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Assessing the Effectiveness of Treatment Programs Among Veterans with Opioid Use Disorder in New York State

Olatoye Oluwaseyi Itaniyi
Walden University

Walden University

College of Health Sciences and Public Policy

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Olatoye Oluwaseyi Itaniyi

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Review Committee
Dr. Heba Athar, Committee Chairperson, Public Health Faculty
Dr. Michael Schwab, Committee Member, Public Health Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
2024

Abstract

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by

Olatoye Oluwaseyi Itaniyi

MPH, Indiana Wesleyan University, 2017

BSc, Osun State College of Health Technology, Ilesa, Nigeria, 2003

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

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Abstract

New York State (NYS) is home to millions of veterans and has the fifth-largest veteran population in the country. Veterans represent a vulnerable population and are at higher risk for mental and physical health struggles. The focus of this quantitative study was to assess if there is any significant difference between pre- and post-OUD 24-hour detoxification treatment services, residential/rehabilitation treatment services, ambulatory outpatient treatment services, frequency of opioid use at discharge, and mental disorder among veterans with opioid use disorder in NYS when controlling for age, gender, race, and marital status. The study utilized the harm reduction framework and the health belief model as theoretical bases. Secondary data from the Treatment Episode Data Set—Discharges from 2018-2020 were used. The results of the binary logistic regression analysis indicate that 24-hour detoxification treatment is not statistically significant associated with ambulatory/outpatient care. The results suggest that, when compared with ambulatory or outpatient treatment, detox 24-hour treatment services did not increase or decrease the likelihood of a mental health disorder among the veterans. The treatment type of 24-hour detoxification was found not to be significantly associated with the likelihood of a mental health disorder among veterans. Implications for positive social change include growth of the community as a result of identifying effective treatment services to significantly lower mental disorders and criminal acts among veterans with opioid use disorder. Further research should be conducted using an experimental design to allow the deduction of cause-and-effect relationships between the study variables.

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Dedication

This dissertation is dedicated to my wife and confidante, Oluwaseyi Julianah Itaniyi, who has accompanied me every step of this journey and encouraged me to aim for excellence. I am grateful to you, Oluwaseyi, for your love, assistance, and empathy throughout this endeavor. Furthermore, this dissertation is dedicated to my children, Victor, Michelle, Tiffany, Trevor, and Vincent, who bring immense happiness to my heart daily. I appreciate your understanding and patience. I would also like to express my gratitude to my dear mother, Dorcas Aduke Itaniyi, who instilled the seed of knowledge in my mind and nurtured it while constantly reminding me of the transformative power of words. Thank you for being a pillar of support for our family throughout this dissertation journey.

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Chapter 1: Introduction to the Study

Introduction

The topic of this study is centered on the effectiveness of treatment programs among veterans with opioid use disorder in New York State (NYS). The situation that prompted this study was that NYS has a large veteran population, ranking fifth in the country (NYS Health Foundation [NYSHealth], 2017; NYS Office for the Aging [NYSOA], n.d.). Meffert et al. (2019) revealed that veterans are a vulnerable group and are at higher risk for both mental and physical health challenges. Veterans with mental illnesses, specifically those with OUD and multiple diagnoses, have a shorter life expectancy compared to those without mental illness (Trivedi et al., 2020).

Finlay et al. (2022) discovered that mental health disorders and OUD diagnoses are more common among veterans involved in legal issues (78.87%) compared to those without legal involvement (42.26%). Veterans who frequently use opioids often meet the criteria for co-occurring mental health disorders such as posttraumatic stress disorder (PTSD), depression, and anxiety (American Addiction Centers [AAC], 2023; Frost et al., 2023; National Institute on Drug Abuse [NIDA], 2019; Teeters et al., 2017). Additionally, certain mental disorders are known risk factors for developing OUD (NIDA, 2022). In 2020, there were 6,146 veteran suicides nationwide, with 143 occurring in NYS during the same year (NYS Department of Health [NYSDOH], 2022). Compared to their civilian counterparts, veterans experience higher rates of mental health disorders, substance use disorders, posttraumatic stress, and traumatic brain injury (NYS Department of Veterans' Services [NYSDVS], 2023). The economic burden associated

with severe mental illness in adults is estimated at $127 billion annually in the United States and $8 billion in NYS (Christensen et al., 2020; Hanke et al., 2018).

Furthermore, a considerable number of veterans experience opioid addictions and necessitate treatment. This research holds great importance as it aims to provide valuable insights that can be beneficial for healthcare professionals, researchers, scholars, and stakeholders. Following are the background of the study, problem statement, purpose of the study, research questions, and theoretical framework. The nature of the study, definitions, assumptions, scope and delimitations, as well as the significance of the study, will follow. The chapter concludes with a summary.

Background

Veterans have a higher likelihood of developing opioid addiction due to their increased prevalence of chronic pain (Bennett et al., 2022). Additionally, mental health issues such as PTSD are commonly experienced by veterans, leading to a greater inclination toward drug and alcohol abuse for self-medication purposes (Bennett et al., 2022). The opioid overdose crisis has had a significant impact on U.S. military veterans, resulting in a 53% increase in drug overdose mortality rates from 2010 to 2019 (Bennett et al., 2022). The risk of overdose among veterans is complex and influenced by ongoing interactions between biological, psychological, and sociostructural factors.

