Effects of Cannabis Use Among Veterans

Dissertation Manuscript

Submitted to National University

School of Psychology

in Partial Fulfillment of the

Requirements for the Degree of

DOCTOR OF PHILOSOPHY

by

DEMETRIA LASHELLE BLUITT

San Diego, California

December 2025

Abstract

Posttraumatic stress disorder is one of the mental health problems that impact many veterans across the nation. The use of cannabis for medicinal purposes has been growing among the veteran population. The problem to be addressed in this study is cannabis use among veterans who report symptoms of posttraumatic stress disorder. The purpose of the quantitative correlation study is to explore the strength of association between severity of symptoms of posttraumatic stress disorder with frequency of use of cannabis among the veteran population. The theoretical framework for this study was the biopsychosocial model. The study utilized a correlation design to identify the strength of the correlation between cannabis use and symptoms of posttraumatic stress disorder. The target population would be veterans who served during conflicts of the War in Iraq (Operation Iraqi Freedom in 2003-2011 and Operation New Dawn in instruments would be previously validated questionnaire, PTSD Checklist for DSM-5 (PCL-5) with Life Events Checklist for DSM-5 (LEC-5) and Criterion A, as well as the Cannabis Use Disorder Identification Test-Revised (CUDIT-R). Data was collected using the two instruments from 41 veterans, of which 29 of the responses were usable. The descriptive statistics suggest that participants in this study seemed to have elevated levels of cannabis use and larger numbers of PTSD symptoms than in the general population. The findings of the Pearson correlation analysis, Kolmogorov-Smimov test, and Shapiro-Wilk test, all failed to reject the null hypothesis. The results of the data analyses indicated there was a non-significant weak, positive relationship between cannabis use and posttraumatic stress disorder symptoms.

Acknowledgements

I am profoundly grateful to YAHWEH (GOD), Who is the head of my life! YOUR grace, mercy, and love gave me the strength to continue not just this journey but my life's journey. YOU have never wavered in YOUR promise to always be with me. If YOU decide to never do another thing for me, YOU have already done so much that sometimes I cannot believe how blessed I am. I want to thank YOU for the people YOU put into my life.

To my mommy and daddy, Donna, and Charles, you all are the definition of a blessing! YAHWEH broke the mold of parent making when HE gave me the two of you. I am so thankful to have you all in my life, for your constant support, advice, love, and presence has helped motivate me to dream, then turn those dreams into goals, and then those goals into actions. I love you mommy and daddy beyond words. To my brothers and sister, Branden (RIP Pokey), Stayce, Lemarr, and Arthur, having siblings is what prepares one to be out in the world, for you all provide love and support most of the time, but can be a pain in the butt other times. Regardless of anything, I was able to have the best siblings, and I thank you and love you all beyond words. To my nieces and nephews, I pray I can be an inspiration to show you that keeping YAHWEH in your life and knowing who your supports are will make your goals achievable. TeeTee DeeDee loves you.

To those women of Sigma Gamma Rho Sorority, Inc. that I call my friends/sisters, along with those coworkers turned friends, and those friends where no matter how much times goes by, we don't miss a beat when we come together, I thank you for your friendship, and for the inspiration to keep going for what I want in life. I also want to thank all those that have persecuted my name. You all gave me another reason to get closer to YAHWEH and to focus my

attention and energy on those in my life who matter. I forgive you and pray that one day you all will find peace in your lives as well.

To my future husband, I know I will be a handful (in many ways), but I promise you, I am worth it!

I want to thank my chair, subject matter expert, academic reader, and the head of the psychology department. You have been tremendously supportive through all of this, and I will be forever grateful.

This has been an incredible journey, and I am forever grateful to all who have encouraged me to keep going. This achievement belongs to all of us. Shoutout to all the veterans!

-Brainchild did it Pokey!

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction

The use of cannabis has significantly expanded over the past decade amongst adults in United States, doubling from 4% in 2001-2002 to 10% in 2012-2013, to more recently to 13% (Davis et at., 2018), with it being the most widespread illegal substance among the substance use disorders, and among adults being cannabis use disorder, with about 3% of adults in the United States meeting the criteria for the disorder (Ecker et al., 2020). Cannabis had been utilized for various medical and therapeutic uses, dating centuries back to the early 2700 Before the Common Era in Asian countries like India and China (Nelson, 2021). Even with it spreading to other countries across the globe to treat conditions such as pain, poor appetite, menstrual cramps, muscle spasms, insomnia, nausea, seizures, asthma, and depression, with an increasingly acceptance of usage only a few decades ago around the 1990s in the United States of America for similar treatment purposes (Nelson, 2021), it was still associated with comorbidity among various mental health disorders, not just a stand-alone diagnosis.

Combat is one of several occupational situations that the military force population may experience. According to Marini et al. (2020) about 50% to 90% of adults have experienced, at minimum, one distressing situation in their lives in the United States of America, and combat exposure has been a particularly germane event for adults experiencing trauma, given that combat trauma predisposes individuals to various mental health challenges that include substance use, depression, anxiety, posttraumatic stress disorder, and other psychological matters. Unfortunately, among the military population, poor mental health is a central problem and tends to go untreated even after transitioning back into civilian life as a veteran. There are several recognized barriers that may discourage veterans from looking for psychological care (Nichter et al., 2020), such as fear of what others may think about them seeking help, financial

issues surrounding cost of care, or physical issues with getting to and/or from offices to receive care (Cheney et al, 2018). With those that serve being trained to focus on the mottos of "This We'll Defend" (Army), "Semper Fidelis – Always Faithful" (Marine Corp), "Non sibi sed patriae-Not self, but country" and "Semper Fortis – Always Courageous" (unofficial for Navy), "Aim High … Fly-Fight-Win" (Air Force), "Semper Paratus– Always Ready' (Coast Guard), and "Semper Supra – Always Above" (Space Force), the transition back into civilian life can be hard for some. The departure from activated status and transitioning back into civilian life can create a multitude of interconnected problems for new veterans which can include situations like loss of consistent employment, social cohesion loss, identity alterations, housing, and medical benefits, and the production of poor cognitive health and financial stress, which are interrelated with each other (McDaniel et al., 2018). Due to these issues that veterans have been experiencing, turning to cannabis as a form of self-medication seems to be on the rise for this population. After collecting surveys from veterans and non-veterans reporting issues across various biopsychosocial factors, veterans become more likely to use cannabis for mental health conditions like posttraumatic stress disorder and resulting in desirable health outcomes of cannabis use for pain, sleep quality, health conditions, and quality of life (Kang et al., 2021).

According to Livingston et al. (2022), there were about 3 out of 10 cannabis users in many states across the nation that are diagnosed with cannabis use disorder in their lifetime, and the changes of cannabis use disorder amongst veterans has grown in the era after September 11, 2001, with recent reports suggesting that there is a frequency of cannabis use among veterans might be higher compared to nonveterans. The Department of Veteran Affairs (2022) reported that from 2013 to 2018, there was an increase of reported cannabis use among veterans in 2014 from 9% over a year's frame time to 11.9% over a 6-months timeframe usage in 2019-2020, and

over 20% among veterans aged 18-44 in 2019-2020 as well. This group has been disproportionately impacted by situations for which medicinal cannabis treatment was often pursued due to the experiences of greater disability from increased rates of posttraumatic stress disorder, as well as chronic pain being higher than the general population (Turna & MacKillop, 2021). According to Krediet et al. (2020), evidence for efficacy and safety of cannabis is scarce, so their utilization of a focus group among military veterans (N=7) with chronic posttraumatic stress disorder who were treated with medical cannabis, showed that patients using medical cannabis helped managed their symptoms and reported various therapeutic effects that included increased quality of sleep. Bobitt et al. (2022) completed research with a maximum variation sampling (i.e. a sample used to capture the widest range of perspectives possible) of 32 veterans, who completed baseline and follow-up surveys to participate in semi-structured interviews struggling with disabling physical and mental health conditions like posttraumatic stress disorder. Bobitt et al. (2022) found they were using medical cannabis as a harm reduction technique and as an adjunct or substitute for other medications and substances, and how a lack of physician engagement and current Veteran Health Administration policies discourage veterans from discussing and potentially benefiting from the use of medical cannabis.

With the changing nature in legalization of cannabis, it is essential to move forward with studying health correlates with substance abuse of both therapeutic cannabis use and non-medical cannabis use in adults, particularly among subgroups like veterans, that can be affected by the changes in legislations. There are states that have legalized the use of cannabis for everyone over the age of 18 years old in those states, while some states have only legalized cannabis for medicinal purposes. According to Smith et al. (2017) therapeutic cannabis has arisen as a potential conventional treatment option for handling mental health disorders like

posttraumatic stress disorder symptoms when other conventional approaches are ineffective, but the current literature lacks strong proof of effectiveness, particularly among veterans. Betthauser et al. (2015) identified four small studies from a literature search out of 11 articles that suggested that cannabis use was associated with improvements in posttraumatic stress disorder symptoms, with evaluated evidence indicating that substantial numbers of military veterans with posttraumatic stress disorder use cannabis to control symptoms, with some veterans reporting benefits in terms of reduced anxiety, insomnia, and improved coping abilities. With the increase in veterans seeking cannabis as a treatment, looking into whether there is some efficacy for cannabis with mental health disorders can help in better understanding whether them turning to cannabis is something that needs to be considered as a treatment option.

Statement of the Problem

The problem addressed in this study is cannabis use among veterans who report symptoms of posttraumatic stress disorder. Frequent cannabis use was correlated with an increase in a range of risks like sleep deprivation, self-harm, substance abuse and other maladaptive behaviors such as impaired perception, anxiety, and anger (Kimbrel et al., 2018; Hill et al., 2021b; Hill et al., 2021c; Berey et al, 2022). These negative health relationships, such as mental health problems and memory impairment, are especially prominent among veterans, particularly among veterans with a past of suicidal ideation, suicide attempts, and non-suicidal self-injury (Adkisson, 2018; Ecker et al., 2021). With exposure to conflicts and combat, along with more posttraumatic stress disorder symptoms, the growth of recreational cannabis usage among veterans is affecting some veterans (i.e., those with a history of trauma) greater than others (Smith et al., 2017; Davis et al., 2018; Gunn et al., 2019; Bryan et al., 2021; Kearns et al.; 2022). According to Hill et al. (2021a), the prevalence of cannabis use between 2019-2020

amongst veterans was 11.9%, plus was over 20% with veterans from 18 through 44 years old, with rates of cannabis use disorder remaining substantially higher among veterans with co-occurring posttraumatic stress disorder (12.1%) in addition to veterans with further psychiatric and substance abuse difficulties (8.9%-13%). Bryan et al. (2021), Hill et al. (2021b), and Turna and MacKillop (2021) have called for in-depth studies on reasons for risks and benefits of cannabis use, clinical recommendations, and practice guidelines for accessing medical and recreational cannabis, and implementing treatments targeting psychological disorders like posttraumatic stress disorder and substance abuse among the veteran population regardless of trauma history. If this study is not done, benefits and risk of cannabis use and ways to cope with cannabis effects will remain unexplored among veterans.

Purpose of the Study

The purpose of the quantitative correlation study was to quantitate the strength of association between severity of symptoms of posttraumatic stress disorder with frequency of use of cannabis among the veteran population. The study utilized a correlation design to identify the strength of the correlation between cannabis use and indicators of posttraumatic stress disorder. The target population were veterans who served during conflicts of the War in Iraq (Operation Iraqi Freedom in 2003-2011 and Operation New Dawn in 2010-2011) and the War in Afghanistan (Operation Enduring Freedom in 2001-2014). The instruments were previously validated questionnaire, PTSD Checklist for DSM-5 (PCL-5) with Life Events Checklist for DSM-5 (LEC-5) and Criterion A, a self-report measure that assesses the presence and severity of posttraumatic stress disorder symptoms and a measure developed by the U.S. Department of Veteran Affairs National Center for posttraumatic stress disorder (U.S. Department of Veteran Affairs, 2022), as well as the Cannabis Use Disorder Identification Test-Revised (CUDIT-R), an

eight-item measure containing items designed to map criteria for Cannabis Abuse and Dependence and has been validated by the DSM-5 criteria for cannabis use disorder (Loflin, Babson, Browne, & Bonn-Miller, 2018), administered via Qualtrics to the target population. Purposeful sampling was the sampling method utilized. G*power analysis suggests that assuming a framework with at least one predictor, control variable, and dependent variable with an effect size of a small to mid-range and alpha level to 0.05, N=84 was required to detect an effect if it exists. The growing use of cannabis among the veteran population with mental health conditions is something that needs to be examined to better understand what could be happening among veterans for them to utilize cannabis.

Introduction to Theoretical Framework

The theoretical framework for this study was the biopsychosocial model, developed in the 1970s primarily by Dr. George Engel to address health problems from a multifactorial approach (Krantz, Suls, & Williams, 2013). The biopsychosocial model is a method that became part of the norm within medicine where professionals are trained to observe social, psychological, and biological influences (Purdy, 2022). This is done when diagnosing and treating different kinds of health issues, observing all social, biological, and psychological influences on the health of humans and the ability of the human body to respond to and recover from countless physical and psychological diseases that include posttraumatic stress disorder (Purdy, 2022). The biopsychosocial model is a valuable tool used by physicians as a means of understanding biological, psychological, and social impacts on a person's health, with every medical disorder or symptom complex being influenced by a person's biological, psychological, and social factors (Purdy, 2022). These key principles to the biopsychosocial model will help guide data analysis since the instruments being utilized (Cannabis Use Disorder Identification

Test-Revised and the PTSD Checklist for DSM-5 with Life Events Checklist for DSM-5 and Criterion A) has indicators that look at biological (i.e. genetics, physical health, and stress responses), psychological (i.e. emotions, trauma, and perceptions), and social (i.e. interpersonal relationships, norms, and work) factors. According to Moring et al. (2022), the biopsychosocial model incorporates behaviors, emotions, cognitions, cultural values, social support, and socioeconomic status as biomedical psychological distress and health-related issues, as well as illustrating that chronic health conditions are exacerbated or maintained by psychiatric distress, therefore, alleviation of such psychiatric distress can have beneficial impacts on health conditions. Even pain has been a strong predictor of substance use, even after adjusting military status and other biopsychosocial factors within studies (Kang et al., 2021). The use of the multidisciplinary approach to various mental health problems like posttraumatic stress disorder, is significant because symptoms associated to combat experiences are comparatively intricate and are not fully understood by clinicians or other professionals due to the constant adjustments that are made to the definitions of disorders to capture the most current research findings and clarifications found from medical research (Damir & Toader, 2015).

Further examination is required to report cannabis usage as a method for treatment for managing posttraumatic stress disorder to figure out the biopsychosocial model disciplines and how each contributes to the effectiveness of the method (Damir & Toader, 2015) to understand the stressful and unwelcomed experiences and feelings associated with combat that veterans may gone through. With the biopsychosocial model providing philosophical ways of understanding how suffering, disease, and illness are affected by multiple societal levels to molecular levels, as well as the practice level as a way to understand a patient's subjective experience as an essential contributor to acute diagnosis, health outcomes, and human care, with practice pillars of self-

awareness, active cultivation of trust, emotional style characterized by empathic curiosity, self-calibration as a way to reduce bias, education of emotions to assist with diagnosis and forming therapeutic relationships, use of informed intuition, and communicating clinical evidence to foster dialogue (Borrell-Carrio, Suchman, & Epstein, 2004), it would be the greatest method when directing further research on the effectiveness of cannabis on indicators that arise from posttraumatic stress disorder, as the current literature presents overall indecisiveness and there is an absence of clarification within the literature suggestions that have not provided clear directions on whether the treatment approach is harmful or beneficial (Eisenstein, 2015).

Introduction to Research Methodology and Design (Nature of the Study)

The study utilized a correlational design to analyze the strength of relationship between severity of symptoms of posttraumatic stress disorder with frequency of usage of cannabis among veterans. The correlational design method was appropriate to use because it involves looking for a relationship between one independent variables (frequency of cannabis use) and one dependent variable (severity of symptoms of posttraumatic stress disorder) and bivariate Pearson Correlation to ensure data meets statistical assumptions to reveal associations among continuous variables. The technique helped in understanding the likelihood of two instances relating to each other (Lau, 2017). The study was a non-experimental, meaning there was no manipulation or controlling of the independent and dependent variables (Glasofer, & Townsend, 2020), and controlling variables, age, sex, educational level, time in service, and ethnicity, as well as managing inaccurate, inconsistent, missing, and duplicate data for data quality is key. Not doing so poses threats to cultivating trustworthy data sets and will mitigate data quality challenges that lead to inaccurate or misleading analytic results.

The instruments utilized would be the Cannabis Use Disorder Identification Test-Revised (CUDIT-R), an eight-item measure containing items designed to map criteria for Cannabis Abuse and Dependence and has been validated by the DSM-5 criteria for cannabis use disorder (Loflin, Babson, Browne, & Bonn-Miller, 2018) and the PTSD Checklist for DSM-5 (PCL-5) with Life Events Checklist for DSM-5 (LEC-5) and Criterion A, which is a measure developed by the U.S. Department of Veteran Affairs National Center for posttraumatic stress disorder in accordance with the American Psychological Association's ethical guidelines (U.S. Department of Veteran Affairs, 2022), allowing for more participation in the study to collect a larger number of data in a shorter amount of time. Recruiting participants included utilizing social media, online flyers, and other means of communication to gather veterans to be included in the sample. Recruiting veterans that served during the conflicts of the War in Iraq and the War in Afghanistan may provide some insight about cannabis use in the United States increasing from 4% in 2001-2002 to 10% in 2012-2013 (Davis et at., 2018). Veterans were recruited in the Fort Hood surrounding areas but not limited to this area. Sociodemographic characteristics was gathered to control any confounding variables that might interfere with data.

Research Question

The research question that guided this study was*:*

RQ:

What is the strength and direction of the relationship between frequency of cannabis use and presence of symptoms of posttraumatic stress disorder among veterans? The null hypotheses was:

H_0: There is no statistically significant relationship between symptoms of posttraumatic stress and cannabis use.

The alternative hypothesis was:

H_a: There is a statistically significant relationship between symptoms of posttraumatic stress and cannabis use.

Significance of the Study

Current literature mostly paints pictures of how an individual's mental health and physical health can begin to deteriorate from cannabis usage over time. According to Adkisson et al. (2022), the "frequent encounters with an array of combat experiences increase risk of mental health problems, increasing posttraumatic stress disorder, depression, and anxiety, so with the emerging research suggesting that the use of cannabis compared to the rest of the substances may be associated with increased risk for suicide attempts among veterans" (Adkisson et al., 2018, p. 687). This provided a report of veterans using cannabis to deal with post-deployment mental health issues with the paradoxical effect of increasing veterans' risk for suicidal behaviors with cannabis dependence. However, even with so much of the literature provided discussing the negative impact that cannabis use can have on mental and physical health, some veterans have a different opinion on its effects for mental health problems. Smith et al. (2017) believed that posttraumatic stress disorder has unpleasant symptoms related to traumatic events and those symptoms are usually treated with pharmacotherapy and psychotherapy. However, veterans have been using medicinal cannabis after unsuccessful pharmacotherapy and psychotherapy treatments (Smith et al., 2017). There is little literature out there that tries to discuss therapeutic benefits of cannabis use. Most of the information out there centers around the issues that cannabis use presents for various mental health problems among veterans, but the increase in usage among this population seems to be continuously increasing. As cannabis usage continues

to increase, it is important to find out if there are any therapeutic benefits of cannabis use among the veteran population.

Definitions of Key Terms

Cannabis

Cannabis is a psychoactive herb derived from the hemp plant and can be consumed via cannabis-based extracts, smoking, vaporization, oral, and sublingual or mucosal routes (Warf, 2014). Cannabis and its constituent cannabinoids, such as THC (delta-9 tetrahydrocannabinol), have long been used for medicinal purposes due to reported analgesic, muscle relaxant, and other effects (Nelson, 2022).

Combat (trauma) stress

Common response to mental and emotional strain that can result from dangerous and traumatic experiences, being a natural reaction to the wear and tear of the body and mind after military operations (Military One Source, 2022).

Posttraumatic Stress Disorder (PTSD)

A psychiatric disorder that may occur in individuals who have experienced or witnessed a traumatic event, series of events or set of circumstances, and that individual may experience this as emotionally or physically harmful or life-threatening and may affect mental, physical, social, and/or spiritual well-being (American Psychiatric Association, 2023).

Summary

Cannabis use has significantly expanded over the past decade among adults in the United States (Davis et at., 2018). Frequent cannabis use is correlated with an increase in a range of risks like sleep deprivation, self-harm, substance abuse and other maladaptive behaviors such as anxiety, anger, and increased stress (Kimbrel et al., 2018; Hill et al., 2021b; Hill et al., 2021c;

Berey et al., 2022). Negative health relationships have been prominent among veterans, particularly among those with a past of suicidal ideation, suicide attempts, and non-suicidal self-injury (Adkisson, 2018; Eckers et al., 2021). Therapeutic cannabis has arisen as a potential conventional treatment option for handling mental health disorders like posttraumatic stress disorder symptoms when other conventional approaches are ineffective (Smith et al., 2017). In-depth studies on reasons for risks and benefits of cannabis use, clinical recommendations, and practice guidelines for accessing medical and recreational cannabis, and implementing treatments targeting psychological disorders like posttraumatic stress disorder and substance abuse among the veteran population regardless of trauma history (Bryan et al., 2021; Hill et al., 2021c; Turna & MacKillop, 2021). According to Damir and Toader (2015), further examination is required to report cannabis usage as a method for treatment for managing posttraumatic stress disorder to understand the stressful and unwelcomed experiences and feeling associated with combat that veterans may have gone through.

Chapter 2: Literature Review

The purpose of the quantitative correlation study was to quantitate the strength of association between severity of symptoms of posttraumatic stress disorder with frequency of use of cannabis among the veteran population. The problem addressed in this study was cannabis use among veterans who report having posttraumatic stress disorder. An integrated literature review was conducted to explore the perceptions of cannabis use among veterans who have experienced stressful symptoms related to combat trauma and posttraumatic stress disorder.

A search within electronic databases of psychology and pharmacology library journals, such as EBSCOhost Databases and APA PsycArticles, were utilized to further explore this topic. The keywords used to search for articles consisted of posttraumatic stress disorder, PTSD, veterans, cannabis, trauma, and biopsychosocial model. The remainder of this chapter provides information regarding material pertaining to certain themes associated with the veterans, cannabis, and posttraumatic stress disorder. The literature review was organized by themes related to the research topic. First the relevance of the theoretical framework adopted to guide the study was elucidated. Next, a discussion on posttraumatic stress disorder among veterans, then the taxonomy pharmacology along with the brain effects of cannabis, cannabis use in the United States, and then finally, the bulk of the chapter covered cannabis use among veterans as well as its mental health effects in veterans and therapies and treatments for cannabis dependency.

