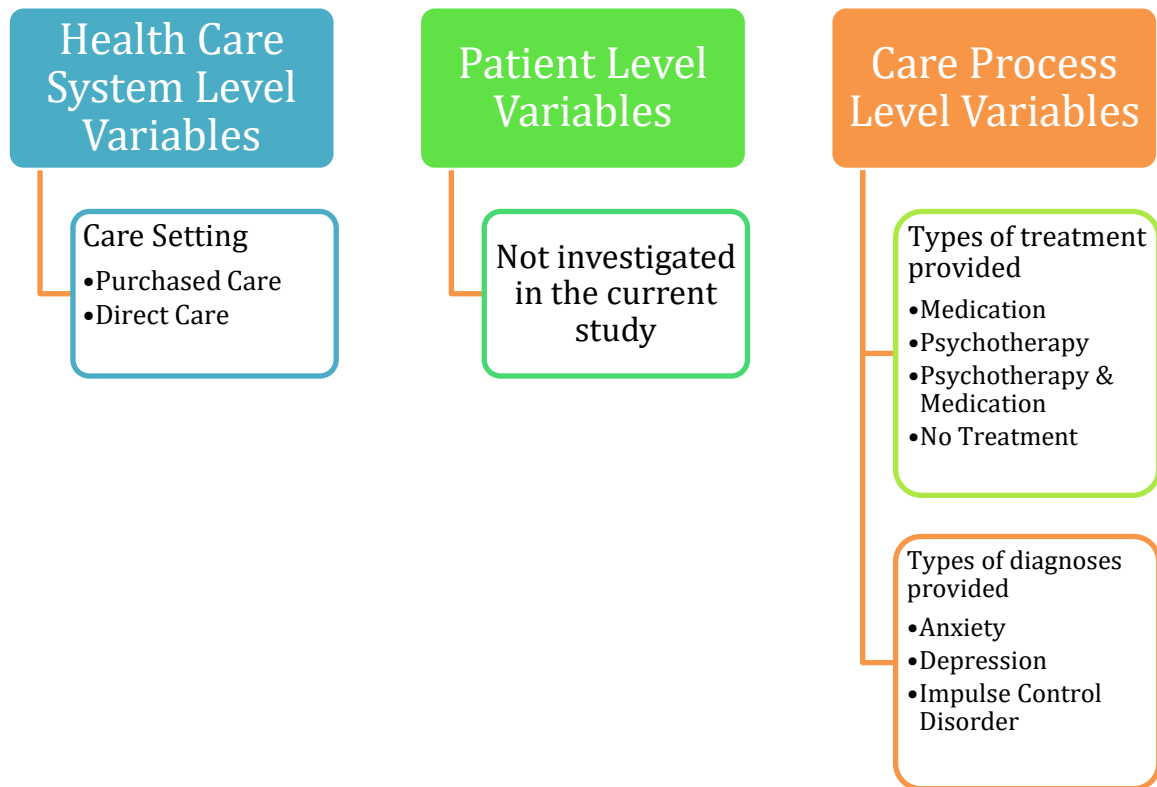


Figure 3. Variables investigated in Study 1 & Study 2



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