According to research, around 33% of veterans have a record of being arrested, which is higher than the 20% rate among non-veterans (Yen, 2023). Topolski et al. (2019) found that 64% of veterans in U.S. prisons were convicted for committing violent crimes, with one third of them serving time for violent sexual offenses (AAC, 2023; Lin

et al., 2011). Additionally, veterans who struggle with opioid abuse are 3-4 times more likely to be diagnosed with a mental health condition compared to those who do not misuse opioids. It is concerning that 13% of veterans who received opioids for pain management developed an OUD, while 23% misused their prescription opioids. Over 1,500 veterans die each week due to opioid consumption. From 2011 to 2021, there has been a significant increase in fatal overdoses caused by illegally produced fentanyl and fentanyl analogs, as well as encounters with law enforcement (The Nestled Recovery Oasis, 2023).

NYS has a substantial veteran population, ranking fifth in the country (NYSHealth, 2017; NYSOA, n.d.). Many of these veterans struggle with opioid addiction and require treatment. Furthermore, their addiction can lead to illegal activities and subsequent arrests. It is crucial to evaluate the effectiveness of OUD treatment services in NYS to address the extensive negative health impacts and behavioral health needs of veterans involved in or at risk of involvement in the criminal and juvenile justice systems. There is a paucity of research that addresses the effectiveness of specific treatment services before and after the intervention based on the type of treatment, mental disorders, and frequency of opioid use while controlling for demographic factors. This study will fill this gap and provide promising support for veterans returning from active duty by assessing the relationship between the type of OUD treatment (detoxification, residential, and ambulatory), mental health disorder status among veterans, and the frequency of opioid use before and after treatment. Additionally, age, gender, race, and marital status were controlled in the analysis.

Problem Statement

The problem is that NYS is home to millions of veterans, the fifth-largest veteran population in the country (NYSHealth, 2017; NYSOA, n.d.). Although the majority of veterans in NYS are male (92%), the number of female veterans is steadily increasing and is expected to exceed 10% by 2025 (NYSDOH, 2022). Approximately 23% of New York's veteran population consists of minorities, and this proportion is projected to reach nearly 30% by 2030 (NYSDOH, 2022). Meffert et al. (2019) found that veterans are a vulnerable group and face higher risks regarding mental and physical health. Research conducted by Trivedi et al. (2020) indicated that veterans with mental illnesses, particularly those with OUD and multiple diagnoses, have a shorter life expectancy compared to those without mental illness. Additionally, Finlay et al. (2022) discovered that mental health issues and OUD diagnoses are more prevalent among veterans involved in legal matters compared to those without legal involvement. Veterans who frequently use opioids often meet the criteria for co-occurring mental health disorders such as PTSD, depression, and anxiety (AAC, 2023; Frost et al., 2023; NIDA, 2020; Teeters et al., 2017). Some mental disorders are established risk factors for developing OUD (NIDA, 2020). It is commonly believed that individuals with severe or even subclinical mental disorders may use drugs as a means of self-medication (NIDA, 2020).

When an individual develops a mental illness, changes in brain activity associated with it can increase vulnerability to problematic opioid use. This can occur through enhancing the rewarding effects of opioids, reducing awareness of their harmful effects, or alleviating the unpleasant symptoms of the mental disorder or side effects of

medication used for its treatment (NIDA, 2020). Nationally, veterans have a significantly higher rate of involvement in the criminal justice system compared to civilians, with one-third (31.1%) having been arrested and booked (Snowden et al., 2017). Involvement in the criminal justice system includes arrest, charge, conviction, and incarceration. In 2020, there were a total of 6,146 veteran suicides across the country, with 143 reported in NYS (NYSDOH, 2022; Timko et al., 2020). The economic burden of severe mental illness among adults is estimated to be $127 billion per year in the United States and $8 billion specifically in NYS (Hanke et al., 2018). Evaluating the effectiveness of OUD treatment services in NYS is crucial to address the widespread health impact and behavioral health needs of veterans involved in or at risk of involvement in the criminal and juvenile justice systems.

Although researchers have investigated this issue, the topic has not been explored in this way: Interventions that address the opioid crisis among veterans are necessary if health professionals are to combat the veteran opioid crisis effectively. According to Banerjee et al. (2019), high-dose prescribed opioids are associated with an increased risk of substance use among U.S. military veterans. Promising interventions include widespread distribution of naloxone and increased availability of low-threshold wrap-around services such as holistic/complementary therapies and medication-assisted treatment (Bennett et al., 2022; Manhapra et al., 2020). However, there is a paucity of research on the effectiveness of specific treatment services before and after intervention based on factors, such as treatment type, veteran status, mental disorders, and frequency of use at discharge. This correlational and quantitative study aims to fill this gap by

providing support for veterans returning from active duty. The study will assess the effectiveness of three treatment programs: detoxification, residential, and ambulatory.

Purpose of the Study

The purpose of this correlational quantitative study is to determine the differences between the effectiveness of OUD treatment services among veterans using opioids (as measured by mental health disorders) and the frequency of opioid use at discharge when controlling for age, gender, race, and marital status. Two dependent variables in this study include the frequency of opioid use at discharge and the presence of a mental health disorder, which is recorded as 1= *yes* and 2= *no*, measured at the nominal level. One nominal independent variable includes treatment type (detoxification 24-hour service-hospital inpatient, rehab/residential short-term [30 days or fewer], and ambulatory intensive outpatient). Additionally, demographics of age, gender, race, and marital status were controlled for in the analysis. The dependent variables were measured at two time points, before and after treatment.

Research Questions and Hypotheses

RQ: Is there any significant difference between pre- and post-OUD 24-hour detoxification treatment services, residential/rehabilitation treatment services, ambulatory outpatient treatment services, frequency of opioid use at discharge, and mental disorder among veterans with OUD in NYS when controlling for age, gender, race, and marital status?