Theoretical Framework

The theoretical framework for this study was the biopsychosocial model. According to Pilgram (2015), George Engel argued that some disease states are multi-determined and may result from biological, psychological, or social processes in variable forms of interactions, but did not provide a formal definition of the biopsychosocial model. During the time of Pilgram's

explanation of the history of the biopsychosocial model, the model was defined as a general approach stating that biological, psychological, and social factors all play a significant role in human functioning in the context of disease or illness (Lugg, 2022). The biopsychosocial model of health and disease was proposed in the 1970s primarily by Dr. George L. Engel in order to address health problems from a multifactorial approach (Krantz, Suls, & Williams, 2013), where he believed that a crisis within modern medicine a merged due to the scientifically limits and clinicians seeming insensitive to the psychological features of patients and their biographical backgrounds (Pilgram, 2015). The model postulates that psychological and social variables significantly influence biological systems and vice versa. The biopsychosocial model is a method that has become part of medicine where professionals are trained to observe social, psychological, and biological influences (Purdy, 2022). This is done when diagnosing and treating different kinds of health issues, observing all social, biological, and psychological influences on the health of humans and the ability of the human body to respond to and recover from countless physical and psychological diseases that include posttraumatic stress disorder (Purdy, 2022). This model allows for the fact that the interaction of the body, mind, and environment all affect each other in diverse ways.

The etiological complexity of psychiatric disorders has made it difficult to impossible to explain their causation through a single explanation, given that pharmacological mechanisms targeting neurotransmitters in the brain can help counter imbalances for some psychological disorders, but in spite adequate and rational treatments being provided, there still might not be noticeable improvements with individuals if there are ongoing psychosocial stressors (Tripathi et al., 2019). The biopsychosocial model is an important tool to be used by physicians as a means of understanding biological, psychological, and social impacts on a person’s health, with every

medical disorder or symptom complex being influenced by a person's biological, psychological, and social factors (Purdy, 2022). According to Moring et al. (2022), the biopsychosocial model incorporates behaviors, emotions, cognitions, cultural values, social support, and socioeconomic status as biomedical psychological distress and health-related issues, as well as illustrating that chronic health conditions are exacerbated or maintained by psychiatric distress, therefore, alleviation of such psychiatric distress can have beneficial impacts on health conditions. The breakdown of each of the three factors within the biopsychosocial model will help in understanding the impact of each to one's health.

Biological influences are mainly an individual's genetic and family history, which can relate to a history of trauma or illness since many psychological disorders have a hereditary component, but other factors must also be involved since family members with a mental illness does not automatically mean the inheritance of that illness (Kostic et al., 2022). The psychological component looks for the cause of either a singular symptom or a combination of symptoms where individuals with a predisposition or genetic vulnerabilities are at a higher risk for developing psychological issues, however, one with a mental illness does not correlate with direct health problems but someone dealing with health problems could cause psychological distress (Giusti et al., 2022). Social influences include a wide range of social factors, in which taxing life events could be the social push that causes psychological distress to create physical or biological health problems that would exacerbate an individual's health issues (Gagliese et al., 2018). Pilgram (2015) stated "Once we begin to open the social complexity of illness behavior, with all its contingencies of human agents embedded in interpersonal settings, then we find that ontological arguments about the generative mechanisms of disease are not the only matter for health researchers." (Pilgram, 2015, p. 171). Pilgram (2015) explained that if prescribing

medications were effective, then the expectation that the prevalence of diagnosed mental illness would decline, however, the reverse has occurred with the more psychopharmaceutical solutions being offered for psychosocial misery, the more the latter has been recorded as mental illness. The use of the multidisciplinary approach to various mental health problems like posttraumatic stress disorder, is significant because symptoms associated to combat experiences are comparatively intricate and are not fully understood by clinicians or other professionals due to the constant adjustments that are made to the definitions of disorders to capture the most current research findings and clarifications found from medical research (Damir & Toader, 2015).

According to Fava and Sonino (2008), almost all of health care spending is directed at biomedically oriented care, while half of the deaths that take place in the United States can be attributed to largely preventable behaviors and exposures, with risk factors for health are almost always normally distributed and supported a population approach to prevention instead of targeting those at the highest risk. The biopsychosocial model provides multi-faceted ways of understanding how suffering, disease, and illness are affected by multiple societal levels to molecular levels, as well as the practice level as a way to understand a patient's subjective experience as an essential contributor to acute diagnosis, health outcomes, and human care, with practice pillars of self-awareness, active cultivation of trust, emotional style characterized by empathic curiosity, self-calibration as a way to reduce bias, education of emotions to assist with diagnosis and forming therapeutic relationships, use of informed intuition, and communicating clinical evidence to foster dialogue (Borrell-Carrio, Suchman, & Epstein, 2004). Dr. George L. Engel stated 30 years ago "…nothing will change unless or until those who control resources have the wisdom to venture off the beaten path of exclusive reliance on biomedicine as the only approach to health care" (Fava & Sonino, 2008, p. 2).

According to Maguire et al. (2021), for several disorders, the biopsychosocial model has provided a promise to better define the disorder and improve patient outcomes for disorders like depression and dementia, however, with the application in posttraumatic stress disorder, it has been limited due to the challenges faced with posttraumatic stress disorder diagnostic process with high rates of depression and anxiety disorder due to comorbidity. Posttraumatic stress disorder tends to manifest following direct or indirect exposure to actual or threatened death, serious injury, or sexual violence, but can also be triggered by natural disasters, war, domestic violence, violent crime, accidents, and medical procedures creating persistent difficulties that negatively impact an individual's social interaction, capacity to work or other area of functioning (Piotrowski & Range, 2022).

Dating back to World War I after soldiers had intense anxiety reactions to the horrors experienced, posttraumatic stress disorder was observed but called neurosis, shell shock, or battle fatigue, then formally diagnosed as an anxiety-based personality disorder in the 1960s among Vietnam War veterans (Piotrowski & Range, 2022). According to Piotrowski and Range (2022), negative impacts to the natural recovery from trauma to the intricate connections between memory and processes such as sleep and learning pathways, links between increased risk for stressors and disorders like dementia and having poor social support after a traumatic experience are a major risk factor for the development of posttraumatic stress disorder. According to Kang et al. (2021) veterans may experience injuries that result in chronic pain and mental health conditions, so veterans have turns to medical cannabis for various conditions. In stress recovery, the highlighting of interconnectedness of intrapersonal and interpersonal coping processes could provide insight between biological and cognitive stress responses (Calhoun et al., 2022). Also, the incorporation of biomarkers, psychological criteria and social factors may be able to improve

posttraumatic stress disorder identification, diagnosis, and treatment management (Maguire et al., 2021). However, professionals proceed in providing the connection, it has been clear that biological, psychological, and social factors all play roles in posttraumatic stress disorder development.

For this section, the biopsychosocial model was discussed and how the possible connection between biological, psychological, and social factors could play a role in the development of posttraumatic stress disorders. Section concluded with discussion about biopsychosocial factors playing a role in PTSD development. In the next section, posttraumatic stress disorder among veterans will be discussed.

Posttraumatic Stress Disorder among Veterans

Posttraumatic stress disorder was defined as "a psychiatric disorder that may occur in people who have experienced or witnessed a traumatic event, series of events or set of circumstances" (American Psychiatric Association, 2022, p. 301). Posttraumatic stress disorder symptoms that make up the criteria are divided into four main symptoms listed in the *Diagnostic and Statistical Manual for Mental Disorders,* 5th edition, text revision (DSM-5-TR). According to the *DSM-5-TR*, the key feature of posttraumatic stress disorder is the development of specific symptoms following the exposure to one or more traumatic events. The *DSM-5-TR* criteria for posttraumatic stress disorder that apply to adults, adolescents, and children older than six years of age are as follows (American Psychiatric Association, 2022):

A. A person has exposure to actual or threatened death, serious injury, or sexual violence in one (or more) of the following ways:
    1. Directly experiencing the traumatic event(s).
    2. Witnessing, in person, the event(s) as it occurred to others.

3. Learning that the traumatic event(s) occurred to a close family member or close friend. In cases of actual or threatened death of a family member or friend, the event(s) must have been violent or accidental.
4. Experiencing repeated or extreme exposure to aversive details of the traumatic event(s) (e.g., first responders collecting human remains; police officers repeatedly exposed to details of child abuse). However, criterion A4 does not apply to exposure through electronic media, television, movies, or pictures, unless this exposure is work related.

B. A person has the presence of one (or more) of the following intrusion symptoms associated with the traumatic event(s), beginning after the traumatic event(s) occurred:
    1. Recurrent, involuntary, and intrusive distressing memories of the traumatic event(s). It should be noted in children older than 6 years; repetitive play may occur in which themes or aspects of the traumatic event(s) are expressed.
    2. Recurrent distressing dreams in which the content and/or effect of the dream are related to the traumatic event(s). It should be noted that in children, there may be frightening dreams without recognizable content.
    3. Dissociative reactions (e.g., flashbacks) in which the individual feels or acts as if the traumatic event(s) were recurring. (Such reactions may occur on a continuum, with the most extreme expression being a complete loss of awareness of present surroundings.) It should be noted that in children, trauma-specific reenactment may occur in play.
    4. Intense or prolonged psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).

5. Marked physiological reactions to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).

C. A person has persistent avoidance of stimuli associated with the traumatic event(s), beginning after the traumatic event(s) occurred, as evidenced by one or both of the following:
    1. Avoidance of or efforts to avoid distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).
    2. Avoidance of or efforts to avoid external reminders (people, places, conversations, activities, objects, situations) that arouse distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).

D. A person has negative alterations in cognitions and mood associated with the traumatic event(s), beginning, or worsening after the traumatic event(s) occurred, as evidenced by two (or more) of the following:
    1. Inability to remember an important aspect of the traumatic event(s) (typically due to dissociative amnesia, and not to other factors such as head injury, alcohol, or drugs).
    2. Persistent and exaggerated negative beliefs or expectations about oneself, others, or the world (e.g., "I am bad," "No one can be trusted," "The world is completely dangerous," "My whole nervous system is permanently ruined").
    3. Persistent, distorted cognitions about the cause or consequences of the traumatic event(s) that lead the individual to blame himself/herself or others.
    4. Persistent negative emotional state (e.g., fear, horror, anger, guilt, or shame).
    5. Markedly diminished interest or participation in significant activities.

6. Feelings of detachment or estrangement from others.
7. Persistent inability to experience positive emotions (e.g., inability to experience happiness, satisfaction, or loving feelings).

E. A person has marked alterations in arousal and reactivity associated with the traumatic event(s), beginning, or worsening after the traumatic event(s) occurred, as evidenced by two (or more) of the following:
   1. Irritable behavior and angry outbursts (with little or no provocation), typically expressed as verbal or physical aggression toward people or objects.
   2. Reckless or self-destructive behavior.
   3. Hypervigilance.
   4. Exaggerated startle response.
   5. Problems with concentration.
   6. Sleep disturbance (e.g., difficulty falling or staying asleep or restless sleep).

F. A person has a duration of the disturbance (Criteria B, C, D and E) is more than 1 month.

G. A person who has the disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

H. A person has the disturbance is not attributable to the physiological effects of a substance (e.g., medication, alcohol) or another medical condition.

The criteria have specification with dissociative symptoms where the individual's symptoms meet the criteria for posttraumatic stress disorder, and in addition, in response to the stressor, the individual experiences persistent or recurrent symptoms of either of the following:

1. Depersonalization**:** Persistent or recurrent experiences of feeling detached from, and as if one were an outside observer of, one's mental processes or body (e.g., feeling as though

one were in a dream; feeling a sense of unreality of self or body or of time moving slowly).

2. Derealization**:** Persistent or recurrent experiences of unreality of surroundings (e.g., the world around the individual is experienced as unreal, dreamlike, distant, or distorted). It should be noted to use this subtype, the dissociative symptoms must not be attributable to the physiological effects of a substance (e.g., blackouts, behavior during alcohol intoxication) or another medical condition (e.g., complex partial seizures).

The criteria have specifications with delayed expression if the full diagnostic criteria are not met until at least 6 months after the event (American Psychiatric Association, 2022). An individual does not have to experience all the symptoms listed to meet the diagnostic criteria for posttraumatic stress disorder. Just the presence of one or more of the intrusion symptoms associated with the traumatic event or events, beginning after the occurrence of the traumatic event or events.

Those serving in the military are exposed to various traumatic events due to the life-threatening situations, injuries, and accidents that combat can create. Service members are at risk of things such as death, injury, may see people hurt or killed, may have to kill or wound others, and must be on alert around the clock (U.S. Department of Veteran Affairs, 2023), which may increase their chances of having mental health problems including posttraumatic stress disorder. These problems can follow service members as they transition back into civilian life as veterans.

For example: “Drugged and raped,” “Being followed by Russian and Chinese navy’s out to sea. Had nightmares daily. My ship being publicly threatened by North Korean and President Trump sent us back to Korea to call his bluff. We all tried to be focused and trained 24hrs a day preparing to be attacked. Nightmares, shakes and panic attacks,” “Someone dropped a grenade in

front of me," "Combat zone," "Suicides from friends that were service members" are actual responses from a few of the participants within this study, responding to part 2 of the PTSD checklist for DSM-5 with Life Event Checklist for DSM-5 that asked about stressful events (discussion of findings is found in Chapter 4). The veteran population have gone through unimaginable situations in their lives, with them focusing on treatments that seem to help them cope with those situations. There are studies that support the proposition that a prolonged trauma of served interpersonal intensity such as war is related to high rates of complex posttraumatic stress disorder among veterans that are seeking treatment even years after war (Letica-Crepuljaa et al., 2020). According to the U.S. Department of Veteran Affairs (2023), posttraumatic stress disorder is slightly more common among veterans compared to civilians, with 7 out of every 100 veterans having posttraumatic stress disorder at some point in their lives. Due to the overwhelming numbers of veterans that do not use VA health care, those with posttraumatic stress disorder could be more common. One study found that 23 out of 100 veterans that use VA care have posttraumatic stress disorder in their lives compared to the 7 out of 100 veterans who do not use VA health care that reported symptoms (U.S. Department of Veterans Affair, 2023).

Individuals can develop posttraumatic stress disorder after suffering or observing life-threatening events such as combat, sexual assaults, natural disasters, or accidents. According to Escarfullei et al. (2021), posttraumatic stress disorder is associated with the premature onset of chronic health conditions. The symptoms associated with posttraumatic stress disorder not only have an impact on health but also on relationships. The mental health burden of posttraumatic stress disorder among veterans can challenge the protective factors that social support can provide in their lives when those symptoms are not addressed (Blais et al., 2021). The impact of these symptoms on veterans' health and the interpersonal dynamics in their lives implores the

need for treatment to help. For this section, posttraumatic stress disorder among veterans was discussed. The section concluded with discussion about the impact of PTSD symptoms on the lives of veterans. In the next section, the taxonomy and pharmacology of cannabis will be discussed.

Taxonomy and Pharmacology of Cannabis

Modern taxonomy of the cannabis plant comes from Carl Linnaeus in 1753, who invented the naming system for organisms (Harmon, 2023). Cannabis is a genus plant that includes the species Cannabis sativa, Cannabis indica, and Cannabis ruderalis, that have green, thin stems, and branch off into five to seven finger shaped leaves with small green flowers that grow in clusters (Harmon, 2023). It can be traced back to ancient times in the Central Asian steppe on into the nineteenth century, where physician William O'Shaughnessy delivered a report about cannabis to a medical group, calling it by its Indian name of gunja and described its medical effects it had on individuals (Patton, 2020).

The effects that cannabis has on an individual can vary based on the way it is administered. Cannabis can be administered orally, transdermal, or inhaled, with the cannabinoids in the cannabis activating the neurotransmitters in the body (Harmon, 2023). This, in turns, activates endogenous cannabinoid receptors that modulate a neurotransmitter release that produces a range of effects on the central nervous system, that includes modification of memory processes and an increase in pleasure, and can potentially have long-term effects on physical and mental health (Caffery, 2023). All of which can contribute to the pharmacologic method of reasoning for the utilization of cannabinoids in the managing the three-core posttraumatic stress disorder symptom groups: hyperarousal, numbing, and avoidance (Hale et al., 2021).

The various terminology used to describe cannabis is important to notate because it signals to the social stigma that is associated with it. While cannabis is the genus term, the common use of the leaves of the plant when smoked as the drug marijuana but also known as pot or weed. Language that is used to describe cannabis has evolved over time, with words accompanied by the evolution of its use, all based on the culture and period, so given the changing landscape, it is important to continue to study the demographic usage (Davis et al., 2018) since the languages that each cultures has brought has combined over time to form new words that may not be known so one can understand that what is being discussed is cannabis.

For this section, the modern taxonomy, effects of cannabis and various terminology of cannabis was discussed. Section concluded with discussion about the language used to describe cannabis. In the next section, the negative effects of cannabis use will be discussed.

Negative effects of cannabis use

A classification for drugs, substances, and chemicals was created by the Comprehensive Drug Abuse Prevention and Control Act of 1970, with Schedule I substances being considered to have no accepted medical value and present a high potential for abuse. Cannabis was classified in 1970 as a Schedule I substance, prohibiting practitioners from prescribing cannabis and prohibiting most research from using cannabis except under rigorous oversight from the National Instituted of Drug Abuse (Russell, Cahill, & Duderstadt, 2019). According to the National Survey on Drug Use and Health, cannabis is one of the most used drugs in the United States, with reports from 2021 stating that 61.2 million people (or 21.9% of the population) used illicit drugs with cannabis being the most commonly used with 52.5 million people using (U.S. Department of Health and Human Services, 2023).

Rates of the use of cannabis also appear to be on the rise among certain age groups. The Monitoring the Future survey in 2019 that tracks substance use patterns among the nation's youth, reported daily cannabis use increasing among children in the 8th grade and 10th grade relative to 2018 (National Institute on Drug Abuse, 2019). Additionally, trends of vaping cannabis had significantly increase in the past year among 8th graders, 10th graders, and 12th graders, with 12th graders explaining that some of the most common reasons for vaping included experimentation, enjoyable flavors, having an enjoyable time with friends and a way to relax and relieve tension (National Institute on Drug Abuse, 2019).

From the statistics of the National Survey of Drug Use and Health, reported that 35.4% of young adults aged 18 to 25 (11.8 million people) reported using cannabis in the past year (U.S. Department of Health and Human Services, 2023). There has also been a noticeable increase in cannabis used among older adults aged 50 and over. According to Lloyd and Striley (2018), the older adult population in the United States will dramatically increase in the upcoming decade. The older adults are now representing the largest growing population of cannabis consumers (Lloyd & Striley, 2018). Han and Palamar (2018) reported an increase in cannabis use among adults aged 50-64 and older increased 57.8% and 250% for adults 65 and older. Han et al. (2021) showed in their study that recent data indicated that the past years rate of cannabis use in individuals 65 and older rose significantly between 2015-2018 from 2.4%. to 4.2%, representing a 75% increase in cannabis use among those in this age group. The rapid increase in rates for this age group could, in some part, be due to higher rates in chronic medical disorders that include pain, insomnia, disturbances, and mood, as well as the increase in popularity for medical cannabis and its availability.

The National Institute on Drug Abuse (2019) reported that cannabis has both short-term effects on the brain, as well as long-term effect. For short-term effects, delat-9-tetrahydrocannabinol (THC) is typically the most abundant phytocannabinoid found in cannabis plants and is responsible for the intoxicating effects of cannabis that quickly passes from the lungs into the bloodstream, carrying the chemical to the brain (as well as other organs throughout the body) in order to activate parts that contain the highest number of receptors to cause a "high" people feels as well as: altering senses (i.e., seeing bright colors); altering sense of time; changing one's mood; impaired movements in the body; difficulties thinking and problem-solving; impairing memory; hallucinations with high dosages; delusions with high dosages; psychosis being the highest risk with use. Long-term effect of cannabis affects brain development, impairing thinking, memory, and learning functions when usage starts at an early age (National Institute of Drug Abuse, 2019).

Cannabis use may also cause a range of effects on physical health that include: breathing problems, increased heart rate, problems with child development during and after pregnancy, intense nausea and vomiting; and mental health that include: temporary hallucinations, temporary paranoia, worsening symptoms in patients with schizophrenia, and has been linked to other mental health problems like depression, anxiety, and suicidal thought (National Institute of Drug Abuse, 2019). According to Bigand et al. (2019), physiological concerns were defined in their study where they examined the perceived effects of cannabis among adults who were prescribed opioids for persistent pain. It was found that negative physical influences on the body that were perceived by some respondents to occur because of cannabis use, where reported effects ranged from minor consequences such as eating too much, coughing, and weight gain to severe outcomes such as seizures and anaphylaxis from an allergic reaction (Bigand et al., 2019).

Luque et al. (2021) also found within their concurrent mixed methods study with adult medical cannabis patients, where survey data was collected and interviews conducted to evaluate medical marijuana patients' perception of therapeutic benefits for self-reported medical conditions, that participants reported negative effects of cannabis use that included weight loss, higher anxiety from some varieties of cannabis sativa, paranoia, and increased blood pressures, as well as other side effects that included increased anxiety with too much use, dry eyes and coughing, and increased appetite. Loflin et al. (2019) conducted a study where they documented various cannabis formulations and routes of administration chosen by veterans with increased access to cannabis and determine if it was used as a substitute for other licit and illicit drugs. Within the study, it was found that most of the sample reported using cannabis for substitute for substances like alcohol, tobacco, and prescriptions medications, as well as limitations that included self-reports for cannabis use and substitution behaviors, and age of first initiation of use of other substances, with future research needing to focus on the development of interventions the disseminate information (Loflin et al., 2019).

Adkisson et al. (2019) wanted to use retrospective data to test whether cannabis dependence would be associated with an increased rate of post-deployment suicide attempts, where they used 319 participants from the Iraq/Afghanistan are of veterans serving in the military after 9/11, being recruited via mailings, advertisements, and clinician referrals. Adkisson et al. (2019) found that lifetime cannabis dependence was significantly associated among veteran during this era with suicide attempts, that heavy cannabis use may be a unique risk factor for post-deployment suicide attempts among this population in contrast with the growing public sentiment of cannabis usage being harmless. Berey et al. (2022) aimed to apply a behavioral economic framework to examine whether sleep disturbances and cannabis demand were

associated with risk-factors for potential cannabis use. Within the study, results showed that it was uncertain how other sleep elements that were not captured by the self-reporting methods used are related to the demand and use of cannabis, as well as limitations with findings among the observational research like the study did not involve actual sleep assessments (Berey et al., 2022).