$H_0$1: There is no significant difference between pre- and post-OUD 24-hour detoxification treatment services and mental disorders among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

H_A1: There is a significant difference between pre- and post-OUD 24-hour detoxification treatment services and mental disorders among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

$H_0$2: There is no significant difference between pre- and post-OUD 24-hour detoxification treatment services and frequency of opioid use at discharge among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

H_A2: There is a significant difference between pre- and post-OUD 24-hour detoxification treatment services and frequency of opioid use at discharge among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

$H_0$3: There is no significant difference between pre- and post-OUD rehab/residential treatment services and mental disorders among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

H_A3: There is a significant difference between pre- and post-OUD rehab/residential treatment services and mental disorders among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

$H_0$4: There is no significant difference between pre- and post-OUD rehab/residential treatment services and frequency of opioid use at discharge

among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

H_A4: There is a significant difference between pre- and post-OUD rehab/residential treatment services and frequency of opioid use at discharge among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

H_05: There is no significant difference between pre- and post-OUD ambulatory outpatient treatment services and mental disorders among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

H_A5: There is a significant difference between pre- and post-OUD ambulatory outpatient treatment services and mental disorders among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

H_06: There is no significant difference between pre- and post-OUD ambulatory outpatient treatment services and frequency of opioid use at discharge among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

H_A6: There is a significant difference between pre- and post-OUD ambulatory outpatient treatment services and frequency of opioid use at discharge among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

Theoretical and/or Conceptual Framework for the Study

The theoretical frameworks that ground this study include the harm reduction framework created by the Substance Abuse and Mental Health Services Administration (SAMHSA) in 2021 (Centers for Disease Control and Prevention [CDC], 2022a) and the health belief model (HBM). The harm reduction framework holds historical significance as it was the first to comprehensively define harm reduction and its role within the Department of Health and Human Services (HHS). The harm reduction framework was collaboratively created by the Harm Reduction Steering Committee, which consists of national leaders with diverse backgrounds and firsthand experience with drug use. SAMHSA considers *harm reduction* to encompass a range of services, organizations, and approaches. While some may simplify harm reduction to a singular service or set of services, its applications extend beyond that. Evidence-based treatment is part of harm reduction as an approach, incorporating guiding principles and pillars that can be applied in different contexts. Even if a company or healthcare professional does not primarily provide harm reduction services, they are still encouraged to adopt the practices and principles outlined in the framework to enhance their services and engage with drug users based on these principles. Any organization working with drug users can benefit from integrating harm reduction as a strategy.

HBM was developed as a means to aid in disease detection and prevention while also providing insight into health-related behaviors. There is ample evidence supporting the adoption of harm reduction interventions and the utilization of the HBM as a comprehensive policy approach toward addressing OUD. The harm reduction approach

seeks to facilitate positive changes beyond abstinence by promoting reduced substance use, safer practices, and other lifestyle changes (Hawk et al., 2017). This approach also emphasizes that clinicians should avoid coercion, discrimination, and bias when working with individuals with OUD (Stancliff, 2019). The NYS Health Department strongly advocates a harm reduction approach in caring for all individuals who use substances, including those with a diagnosed OUD (Stancliff, 2019). The primary goal of most harm-reduction approaches is to meet individuals where they are at and not to ignore or condemn the harmful behaviors but rather to work with the individual or community to minimize the harmful effects of a given behavior (Marlatt & Witkiewitz, 2010). Using the HBM can help to examine the psychological elements influencing veterans' decisions to participate in OUD treatment programs (Frost et al., 2023).

HBM specifically examines how NYS veterans see OUD as a threat, the advantages and disadvantages of getting treatment, cues to act, and their confidence in their ability to follow the recommended treatment plan. For instance, the HBM contends that veterans' opinions about the seriousness of their OUD and its possible effects (mental disorders, relapse) will affect their willingness to seek and adhere to therapy (Gustavson et al., 2021; Mackey et al., 2020).

Nature of the Study

To address the research questions in this quantitative study, the specific research design included a correlational design. A quantitative methodology with a correlational design is most appropriate for specific reasons. First, the study includes numerical data analyzed to test hypotheses (McCusker & Gunaydin, 2015). Second, choosing a

quantitative method with a correlational design ensures research objectivity as the researcher is separated from the research participants (McCusker & Gunaydin, 2015). Third, there is no manipulation of independent variables; thus, this study is a quantitative method with a correlational design (McCusker & Gunaydin, 2015). Fourth, a quantitative method with a correlational design is the correct design for the current study because the objective is to identify and evaluate the differences between the dependent and independent variables. Finally, quantitative research methodology uses numerical data for statistical analyses, helps reduce biases, and is based on an objectivity paradigm (Bowers, 2016). Quantitative research measures include statistical, mathematical, or numerical analyses of data collected through questionnaires and surveys or by manipulating preexisting statistical data using computational techniques. A qualitative approach was inappropriate because the study was focused on something other than exploring a phenomenon or establishing a theory, model, or definition (see Allwood, 2012).

Due to the nature of the research questions, multinomial logistic regression and binomial logistic regression are the best fits for the analysis. Multinomial logistic regression predicts a nominal dependent variable given one or more independent variables (Aldrich, 2018; Lee et al., 2013). Multinomial logistic regression is an extension of binomial logistic regression to allow for a dependent variable with more than two categories (Aldrich, 2018). The reason for considering multinomial logistic regression is that it can have nominal and continuous independent variables and can have interactions between independent variables to predict the dependent variable (Aldrich, 2018; Hashimoto et al., 2019); this model can be used with any number of independent

variables that are categorical or continuous (Hashimoto et al., 2019), A binomial logistic regression predicts the probability that an observation falls into one of two categories of a dichotomous dependent variable based on one or more independent variables that can be either continuous or categorical (Harris, 2021). According to de Jong et al. (2019), multinomial logistic regression is designed to analyze data sets simultaneously, i.e., the analysis of different variables for each person or object studied measured at different time points based on three or more independent groups (in this case treatment type: detoxification 24-hour service-hospital inpatient, rehab/residential, short term [30 days or fewer], and ambulatory, intensive outpatient). Also, multivariate methods allow variables to be controlled for (in this case, age, gender, race, and marital status).

Two dependent variables in this quantitative study include the frequency of opioid use at discharge and the presence of a mental health disorder, which is recorded as 1 = *yes* and 2 = *no*, measured at the nominal level. One nominal independent variable includes treatment type (detoxification 24-hour service-hospital inpatient, rehab/residential short-term [30 days or fewer], and ambulatory intensive outpatient). Additionally, demographics of age, gender, race, and marital status will be controlled for in the analysis. The dependent variables were measured at two time points, before and after treatment.

Definitions

Drug abuse: Refers to the unauthorized consumption of drugs, including prescription medications, for purposes other than their intended use and without the guidance of a physician (CDC, 2019). Typically, drug abuse involves taking larger

quantities of drugs over a longer period than prescribed, often using someone else's prescription (CDC, 2019).

Fentanyl: Refers to a pharmaceutical drug (a synthetic opioid) designed to treat severe pain, such as in advanced cancer. The drug is 50 to 100 times more potent than morphine. However, illegal fentanyl exists and can be sold in illegal markets. Fentanyl produces heroin-like effects for users but can be extremely dangerous and fatal (CDC, 2019).

Fentanyl analogs: Refers to illicitly produced drugs that aim to produce similar psychoactive effects as regular fentanyl. However, their slightly modified molecular structures make it more difficult for investigators to detect and screen them (Cabrices et al., 2018). Like other opioids, fentanyl analogs exert effects on the central nervous system such as euphoria, sedation, anesthesia, and respiratory depression at high doses (Di Trana & Del Rio, 2020). Fentanyl is the parent compound of this highly potent opioid class with up to 10,000 times the potency of morphine. Currently fentanyl analogs are prescribed as an anesthetic and painkiller (Di Trana & Del Rio, 2020).

Opioid: A class of drugs used to alleviate pain (CDC, 2023).

Opioid dependence: When the body adjusts its normal functioning around regular opioid use. Stopping medication results in unpleasant physical symptoms (Benich, 2011; CDC, 2021).

Opioid overdose: Taking excessive amounts of opioids affects the brain's control over the respiratory system and can lead to overdose. This can slow down or suddenly stop respiration, resulting in death in some cases (MedlinePlus, 2015).

Opioid tolerance: When a person using opioids experiences a reduced response to the medication, necessitating higher doses to achieve the same effect (CDC, 2021).

Opioid treatment programs: Also known as narcotic treatment programs, these are highly regulated methadone clinics. They are the only authorized facilities to dispense methadone for the treatment of OUD (Broone et al., 2022)

Opioid use disorder (OUD): Refers to problematic opioid usage that causes significant impairment or distress (CDC, 2021; Kim et al., 2022). OUD refers to the inability to successfully reduce or control opioid use, leading to social problems and an inability to fulfill responsibilities at work, school, and home (CDC, 2021). Opioid addiction typically develops after an individual has developed tolerance and dependence on opioids, presenting physical barriers to cessation and increasing the likelihood of experiencing withdrawal symptoms (CDC, 2021).

OUD 24-hour detoxification treatment services: Round-the-clock medical acute care in a hospital setting for individuals with severe medical complications associated with withdrawal (Wakeman et al., 2020).

OUD ambulatory outpatient treatment services: Outpatient treatment services provided in an ambulatory setting for safe withdrawal (Kinard, 2017). This treatment is defined as outpatient treatment services provided for safe withdrawal in an ambulatory setting (Kinard, 2017).

Substance use disorder: A state of brain impairment that causes a person's inability to control the use of a lawful or unlawful substance or medicine. Among others, alcohol, marijuana, and nicotine are also considered drugs (Mayo Clinic, 2022)**.**

Assumptions

The first assumption was that the participants in the survey would provide honest and unbiased answers. Researchers have a responsibility to protect the privacy of study respondents and to create a sense of trust to attain responses that are not biased (Creswell, 2008). The second assumption was that the data obtained from the Treatment Episode Data Set—Discharges (TEDS-D) would be reliable and valid data. A third assumption was that the sample was representative of the study's target population.

Scope and Delimitations

The scope of the study was centered on the effectiveness of treatment programs among veterans with OUD in NYS. Additionally, I investigated how mental health and frequency of opioid use before and after treatment differ based on factors such as type of treatment, presence of mental disorders, and frequency of drug use while controlling for age, gender, race, and marital status. This study was limited to military veterans treated for OUD in NYS and included in the TEDS-D from 2018–2020. The TEDS-D did not provide the data for the years 2021 and 2022.

Limitations

The self-reported data by individuals is one limitation of the study. This self-reported data may limit the reliability of the data tool if the participants were not truthful regarding the information provided. I assumed, however, that the data were accurate and reliable. Another study limitation is convenience sampling, which limits the generalizability of study findings relative to probabilistic or random sampling techniques. Additionally, a correlational design cannot deduce any cause-and-effect difference

between the study variables, as independent variables will not be manipulated. Also, the data set used in this study was based on information that treatment facilities reported. This means the data may need to be more accurate (Do Dang, 2022). Treatment facilities may need to report all the required information, or they may be reporting inaccurate information. Also, deciding whether the archival data matches the research questions and recording the variables poses a challenge.