Browne et al., (2022) examined the passing year's cannabis use prevalence and sociodemographic and clinical correlates of cannabis use among primary care patients in the Veteran Health Administration in states where medical cannabis is legalized, where they used 1072 veterans that were enrolled in drug screening validation study between 2012 and 2014, utilizing computer-assisted interviews. They found that veterans endorsing only medical use of cannabis reported more cannabis throughout the week compared to veterans endorsing only using cannabis for recreational use only, so veterans enrolled in the Veteran Health Administration in states with legalized cannabis may be more likely to use cannabis (Browne et al., 2022). There were limitations of the study that included a sample that was not population based since the participants were veterans who self-selected enrollment into the drug-based screening validation study, limits to the reporting since they could be subject to bias, and limits to the generalization of the population sample (Browne et al., 2022). Browne et al., (2022) also suggested for future work to identifying veteran subgroups at high risk for cannabis use and problems related to use, as well as a more thorough study of those engaging in only medical cannabis use could improve understanding of differences seen in adverse outcomes among medical use compared to recreational use, which could be used in the future for education, assessment, and intervention.

While there's literature that claims that cannabis reduces perceived symptoms of negative affect in the short-term (Cuttler, Spradlin, McLaughlin, 2018), the intake of cannabis can present just as many issues trying to stop as reported as effects of consumptions. According to Perron et al. (2019), cannabis withdrawal, now a codable disorder in the 5th edition of the Diagnostic and Statistical Manual (DSM-5), is a common experience among those who frequently use cannabis and shows that abrupt cessation of prolonged and heavy cannabis use is associated with a variety of withdrawal symptoms that include but are not limited to headaches, sleep disturbances, irritability, and anxiety, as well as clinically meaningful distress and functional impairments.

For this section, the classification of cannabis, the negative effects of cannabis, and statistical information regarding cannabis use was discussed. Section concluded with discussion about the claims regarding cannabis in the literature out there. For the next section, veteran cannabis use will be discussed.

Veteran cannabis use

Military veterans are at a heightened risk of issues, with some of the biggest risk and protective factors that this population faces are mood and anxiety disorders, stressful situations that can be exacerbated after service, physical health problems, alcohol, and drug use, and attempts in suicide. According to Santangelo, Baldwin, and Stogner (2022), one-third of the United States veterans screen positive for alcohol use disorder with other studies showing that 7-20% meet the criteria for drug use disorders. While veterans are a high-risk group for various factors, particularly when it comes to alcohol and cannabis use, research on rates for veterans, compared to rates of those that aren't veterans when it comes to alcohol and cannabis use (56.6% and 50.8%, respectively, compared to 60% of cannabis use reported by the Veteran Health Association) are inconsistent across studies (Waddell et al., 2022). Little is known about

cannabis use among veterans in the general United States population compared to civilians (Davis et al., 2018).

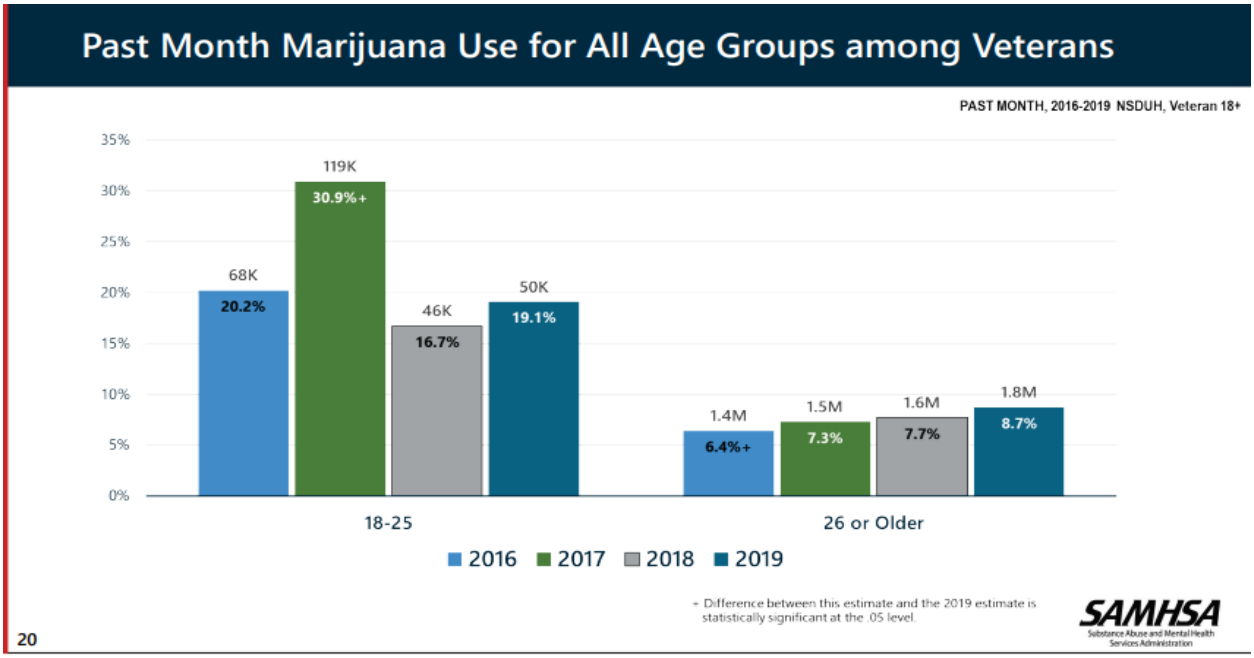
When it comes to cannabis, it is said to be one of the most widely used addictive substance globally, and its use increased various physical and psychological problems, with some users developing cannabis dependence (Asper et al., 2022). It is also believed that cannabis use is associated with psychiatric illness and suicidality, which is prevalent among US military veterans (Hill et al., 2021). However, with 9% of US veterans reporting cannabis use in the past year and 41% of veterans using cannabis reported the use to be medical, there seems to be a rise of usage among this population (Davis et al., 2018). The Substance Abuse and Mental Health Service Administration (2020) completed the 2019 National Survey on Drug Use and Health, a comprehensive household interview survey of substance use, substance use disorder, mental health, and the receipt of treatment services for various disorders that include marijuana (cannabis) with the below figures showing significantly decreased in the past month for veterans ages 18-25 when compared to 2017 while there was an increase over the past month among veterans 26 years old and older (Figure1, Figure 2).

Specifically, in Figure 1 demonstrates that the past month of marijuana use for all age groups among veterans described to fluctuation from the years of 2016-2019 was at 20.2% in 2016, 30.9% in 2017, 16.7% in 2018, 19.1% in 2019 for those aged between 18-25, and 6.5% in 2016, 7.3% in 2017, 7.7.% in 2018, and 8.7% in 2019 for those aged 26 or older (Substance Abuse and Mental Health Service Administration, 2020). Figure 2 shows the marijuana use among veteran young adults aged 18-25 was 20.2% in 2016, 30.9% in 2017, 16.7% in 2018, 19.1% in 2019, with this age groups past year daily use or almost daily use being at 8.9% in 2016, 11.1% in 2017, 4.5 in 2018, and 6.6% in 2019 (Substance Abuse and Mental Health

Service Administration, 2020). There was a significant increase for veterans 26 years old and older compared to 2016 (Figure 3) and marijuana use disorder for veterans 26 and older continues to slightly decline (Figure 4). Specifically in Figure 3 showing marijuana use among veteran adults 26 years and older with 6.5% in 2016, 7.3% in 2017, 7.7.% in 2018, and 8.7% in 2019 with past month use, with this age groups past year daily use or almost daily use being at 1.7% in 2016, 2.4% in 2017, 3.1% in 2018 and the same in 2019 (Substance Abuse and Mental Health Service Administration, 2020). Figure 4 specifically showing marijuana use disorder among veterans aged 18-25 being at 1.2% in 2016, 4.3% in 2017, 3.3% in 2018, and 3.2% in 2019, and showing veterans aged 26 and older at 0.5% in 2016, 0.9% in 2017, 0.7% in 2018 and 0.5% in 2019 (Substance Abuse and Mental Health Service Administration, 2020):

Figure 1

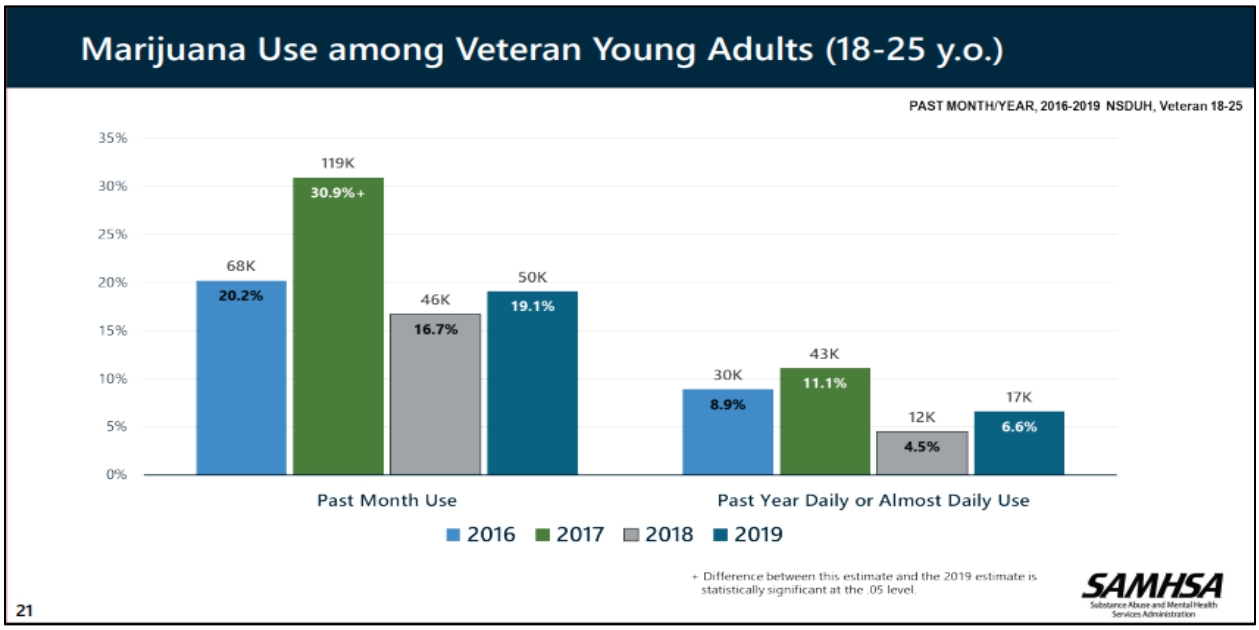
Past Month Use for All Age Groups of Veterans



(SAMHSA, 2020)

Figure 2

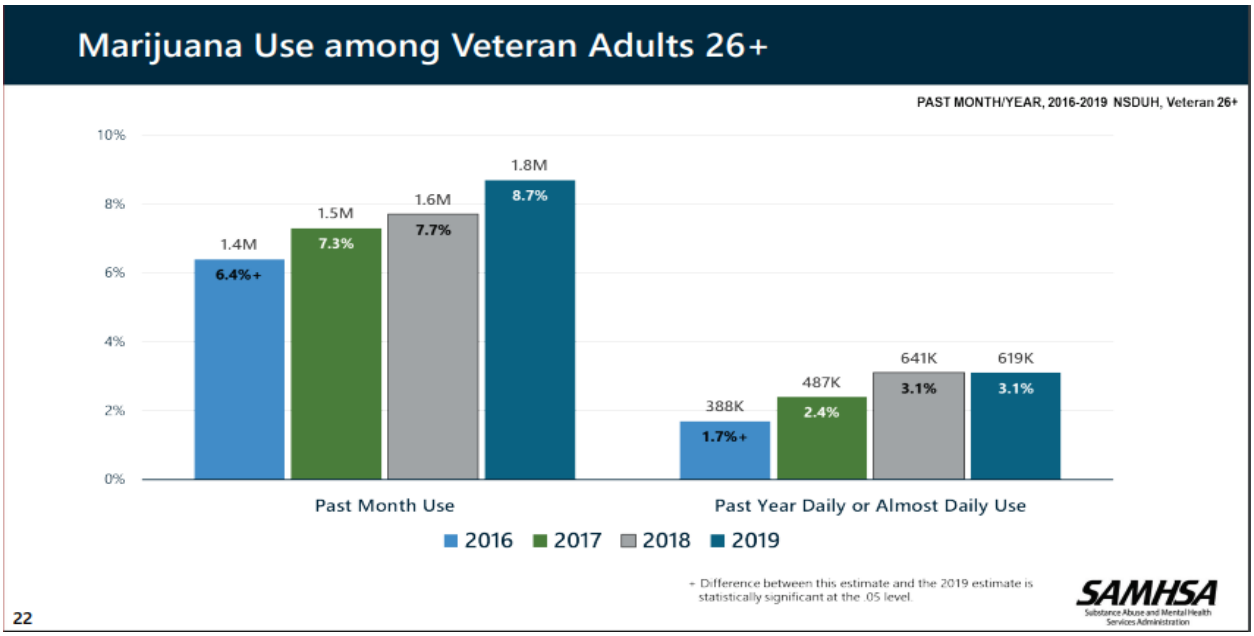
Use by Young Adult Veterans



(SAMHSA, 2020)

Figure 3

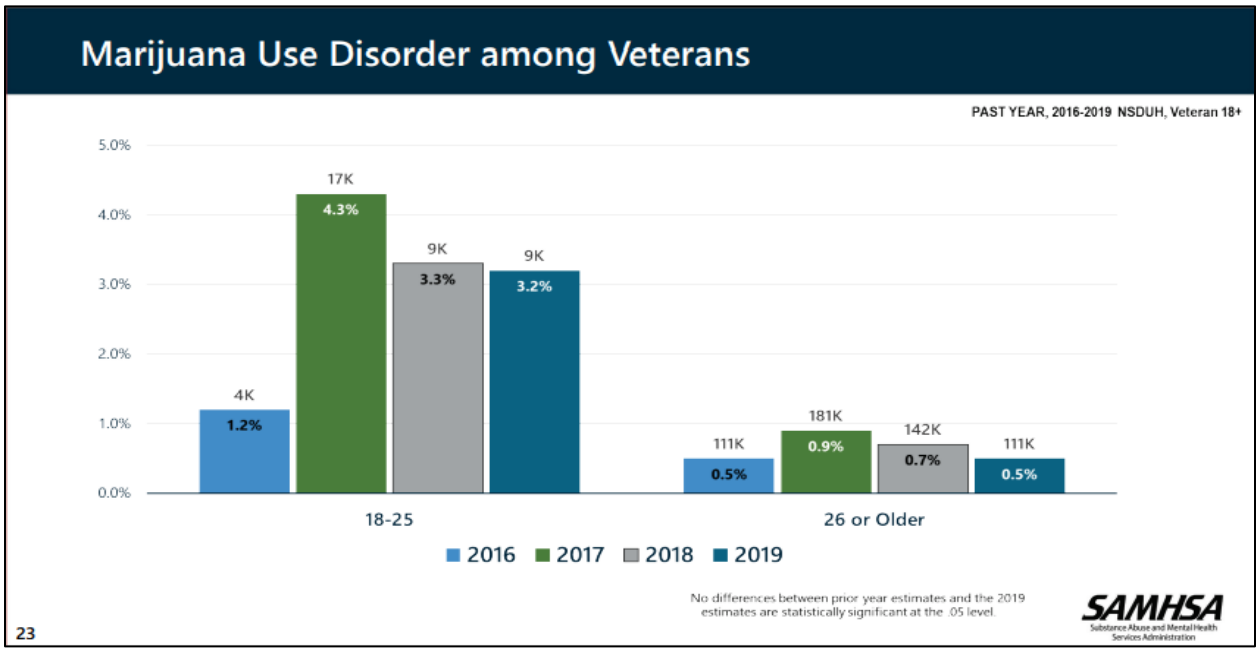
Use by Veterans Over 26



(SAMHSA, 2020))

Figure 4

Marijuana Use Disorder: Veterans



(SAMHSA, 2020))

These figures show fluctuation of marijuana (cannabis) use over those four years with both reported monthly and daily usage. Those fluctuations could be explained by the happening in the world that would cause veterans to turn to alternative ways to cope with stress. The fluctuations in age groups could also be explained by the developmental stage of life and how age groups tend to cope with stressors in life. There are notable fluctuations, as well as clear sign indications that cannabis is still being used among veterans .

The literature regarding its association with multiple mental and physical health issues is not an issue among states across the nation through reports from the U.S. Department of Veteran Affairs. According to the U.S. Department of Veteran Affairs (2022), while veterans should be aware that federal law classifies cannabis as a Schedule One Controlled Substance, making it illegal in the eyes of the federal government, several states have approved the use of cannabis for

medical and/or recreational use. While the U.S. Department of Veteran Affairs is required to follow the federal laws regarding cannabis uses, veterans participation in state cannabis programs, veterans will not be denied VA benefits because of cannabis use, are encouraged to discuss cannabis use with the providers at their local VA hospital, and will have records taken by providers in order to have information available in treatment planning (U.S. Department of Veteran Affairs, 2022). So, in the wake of an increase surrounding the legislation sanctioning the recreational and medical use of cannabis in the United States, there is a growing interest on the impact cannabis has (Gunn et al., 2019).

The 2019 Veteran Health and Medical Cannabis (McNabb et al., 2020) study reported the findings of US military veterans regarding their current health conditions, conventional medical treatments, and medical cannabis use, showing that among the demographic indicators among the 565 veterans from various branches of the military, age group and races that completed the survey. It was reported that 345 of them had self-determined medically indicated cannabis use, while 299 of them had recommendations by a licensed clinical provider for medically indicated cannabis use, with Army the branch of services with the most reports, males being the highest reporting gender, 60-69 being the highest reporting age group, and Non-Hispanic White or Euro-Americans being the highest reporting race (see Table 1 that break downs demographics of the branch of service (Army, Navy, Air Force, Marines, Coast Guard, Other), gender (Male, Female, Prefer not to answer, Prefer to self-describe), age (21-29, 30-39, 40-49, 50-59, 60-69, 70+), race (Non-Hispanic White or Euro-American, Prefer not to answer, Latino or Hispanic American, Black, Afro-Caribbean, or African-American, Native American or Alaskan Native, East Asian or Asian American, Middle Eastern or Arab American, South Asian or Indian American), and self-reported cannabis use (Medically indicated, self-determined, Medically indicated, recommended

by a licensed clinical provider, Recreational user, Other, Religious) (McNabb et al., 2020).

Posttraumatic stress disorder was the second most reported health condition by veterans among the top health conditions, from 144 reports (see Table 1) The top health conditions reported by veterans in addition to posttraumatic stress disorder were chronic pain, anxiety, depression, insomnia, cancer, arthritis, bipolar/manic depression, cardiovascular disease, diabetes, gastrointestinal/digestive system disorder, fibromyalgia/myositis, respiratory problems, hypertension, multiple sclerosis, obesity, substance abuse/addiction, attention deficit/hyperactivity disorder (ADHD), inflammatory bowel disease (IED), reflux esophagitis, allergies, and HIV/AIDS (McNabb et al., 2020). There were reports from 207 veterans experiencing a greater quality of life with cannabis consumptions, while 304 veterans reporting experiencing a much more greater quality of life with cannabis consumption, 288 veterans reporting experiencing less psychological symptoms, 116 veterans reporting using much less opioids, 150 veterans reporting being about the same with their medication (non-opioid) use, and 193 veterans reporting much less alcohol consumption (see Table 2 that breaks down several levels of quality of life changes after cannabis consumptions with options such as “I experience a greater quality of life,” “I experience physical symptoms (body pains, functions, sensations),” “I experience psychological symptoms (anxiety, stress and sadness),” “I use opioids,” “ I use my prior medications (non-opioids),” and “I use alcohol” (McNabb et al., 2020).

Table 1

Top Health Conditions Reported by Veterans

Health Condition	N (National) N=565	% (National)	N (MA) N=201	% MA
Chronic pain	217	38.41%	75	37.31
Post-traumatic stress disorder (PTSD)	144	25.49%	49	24.38%
Anxiety	51	9.03%	20	9.95%
Depression	34	6.02%	11	5.47%
Insomnia	19	3.36%	8	3.98%
Cancer	17	3.01%	9	4.48%
Arthritis	15	2.65%	5	2.49%
Bipolar/manic depression	11	1.95%	5	2.49%
Cardiovascular disease	8	1.42%	4	1.99%
Diabetes	7	1.24%	2	1.00%
Gastrointestinal/digestive system disorders	7	1.24%	1	0.50%
Fibromyalgia/myositis	6	1.06%	2	1.00%
Respiratory problems	6	1.06%	2	1.00%
Hypertension	4	0.71%	2	1.00%
Multiple sclerosis	4	0.71%	1	0.50%
Obesity	4	0.71%	1	0.50%
Substance abuse/addiction	3	0.53%	3	1.49%
Attention deficit/hyperactivity disorder (ADHD)	2	0.35%	0	0.00%
Inflammatory bowel disease (IBD)	2	0.35%	0	0.00%
Reflux esophagitis	2	0.35%	1	0.50%
Allergies	1	0.18%	0	0.00%
HIV/AIDS	1	0.18%	0	0.00%

(McNabb et al., 2020)

Table 2

Quality of Life Changes with Cannabis Consumption

Indicator		N (National)	% (National)	N (Mass)	% (Mass)
I experience a greater quality of life		N=554		N=194	
	Much Less Now	4	0.72%	1	0.52%
	Less	7	1.26%	3	1.55%
	About the Same	32	5.78%	13	6.70%
	More	207	37.36%	84	43.30%
	Much More Now	304	54.87%	93	47.94%
I experience physical symptoms (body pains, function, sensation)		N=531		N=185	
	Much Less Now	144	27.12%	35	18.92%
	Less	265	49.91%	103	55.68%
	About the Same	75	14.12%	32	17.30%
	More	29	5.46%	10	5.41%
	Much More Now	18	3.39%	5	2.70%
I experience psychological symptoms (anxiety, stress, sadness)		N=524		N=184	
	Much Less Now	158	30.15%	40	21.74%
	Less	288	54.96%	118	64.13%
	About the Same	48	9.16%	17	9.24%
	More	18	3.44%	7	3.80%
	Much More Now	12	2.29%	2	1.09%
I use opioids		N=169		N=55	
	Much Less Now	116	68.64%	35	63.64%
	Less	26	15.38%	9	16.36%
	About the Same	23	13.61%	11	20.00%
	More	4	2.37%	0	0.00%
	Much More Now	0	0.00%	0	0.00%
I use my prior medications (non-opioid)		N=409		N=151	
	Much Less Now	136	33.25%	31	20.53%
	Less	115	28.12%	49	32.45%
	About the Same	150	36.67%	70	46.36%
	More	4	0.98%	0	0.00%
	Much More Now	4	0.98%	1	0.66%
I use alcohol		N=337		N=118	
	Much Less Now	193	57.27%	60	50.85%
	Less	70	20.77%	26	22.03%
	About the Same	67	19.88%	30	25.42%
	More	6	1.78%	2	1.69%
	Much More Now	1	0.30%	0	0.00%

(McNabb et al., 2020)

However, as an order by the Senate Committee on Veteran Affairs (Congress. Gov, 2023) there was a VA Medicinal Cannabis Research Act of 2023 that required the Department of Veteran Affairs to conduct long-term research on the use of medical cannabis to treat veterans with chronic pain and posttraumatic stress disorder. With the bill, it authorized them to conduct clinical trials so the department could meet certain criteria under current laws governing cannabis prescription and use, and examined the risks and benefits of using cannabis to treat posttraumatic stress disorder and chronic pain within the restrictions of other laws governing its use and prescription and report at least annually for five years if they decided to conduct the trials, but providing no budget to see these trials (Congress. Gov, 2023). So even though there were sanctions surrounding the recreational and medical use of cannabis in the United States (Gunn et al., 2019), this bill highlights the government's notice of the increase in usage among veterans and would like to see what those risks and benefits are.

According to Callaghan, Sanches, and Kish (2020), in almost all of the literature examining the relation between cannabis use and cannabis-related harms, there has been a neglect to include the quantity of cannabis use, so they aimed to assess where cannabis quantity predicts harm and whether cannabis quantity might interact with other key variables to effect outcomes. They assessed the cross-sectional relations between the continuous variables of cannabis-use quantity and frequency among different scales, finding that the quantity by frequency interactions in the models showed that the relative effects of quantity on cannabis use disorders and cannabis related problems decrease as frequency increased and vice versa (Callaghan, Sanches, & Kish, 2020). Davis et al. (2018) conducted a study because they wanted to examine the prevalence and correlates of recent medical and non-medical cannabis use among what was stated to be an important US sub-population. The findings showed that recent use of

cannabis was related or slightly lowered among veterans compared to non-veterans but the proportion of those using it medically has more than doubled that of the general population and the researchers believed that theirs may have been the first to assess cannabis use medically and non-medically among veterans from a national representative sample in the United States so certain limitations were notated (Davis et al., 2018). With approximately 7% of US adults meeting the criteria for veteran status and are thought to be a vulnerable population for mental health concern due to military service that may render them more likely to experience psychological challenges, including posttraumatic stress disorder, sleep problems, and chronic pain, as well as unique stressors when reintegrating to civilian life that could include posttraumatic stress disorder severity, poorer life satisfaction, and reduced social support (Waddell et al., 2022), the need for something to assists with coping with these types of risk factors and stressors could provide an explanation for the increase in cannabis use among the veteran population.

For this section, the reasons as to why veteran are at a heighten risk for physical and mental health factors and the literature regarding the association of cannabis use due to risk factors were discussed. Section concluded with discussion regarding the increasing need for something to assist with coping. In the next section, cannabis use in veteran with posttraumatic stress disorder will be discussed.

Cannabis use in veterans with posttraumatic stress disorder

Cannabis is one of the most widely used addictive substances, and its use increases the risk for various physical and psychological problems, with some cannabis users developing cannabis dependence, particularly among military veterans with an elevated risk for cannabis dependence and several emotional disorders (Asper et al., 2022). Veterans are at a heightened

risk for substance use issues, with over one-third of the veterans in the United States screening positive for disorders like alcohol, cannabis, and other common substances (Santangelo, Baldwin, & Stogner, 2022). The use of cannabis to induce positive mood or attenuate aversive mood states has increased as a self-medication among individuals suffering from various disorders (Spechler et al., 2020). The odds of nonmedical cannabis use and cannabis use disorder are elevated among vulnerable subgroups among veterans, which include those with lower incomes or mental health disorders (Browne et al., 2022). According to the U.S. Department of Veteran Affairs (2023), the number of Veterans with posttraumatic stress disorder varies by service era shown in the data below (Figure 8 breaks down the service era and PTSD in the past year and PTSD as some point in life for veterans among those service eras) are from a large study of veterans across the country. Specifically, figure 8 showing that in the service era of Operation Iraqi Freedom (OIF) and Enduring Freedom (OEF) showed that 15 out of 100 veterans in the past year was diagnosed with posttraumatic stress disorder and 29 out of 100 veterans were diagnosed with posttraumatic stress disorder at some point in their life (U.S. Department of Veteran Affairs, 2023). It continued to describe the same for the service eras of Persian Gulf War (Desert Storm) with 14 out of 100 veterans being diagnosed with posttraumatic stress disorder in the past year and 21 out of 100 veterans diagnosed with posttraumatic stress disorder at some point in life; Vietnam War with 5 out 100 veterans diagnosed over the past year with posttraumatic stress disorder and 10 out of 100 diagnosed at some point in life with posttraumatic stress disorder; and World War II (WWII) and Korean War with 2 out of 100 veterans diagnosed with posttraumatic stress disorder in the past year and 3 out of 100 veterans diagnosed with posttraumatic stress disorder at some point in their life (U.S. Department of Veteran Affairs, 2023). The trend of this data showed that there was an increase over time in

diagnosed veterans with posttraumatic stress disorder over services eras, with the amount of veterans being diagnosed with posttraumatic stress disorder pretty much doubling from veterans among the World War II and Korean War era to those in the Vietnam War era, to nearly tripling from those in the Persian Guld War (Desert Storm) era, with similar numbers from that ear to those veterans among the Operation Iraqi Freedom and Enduring Freedom era. Other data that is less recent than the study in the data shown is more common among veterans of different service eras, specifically Vietnam Veterans, with those studies using different methods to get information which can affect findings, as well as the timing of studies matters as well because posttraumatic stress disorder is related to other health conditions that may affect mortality, or risk of dying, so veterans who were not alive to participate in a study may have had a different rate of PTSD than those included in current research (see Table 3) (U.S. Department of Veteran Affairs, 2023):

Table 3

PTSD Incidence

Service Era	PTSD in the Past Year	PTSD at Some Point in Life
Operations Iraqi Freedom (OIF) and Enduring Freedom (OEF)	15 out of 100 (15%)	29 out of 100 (29%)
Persian Gulf War (Desert Storm)	14 out of 100 (14%)	21 out of 100 (21%)
Vietnam War	5 out of 100 (5%)	10 out of 100 (10%)
World War II (WWII) and Korean War	2 out of 100 (2%)	3 out of 100 (3%)

NOTE: The data in this table is from Veterans alive at the time of the study. As such, it does not include Veterans in any service area who have died and may have had PTSD.

(U.S. Department of Veteran Affairs, 2023)

There were several studies that tried to explain the effects of cannabis use on posttraumatic stress disorder. Peterson et al. (2021) conducted a study, where researchers investigated anandamide and cannabinoid type 1 receptor activation that encouraged extinction of aversive memories, where some of these cannabinoids may provide a new treatment approach for posttraumatic stress disorder. This caused them to examine if cannabis use impacts the success of evidence-based intensive outpatient posttraumatic stress treatment in the veteran population, using a list of veterans enrolled in an outpatient posttraumatic stress clinical team clinic between October 2008 and October 2016 and a random sample of participants from 18 to 85 years old with two posttraumatic stress disorder checklist scores and diagnosed with posttraumatic stress disorder, comparing the cannabis use group with the no cannabis use group and different variables pertaining to the relative number of treatment successes and failures, resulting in the majority of participants who were white males having similar success rates between those using cannabis compared to those not using cannabis (Peterson et al., 2021).

Krediet et al. (2020) organized a focus group discussion among military veterans with chronic posttraumatic stress disorder who were treated with medical cannabis, with their partners joining the groups for an evaluation, sharing their perspectives on their partner's use of medical cannabis. They found the patients reporting use of medical cannabis helped managed their symptoms and did not experience any urges to get high, that they used different cannabis strains and dosages for several therapeutic effects and had discussions about the experienced stigma surrounding cannabis generated insights with the implications for the initiation of medical cannabis use (Krediet et al., 2020). Gibson et al. (2021) conducted a study that was a part of a larger study that examined a cohort of five veterans over a year who used both medical cannabis and alcohol and were matched with posttraumatic stress service dogs where a comparison of

perceptions and use of alcohol and medical cannabis among the veterans to cope with posttraumatic stress disorder symptoms and outlined key implications. This resulted in veterans identifying alcohol use as more influenced by social norms and perceived it as more of a concern for addition compared to medical cannabis, offering a unique insight into the military culture's general acceptance of alcohol but not medical cannabis use, as well as possible implications for veterans to use alcohol and/or medical cannabis to help manage their posttraumatic stress disorder symptoms (Gibson et al., 2021).

Psychology Today (2022) reported that conventional wisdom among many veterans with posttraumatic stress disorder is that cannabis is the best treatment even though the Department of Veteran Affairs cannot recommend or provide it. Psychology Today (2022) continued to report that there is good evidence that THC reduces nightmares and intrusive re-experience of trauma reactions in combat veterans which are a symptoms of posttraumatic stress disorder, that the continuous use of cannabis, even for it beneficial effect on posttraumatic stress disorder, can have the side effect of addition and reduction of those benefits, and that more effective medications with fewer side effects are under development to increase the brain's natural cannabinoid chemistry. With veterans struggling with disabling physical and mental health conditions that tend to worsen as they get older, the search for treatment is continuous to provide this population with the necessary relief they need and deserve, due to their commitment to service. With the existence of current policies and perceived inconsistency across the Veteran Health Administration regarding the interpretation and application of cannabis policies, the discussion and potentiality of the benefits of cannabis appears to be a subject that continues to be the lack of engagement among physicians working with veterans (Bobitt et al., 2023).

For this section, cannabis use for posttraumatic stress disorder among veterans and the struggles veterans with disabilities and mental health conditions were discussed. Section concluded with discussion about the potentiality of the benefits of cannabis. For the next section, therapies and treatments for cannabis dependency will be discussed.

Therapies and treatments for cannabis dependency

With the increase of cannabis usage and perceived risk declining with a better understanding of how from the first-time cannabis was used to cannabis dependence, the predicting of prognostic indicators of cannabis-related problems and treatment outcomes could be critical (Sherman et al, 2021). Even though there are individuals with regular cannabis use demonstrating adverse health outcomes, that include poor work performance, other substance misuse, risky sexual behaviors, neurocognitive problems, interpersonal and relation violence, and increased risk of psychosis, there is infrequent seeking into treatments, thus creative strategies are needed to help individuals modify their cannabis use (Arnedt et al., 2023).

The increase in interest and evidence for the use of cannabinoid medications in the treatment of cannabis use disorder lead to the a secondary analysis of a randomized placebo controlled trial of nabiximols for the treatment of cannabis use disorder that aimed to identify client and treatment characteristics impact treatment engagement and outcomes, finding that counseling combined with agonist pharmacotherapy may provide the optimal treatment for cannabis use disorder (Mills et al., 2022). Montebello et al. (2022) conducted a second analysis from a 12-week double blind placebo controlled trial testing the efficacy of a cannabis agonist (nabiximols) against placebo in reducing illicit cannabis use, only to find that the participants had elevated comorbidity symptoms with no evidence that nabiximols treatment is a barrier to achieving reductions in the comorbid symptoms but cannabis dependence treatment reduced

illicit cannabis use and improved comorbidity symptoms even when abstinence was not achieved. Past literature has demonstrated that motivational enhancement and cognitive behavioral therapy are some of the most effective interventions for adults with cannabis use disorder, with only a few sessions of them combined producing abstinence and reductions of cannabis usage greater than delayed treatment controls, however absolute treatment outcomes have been modest with only 20-30% of individuals treated remaining abstinent or showing significant improvement at longer-term follow-ups to sessions (Stephens et al., 2020). Geagea et al. (2022) conducted a pilot study that aimed to assess the effect of cognitive behavioral therapy for negative symptoms that could be associated with posttraumatic stress disorder like insomnia in individuals with cannabis use disorders. It was found that among the individuals with cannabis use disorder and insomnia symptoms that cognitive behavioral therapy for insomnia is effective as a short- and long-term treatment of insomnia and comorbid anxiety/depression in individuals who regularly use cannabis with an added benefit of reduction in cannabis consumption and inflammatory serum biomarkers (Geagea et al., 2022).

Cannabis use for medical conditions has been an issue of growing interest and concern, with the belief that cannabis can be used to treat posttraumatic stress disorder that is primarily from anecdotal evidence from individuals with the disorder who reported that cannabis helps with the symptoms or improves their overall life and functioning (U.S. Department of Veteran Affairs, 2022). The U.S. Department of Veteran Affairs (2022) conducted randomized controlled trials to determine safety and efficacy of cannabis for posttraumatic stress disorder. The trials showed that no significant difference in posttraumatic stress disorder symptom reduction between placebo and any of the active cannabis preparation, however it was not possible to draw conclusions about the efficacy of cannabis to treat posttraumatic stress disorder from results

where there was no placebo used in a phase from study with just cannabis (U.S. Department of Veteran Affairs, 2022). Veterans diagnosed with posttraumatic stress disorder have been looking for alternative ways to treat is and the first FDA-regulated study on the benefits of cannabis yielded favorable results, showing improvements in veterans prescribed cannabis with other posttraumatic stress disorder sufferers who do not use cannabis to treat symptoms (Rodriguez Jr., 2021).

For this section, the therapies and treatments related to cannabis dependency among veterans was discussed. Section concluded with the discussion about the look for alternative ways to treat PTSD. Next, the literature review will be summarized with what was discussed and will range of years, and types of literature.

Summary

The continued growth in usage of cannabis among veterans with mental health disorders, particularly those with posttraumatic stress disorder, is what guided the development of the problem statement, purpose statement, and research question with the wanting to better understand if they are on to something with usage of cannabis instead of pharmacological means of treatment. The literature review discussed the theoretical framework adopted to guide the study, posttraumatic stress disorder among veterans, the taxonomy pharmacology along with the brain effects of cannabis, cannabis use in the United States, with the bulk of the chapter covering cannabis use among veterans as well as its mental health effects in veterans and therapies and treatments for cannabis dependency.

The theoretical framework section explained that for this study is the biopsychosocial model, where George Engel argued that some disease states are multi-determined and may result from biological, psychological, or social processes in variable forms of interactions but did not

provide a formal definition of the biopsychosocial model, with the model postulates that psychological and social variables significantly influence biological systems and vice versa (Pilgram, 2015). The posttraumatic stress disorder among veteran sections explained how posttraumatic stress disorder is defined and the criteria that an individual must meet in order to be diagnosed with the disorder, as well as the number if veterans that have been diagnosed with posttraumatic stress disorder according to the VA healthcare system and how that has impacted their lives. The taxonomy pharmacology section explained that modern taxonomy of the cannabis plant comes from Carl Linnaeus in 1753, with cannabis being a genus plant that includes three species: Cannabis sativa, Cannabis indica, and Cannabis ruderalis (Harmon, 2023), where the effects that cannabis has on an individual varies based on the way it is administered whether it be administered orally, trans dermally, or inhaled, with the cannabinoids in the cannabis activating the neurotransmitters in the body (Harmon, 2023), all of which can contribute to the pharmacologic method of reasoning for the utilization of cannabinoids in the managing the three-core posttraumatic stress disorder symptom groups: hyperarousal, numbing, and avoidance (Hale et al., 2021). The negative effects of cannabis use section explained that cannabis was classified in 1970 as a Schedule I substance, prohibiting practitioners from prescribing cannabis and prohibiting most research from using cannabis except under rigorous oversight from the National Instituted of Drug Abuse (Russell, Cahill, & Duderstadt, 2019), with the National Survey on Drug Use and Health explaining that cannabis is one of the most used drugs in the United States, with reports from 2021 stating that 61.2 million people (or 21.9% of the population) used illicit drugs with cannabis being the most commonly used with 52.5 million people using, as well as it was reported that 35.4% of young adults aged 18 to 25 (11.8 million people) reported using cannabis in the past year (U.S. Department of Health and Human

Services, 2023), causing a range of effects on physical health that include: breathing problems, increased heart rate, problems with child development during and after pregnancy, intense nausea and vomiting; and mental health that include: temporary hallucinations, temporary paranoia, worsening symptoms in patients with schizophrenia, and has been linked to other mental health problems like depression, anxiety, and suicidal thought (National Institute of Drug Abuse, 2019). The veteran cannabis use section explained that one-third of the United States veterans screen positive for alcohol use disorder with other studies showing that 7-20% meet the criteria for drug use disorders Santangelo, Baldwin, &Stogner, 2022), with research on rates for veterans, compared to rates of those that aren't veterans when it comes to alcohol and cannabis use (56.6% and 50.8%, respectively, compared to 60% of cannabis use reported by the Veteran Health Association) are inconsistent across studies (Waddell et al., 2022), with 9% of US veterans reporting cannabis use in the past year and 41% of veterans using cannabis reported the use to be medical, there seems to be a rise of usage among this population (Davis et al., 2018). The cannabis use in veterans with posttraumatic stress disorder section explained that cannabis use increases the risk for various physical and psychological problems, with some cannabis users developing cannabis dependence, particularly among military veterans with an elevated risk for cannabis dependence and several emotional disorders (Asper et al., 2022), with veterans struggling with disabling physical and mental health conditions that tend to worsen as they get older, searching for treatment is continuous in order to provide the population with the necessary relief they need and deserve. The therapies and treatments for cannabis dependency section explained that even though there are individuals with regular cannabis use demonstrating adverse health outcomes, there is an infrequency of treatments, which creative strategies are needed to help individuals modify their cannabis use (Arnedt et al., 2023), with it being an issue of

growing interest and concern, with the belief that it can be used to treat posttraumatic stress disorder from individuals with the disorder who reported that cannabis helps with the symptoms or improves their overall life and functioning (U.S. Department of Veteran Affairs, 2022).

While most of the literature has provided information regarding the negative effects of cannabis, the literature has not produced evidence of how cannabis effects posttraumatic stress among veterans. There are gaps within the literature on how cannabis can be impactful and whether consumption can truly be harmful or helpful when treating posttraumatic stress disorder among veterans.

Chapter 3: Research Method

The problem addressed in this study is cannabis use among veterans who report symptoms of PTSD. The purpose of the quantitative correlational study was to determine the strength of association between severity of symptoms of posttraumatic stress disorder with frequency of use of cannabis among the veteran population. The chapter will provide the research methodology and design for the study, to include why it is appropriate in relation to the problem, purpose, and research question. The chapter will describe the population, why the population was important, and the sampling type used for the methodology and design of the study, with information about the power analysis reported, and how veterans were recruited. This chapter will also provide information on the measurements used to collect data on cannabis use and posttraumatic stress disorder and their origins, the identification of the variables and the level of measurement of each variable, the steps that will be followed to collect the data and the strategies used to analyze the data. At the end of this chapter, there will be a description of the assumptions corresponding to the underlying rationale, the study limitations and measures taken to mitigate those limitations, a description of any delimitations for the study, ethical assurances taken place to minimize risk to any participants and will summarize the key points of the chapter.

Research Methodology and Design (Nature of the Study)

The study utilized a correlational design to analyze the strength of relationship between severity of symptoms of posttraumatic stress disorder with frequency of usage of cannabis among veterans. The correlational design method was appropriate to use because it involves assessing the strength of the relationship between one independent variables (frequency of cannabis) and one dependent variable (severity of symptoms of posttraumatic stress disorder) and utilized bivariate Pearson Correlation to ensure data meets statistical assumptions that both

variables are on an interval or ratio level of measurement, data from both of the variables follow normal distributions, there are no outliers, the data is from a random or representative sample, and there is an expected linear relationship between the two variables to reveal associations among variables. The technique helped in understanding the likelihood of two instances relating to each other (Lau, 2017). My proposed study was non-experimental, meaning there would be no manipulation or controlling of any of the independent and dependent variables, and controlling variables, age, sex, educational level, time in service, and ethnicity, as well as managing inaccurate, inconsistent, missing, and duplicate data is key (Glasofer, & Townsend, 2020). If the study utilized experimental or quasi-experimental designs, that would mean having to purposely expose veterans to cannabis to gather data for the research. Since there is still research being completed on whether cannabis is helpful or harmful, which would be unethical to subject human beings to a substance that professionals are still debating its benefits. Those designs also put individuals at risk of legal repercussions. Cannabis is not legalized across the nation, so purchasing and consuming cannabis in some states can lead to jail time, legal fines, and/or other legal actions (Browne et al., 2022). So, using a non-experimental design for my proposed study will not pose any threats to cultivating trustworthy data sets and will mitigate data quality challenges that lead to inaccurate or misleading analytic results.

Population and Sample

The targeted population were United States veterans. According the to the Department of Veteran Affairs (2023), as of September 2023, there are a projected 18,592,457 veterans in the United States, with 7 out of 100 of them having or developing posttraumatic stress disorder. The participants will consist of U. S. military veterans from all branches (Army, Air Force, Navy, Marine Corp, Space Force, and Coast Guard) who have separated from the military services

since the Vietnam War to those that served in the Global War on Terror (including Operation Enduring Freedom and Operation Iraqi Freedom) that fit the criteria for a formal diagnosis of posttraumatic stress disorder diagnosed by a mental health professional and/or physician or self-reported that they are currently experiencing posttraumatic stress disorder symptoms. They were range in various sociodemographic characteristics (i.e., age, sex, race, etc.) that gathered to control for any confounding variables that might interfere with data. This population was appropriate because the study's purpose is to quantitate the strength of association between severity of symptoms of posttraumatic stress disorder with any use of cannabis among the veteran population. Recruiting veterans that served during the conflicts of the War in Iraq and the War in Afghanistan may have provided insight about cannabis use in the United States increasing from 4% in 2001-2002 to 10% in 2012-2013 (Davis et at., 2018). Yockey and Hoopsick (2023) reported in their study that the weighted analyses revealed a significant increase at 56% in overall cannabis use from 2013-2019, with nearly one in 10 veterans reporting cannabis use within the past year, as well as veterans age 35-49 years, 50-64 years, and 65 years or older being more likely to report using medical cannabis in the past year compared to those veterans 18 to 25 years old. According to Mian et al. (2023), lifetime cannabis use has been common among veterans at a rate of 77.5% with 29.5% of veterans reporting use during their study.