In addition, obtaining detailed descriptions of the population under study, assessment tools, and quality control measures poses a challenge to the investigator because the investigator has to obtain and study the codebook and other information provided by the SAMHSA database. I had to ensure that all information provided was sufficient to assess the internal and external validity of the data and allowed me to determine whether there were enough cases in the data set to generate meaningful estimates about the topic.

Significance

This quantitative study might be significant in that I sought to offer valuable information that researchers, scholars, and stakeholders may use in healthcare to understand better the link between the effectiveness of OUD treatment services and whether age, gender, race, and marital status are essential factors. The study may have several contributions to positive social change by addressing opioid disorder treatments and their connection to arrest and mental health outcomes. Veterans with OUDs often struggle to overcome addiction on their own. Effective treatments can help rehabilitate veterans with opioid addiction, leading to a reduction in arrests. This reduction can

contribute to the positive growth of the community by significantly lowering mental disorders and criminal acts among veterans with OUD. The effectiveness of treatment services involves improving knowledge and safety for veterans, providers, and legal system personnel. This also could enhance veteran education about OUD treatment services and providing social support opportunities. These efforts can enable public health professionals and healthcare providers to deliver compassionate, patient-centered treatment, improve care quality, and incorporate veterans' experiences in care delivery. When OUD treatment programs are designed and implemented effectively, the chances of success for veterans with OUDs increase significantly.

Summary

In summary, the present study aimed to determine the differences between the effectiveness of OUD treatment services among veterans using opioids (as measured by mental health disorders) and the frequency of opioid use at discharge when controlling for age, gender, race, and marital status. Veterans, who are a vulnerable group, face a higher risk of experiencing mental and physical health difficulties (Meffert et al., 2019). Individuals with mental illnesses among veterans, especially those with OUD and multiple diagnoses, have a shorter life expectancy compared to those without mental illness. Upon returning to civilian life in NYS, veterans encounter personal obstacles such as mental health issues and involvement in criminal activities after serving in the military, as stated by the NYS Unified Court System Office for Justice Initiatives (n.d.). The economic impact of each severe mental illness on adults is estimated at $127 billion annually nationwide and $8 billion within NYS.

Assessing the effectiveness of OUD treatment services in NYS is needed to address the pervasive, harmful, costly health impact and behavioral health needs of veterans involved in or at risk of involvement in the criminal and juvenile justice systems. However, there is a paucity of research that addresses the effectiveness of specific treatment services before and after the intervention based on the type of treatment, veteran status, mental disorders, and frequency of use at discharge. This study aims to fill this gap and provide promising support for veterans returning from active duty.

This study can make a number of valuable contributions to social change. In particular, the study may uncover important details on opioid disorder treatments and their relationship to outcomes in terms of arrest and mental health. The study might also benefit the community because veterans with OUDs tend to have significantly fewer mental health issues and criminal offenses when they receive effective treatment services. The study might also give veterans more opportunities for social support and better education about OUD treatment services. As a result, public health experts and healthcare providers can provide kind, patient-centered care, raise the standard of care, and ensure that veterans' experiences are considered when providing care. The next chapter, Chapter 2, offers an overview of the literature with research and theories related to the research questions.

Chapter 2: Literature Review

Introduction

NYS has a considerable number of veterans, ranking fifth in terms of veteran population nationwide. It is estimated that there are approximately 969,000 adult veterans residing in NYS (NYSDOH, 2022; NYSOA, n.d.). Many of these veterans suffer from opioid addictions and require treatment. Additionally, the opioid addiction that these veterans face may also lead to illegal activities that result in their arrest. Assessing the effectiveness of OUD treatment services in NYS is needed to address the pervasive, harmful, costly health impact and behavioral health needs of veterans involved in or at risk of involvement in the criminal and juvenile justice systems. There is a lack of research that addresses the effectiveness of specific treatment services before and after the intervention based on the type of treatment, mental disorders, and frequency of opioid use while controlling for demographic factors. This study will fill this gap and provide promising support for veterans returning from active duty by assessing the relationship between the type of OUD treatment (detoxification, residential, and ambulatory), mental health disorder status among veterans, and the frequency of opioid use before and after treatment. Additionally, age, gender, race, and marital status will be controlled in the analysis.

Literature Search Strategy

I searched online sources through the Walden University Library and Google Scholar. Databases include Google Scholar, PubMed, ScienceDirect, APA PsycArticles, APA PsycINFO, ProQuest, Eric, ResearchGate, and JSTOR. The keywords and

databases searched included *opiate uses in veterans, opiate treatment therapies, the relationship between opioid treatment plans,* and *demographics*. All sources, with the exception of seminal ones in the theoretical framework, were published from 2019–2023. This was to ensure that current sources were used to investigate the current research phenomenon.

Theoretical Framework

This correlational and quantitative study is rooted in two well-known theoretical frameworks, the harm reduction framework and the HBM, which serve as the fundamental basis for this research.

Harm Reduction Theoretical Framework

The harm reduction theoretical framework, established in 2021 under the guidance of SAMHSA, represents a crucial milestone in the efforts to define and integrate harm reduction practices within the HHS. This framework signifies a pioneering collaboration between SAMHSA and the Harm Reduction Steering Committee, comprised of a diverse group of national experts in harm reduction who possess firsthand experience in the field of substance use. According to the latest report from the CDC in 2023, SAMHSA recognizes harm reduction as a comprehensive approach encompassing various services, organizations, and a fundamental perspective. While some may oversimplify harm reduction by associating it with specific services, its scope extends far beyond that. In harm reduction, the implementation of evidence-based treatments plays a central role, guided by adaptable principles and pillars that can be applied in different contexts. Even if an entity or healthcare professional does not primarily identify

themselves as providers of harm reduction services, they can still integrate the practices and principles outlined in the framework to enhance the services they offer and engage with individuals who use drugs in a manner consistent with these principles. This highlights the broad applicability of harm reduction principles and practices, making them relevant to any organization working with drug users, regardless of their primary focus (SAMHSA, 2023).