Veterans were recruited in Fort Hood, Texas, and surrounding areas. Purposive sampling, which is selecting a sample that is useful for the purpose of the research (i.e., selecting veterans), was the sampling method utilized. G*power analysis suggests that assuming a framework with at least one predictor, control variable, and dependent variable with an effect size of a small to mid-range and alpha level to 0.05, N=84 was required to detect an effect if it exists. The growing use

of cannabis among the veteran population with posttraumatic stress disorder is something that needed to be examined to better understand whether there is a correlation with usage and symptoms.

Instrumentation

The Role of the Researcher

The role of the researcher is to uphold ethical standards, obtain information and to protect information, as well as having participants sign an informed consent (APA, 2018) (Appendix A). The researcher should reduce and monitor bias whenever possible in the research study. All doctoral learners were expected to conduct rigorous research during the dissertation process, while working with assigned dissertation chair(s) as an integral part in guiding the research process and assisting with any lingering questions during the process (National University, 2025).

Demographic Questionnaire

After identification by Qualtrics for self-reported sociodemographic (gender, age, ethnicity, education, marital status, and employment) and branch of military and completing the online consent form (contact information provided within informed consent form if someone needs to make contact before completing survey), participants answered a unitary questionnaire combining the discussed measures. Demographic information was used to describe the sample.

Cannabis Use Disorder Identification-Revised (CUDIT-R)

The instrument utilized, a nominal and interval measure, was the Cannabis Use Disorder Identification Test-Revised (CUDIT-R) (see Appendix B). The CURIT-R an eight-item measure containing a Likert scale 0 to 4 designed to map criteria for Cannabis Abuse and Dependence and validated by the DSM-5 criteria for cannabis use disorder (Loflin et al. 2018).

Posttraumatic Stress Disorder Checklist for Diagnostic and Statistical Manual of Mental Disorders, Edition 5, with Life Events Checklist for Diagnostic and Statistical Manual, Edition 5, and Criterion A (PCL-5 with LEC-5 and Criterion A)

The instrument utilized, a nominal and interval measure, was the PTSD Checklist for DSM-5 (PCL-5) with Life Events Checklist for DSM-5 (LEC-5) and Criterion A (Appendix C). This instrument was a measure developed by the U.S. Department of Veteran Affairs National Center for symptoms of posttraumatic stress disorder measured on Likert scale 0 to 4, and intervals lettered A to E in accordance with the American Psychological Association's ethical guidelines (U.S. Department of Veteran Affairs, 2022).

Operational Definitions of Variables

The operational definitions section expressed the understanding of and use of variables within the study. There were nominal variables to include (1) branch of military, (2) age, (3) marital status, (4) education, and (5) gender. During this study, there were two major constructs explored, cannabis use and symptoms of posttraumatic stress disorder.

Cannabis Use

Cannabis Use Disorder Identification Test-Revised (CUDIT-R), an eight-item measure containing items that identifies individuals with problematic cannabis use within the preceding six months, assessing consumption, abuse, dependence, and psychological features (Risi et al., 2020). These items 1-7 are on a 5-point Likert scale with item 1: 0-never; 1-monthly or less; 2-two-four a month; 3-two-three times a week; or 4-four plus times; items 2-7: 0-never; 1-less than monthly; 2-monthly; 3-weekly; or 4-daily or almost daily; and it 8: 0-never; 2-yes, but not in the past 6 months; 4-yes, during the past 6 months (Schultz et al., 2019). The entire measure could be completed in 5-10 minutes. Factors related to cannabis use will be measured with the CURIT-

R with the level of measurement of the variable being interval, the scaling of each item on the measure for the variable being 0 to 4, the composite score for the variable will be scored/calculated on the sum of each rating, the total possible range of scores for the variable is 0 to 32, the range of scores indicates that it is designed to assess the participant's cannabis use, and the coding of the variable is continuous/simple coding.

Posttraumatic Stress Disorder Symptoms

Posttraumatic stress disorder symptoms listed in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), published by the American Psychiatric Association (APA, 2013). Posttraumatic stress disorder is a psychiatric disorder listed in the DSM-V that includes 20 symptoms (an ordinal variable in this proposed research) often experienced by the individual following a potentially traumatic event, which is frequent during combat deployments by military service members (Armour et al., 2017). For this current study, posttraumatic stress disorder symptoms are a continuous variable measured by the PTSD Checklist for DSM-5 (PCL-5) with Life Events Checklist for DSM-5 (LEC-5) and Criterion A, which was a measure developed by the U.S. Department of Veteran Affairs National Center for posttraumatic stress disorder in accordance with the American Psychological Association's ethical guidelines (U.S. Department of Veteran Affairs, 2022). Veterans were asked to check one or more of the boxes from the 17 items life events listed in part 1 to indicated: a-happened to you personally; b-you witnessed it happen to someone else; c-you learned about it happening to a close family member or close friend; d-you were exposed to it as part of your job; e-you're not sure if it fits; or f-doesn't apply to you, then expand on that information in part 2, answering 8 additional questions about those life events. The PCL-5, or part 3, was a 20-item questionnaire corresponding to the DSM-5 symptom criteria for posttraumatic stress disorder read by participants themselves or

read to them either in person or over the telephone. These items are on a 5-point Likert scale: 0-not at all; 1-a little bit; 2-moderately; 3-quite a bit; or 4-extremely (U.S. Department of Veteran Affairs, 2022). The entire checklist could be completed in 20-30 minutes. PTSD Symptomology will be measured with the PTSD Checklist for DSM-V (PCL-5) with LEC-5 and Criteria A with the level of measurement of the variable being interval, the scaling of each item on the measure for the variable is 0 to 4, the composite score for the variable will be scored/calculated on sum of each rating, the total possible range of scores for the variable is 0 to 80, the range of scores indicates that is designed to assess the participant's PTSD symptomology, and the coding of the variable is continuous/simple coding.

Study Procedures

The Qualtrics survey tool was needed in order to create the demographic survey and input the Cannabis Use Disorder Identification Test-Revised (CUDIT-R), which was a self-reported measure open to the public and used in clinical and non-clinical settings (Loflin et al., 2018; Schultz et al., 2019), and the PTSD Checklist for DSM-5 (PCL-5) with Life Events Checklist for DSM-5 (LEC-5) and Criterion A, which was a self-reported measure open to the public that can be administered to patients waiting for professional mental health sessions or to participants as part of a study (U.S. Department of Veteran Affairs, 2022). I added the required contact information and details about the study to the consent letter for participants that agree to complete the survey would understand why I am gathering information. I created the demographic survey, using the template that Qualtrics has, altering the template to add specific demographic questions regarding branch service in the military. I then proceeded to add blocks to the survey that included the Cannabis Use Disorder Identification Test-Revised (CUDIT-R) and the PTSD Checklist for DSM-5 (PCL-5) with Life Events Checklist for DSM-5 (LEC-5) and

Criterion A. I entered the quota of greater than or equal to 84 participants needed. I reviewed the survey in the survey creation view and then previewed the survey in what it would look like after publication. I submitted my survey for review to the IRB, who approved it for publications.

Data Analysis

Sample size and power analysis tools were used to calculate the number of study participants required to confirm if the null hypothesis had any impact on the study results.

RQ1: What is the strength of the relationship between frequency of cannabis use and presence of symptoms of posttraumatic stress disorder among veterans?

$H_0 1$-There is no statistically significant different in symptoms of posttraumatic stress and cannabis use.

$H_1 1$-There is a statically significant different in symptoms of posttraumatic stress and cannabis use.

I used Pearson Product Moment correlation to make key assumptions which would be confirmed prior to analyzing the data. The assumptions included: (a) that both variables being compared are of a continuous level of measurement (interval or ratio), (b) that the relationship between the variables was linear, (c) that there are no significant outliers and (d) that variables should be approximately normally distribute.

Assumptions

There were various paradigm assumptions that are inherent in all quantitative research studies, including the roles of values, the nature of reality, and methodological assumptions. During the study, it was assumed that the information collected from the survey about cannabis use and symptoms of posttraumatic stress disorder were answered truthfully. An assumption of this study was that the cannabis use decreased those symptoms posttraumatic stress disorders that

the Veterans reported. Another assumption was that the collected data and participant intake forms were provided in a non-biased manner.

Limitations

There were limitations that exist within this study. First, the data collected was self-reported. While self-reporting is usually regarded as an acceptable data collection, this method limited my ability to collect more detailed information regarding cannabis use and posttraumatic stress disorder symptoms. Likewise, the symptoms of posttraumatic stress disorder for Veterans were not assessed outside of self-reporting.

I made all attempts to recruit a diverse sample of Veterans for this study; however, the participant group was limited to those that have access to social media to gain access to the survey. Expanding the distribution of the survey with other methods to gather more participants should be addressed in future studies.

Delimitations

For this research, I used preexisting instruments used to report cannabis use and posttraumatic stress disorder symptoms with participants 18 years and older that have been in the United States military and identified as Veterans. Data was self-reported cannabis use and posttraumatic stress disorder symptoms. The sample population was limited to Veterans that have access to social media.

The increase in cannabis use for medicinal purposes has been on the rise for various mental illnesses among veterans. Its rise in use has been potentially equivalent to traditional medications as an alternative to help treat symptoms of posttraumatic stress disorder.

Ethical Assurances

All participant data collected was by Qualtrics via an online questionnaire. Limitations of these collection methods included the absence of the interviewer, the ability to reach all participants, completeness of the data sent, identity verification of participants provided with the data, and a lack of good random sampling could lead to questionable statistical confidence. I received approval from Institute Review Board prior to the data. Utilizing a secure site to collect and store data helped to reduce study threats and improve confidence in the data. All participants that decided to access the link via post on social media were, also, informed not to like nor comment on any post regarding any willingness of themselves or anyone else so that participants remain deidentified.

Summary

The purpose of the quantitative correlational study was to determine the strength of association between severity of symptoms of posttraumatic stress disorder with frequency of use of cannabis among the veteran population. Specially, this study considered the independence variable of cannabis use and the dependent variable of symptoms of posttraumatic stress disorder. The non-experimental, correlational study design utilized the analysis of data collected from a survey regarding cannabis use and symptoms of posttraumatic stress disorder. A Pearson Correlation was conducted to analyze the data, utilizing a sample set of 84 participants. Study threats were discussed and considered as analyses being conducted.

Chapter 4 reviews the method, the data that was collected and the analyses and interpretation of the research data. Research findings are discussed along with the evaluation of the research question and the hypotheses.

Chapter 4: Findings

The problem addressed in this study was cannabis use among veterans who report symptoms of PTSD. The purpose of the quantitative correlation study was to examine the strength of association between severity of symptoms of posttraumatic stress disorder and frequency of use of cannabis among the veteran population. The chapter presents the analyses of the research data.

The data collection process included the administration of a questionnaire through Qualtrics after screening that participants met the threshold of age, veteran status, experience with taking cannabis, and having been diagnosed or self-reporting posttraumatic stress disorder symptoms. The questionnaire included the informed consent, a measure of frequency of cannabis use (CURIT-R) and an instrument measuring PTSD symptom (PCL5-LEC-Criterion A). Questionnaire submission results were analyzed using SPSS 29.0 software. The researcher evaluated the assumptions for correlational analysis and performed reliability analyses for the two measures. The correlational analysis evaluated the relationship between the two variables: cannabis use and PTSD symptoms.

A sample size of 84 was needed for this study as identified by the G*power analysis (see Appendix D). However, after several months of recruitment, there were just 29 out of 41 participants with complete data and so the findings should be interpreted with caution. The following research question guided this study:

RQ1: *What is the strength and direction of the relationship between frequency of cannabis use and presence of symptoms of posttraumatic stress disorder among veterans?*

This chapter contains a discussion of validity and reliability of the data, the results of the reliability analysis and assumptions testing, the correlational analysis to respond to the research question, and an evaluation of the findings.

Validity and Reliability of the Data

The Cannabis Use Disorder Identification Test-Revised (CUDIT-R); (Adamson et al., 2010).), an 8-item measurement used to measure cannabis use in the sample seen in Appendix B. The assessment uses a 5-point Likert scale from 0 (never) to 4 (daily/almost daily) for items 1-7 and item 8 is scored from 0 (never), 2 (yes, but not in the past 6 months), and 4 (yes, during the past 6 months). The current study used the full scale. The PTSD Checklist for DSM-5 (PCL-5) with Life Events Checklist for DSM-5 (LEC-5) and Criterion A (See Appendix C), was a three-part measurement, where part 3 was used to measure posttraumatic stress symptoms (Weathers et al., 2013). Part 3 of the assessment used a 5-point Likert scale for items 1-20, from 0 (not at all) to 4 (extremely). The full scale was distributed, however, the study only used part 3 to measure posttraumatic stress symptoms. Part 1 and part 2 of the scale gathered information about participant's reactions to life events and was used in discussion of their reactions in Chapters 2 and 5.

Researchers assess validity to see how accurate a study measures what it was intended to measure. Schultz et al. (2019) conducted bivariate correlations between CUDIT-R and risk measures to examine concurrent validity in a sample of college student who reported recent cannabis use and found the CUDIT-R to be a reliable and valid screening measure. Roberts et al. (2021) investigated the validity of the PCL-5 in a sample of 273 participants who reported past diagnoses of PTSD or screened positively for traumatic stress symptoms, finding that PCL-5 demonstrated good convergent and divergent validity.

Cronbach's alpha provides an internal reliability coefficient for a set of questions with a measure of a variable. A Cronbach's coefficient alpha value of .70 or greater indicates good reliability of an instrument (Taber, 2018). In previous research, the CUDIT-R has demonstrated good psychometric properties (Myers et al., 2023; Amirinia et al., 2025). In the current study, reliability was calculated for the full scale. For this study, the Cronbach's alpha for the CUDIT_R (α=.877) demonstrates exceptionally good internal reliability. In previous research, the PCL-5 (which is part 3 of the instrument for this study) has shown good psychometric properties with internal consistency coefficients ranging from 0.78 to 0.94 (Arora et al., 2024; Georgescu et al., 2024; Sveen et al., 2016). For the current study, the PLC-5 has exceptionally good internal reliability (α=.940). The reliability scores are shown on Table 4.

Table 4

Internal Reliability of Scales

CUDITR		**PCL-5**	
Cronbach's α	N of Items	Cronbach's α	N of Items
.877	8	.940	20

Results

In this section, demographic characteristics of the sample and the descriptive statistics of the sample are presented. A total of 29 participants provided complete data on symptoms of PTSD and cannabis use. The results are presented from those 29 participants for the research question.

Descriptive statistics

Participant Characteristics. The final sample included twenty-nine veterans who completed the Qualtrics survey (n = 29). Most of the participants were male (59%), aged 25-35 (59%), and non-Hispanic, white (55%). Participants were well educated, with 34% having some

college with no degree and 59% reporting a college degree. Almost half were married or in a domestic partnership (48%). Most were employed full-time (62%) and served in the Army (48%). Demographics are reported on Tables 5 and 6,

Table 5

Participant Demographics

	n	%
Gender		
Male	17	59
Female	12	41
Other	0	0
Age		
18-24	1	3
25-34	17	59
35-44	6	21
45-54	3	10
55-64	1	3
65+	1	3
Ethnicity		
Hispanic, Latino, or Spanish	12	41
Non-Hispanic, Latino or Spanish	16	55
No answer	1	3
Race		
White	13	45
Black or African American	9	31
Native American or Alaska Native	2	7
Asian	2	7
Native Hawaiian or Pacifica Islander	0	0
Biracial or Multiple Races	3	10
Education		
Less than high school diploma	0	0
High school diploma or equivalate (e.g., GED)	2	7
Some college, no degree	10	34
Associate degree (e.g., AA, AS)	4	14
Bachelor's degree (e.g., BA, BS)	8	28
Master's degree (e.g., MA, MS)	5	17
Doctorate or professional degree (e.g., MD, DDS, PhD)	0	0
Marital Status		
Single	7	24
Married or in domestic partnership	14	48
Widowed	3	10
Divorced	5	17
Separated	0	0

Note. $N = 29$. Total percentage may not add to 100% due to rounding.

Table 6

Frequency and Percentage of Employment and Branch of Military

	n	%
Employment		
Employed full-time (40 or more hours per week)	18	62
Employed part time (up to 39 hours per week)	3	10
Unemployed and currently looking for work	1	3
Unemployed not currently looking for work	1	3
Student	2	7
Retired	3	10
Homemaker	0	0
Self-employed	0	0
Unable to work	1	3
Brach of Military		
Army	14	48
Marine Corp	4	14
Navy	4	14
Air Force	2	7
Space Force	2	7
Coast Guard	2	7
Other	1	3

Note. $N = 29$. Total percentage may not add to 100% due to rounding.

Descriptive statistics of measurement instruments

The present study measured the relationship between cannabis use and posttraumatic stress symptoms. The mean, median, mode, and standard deviation, were calculated for each of the measures (Table 4): showing that the average frequency of cannabis use over 6 months was $M_c = 12.76$, $sd = 5.7$. Scores higher than 12 have been found to indicate a cannabis use disorder (U.S. Department of Veteran Affairs, 2022). The average PTSD symptom score was $M_{PTSD} = 58.86$, $sd = 15.84$. For this instrument, a cutoff score between 31-33 is indicative of probable PTSD (U.S. Department of Veteran Affairs, 2022). These findings suggest that participants in

this study seemed to have elevated levels of cannabis use and more PTSD symptoms than in the general population.

Table 7

Descriptive Statistics of Variables

Variable	Mean	Median	Mode	Std. Deviation	N
Frequency of Cannabis Use	12.76	13.00	6	5.674	29
PTSDStress3	58.8621	61.00	64	15.83559	29

Assumptions Testing

The analysis required to answer the research question was Pearson Product Moment correlation. Pearson correlation was used with Likert scale PTSD measures to show scores moving together as expected and assess relationships between symptoms and other variables (Contractor et al., 2019). This correlational analysis has four assumptions. For Pearson correlation, the first assumption was both variables compared are of a continuous level of measurement (interval or ratio). This assumption was met by the characteristics of the measurement instruments because both measures of cannabis use, and PTSD symptoms were on a continuous level of measurement. The second assumption of Pearson correlation is that the relationship between the variables was linear. This assumption was evaluated by visual inspection of the scatterplot (see Appendix D), and the assumption of a linear relationship was met. The third assumption of Pearson correlation was that there are no significant outliers. Boxplots of the variables demonstrated that there were no outliers, and this assumption was met (see Appendix E). The final assumption was that variables should be normally distributed and was evaluated using Shapiro-Wilk test and Kolmogorov-Smimov test (Appendix G), resulting in $p > .05$ for PTSD symptoms but not for cannabis use, indicating that the data for cannabis use

was not normally distributed. This was supported by the histograms for the two variables. The assumption of normal distribution was not met for the cannabis data (see Appendix G). For this reason, the findings should be interpreted with caution.

Inferential Statistics

A Pearson Product Moment correlation analysis was conducted to quantify the strength and direction of a linear relationship between the two variables of interest, frequency of cannabis use and PTSD symptoms. The results of this analysis are reported below.

Research Question 1/Hypothesis. The research question that guided this study was: *What is the strength and direction of the relationship between frequency of cannabis use and presence of symptoms of posttraumatic stress disorder among veterans?* The null hypothesis was:

H_0: There is no statistically significant relationship between symptoms of posttraumatic stress and cannabis use.

The alternative hypothesis was:

H_a: There is a statistically significant relationship between symptoms of posttraumatic stress and cannabis use.

A Pearson correlation coefficient was calculated to evaluate the association between cannabis use and posttraumatic stress disorder symptoms. The results indicated there was a non-significant, weak positive relationship between cannabis use and posttraumatic stress disorder symptoms, $r(27) = .13$, $p = .511$ (Table 5). That is, there was no significant relationship between cannabis use and posttraumatic stress symptoms in this sample. The null hypothesis was not rejected.

Table 8

Correlation: Frequency of Cannabis Use and PTSD Symptoms

		Frequency of Cannabis Use	PTSDStress3
Frequency of Cannabis Use	Pearson Correlation	1	.127
	Sig. (2-tailed)		.511
	N	29	29
PTSDStress3	Pearson Correlation	.127	1
	Sig. (2-tailed)	.511	
	N	29	29

Evaluation of the Findings

The research question that guided this study was: *What is the strength and direction of the relationship between frequency of cannabis use and presence of symptoms of posttraumatic stress disorder among veterans?* In response to the research question, there was a non-significant weak, positive relationship between cannabis use and posttraumatic stress disorder symptoms. The results add to the current literature on cannabis use and posttraumatic stress disorder symptoms, where some research would report the benefits of cannabis use for posttraumatic stress disorder among veterans and other research would report how detrimental cannabis use is for mental health disorders. My findings in this study did not clearly support the research indicating that cannabis use could be useful for decreasing symptoms of posttraumatic stress disorder among veterans (Betthauser et al., 2015; Bobitt et al., 2023; Roberts, 2020; Smith et al., 2017; Walsh et al., 2017).

Findings from several studies indicated that cannabis use was associated with improvements in posttraumatic stress disorder symptoms, with evaluated evidence indicating that substantial numbers of military veterans with posttraumatic stress disorder had used cannabis to control symptoms (Betthauser et al., 2015). These results indicated that there might be a

significant negative relationship between cannabis use and PTSD symptoms with increased Cannabis use related to decreased PTSD symptoms. This was not found in the current study. In a qualitative study, Bobitt et al. (2023) found that older veterans who participated in semi-structured interviews regarding their cannabis use reported using medical cannabis as a means of harm reduction, as an adjunct or substitute for other medications and substances. Roberts (2020) reported that not only did cannabis provide relief from several specific diseases such as mood disorders and neurogenerative disease, but cannabis may be able to prevent some health problems like inflammation, seizures, and pain. Similarly, Smith et al. (2017) found that therapeutic cannabis was a potential conventional treatment option for handling mental health disorders like posttraumatic stress disorder symptoms. Also, Walsh et al. (2017) reported in their study that cannabis had was successfully used to improve sleep and negative affect symptoms in people with posttraumatic stress disorder. Walsh et al. (2017) noted that based on retrospective self-reporting of U.S. veterans, 75% of reduction in re-experiencing, avoidance, and arousal symptoms of PTSD was associated with cannabis usage. It is likely that the reason the findings of the current study did not similarly support a stronger positive link between cannabis use and reduced PTSD symptoms may have been due to the insufficient sample size and resultant lack of normal distribution of the cannabis use data.