Health Belief Model

The HBM is one of the most commonly employed frameworks in the realm of public health, initially developed in the 1950s by social psychologists Rosenstock, Kegels, Leventhal, and Hochbaum (Huang et al., 2023). The HBM provides valuable insights into the factors influencing people's choices regarding health-related behaviors, particularly preventive actions (Anuar et al., 2020). According to this model, an individual's decision to embrace health-related behaviors is shaped by various elements, including their perception of the seriousness of a health issue, the perceived advantages and obstacles to taking action, cues that prompt action, and self-efficacy, which refers to their confidence in executing the recommended steps. Applying the HBM enables a thorough exploration of the psychological factors influencing veterans' decisions to participate in OUD treatment programs in NYS (Frost et al., 2023). The program investigates how NYS veterans perceive OUD as a threat, weighs the benefits and drawbacks of seeking treatment, responds to cues motivating action, and assesses their confidence in adhering to the prescribed treatment regimen.

Understanding how NYS veterans assess the severity of their OUD and the potential ramifications, both mental and physical, allows for the effective tailoring of interventions and treatment plans to their specific needs (Lu et al., 2023; Manhapra et al., 2020; Mauro et al., 2022). For example, suppose veterans feel a significant threat from their OUD, such as the potential for severe mental health effects. In that case, they may be more likely to participate in treatment programs, resulting in improved results (Gellad et al., 2017; Oliva et al., 2017). Furthermore, understanding how veterans perceive the benefits (lower opioid use, improved mental health, avoidance of legal concerns) and downsides (stigmatization, logistical challenges) of therapy aids in customizing interventions to meet the unique needs of NYS veterans (Lu et al., 2023; Manhapra et al., 2020; Mauro et al., 2022). The model emphasizes that veterans are more likely to engage in and adhere to suggested therapies if they believe these programs will effectively reduce opiate use and improve their mental health.

Through analysis of this information, it becomes possible to assess essential aspects within the veteran community, such as how veterans perceive the severity of OUD, their perspectives on the benefits and drawbacks of therapy, their exposure to cues that encourage action (such as advice from medical professionals or fellow veterans), and their confidence in following a treatment plan. Additionally, by conducting correlational analysis, it becomes possible to understand the relationships between these factors and treatment outcomes, such as mental health status and the frequency of opioid use at the end of treatment (Hser et al., 2022; Williams et al., 2020). Correlational analyses can

provide valuable insights into the effectiveness of therapy and help identify which factors contribute to positive treatment outcomes.

Literature Review

Risk Factors Associated With Opioid Use

History of Substance Abuse

Previous misuse of prescription or illicit substances can increase the likelihood of opioid use. Continuous usage of illicit drugs such as cocaine increases the psychological urge to use other drugs, such as opioids (Bechara et al., 2019; Martel et al., 2021). Similar findings were reported by Goins et al. (2021), which established that drug users, when they lack access to their regularly used drugs, tend to opt for other available drugs, such as opioids, increasing access to over-the-counter or illicit sources. Cragg et al. (2019), in a systematic review and meta-analysis study using 65 studies on risk factors for misuse of prescribed opioids, established that individuals with a long period of addiction to prescribed drugs are highly susceptible to using and developing dependence on opioids. Individuals who have had historical encounters with substance abuse have greater chances of using opioids as an alternative drug.

Genetic Predisposition

Genetic factors can affect an individual's susceptibility to addiction and substance abuse. An explanation by Blum et al. (2021) and Deak and Johnson (2021) has shown that the allele gene increases the chances of addiction to opioids as well as other drugs, such as alcohol, by exacerbating addiction levels. Hriatpuii et al. (2022) established that mu-opioid receptors found in homo genes increase the chances of individuals addiction to

opioid abuse. Blackwood et al. (2021), concurring with Hriatpuii et al.'s (2022) findings, established that the mu-opioid receptor increases individuals' risk of dependence on other substances of abuse, such as alcohol, by influencing their dopamine systems. Other researchers have found that individuals' repulsive guidance molecule A (RGMA) gene increases their susceptibility to dependency on opioids (Cozzoli et al., 2021; Crist et al., 2019; Gelernter & Polimanti, 2021). Genetic factors increase the risks of individual addiction to opioids and other substance abuse.

Mental Health Disorders

Individuals with mental health conditions may use opioids to self-medicate, which increases the risk of suffering. Individuals with depressive symptoms are at high risk of misusing opioids as they intend to relieve themselves from these symptoms (Huang et al., 2023; Rogers et al., 2021). Herlinger and Lingford (2022), agreeing with Rogers et al.'s (2021) findings, reported that using opioids to relieve depressive symptoms is likely not to achieve the intended purpose as opioids affect the functionality of their brains by lowering their effectiveness in treating depressive symptoms. McHugh et al. (2021) established that opioids, when used by individuals suffering from anxiety symptoms, are likely to increase unpredictability and uncertainty, making it difficult to offer treatment to these individuals. Ciucă et al. (2023) concurred with McHugh et al.'s (2021) findings, which reported that individuals using opioids suffer from severe anxiety conditions with symptoms of panic attacks and tremors. Individuals with mental health conditions exacerbate their suffering by using opioids for self-medicating.