The theoretical framework for this study was the biopsychosocial model, developed in the 1970s primarily by Dr. George Engel to address health problems from a multifactorial approach (Krantz, Suls, & Williams, 2013), observing social, biological, and psychological influences on the health of humans. In this study, interpersonal relationships (social), stress responses (biological), and trauma (psychological) were captured through responses from the instruments utilized, showing responses to distress based on work factors. Although the results of

this study did not indicate a significant relationship between the use of cannabis and the level of PTSD symptoms, the relatively high levels of cannabis use and PTSD symptoms of these participants, suggests the need for further research into the relationships among these variables with larger veteran samples.

Summary

The purpose of the quantitative correlation study was to quantify the strength of association between symptoms of posttraumatic stress disorder with frequency of use of cannabis among the veteran population. Data was collected using two instruments (CUDIT-R and PCL-5-LEC-5-Criterion A) from 41 veterans, of which 29 of the responses were usable. The Cannabis Use Disorder Identification Test-Revised (CUDIT-R) had good internal reliability with Cronbach's alpha of α=.877, and the PTSD Checklist with DSM-5, with Life Events Checklist for DSM-5 and Criterion A (PCL-5-LEC-5-Criterion A) had good internal reliability with Cronbach's alpha of α=.940. The descriptive statistics suggest that participants in this study seemed to have elevated levels of cannabis use and larger numbers of PTSD symptoms than in the general population. The Pearson Product Moment correlation analysis was conducted to quantify the strength and direction of a linear relationship between cannabis use and PTSD symptoms. The findings of the Pearson correlation analysis (Table 5), Kolmogorov-Smimov test (Appendix G), and Shapiro-Wilk test (Appendix G), which all failed to reject the null hypothesis, were detailed in this chapter. The theoretical framework for this study was the biopsychosocial model so, in this study, interpersonal relationships (social), stress responses (biological, and trauma (psychological) were captured through the responses from the instruments utilized. The results of the data analyses indicated there was a non-significant weak, positive relationship between cannabis use and posttraumatic stress disorder symptoms. The results of this study

expand on prior research that there is still ambivalence in the among the effects of cannabis use on posttraumatic stress disorder. Chapter 5 offers implications for the study, and recommendations for future research.

Chapter 5: Implications, Recommendations, and Conclusions

The problem addressed in this study was cannabis use among veterans who report symptoms of PTSD. The purpose of the quantitative correlation study was to quantify the strength of association between severity of symptoms of posttraumatic stress disorder with frequency of use of cannabis among the veteran population. Data was collected using two instruments and a total of 29 veteran participants provided complete data on symptoms of PTSD and cannabis use, with the results of the data analyzes indicating a non-significant weak, positive relations between cannabis use and posttraumatic stress disorder. The null hypothesis was not rejected.

Recruitment efforts to gain participants were focused on postings on social media platforms within social media groups on those platforms that were specifically for veterans. For those groups that allowed access (most were private and required a person to be a veteran to join, but a total of 25 groups were joined), a post was submitted every 2-3 weeks staggering on each other (posted for 5-10 one week, the next 5-10 the next week, and so forth). Veterans that saw the post and were willing to participate could click the link and be redirected to the questionnaire. A final sample of 29 participants was obtained.

The analysis was completed for those 29 participants to respond to the research question. The results of the current study suggested that the use of cannabis by participating veterans was not related to the severity of their PTSD symptoms. The results demonstrated a non-significant, weak positive relationship between cannabis use and posttraumatic stress disorder symptoms. The null hypothesis was not rejected. The current findings and previous literature suggest using cannabis could allow a veteran's symptoms of posttraumatic stress disorder. Some research reported the benefits of cannabis use for posttraumatic stress disorder among veterans

(Betthauser et al., 2015; Bobitt et al., 2023; Roberts, 2020). However, some other research reported how detrimental cannabis use is for mental health disorders (Asper et al., 2022; Baldwin & Stogner, 2022; U.S. Department of Veteran Affairs, 2022). Although the effectiveness of cannabis use for ameliorating PTSD symptoms was not addressed in this study, the study found that there was not a significant relationship between use and severity of symptoms, which may suggest that cannabis is not effective for reducing symptoms. This may be caused by the insufficient participants within the sample size to make such a determination, or cannabis just may not be effective in symptom reduction of PTSD.

The study had several limitations. The primary limitation was the insufficient sample size. As a result of the small number of potential participants responding to multiple recruitment efforts, the final usable sample size was only 29. This limited the power of the analysis to reject the null hypothesis. An additional limitation was all data collected were anonymously self-reported. The honesty and accuracy of responses to both questions about cannabis use and questions about PTSD symptoms could not be verified. A final limitation was that potential participants needed access to social media to gain access to the survey link. Eligible individuals who do not access social media would not have been aware of or able to take part in the study. These limitations resulted in an insufficient and biased sample.

Discussion

This study explored cannabis use among veterans who reported symptoms of posttraumatic stress disorder. By examining the effects of cannabis on symptoms of PTSD, the findings intended to provide a nuanced understanding to the effects. The insight gained from this research (e.g. descriptive statistics showing high levels of cannabis use and larger number of PTSD symptoms among veteran than in the general population, the assumption testing accepting

the null hypothesis, and the results of the data analyses indicating a non-significant weak, position relationship) contributed to the ongoing discussion about cannabis and its effects on mental health disorders such as posttraumatic stress disorder. These findings may suggest a more complex relationship between cannabis use and PTSD. For example, Davis et al. (2025) examined the daily association among cannabis use, posttraumatic stress disorder symptoms, perceived stress, and sleep quality using intensive longitudinal data and found that stress mediated that relationship, as cannabis' effect on stress seemed to account for reduction of PTSD symptoms.

Research Question

The aim of the research question was to examine the relationship between the frequency of cannabis use and symptoms of posttraumatic stress disorder. It was hypothesized that there was statistically significant relationship between symptoms of posttraumatic stress disorder and cannabis use. Findings from this study suggested that there was a no statistically significant relationship between symptoms of posttraumatic stress disorder and cannabis use. This did not align with existing research than indicated that cannabis use improves symptoms of PTSD, where results showed a significant negative relationship between increased cannabis used and decreased symptoms of posttraumatic stress disorder (Betthauser et al., 2015). Nor did the results of the current study concur with research indicating that cannabis use increased mental health disorders (Asper et al., 2022; Baldwin & Stogner, 2022; U.S. Department of Veteran Affairs, 2022). These conflicting results suggest the need for future research that extends beyond self-report, such as meta-analysis of the conflicting findings or controlled randomized clinical trials of cannabis use. With the findings in the study, there seems to be a gray area where there is no significant benefit, nor any significant harm caused by cannabis use for symptoms of

posttraumatic stress disorder. This could have been due to the lack of sufficient participants needed to show the magnitude of the relationship between cannabis use and symptoms of posttraumatic stress disorder. It is possible that if the required sample size had been obtained, the results might have been significant.

These findings imply the importance of continuing to explore this issue for both practice and research. With previous research showed that there are benefits to cannabis use for posttraumatic stress disorder symptoms (Smith et al. 2017; Callaghan, Sanches, & Kish, 2020), while other research showed the harm caused by its usage (Hill et al., 2021; Berey et al., 2022), the weak, positive correlation in the study implies a need for additional research on the matter. While Asper et al. (2022) reported in their research that cannabis is one of the most widely used "additive" substances, 9% of United States veterans reporting cannabis use in the past year and 41% of veterans using cannabis reported the use to be medical (Davis et al., 2018). Cannabis use for medical conditions among veterans continues to be a growing interest, with the belief that cannabis can be used to treat posttraumatic stress disorder (U.S. Department of Veteran Affairs, 2022).

This study adds to some of the literature, where cannabis is not considered a viable form of treatment within the therapeutic process. While cannabis has become legalized in several states, both for medical and recreational use, little has been known about cannabis use among veterans compared to civilians in the United States (Davis et al., 2018). Even though cannabis has become readily available for veterans to obtain across the nation, because it has not been proven to be an effective method for treatment, cannabis has not been used as a form of treatment within the Department of Veteran Affairs.

Recommendations for Practice

While the findings of this study showed no statistically significant relationship, there is research that reports that veterans have been looking for alternative ways to treat their PTSD symptoms, with the first FDA-regulated study showing improvements in veterans prescribed cannabis compared to posttraumatic stress disorder sufferers who do not use cannabis (Rodriguez Jr., 2021). Hill et al. (2025) stated that treatment providers should not ignore cannabis use in their PTSD veteran patients. Veterans turning to cannabis to cope for their mental health problems should not be ignored during this process. While the 2023 VA/DoD PTSD Clinical Practice Guideline recommends providing evidence-based treatments for disorders concurrently and have recommendation against treating posttraumatic stress disorder with cannabis or derivatives of cannabis due to the lack of evidence for their effectiveness (Hill et al., 2025), current practices should consider assessing whether cannabis use may be beneficial when combined with established treatments like cognitive behavioral therapy for posttraumatic stress disorder (Davis et al., 2025).

Another recommendation for current practices would be to consider the option of cannabis as a therapeutic method if legalization is not an issue within the state. Clinicians with veteran patients that have posttraumatic stress disorder or other issues resulting from trauma could have the conversation of usage if they are, or if legal in the state, ask if they would consider its use. It is recommended for current practices to include the veteran more into the therapeutic process, with the consideration for their treatment methods to be an option, to create a defensible standard unit for the quantification of cannabis consumption and dosing equivalencies across products (Damir & Toader, 2015; McNabb et al., 2020; Callaghan, Sanches, & Kish, 2020). Even if providers aren't making any progression with other treatments, having

veterans involved in their process for healing will leave the veteran more educated about cannabis, their mental health, and overall, themselves at their current stage of civilian life.

Recommendations for Future Research

Future research should focus on several key areas to better understand the effects of cannabis on symptoms of posttraumatic stress disorder. The first recommendation would be to address sample size by expanding the methods of distribution to gather participants. As a result of the small number of potential participants responding to multiple recruitment efforts, the final sample size was small. This was significantly lower than the size of needed, which the G*power analysis suggests that assuming with an effect size of a small (0.2) to mid-range (0.5) and alpha level of 0.05, N=84 would be required to detect an effect if it exists. Having a larger sample size would be able to increase the ability to find if there is any statistical significance within the study—if in fact cannabis use does mitigate PTSD symptom. In addition, a study looking at the quantity or frequency of cannabis use for veteran's who use it for symptom reduction would provide essential information about the 'dosage' needed to mitigate those symptoms.

Future research should also consider additional methods to collect data. Data collected within this study was all self-reported. Additional methods, such as a randomized controlled study comparing symptoms in randomly assigned control groups with no cannabis use to symptoms of participants who are assigned to use cannabis, additional quantitative data collection instruments focusing on understanding the perspectives of veterans using cannabis for symptoms of posttraumatic stress disorder, could not only increase the potential sample size but assist with gathering more detailed information regarding cannabis use and posttraumatic stress disorder symptoms.

In addition to the increased research methods themselves, the utilization of surveys and questionnaires should attempt to go beyond one method of distribution. While the use of social media is one way, distributing them through other technological or tangible ways, such as creating a QR code to be posted on websites or printing flyers of the QR code to post in places frequented by the intended population like the VA hospital, could increase the likelihood of potential participation.

Expanding on the quantitative methods and adding qualitative study, will provide a more comprehensive understanding of the effects of cannabis use on symptoms of posttraumatic stress disorder. A qualitative study focusing on understanding the perspectives of veterans using cannabis for symptoms of posttraumatic stress disorder would provide essential information. Additional methods would expand on the number of potential participants gathered and the methods in which the data is collected. Future research focused on exploring the impact of different cannabis methods of administration, frequencies, dosages, and preparations of use in the management of PTSD would be imperative in better understand its impact (Rehem et al., 2021). These recommendations aim to build upon the current study's findings, address the limitations, and further expand the understanding of the effects of cannabis use on symptoms of posttraumatic stress disorder.

Study Summary

The problem addressed in this study was cannabis use among veterans who report symptoms of posttraumatic stress disorder, with the purpose being to quantify the strength of association between severity of symptoms of posttraumatic stress disorder with frequency of use of cannabis among the veteran population. While some existing research cautioned against the long-term use of cannabis due to its association with mental health risk (Asper et al., 2022;

Baldwin & Stogner, 2022), other research provided some insight to its possibilities in being a beneficial role for treatment among veterans with symptoms of posttraumatic stress disorder (Bobitt et al., 2023; Roberts, 2020). This study was important to add to the literature on whether cannabis can be beneficial in treatment of symptoms of PTSD or not.

While this study findings didn't show any significant correlation between cannabis and symptoms of posttraumatic stress disorder, the literature demonstrates that veterans are not only a population that are at a higher risk for stressors and trauma but are wanting and willing to find ways to cope with those stressors and trauma (U.S. Department of Veteran Affairs, 2023; Letica-Crepuljaa et al., 2020). Veterans may be focused on alternative methods of coping compared to just taking pills that they believe do not work or are not used (McNaab et al., 2020). The central take-away from this study is that a strong need exists to understand if and how cannabis use may mitigate symptoms of posttraumatic stress disorder among veterans, so similar research must continue with larger samples to better understand this.

References

Adamson, S. J., Kay-Lambkin, F. J., Baker, A. L., Lewin, T. J., Thornton, L., Kelly, B. J., & Sellman, J. D. (2010). An improved brief measure of cannabis misuse: The cannabis use disorders identification test-revised (CUDIT-R). Elsevier BV. https://doi.org/10.1016/j.drugalcdep.2010.02.017

Adkisson, K., Cunningham, K. C., Dedert, E. A., Dennis, M. F., Calhoun, P. S., Elbogen, E. B., Beckham, J. C., & Kimbrel, N. A. (2019). Cannabis use disorder and post-deployment suicide attempts in Iraq/Afghanistan-era veterans. *Archives of Suicide Research, 23*(4), 678-687. https://doi.org/10.1080/13811118.2018.1488638

Adkisson, K., Cunningham, K. C., Dedert, E. A., Dennis, M. F., Calhoun, P. S., Elbogen, E. B., Beckham, J. C., & Kimbrel, N. A. (2018). Cannabis use disorder and post-deployment suicide attempts in Iraq/Afghanistan-era veterans. *Informa UK Limited*. https://doi.org/10.1080/13811118.2018.1488638

Amirinia, M., Ghasemi, B., Aghazadeh, P., & Mollazadeh, A. (2025). Psychometric validation of the persian version of the cannabis use disorder identification test. *Open Journal of Medical Psychology*, *14*(01), 71. https://doi.org/10.4236/ojmp.2025.141005

Armour, C., Fried, E. I., Deserno, M. K., Tsai, J., & Pietrzak, R. H. (2017). A network analysis of DSM-5 posttraumatic stress disorder symptoms and correlates in U.S. military veterans. Journal of Anxiety Disorders, 45, 49-59. https://doi.org/10.1016/j.janxdis.2016.11.008

Arora, I. H., Woscoboinik, G. G., Mokhtar, S., Quagliarini, B., Bartal, A., Jagodnik, K. M., Barry, R. L., Edlow, A. G., Orr, S. P., & Dekel, S. (2024). A diagnostic questionnaire for childbirth related posttraumatic stress disorder: A validation study. *American Journal of Obstetrics and Gynecology, 231*(1), 134. https://doi.org/10.1016/j.ajog.2023.11.1229

Asper, A., Binenfeld, E., Pshitizky, H., & Feingold, D. (2022). Sociodemographic and clinical correlates of cannabis dependence among Israeli combat veterans. *Journal of Substance Abuse Treatment, 139.* https://doi.org/10.1016/j.jsat.2022.108786

Berey, B. L., Aston, E. R., Kearns, N. T., McGeary, J. E., Borsari, B., & Metrik, J. (2022). Prospective associations between sleep disturbances and cannabis use among veterans: A behavioral economic approach. *Addictive Behaviors, 134.* https://doi.org/10.1016/j.addbeh.2022.107424

Betthauser, K., Pilz, J., & Vollmer, L. E. (2015). Use and effects of cannabinoids in military veterans with posttraumatic stress disorder. *American Journal of Health-System Pharmacy, 72*(15), 1279-1284. https://doi.org/10.2146/ajhp140523

Blais, R.K., Tirone, V., Orlowska, D., Lofgreen, A., Klassen, B., Held, P., Stevens, N., & Zalta, A.K. (2021). Self-reported PTSD symptoms and social support in U.S. military service members and veterans: a meta-analysis. *Eur J Psychotraumatol, 12*(1):1851078. doi: 10.1080/20008198.2020.1851078. PMID: 34992740; PMCID: PMC8725779.

Bigand, T., Anderson, C. L., Roberts, M. L., Shaw, M. R., & Wilson, M. R. (2019). Benefits and adverse effects of cannabis use among adults with persistent pain. *Elsevier BV*. https://doi.org/10.1016/j.outlook.2018.12.014

Bobitt, J., Clary, K., Krawitz, M., Silva, L. Q., & Kang, H. (2023). Prevention, practice, and policy: Older US veterans' perspectives on cannabis use. *Drugs & Aging, 40*(1), 59-70. https://doi.org/10.1007/s40266-022-00995-2

Borrell-Carrio, F., Suchman, A. L., & Epstein, R. M. (2004). The biopsychosocial model 25 years later: Principles, practice, and scientific inquiry. *Annals of Family Medicine, 2*(6), 576-582. https://doi.org/10.1370/afm.245

Borrell-Carrió, F., Suchman, A. L., & Epstein, R. M. (2004). The biopsychosocial model 25 years later: Principles, practice, and scientific inquiry. *Annals of Family Medicine*. https://doi.org/10.1370/afm.245

Browne, K., Leyva, Y., Malte, C. A., Lapham, G. T., & Tiet, Q. Q. (2022). Prevalence of medical and nonmedical cannabis use among veterans in primary care. *Psychology of Addictive Behaviors, 36*(2), 121-130. https://doi.org/10.1037/adb0000725

Bryan, J. L., Hogan, J., Lindsay, J. A., & Ecker, A. H. (2021). Cannabis use disorder and post-traumatic stress disorder: The prevalence of comorbidity in veterans of recent conflicts. *Journal of Substance Abuse Treatment, 122*, 108254. https://doi.org/10.1016/j.jsat.2020.108254

Calhoun, C. D., Stone, K. J., Cobb, A. R., Patterson, M. W., Danielson, C. K., & Bendezú, J. J. (2022). *The role of social support in coping with psychological trauma: An integrated biopsychosocial model for posttraumatic stress recovery*. Springer Science and Business Media LLC. https://doi.org/10.1007/s11126-022-10003-w

Callaghan, R. C., Sanches, M., & Kish, S. J. (2020). Quantity and frequency of cannabis use in relation to cannabis-use disorder and cannabis-related problems. *Drug and Alcohol Dependence, 217*, 108271. https://doi.org/10.1016/j.drugalcdep.2020.108271

Cheney, A. M., Koenig, C. J., Miller, C. J., Zamora, K., Wright, P., Stanley, R., Fortney, J., Burgess, J. F., & Pyne, J. M. (2018). Veteran-centered barriers to VA mental healthcare services use. *BMC Health Services Research, 18*(1), 1-14. https://doi.org/10.1186/s12913-

Contractor, A. A, Weiss, N. H., Kearns, N. T., Caldas, S. V., & Dixon-Gordon. K. (2019). Assessment of PTSD's E2 Criterion: Development, Pilot Testing, and Validation of the

Posttrauma Risky Behaviors Questionnaire. *Int J Stress Manag*, 27(3)0, 292-303. doi: 10.1037/str0000145. PMID: 33767575; PMCID: PMC7989649.018-3346-9

Cuttler, C., Spradlin, A., & Mclaughlin, R. J. (2018). *A naturalistic examination of the perceived effects of cannabis on negative affect*. Elsevier BV. https://doi.org/10.1016/j.jad.2018.04.054

Damir, D., & Toader, E. (2015). Ethical and biopsychosocial implications in posttraumatic stress syndrome. *Revista Romana De Bioetica, 13*(3), 122-127. https://search.ebscohost.com/login.aspx?direct=true&AuthType=sso&db=a9h&AN=112161843&site=eds-live&scope=site&custid=s1229530

Davis, A. K., Lin, L. A., Ilgen, M. A., & Bohnert, K. M. (2018). Recent cannabis use among veterans in the United States: Results from a national sample. *Addictive Behaviors, 76*, 223-228. https://doi.org/10.1016/j.addbeh.2017.08.010

Davis, J. P., Saba, S. K., Leightley, D., Pedersen, E. R., Prindle, J., Dilkina, B., Cantor, J., Dworkin, E., & Sedano, A. (2025). Seeking relief or fueling the fire? Understanding the complex role of cannabis in PTSD, stress, and sleep dysregulation. *Psychology of Addictive Behaviors*. https://doi.org/10.1037/adb0001097

Ecker, A. H., Lang, B., Hogan, J., Cucciare, M. A., & Lindsay, J. (2020). Cannabis use disorder among veterans: Comorbidity and mental health treatment utilization. *Journal of Substance Abuse Treatment, 109*, 46-49. https://doi.org/10.1016/j.jsat.2019.11.003

Eisenstein, M. (2015). Medical marijuana: Showdown at the cannabis corral. *Nature, 525*(7570), S15-S17. https://doi.org/10.1038/525S15a

Fava, G. A., & Sonino, N. (2008). The biopsychosocial model thirty years later. *Psychotherapy and Psychosomatics, 77*(1), 1-

2. https://search.ebscohost.com/login.aspx?direct=true&AuthType=sso&db=edsjsr&AN=edsjsr.48511053&site=eds-live&scope=site&custid=natuniv

Federal study finds cannabis beneficial for PTSD treatment (2)

Geagea, L., Ghanimé, P. M., El Hayek, S., Kobeissy, F., Tamim, H., Elbejjani, M., & Talih, F. (2022). Assessing cognitive behavioral therapy for insomnia in individuals with cannabis use disorder utilizing actigraphy and serum biomarkers: A pilot study. *Sleep Medicine, 100*, 434-441. https://doi.org/10.1016/j.sleep.2022.09.017

Georgescu, T., Nedelcea, C., Gorbănescu, A., Papasteri, C., Cosmoiu, A. M., Vasile, D. L., & Letzner, R. D. (2024). Psychometric evaluation of the PCL-5: Assessing validity, diagnostic utility, and bifactor structures. *European Journal of Psychotraumatology*, *15*(1). https://doi.org/10.1080/20008066.2024.2333222