Early Exposure to Substances

Early experimentation with drugs or alcohol during adolescence may increase the risk of opioid use later in life. An explanation by Sakulsriprasert et al. (2023) has shown that the use of drugs by adolescents leads to behavioral addictions, making them develop a dependence on drugs and increasing the risk of future usage of opioids. Nawi et al. (2021) established that the high-perceived accessibility of drugs among adolescents increases the risks of opioid use as they have established the joint where to acquire the drugs with ease. Most adolescents tend to have a low perceived risk of drug use, making them indulge in various drugs within their exposition (Morales et al., 2020). Nawi et al. (2021) established that adolescent youth tend to have a high attitude toward using synthetic drugs, which increases their susceptibility to the use of opioid drugs. Early exposure to drugs among adolescents contributes to addictions as they are likely to engage in early drug usage, increasing the risks of opioid use in their future lives.

Traumatic Events

Experience of trauma, abuse, or neglect can contribute to a higher risk of substance use, including opioids, as a coping mechanism. Sharma et al. (2020) found that trauma events affect individuals' emotional and brain functionality, increasing their susceptibility to drug use. Traumatic encounters contribute to the risk of drug abuse as individuals seek coping mechanisms (Maël & Daniel, 2022). Concurring with Maël and Daniel's (2022) findings, Alexander et al. (2022) established that indulging in drugs to overcome traumatic events exacerbates individual susceptibility to addictions. Somer (2019) found that high perception individuals experiencing traumatic events for which

substance abuse offers relief are likely to be at increased risk of engaging in substance abuse. Children suffering from traumatic events are likely to develop substance abuse and addictions as they try to cope with past traumatic experiences (Darlington et al., 2023). The experience of trauma increases the risks of using opioids and other substances as they seek to cope with complex events.

Risk-Taking Behavior

Individuals inclined toward risk taking and impulsivity may be more prone to trying opioids. Individuals with sensation-seeking behaviors tend to be prone to opioid use as they seek to satisfy their needs or excitement (Ren & Lotfipour, 2019). Kozak et al. (2019) indicated that a lack of premeditation among individuals makes them more susceptible to opioids, as they are likely to use them without thinking of their adverse body effects. Individuals with urgent negative behaviors use opioids to satisfy their immediate needs and to feel good (Lucas et al., 2023). An observation by Simmons et al. (2022) has shown that a lack of individual perseverance contributes to substance use mostly through peer influence, increasing the risks of opioid use. Individuals with risk-taking behaviors and impulsivity are more susceptible to substance use as they cannot control their own behaviors.

Peer Influence

Being in social circles where substance use is prevalent can influence an individual to use opioids. The feeling of rejection by family members contributes to engagement in substance abuse among peers, as they are likely to seek acceptance and inclusivity in that group (Cance et al., 2021). Individuals encountering difficulty in

family situations tend not to resist the influence of peer pressure (Shariat et al., 2023). Individuals ailing from a family with a history of substance abuse are more susceptible to giving in to peer influence as they quickly follow their family members (Afuseh et al., 2020). Individuals facing mental health conditions may tend to engage in drug abuse, especially when their circle of friends is involved in drug abuse (Nath et al., 2022). Young people from families with favorable attitudes toward drug abuse are likely to give in to their peers involved in drug abuse (Kaur et al., 2019). Children with little parental supervision and monitoring are likely to engage with peers who are drug addicts, leading to increased susceptibility to drug abuse (Field, 2020; Sharma et al., 2023). Closely related to Sharma et al.'s (2023) findings, Trucco et al. (2023) established that children who have little sense of connection to school are at high risk of engaging in substance abuse as they are likely to follow their peers' behaviors and actions. An individual's social circle determines their susceptibility to drug abuse, as it is likely to influence their actions and behaviors.

Family History of Substance Abuse

Growing up in a household with a history of substance abuse can normalize substance use and increase the likelihood of opioid misuse. Children with addicted parents are likely to abuse substances as they follow and copy their parents' behaviors (Alhammad et al., 2022). Similar findings regarding parents' addiction and dependency on substance abuse have been reported by Ervatti et al. (2023), who established that there is the likelihood of the existence of a dysfunctional family that causes trauma to children who may engage in substance abuse as a way of coping with various family problems.

Families with parents suffering from dual diagnoses of mental health conditions and substance abuse are more susceptible to developing substance use issues (Voss et al., 2023). Family history contributes to the risk of developing substance abuse issues as people tend to copy their behaviors or seek coping mechanisms.

Socioeconomic Status

Lower socioeconomic status may limit access to education, employment, and healthcare, increasing vulnerability to opioid use. Families with low socioeconomic status lack access to education, making them more susceptible to opioid use as they seek alternative coping procedures (Spencer & Weathers, 2020). Low educational attainment makes it difficult for low-status families to secure formal jobs, denying them chances to earn better (Beseran et al., 2022). Van et al. (2020), agreeing with the findings of Beseran et al. (2022), established that lack of better pay for low-income families exacerbates their engagement with drugs, emanating from increased risks of mental health disorders such as high depression levels, hence an increase in their susceptibility to opioid use. Low socioeconomic status limits accessibility to better healthcare services, making them access over-the-counter drugs such as opioids, which increases their risk of dependency and addiction (Atkins & Mukhida, 2022). Families with low socioeconomic status are at greater vulnerability to opioid use as they try to cope with the severe suffering emanating from their living conditions.

Availability of Opioids and Prescription Practices

Easy access to prescription opioids, whether through legal prescriptions or illicit sources, increases the risk of misuse. Individuals accessing opioids through medical

prescriptions increase the chances of their usage and probable misuse (Nazarian et al., 2021). Increased sales of opioids over the counter exacerbate their abuse as they can easily acquire them in pharmacies and from chemists (Sobczak & Goryński, 2020). Increased opioid usage has also emanated from high levels of illicit acquisition, increasing its abuse among many people (Jones et al., 2020). Access to opioids with ease has led to increased misuse as users know various joints where to access them.