Gibson, L. P., Karoly, H. C., Ellingson, J. M., Klawitter, J., Sempio, C., Squeri, J. E., Bryan, A. D., Bidwell, L. C., & Hutchison, K. E. (2021). *Effects of cannabidiol in cannabis flower: Implications for harm reduction*. Wiley. https://doi.org/10.1111/adb.13092

Glasofer, A. & Townsend, A.B. (2020). Determining the level of evidence: Nonexperimental research designs. *Nursing Critical Care*, *15*(1), 24-27. doi: 10.1097/01.CCN.0000612856.94212.9b

Giusti, E. M., Lacerenza, M., Gabrielli, S., Manzoni, G. M., Manna, C., D'Amario, F., Marcacci, M., & Castelnuovo, G. (2022). Psychological factors and trajectories of post-surgical pain: A longitudinal prospective study. *Pain Practice, 22*(2), 159-170. https://doi.org/10.1111/papr.13074

Gunn, R., Jackson, K., Borsari, B., & Metrik, J. (2019). A longitudinal examination of daily patterns of cannabis and alcohol co-use among medicinal and recreational veteran cannabis

users. *Drug and Alcohol Dependence, 205*, 107661. https://doi.org/https://doi.org/10.1016/j.drugalcdep.2019.107661

Hale, A. C., Bremer-Landau, J., Wright, T. P., McDowell, J. E., & Rodriguez, J. L. (2021). Residential PTSD treatment outcomes during cognitive processing therapy for veterans with and without recent histories of cannabis use. *Psychological Services, 18*(4), 497-503. https://doi.org/10.1037/ser0000424

Han, B. H., Le, A., Funk-White, M., & Palamar, J. J. (2021). *Cannabis and prescription drug use among older adults with functional impairment*. Elsevier BV. https://doi.org/10.1016/j.amepre.2021.01.042

Han, B. H., & Palamar, J. J. (2018). *Marijuana use by middle-aged and older adults in the United States, 2015–2016*. Elsevier BV. https://doi.org/10.1016/j.drugalcdep.2018.07.006

Harmon, A. (2023). Cannabis (genus Cannabis). *Salem Press Encyclopedia of Science*, 1-4

Hill, M. L., Loflin, M., Nichter, B., Norman, S. B., & Pietrzak, R. H. (2021a). Prevalence of cannabis use, disorder, and medical card possession in US military veterans: Results from the 2019–2020 national health and resilience in veterans study. *Addictive Behaviors,* 120. https://doi.org/10.1016/j.addbeh.2021.106963

Hill, M. L., Nichter, B. M., Norman, S. B., Loflin, M., & Pietrzak, R. H. (2021b). Burden of cannabis use and disorder in the U.S. veteran population: Psychiatric comorbidity, suicidality, and service utilization. *Journal of Affective Disorders, 278*, 528-535. https://doi.org/https://doi.org/10.1016/j.jad.2020.09.099

Hill, M. L., Nichter, B., Loflin, M., Norman, S. B., & Pietrzak, R. H. (2021c). Comparative associations of problematic alcohol and cannabis use with suicidal behavior in U.S. military

veterans: A population-based study. *Journal of Psychiatric Research, 135*, 135-142. https://doi.org/10.1016/j.jpsychires.2021.01.004

Hill, M., Loflin, M., Hicks, T., Browne, K., & Norman, S.D. (2025). Cannabis use and PTSD among veterans. https://www.ptsd.va.gov/professional/treat/cooccurring/marijuana_ptsd_vets.asp#backtotop

Kang, H., Hunniecutt, J., Quintero Silva, L., Kaskie, B., & Bobitt, J. (2021). Biopsychosocial factors and health outcomes associated with cannabis, opioids and benzodiazepines use among older veterans. *The American Journal of Drug and Alcohol Abuse, 47*(4), 497-507. https://doi.org/10.1080/00952990.2021.1903479

Kearns, N. T., Gunn, R. L., Stevens, A. K., Berey, B. L., & Metrik, J. (2022). Longitudinal associations between impulsivity and alcohol and cannabis use frequency, quantity, and problems among military veterans. *Psychology of Addictive Behaviors*, https://doi.org/10.1037/adb0000825; 10.1037/adb0000825.supp (Supplemental)

Kimbrel, N. A., Meyer, E. C., DeBeer, B. B., Gulliver, S. B., & Morissette, S. B. (2018). The impact of cannabis use disorder on suicidal and nonsuicidal self-injury in Iraq/Afghanistan-era veterans with and without mental health disorders. *Suicide and Life-Threatening Behavior, 48*(2), 140-148. https://doi.org/https://doi.org/10.1111/sltb.12345

Lau, F (2017). Chapter 12: Methods for Correlational Studies. *Handbook of eHealth Evaluation: An Evidence-based Approach [Internet].* Victoria (BC): University of Victoria. https://www.ncbi.nlm.nih.gov/books/NBK481614/

Letica-Crepulja, M., Stevanović, A., Protuđer, M., Grahovac Juretić, T., Rebić, J., & Frančišković, T. (2020). *Complex PTSD among treatment-seeking veterans with PTSD*. Informa UK Limited. https://doi.org/10.1080/20008198.2020.1716593

Livingston, N. A., Farmer, S. L., Mahoney, C. T., Marx, B. P., & Keane, T. M. (2022). Longitudinal course of mental health symptoms among veterans with and without cannabis use disorder. *Psychology of Addictive Behaviors*, *36*(2), 131-143. https://doi.org/10.1037/adb0000736

Lloyd, S. L., & Striley, C. W. (2018). Marijuana use among adults 50 years or older in the 21st century. *SAGE Publications*. https://doi.org/10.1177/2333721418781668

Loflin, M. J. E., Babson, K., Sottile, J., Norman, S. B., Gruber, S., & Bonn-Miller, M. O. (2019). A cross-sectional examination of choice and behavior of veterans with access to free medicinal cannabis. Informa UK Limited. https://doi.org/10.1080/00952990.2019.1604722

Loflin, M., Babson, K., Browne, K., & Bonn-Miller, M. (2018). Assessment of the validity of the CUDIT-R in a subpopulation of cannabis users. *The American Journal of Drug and Alcohol Abuse, 44*(1), 19-23. https://doi.org/10.1080/00952990.2017.1376677

Lugg, W. (2022). The biopsychosocial model – history, controversy, and Engel. *Australasian Psychiatry*, *30*(1):55-59. doi:10.1177/10398562211037333

Luque, J. S., Okere, A. N., Reyes-Ortiz, C. A., & Williams, P. M. (2021). Mixed methods study of the potential therapeutic benefits from medical cannabis for patients in florida. *Elsevier BV*. https://doi.org/10.1016/j.ctim.2021.102669

Marini, C. M., Pless Kaiser, A., Smith, B. N., & Fiori, K. L. (2020). Aging veterans' mental health and well-being in the context of COVID-19: The importance of social ties during physical distancing. *Psychological Trauma: Theory, Research, Practice and Policy, 12*, S217-S219. https://doi.org/10.1037/tra0000736

McDaniel, J. T., Thomas, K. H., Albright, D. L., Fletcher, K. L., & Shields, M. M. (2018). Mental health outcomes in military veterans: A latent growth curve model. *Traumatology (Tallahassee, Fla.), 24*(3), 228-235. https://doi.org/10.1037/trm0000151

McNabb, M., Mandile, S., Ritter, D., Brum, A., Bacon, R., MacCaffrie, R., Stout, D., White, S., Rewegan, A.N., &Tangney, E. (2020). The 2019 Veterans Health and Medical Cannabis Study. https://www.cannabissciencetech.com/view/the-2019-veterans-health-and-medical-cannabis-study

Mian, M. N., Osilla, C., & Blonigen, D. (2023). Cannabis use among U.S. military veterans following residential substance use disorder treatment. *Military Medicine*, *00*. https://doi.org/10.1093/milmed/usad216/7193027

Military One Source, 2022). Understanding and dealing with combat stress and PTSD. https://www.militaryonesource.mil/military-basics/wounded-ill-injured-and-caregivers/understanding-and-dealing-with-combat-stress-and-ptsd/

Mills, L., Dunlop, A., Montebello, M., Copeland, J., Bruno, R., Jefferies, M., Mcgregor, I., & Lintzeris, N. (2022). Correlates of treatment engagement and client outcomes: Results of a randomised controlled trial of nabiximols for the treatment of cannabis use disorder. *Springer Science and Business Media LLC*. https://doi.org/10.1186/s13011-022-00493-z

Montebello, M., Jefferies, M., Mills, L., Bruno, R., Copeland, J., McGregor, I., Rivas, C., Jackson, M. A., Silsbury, C., Dunlop, A., & Lintzeris, N. (2022). Mood, sleep, and pain comorbidity outcomes in cannabis dependent patients: Findings from a nabiximols versus placebo randomised controlled trial. *Drug and Alcohol Dependence, 234*, 109388. https://doi.org/10.1016/j.drugalcdep.2022.109388

Moring, J. C., Resick, P. A., Peterson, A. L., Husain, F. T., Esquivel, C., Young-Mccaughan, S., Granato, E., & Fox, P. T. (2022). Treatment of posttraumatic stress disorder alleviates tinnitus-related distress among veterans: A pilot study. *American Speech Language Hearing Association*. https://doi.org/10.1044/2022_aja-21-00241

Myers, M. G., Ganoczy, D., Walters, H. M., Pfeiffer, P. N., Ilgen, M. A., & Bohnert, K. M. (2023). Assessing the diagnostic utility of the cannabis use disorder identification test – revised (CUDIT-R) among veterans with medical and non-medical cannabis use. *Drug and Alcohol Dependence*, *247*, 109876. https://doi.org/10.1016/j.drugalcdep.2023.109876

National Institute on Drug Abuse. (2019). 2019 Monitoring the future survey. https://archives.nida.nih.gov/research-topics/trends-statistics/monitoring-future-survey-archive

National University. (2025). The Doctoral Student Experience (DSE). https://resources.nu.edu/c.php?g=1443778&p=10934288

Nelson, E. M. M., PhD. (2021). Medical marijuana. *Salem Press.*

Nichter, B., Hill, M., Norman, S., Haller, M., & Pietrzak, R. H. (2020). Mental health treatment utilization among U.S. military veterans with suicidal ideation: Results from the national health and resilience in veterans study. *Journal of Psychiatric Research, 130*, 61-67. https://doi.org/10.1016/j.jpsychires.2020.07.004

Perron, B. E., Holt, K. R., Yeagley, E., & Ilgen, M. (2018). Mental health functioning and severity of cannabis withdrawal among medical cannabis users with chronic pain. *Elsevier BV*. https://doi.org/10.1016/j.drugalcdep.2018.09.029

Petersen, M., Koller, K., Straley, C., & Reed, E. (2021). Effect of cannabis use on PTSD treatment outcomes in veterans. *College of Psychiatric and Neurologic Pharmacists (CPNP)*. https://doi.org/10.9740/mhc.2021.07.238

Piotrowski, N.A. & Range, L.M. (2022). Post-traumatic stress disorder. *Magill's Medical Guide (Online Edition)*, 1-7.

Psychology Today. (2022). Veterans, PTSD, and Cannabis. https://www.psychologytoday.com/us/blog/healing-addiction/202203/veterans-ptsd-and-cannabis

Purdy, E. R. (2022*). Biopsychosocial model.* Salem Press.

Rehman, Y., Saini, A., Huang, S., Sood, E., Gill, R., Yanikomeroglu, S. Cannabis in the management of PTSD: a systematic review. (2021). *AIMS Neurosci*, *8*(3):414-434. doi: 10.3934/Neuroscience.2021022. PMID: 34183989; PMCID: PMC8222769.

Risi, M.M., Sokolovsky, A.W., White. H.R., & Jackson, K.M. (2020). Factor Structure of the Cannabis Use Disorders Identification Test Revised (CUDIT-R) for Men and Women. *Cannabis*, 3(2), 148-156. doi: 10.26828/cannabis.2020.02.002. PMID: 37041965; PMCID: PMC10085579.

Roberts, J. (2020). Medical cannabis in adult mental health settings: Reconstructing one of the most maligned medications in the united states. *Clinical Social Work Journal, 48*(4), 412–420. https://doi.org/10.1007/s10615-018-0670-9

Roberts, N. P., Kitchiner, N. J., Lewis, C. E., Downes, A. J., & Bisson, J. I. (2021). Psychometric properties of the PTSD checklist for DSM-5 in a sample of trauma exposed mental health service users. *Informa UK Limited*. https://doi.org/10.1080/20008198.2020.1863578

Rodriguez, Jr., I. (2021). Federal study finds cannabis beneficial for PTSD treatment. Results of a study in march revealed improvements among PTSD patients receiving cannabis doses with higher levels of THC. *Veterans of Foreign Wars*. https://www.vfw.org/media-and-events/latest-releases/archives/ 2021/9/federal-study-finds-cannabis-beneficial-for-ptsd-treatment.

Russell, K., Cahill, M., & Duderstadt, K. G. (2019). Medical marijuana guidelines for practice: Health policy implications. *Elsevier BV*. https://doi.org/10.1016/j.pedhc.2019.07.010

Santangelo, O., Baldwin, J.M., & Stogner, J. (2022) Does cannabis testing in the military drive synthetic cannabinoid use? Self-reported use motivation among justice-involved veterans. *Internation Journal of Drug Policy*, *106*, 1-10.

Schultz, N. R., Bassett, D. T., Messina, B. G., & Correia, C. J. (2019). Evaluation of the psychometric properties of the cannabis use disorders identification test - revised among college students. *Elsevier BV*. https://doi.org/10.1016/j.addbeh.2019.02.016

Smith, P. A., Chan, S., Blake, A., Wolt, A., Zhang, L., Wan, B. A., Zaki, P., Lam, H., DeAngelis, C., Slaven, M., Shaw, E., Ganesh, V., Malek, L., Chow, E., & O'Hearn, S. (2017). Medical cannabis use in military and police veterans diagnosed with post-traumatic stress disorder (PTSD). *Journal of Pain Management, 10*(4), 397-405. https://search.ebscohost.com/login.aspx?direct=true&AuthType=sso&db=ccm&AN=129041543&site=eds-live&scope=site&custid=s1229530

Spechler, P.A., Stewart, J.L., Kuplicki, R., the Tulsa 100 Investigators, & Paulus, M.P. (2020). Attenuated reward activiations associated with cannabis use in anxious/depressed individuals. *Tanslational Psychiatry*, *10*(189), 1-13.

Stephens, R. S., Walker, R., DeMarce, J., Lozano, B. E., Rowland, J., Walker, D., & Roffman, R. A. (2020). Treating cannabis use disorder: Exploring a treatment as needed model with 34-month follow-up. *Journal of Substance Abuse Treatment*, *117*, 108088. https://doi.org/10.1016/j.jsat.2020.108088

Substance Abuse and Mental Health Service Administration. (2020). 2019 National Survey on Drug Use and Health: Veteran Adults. Pfd.

Suls, J., Krantz, D. S., & Williams, G. C. (2013). Three strategies for bridging different levels of analysis and embracing the biopsychosocial model. *Health Psychology*, *32*(5), 597-601. https://doi.org/10.1037/a0031197

Sveen, J., Bondjers, K., & Willebrand, M. (2016). Psychometric properties of the PTSD checklist for DSM-5: A pilot study. *European Journal of Psychotraumatology*, *7*(1). https://doi.org/10.3402/ejpt.v7.30165

Taber, K.S. (2018) The Use of Cronbach's Alpha When Developing and Reporting Research Instruments in Science Education. *Res Sci Educ 48*, 1273–1296. https://doi.org/10.1007/s11165-016-9602-2

Todd Arnedt, J., Conroy, D. A., Stewart, H., Yeagley, E., Bowyer, G., Bohnert, K. M., & Ilgen, M. A. (2023). Cognitive behavioral therapy for insomnia to reduce cannabis use: Results from a pilot randomized controlled trial. *Elsevier BV*. https://doi.org/10.1016/j.drugalcdep.2023.109835

Trauma- and stressor-related disorders | psychiatry online. (2022). https://psychiatryonline.org/doi/abs/10.1176/appi.books.9780890425787.x07_Trauma_and_Stressor_Related_Disorders

Tripathi, A., Das, A., & Kar, S. (2019). Biopsychosocial model in contemporary psychiatry: Current validity and future prospects. *Indian Journal of Psychological Medicine, 41*(6), 582-585. https://doi.org/10.4103/IJPSYM.IJPSYM_314_19

Turna, J., & MacKillop, J. (2021). Cannabis use among military veterans: A great deal to gain or lose? *Clinical Psychology Review*, *84*, 101958. https://doi.org/https://doi.org/10.1016/j.cpr.2021.101958

U.S. Department of Veteran Affairs. (2022). PTSD Checklist for *DSM-5* (PCL-5). https://www.ptsd.va.gov/professional/assessment/adult-sr/ptsd-checklist.asp

U.S. Department of Veteran Affairs. (2022). VA and Marijuana-what Veterans need to know. Pdf.

U.S. Department of Veteran Affairs. (2023). How Common is PTSD in Veterans? https://www.ptsd.va.gov/understand/common/common_veterans.asp

Waddell, J.T., Gress-Smith, J., Hartman, J.D., Doran, N., & Reed, B. Age, sex, and race-varying rates of alcohol use, cannabis use, and alcohol and cannabis co-use in veterans vs. non-veterans. *Addictive Behaviors*, *134*, 1-10.

Walsh, Z., Gonzalez, R., Crosby, K., S. Thiessen, M., Carroll, C., & Bonn-Miller, M. O. (2017). Medical cannabis and mental health: A guided systematic review. *Clinical Psychology Review, 51*(15). https://doi.org/10.1016/j.cpr.2016.10.002

Warf, B. (2014). High points: An historical geography of cannabis. *Geographical Review, 104*(4), 414-438. https://doi.org/10.1111/j.1931-0846.2014.12038.x

Weathers, F. W., Litz, B. T., Keane, T. M., Palmieri, P. A., Marx, B. P., & Schnurr, P. P. (2013). The PTSD Checklist for DSM-5 (PCL-5) – LEC-5 and Extended Criterion A [Measurement instrument]. Available from https://www.ptsd.va.gov/

Yockey, R. A., & Hoopsick, R. A. (2023). National trends in past-year marijuana use among veterans in the United States, 2013–2019. *Substance use & Misuse*, *58*(6), 822-827. https://doi.org/10.1080/10826084.2023.2191700

Appendix A

Informed Consent

Consent Letter

Introduction

My name is Demetria Bluitt. I am a doctoral student at Northcentral University and am conducting a research study on posttraumatic stress disorder and cannabis use. The name of this research study is The Effects of Cannabis on Posttraumatic Stress Disorder among Veterans. I am seeking your consent to participate in this study. Your participation is completely voluntary, and I am here to address your questions or concerns at any point during the study.

Eligibility

You are eligible to participate in this research if you:

1. Are over 18 years old
2. Served in the military (veteran)
3. Have used or is currently using any cannabis and/or cannabis products
4. Experiencing or experienced symptoms of posttraumatic stress disorder

Activities

In this study, participants will:

1. Complete an online survey for at about 45 minutes

I hope to include at least 54 people in this research.

Risks

There are no foreseeable risks or discomforts associated with this study. You can skip any question you do not wish to answer or stop participating at any time.

Benefits

If you participate, there are no direct benefits to you. This research may increase the body of knowledge in the subject area of this study.

Privacy and Confidentiality

In this study, certain identifying/private information may be collected. Any information you provide will be kept confidential to the extent allowable by law. To keep your information confidential, I will not ask for your name, institution, or any other identifying information. The people who will have access to your information are the researcher and my dissertation chair Patrick McNamara. The Institutional Review Board may also review my research and view your information.

I will secure your information with these steps: Locking the computer file with a password and using encryption on my computer.

Even with this effort, there is a chance that your identifying/private information may be accidentally released.

I will securely store your data for 3 years. Then, I will delete electronic data and destroy paper data.

How the Results Will Be Used

The results of this research will be presented in my dissertation for my doctoral degree. The results may also be shared in conference presentations or a scholarly publication. No participant will be identified in the results.

Contact Information

If you have questions, you can contact me at: d.bluitt6587@o365.ncu.edu.

My dissertation chair's name is Patrick McNamara. They work at Northcentral University and is supervising me on the research. You can contact them at: pmcnamara@ncu.edu.

If you have questions about your rights in the research or if a problem or injury has occurred during your participation, please contact the NCU Institutional Review Board at irb@ncu.edu or 1-888-327-2877 ext 8014.

Voluntary Participation

If you decide not to participate, or if you stop participation after you start, there will be no penalty to you: you will not lose any benefit to which you are otherwise entitled.

Consent

If you consent to participate in this research, please select the “I agree” below.

Appendix B

CUDIT-R

The Cannabis Use Disorder Identification Test - Revised (CUDIT-R)

Have you used any cannabis over the past six months? Yes_____ No _____

If you answered "Yes" to the previous question, please answer the following questions about your cannabis use. Circle the response that is most correct for you in relation to your cannabis use over the *past six months.*

1. How often do you use cannabis?

Never	Monthly or less	2-4 times a month	2-3 times a week	4+ times a week
0	1	2	3	4

2. How many hours were you "stoned" on a typical day when you had been using cannabis?

Less than 1	1 or 2	3 or 4	5 or 6	7 or more
0	1	2	3	4

3. How often during the past 6 months did you find that you were not able to stop using cannabis once you had started?

Never	Less than monthly	Monthly	Weekly	Daily/almost daily
0	1	2	3	4

4. How often during the past 6 months did you fail to do what was normally expected from you because of using cannabis?

Never0 Less than monthly1 Monthly2 Weekly3 Daily or almost daily4

5. How often in the past 6 months have you devoted a great deal of your time to getting, using, or recovering from cannabis?

Never	Less than monthly	Monthly	Weekly	Daily/almost daily
0	1	2	3	4

6. How often in the past 6 months have you had a problem with your memory or concentration after using cannabis?

Never0 Less than monthly1 Monthly2 Weekly3 Daily or almost daily4

7. How often do you use cannabis in situations that could be physically hazardous, such as driving, operating machinery, or caring for children?

Never	Less than monthly	Monthly	Weekly	Daily/almost daily
0	1	2	3	4

8. Have you ever thought about cutting down, or stopping, your use of cannabis?

Never	Yes, but not in the past 6 months	Yes, during the past 6 months
0	2	4

This questionnaire was designed for self-administration and is scored by adding each of the 8 items:

Appendix C

PTSD Checklist for DSM-5 (PCL-5) with Life Event Checklist for DSM-5 (LEC-5) and Criterion A

PCL-5 with LEC-5 and Criterion A

Part 1

Instructions: Listed below are a number of difficult or stressful things that sometimes happen to people. For each event check one or more of the boxes to the right to indicate that: (a) it happened to you personally; (b) you witnessed it happen to someone else; (c) you learned about it happening to a close family member or close friend; (d) you were exposed to it as part of your job (for example, paramedic, police, military, or other first responder); (e) you're not sure if it fits; or (f) it doesn't apply to you.

Be sure to consider your entire life (growing up as well as adulthood) as you go through the list of events.

Event	Happened to me	Witnessed it	Learned about it	Part of my job	Not sure	Doesn't apply
1. Natural disaster (for example, flood, hurricane, tornado, earthquake)						
2. Fire or explosion						
3. Transportation accident (for example, car accident, boat accident, train wreck, plane crash)						
4. Serious accident at work, home, or during recreational activity						
5. Exposure to toxic substance (for example, dangerous chemicals, radiation)						
6. Physical assault (for example, being attacked, hit, slapped, kicked, beaten up)						
7. Assault with a weapon (for example, being shot, stabbed, threatened with a knife, gun, bomb)						
8. Sexual assault (rape, attempted rape, made to perform any type of sexual act through force or threat of harm)						
9. Other unwanted or uncomfortable sexual experience						

10. Combat or exposure to a war-zone (in the military or as a civilian)						
11. Captivity (for example, being kidnapped, abducted, held hostage, prisoner of war)						
12. Life-threatening illness or injury						
13. Severe human suffering						
14. Sudden violent death (for example, homicide, suicide)						
15. Sudden accidental death						
16. Serious injury, harm, or death you caused to someone else						
17. Any other very stressful event or experience						

Part 2

A. If you checked anything for #17 in PART 1, briefly identify the event you were thinking of:

B. If you have experienced more than one of the events in PART 1, think about the event you consider the worst event, which for this questionnaire means the event that currently bothers you the most. If you have experienced only one of the events in PART 1, use that one as the worst event. Please answer the following questions about the worst event (check all options that apply):

Briefly identify the worst event (if you feel comfortable doing so):

How long ago did it happen? _____ (please estimate if you are not sure)

How did you experience it?

- ☐ It happened to me directly
- ☐ I witnessed it
- ☐ I learned about it happening to a close family member or close friend
- ☐ I was repeatedly exposed to details about it as part of my job (for example, paramedic, police, military, or other first responder)
- ☐ Other, please describe

Was someone's life in danger?

- ☐ Yes, my life
- ☐ Yes, someone else's life
- ☐ No

Was someone seriously injured or killed?

- ☐ Yes, I was seriously injured
- ☐ Yes, someone else was seriously injured or killed
- ☐ No

Did it involve sexual violence? _____Yes ☐ ____ No ☐

If the event involved the death of a close family member or close friend, was it due to some kind of accident or violence, or was it due to natural causes?

- ☐ Accident or violence
- ☐ Natural causes
- ☐ Not applicable (the event did not involve the death of a close family member or close friend)

How many times altogether have you experienced a similar event as stressful or nearly as stressful as the worst event?

- ☐ Just once
- ☐ More than once (please specify or estimate the total number of times you have had this experience ____)

Part 3

Instructions: Below is a list of problems that people sometimes have in response to a very stressful experience.

Keeping your worst event in mind, please read each problem carefully and then select one of the numbers to the right to indicate how much you have been bothered by that problem in the past month.

Your worst event:

_____

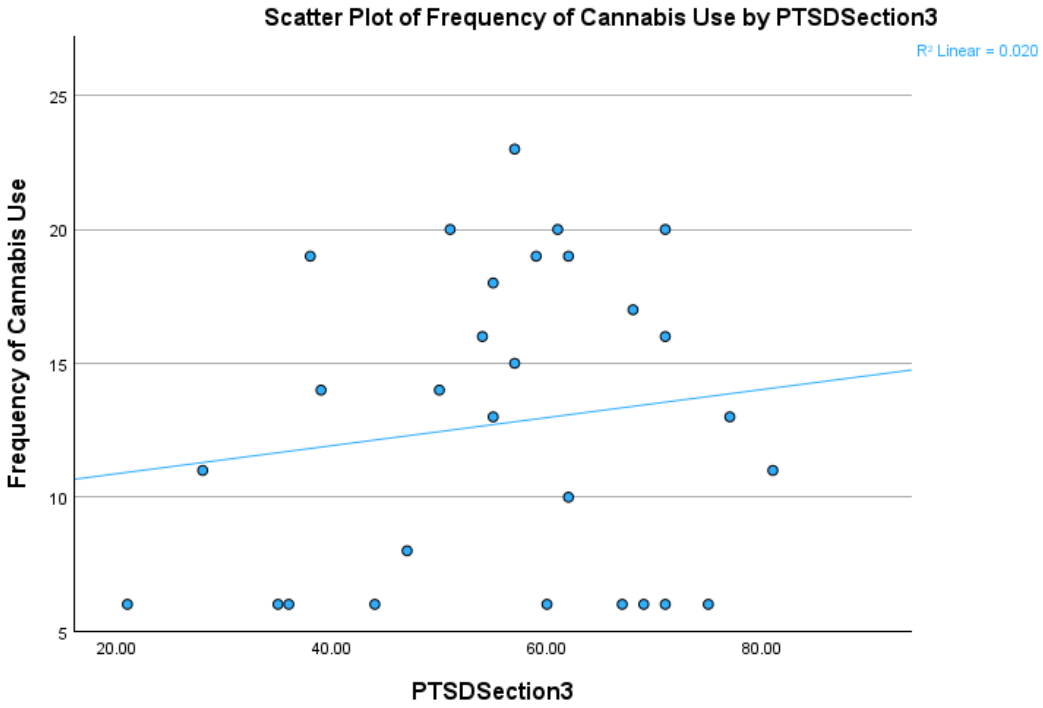
_

In the past month, how much were you bothered by:	Not at all	A little bit	Moderately	Quite a bit	Extremely
1. Repeated, disturbing, and unwanted memories of the stressful experience?	0 ○	1 ○	2 ○	3 ○	4 ○
2. Repeated, disturbing dreams of the stressful experience?	0 ○	1 ○	2 ○	3 ○	4 ○
3. Suddenly feeling or acting as if the stressful experience were actually happening again (as if you were actually back there reliving it)?	0 ○	1 ○	2 ○	3 ○	4 ○
4. Feeling very upset when something reminded you of the stressful experience?	0 ○	1 ○	2 ○	3 ○	4 ○
5. Having strong physical reactions when something reminded you of the stressful experience (for example, heart pounding, trouble breathing, sweating)?	0 ○	1 ○	2 ○	3 ○	4 ○
6. Avoiding memories, thoughts, or feelings related to the stressful experience?	0 ○	1 ○	2 ○	3 ○	4 ○
7. Avoiding external reminders of the stressful experience (for example, people, places, conversations, activities, objects, or situations)?	0 ○	1 ○	2 ○	3 ○	4 ○
8. Trouble remembering important parts of the stressful experience?	0 ○	1 ○	2 ○	3 ○	4 ○
9. Having strong negative beliefs about yourself, other people, or the world (for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous)?	0 ○	1 ○	2 ○	3 ○	4 ○
10. Blaming yourself or someone else for the stressful experience or what happened after it?	0 ○	1 ○	2 ○	3 ○	4 ○
11. Having strong negative feelings such as fear, horror, anger, guilt, or shame?	0 ○	1 ○	2 ○	3 ○	4 ○

12. Loss of interest in activities that you used to enjoy?	0 ○	1 ○	2 ○	3 ○	4 ○
13. Feeling distant or cut off from other people?	0 ○	1 ○	2 ○	3 ○	4 ○
14. Trouble experiencing positive feelings (for example, being unable to feel happiness or have loving feelings for people close to you)?	0 ○	1 ○	2 ○	3 ○	4 ○
15. Irritable behavior, angry outbursts, or acting aggressively?	0 ○	1 ○	2 ○	3 ○	4 ○
16. Taking too many risks or doing things that could cause you harm?	0 ○	1 ○	2 ○	3 ○	4 ○
17. Being “superalert” or watchful or on guard?	0 ○	1 ○	2 ○	3 ○	4 ○
18. Feeling jumpy or easily startled?	0 ○	1 ○	2 ○	3 ○	4 ○
19. Having difficulty concentrating?	0 ○	1 ○	2 ○	3 ○	4 ○
20. Trouble falling or staying asleep?	0 ○	1 ○	2 ○	3 ○	4 ○

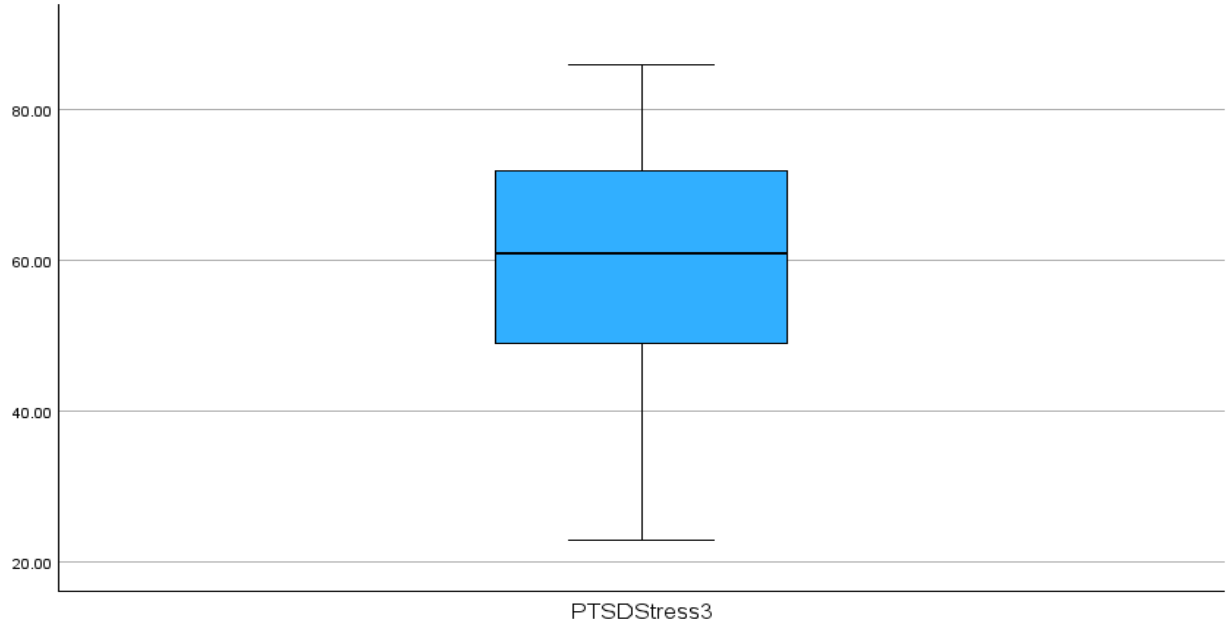
Appendix D

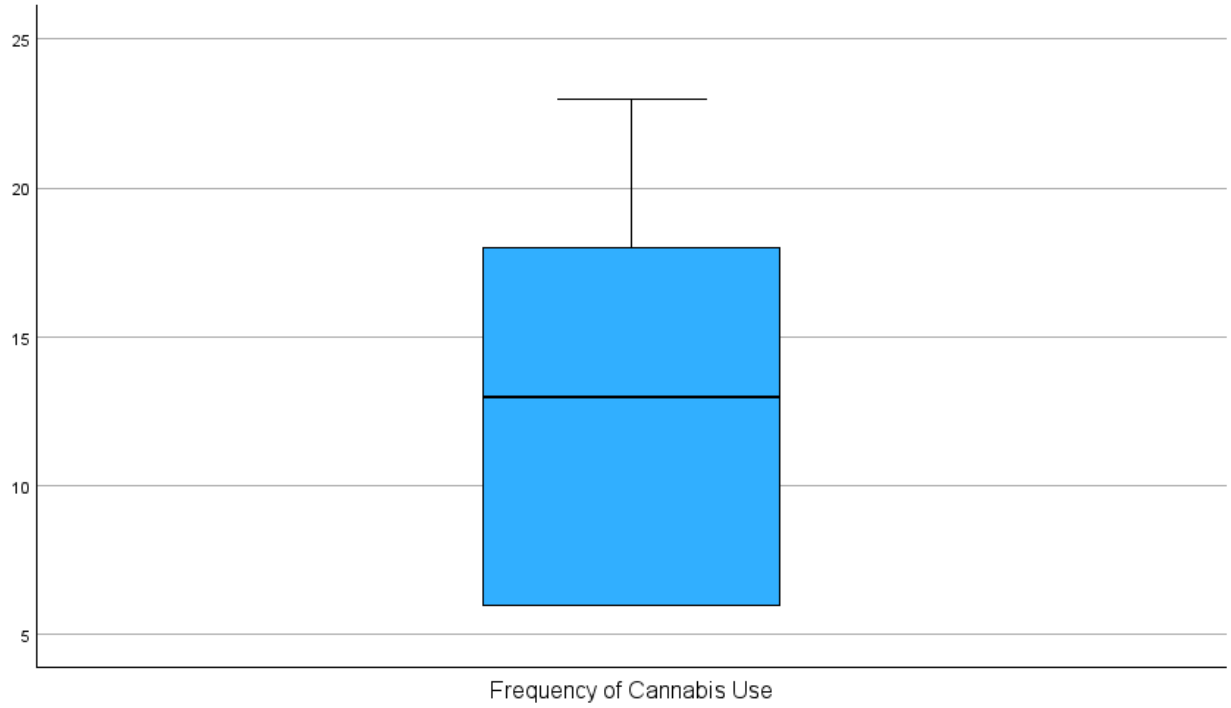
Scatterplot of Cannabis Use by PTSD Symptoms



Appendix E

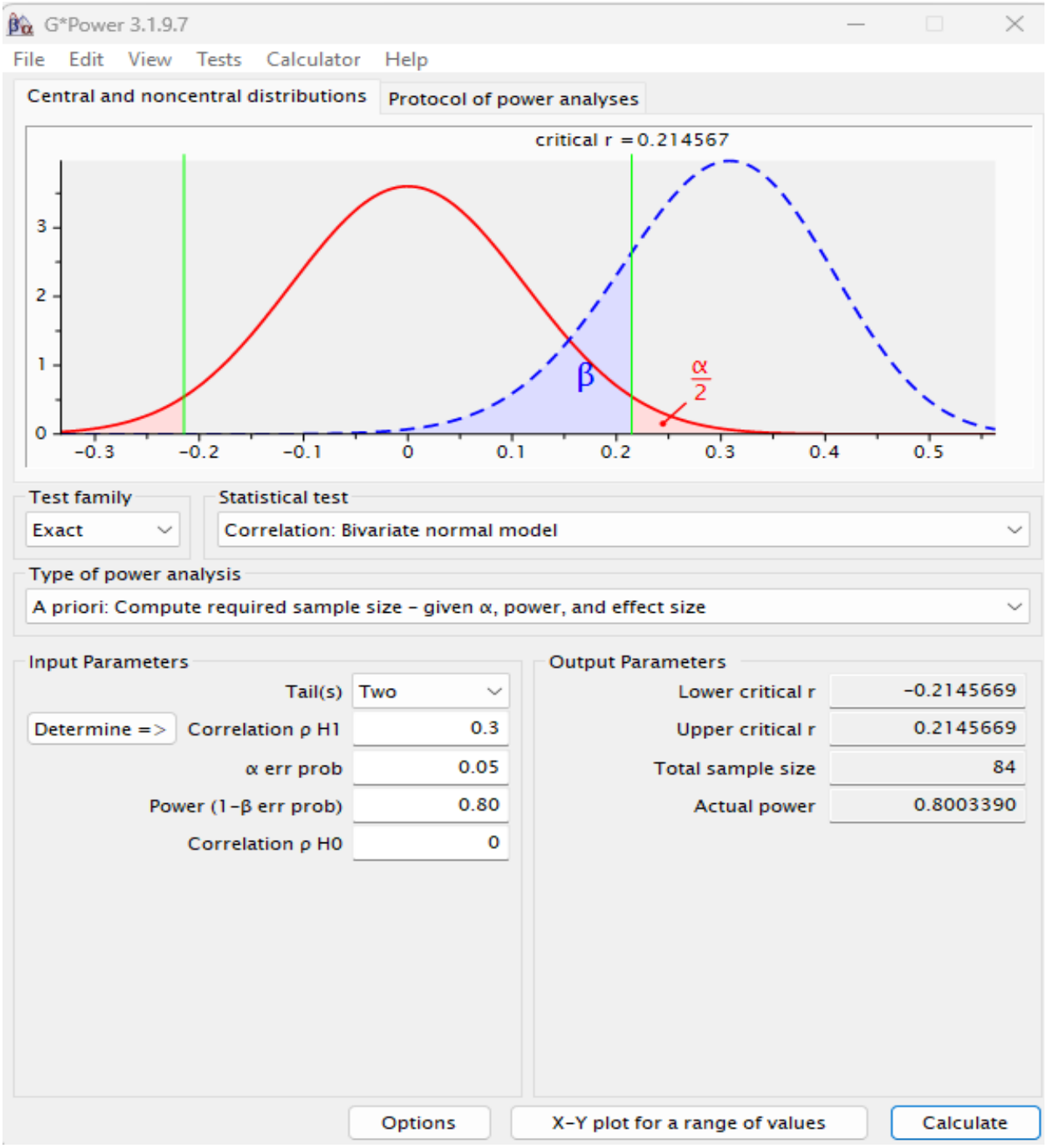
Boxplots for Visual Inspection of Outliers





Appendix F

G*Power Analysis



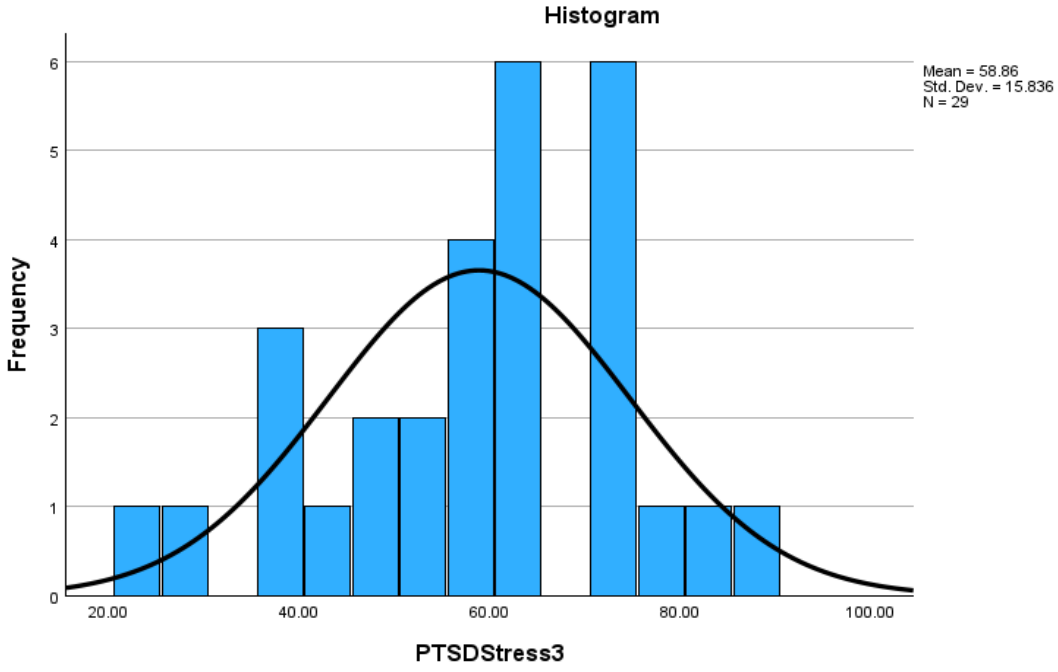
Appendix G

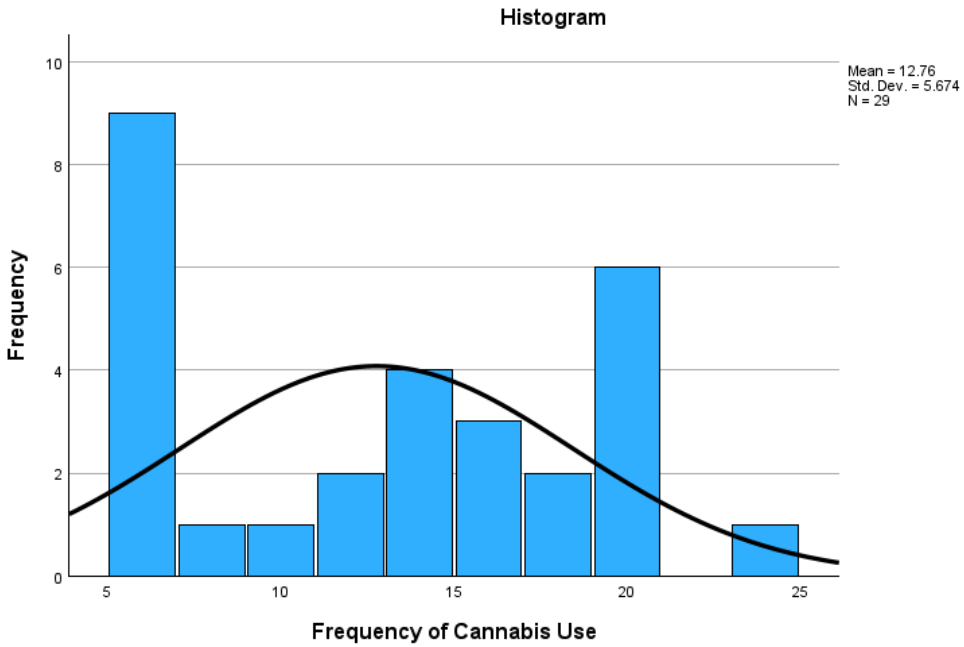
Tests of Normality

Tests of Normality

		Kolmogorov-Smirnov	Shapiro-Wilk
Frequency of Cannabis Use	Statistic	.194	.885
	Sig. (2-tailed)	.007	.004
	Df	29	29
PTSDStress3	Statistic	.089	.972
	Sig. (2-tailed)	.200*	.626
	Df	29	29

Note: *This is a lower bond of the true significance




Histogram
Mean = 12.76
Std. Dev. = 5.674
N = 29
Frequency
0
2
4
6
8
10
5
10
15
20
25
Frequency of Cannabis Use