Overprescribing or inappropriate prescribing of opioids for pain management can increase the risk of dependence and misuse. Johnson et al. (2021) found that individuals with mental health problems during pain management of other illnesses are at high risk of developing dependence on opioids as their mental conditions may aggregate their pain suffering, leading to overdose. Similar to Johnson et al. (2021), findings were reported by Adeola and Urman (2022), which established that patients with a history of current substance use, such as opioids, may tend to misuse prescribed opioid dosages as they are likely to take the required prescriptions. Individuals prescribed high doses of opioids are likely to develop dependence as they use them regularly (Bedene et al., 2022). Overdependence and misuse of opioids arise in scenarios where overprescribing or inappropriate prescribing occurs, leading to an increased risk of abuse.

Factors Contributing to the Opioid Crisis Among Veterans

The opioid overdose crisis has significantly impacted U.S. military veterans, creating a pressing public health concern. Veterans, like other segments of the population, are not immune to the challenges posed by opioid misuse and addiction. Several factors contribute to the opioid crisis among veterans:

Transitioning to Civilian Life

The transition from military to civilian life can be challenging, and veterans may turn to opioids to cope with the stress and difficulties they encounter during this period. Prior research studies have shown that military veterans may suffer psychological and social pain after their military service; therefore, combating pain and stress made them seek intervention in opioid misuse to enable them to readjust to civilian life (Bennett et al., 2022). Similarly, veterans with co-occurring depression, trauma from landmine blasts, and suicidal thoughts may develop increased opioid-seeking behavior as a coping mechanism as they reintegrate into society (Baria et al., 2018). Analyzing data from a systematic review of 20 articles, Timko et al. (2020) found that female veterans with severe mental disorders, particularly those unemployed, reported high and significant risks of abusing opioids to counter their stress in the community. Overall, transitioning to civilian life has significantly contributed to opioid abuse among veterans.

The perspective of veteran transition to civilian life leading to opioid misuse has increasingly become a significant point, attracting increased scientific interest due to inclusive reported findings. Stigmatized veterans suffering from depression combined with low-income family relationships may endure the risks of engaging in opioid abuse to enable them to counter their pain and keep a good reputation as they readjust to civilian life (Meca et al., 2020). Other researchers have also reported that military veterans lacking financial and social support will likely endure being opioid addicts during the transition, given that it would enable them to cope with their life challenges (Bond et al., 2022). Additionally, analyzing data from online surveys, Bennett Jr. et al. (2023) also

concluded that African American veterans with severe disease multi-morbidity due to traumatic exposure and socio-environmental factors were significantly associated with opioid misuse, thus reducing the gap in transitioning. Combined, the evidence presented in this section suggests that veteran transitional challenges may directly contribute to their engagement in opioid abuse to cope with their life challenges, including mental health and financial constraints.

Accessibility and Availability

Veterans may have easier access to prescription opioids through the Veterans Health Administration (VA) and private healthcare providers, contributing to the misuse of these medications. Prescribing pain reliever opioids to injured, traumatized, and homeless veterans after military deployment has immensely contributed to the use of opioids and OUDs (Finlay et al., 2021). Similar findings were also reported by Gordon et al. (2020) in a quantitative study with 246 participants. The researchers demonstrated that the Veteran Health Administration, in initiating stepped care for opioid use and increased prescription treatment for opioids among veterans with mental health and chronic pain, led to veteran abuse of opioids. Brunet et al. (2022) results also corroborated Gordon et al. (2020) findings, maintaining that tele-prescription of buprenorphine and treatment among 12 veterans with opioid use disparities inversely promoted their frequent abuse of opioids after their treatment. Overall, the research findings reported here consistently indicate that access to and availability of healthcare services among veterans may significantly contribute to opioid addiction.

Contrary to the compelling evidence regarding access to medication among veterans, increased OUD is still an issue that has attracted high scientific interest, mainly due to inadequate findings. Investigating barriers to medical treatment among 18 veterans with opioid disparities and those they work with in the Veterans' Health Administration, Finlay et al. (2020) found a significant correlation in opioid abuse. The study findings showed that despite medication stigma among veterans, individuals working in the Veterans Health Administration provided un-prescribed opioid medication to veterans, thus exacerbating the abuse of opioids. Similarly, multiple studies have also shown that accessibility to healthcare may affect veteran use of opioids indifferently (Finlay et al., 2020; Lin et al., 2020). Supporting Finlay et al. (2020) findings, Lin et al. (2020) also concluded that despite veterans having adequate opioid clinic visits, opioids and other substances of abuse continued to be abused as pain relievers. In a different study, Chang et al. (2020) reiterated that the Veterans Health Administration can enhance the training of veterans with OUDs on medical treatment and the provision of clinical preceptors, thus reducing opioid abuse.

Co-occurring Substance Use Disorders

Veterans with substance use disorders, including alcohol or other drug dependencies, are at higher risk for opioid misuse and overdose. Analyzing data from online surveys with 212 participants, Kelley et al. (2019) alluded to the fact that depressed and traumatized veterans may use sedative drugs, which can later contribute to opioid overdose as a pain-relieving mechanism. Fletcher et al. (2022) also examined Kelley et al. (2019) findings, revealing that transgender veterans facing economic

hardship, homelessness, and military sexual trauma reported high substance use disorders that fueled their addiction to opioid misuse. Some researchers have also demonstrated that veterans associated with binge drinking may develop higher odds of opioid misuse compared to non-drinkers in a study by Esser et al. (2019). Along the same lines, Warfield et al. (2021) also asserted that increased use of substance abuse, including heroin, may not only increase overdoses of opioids but also have been shown to increase the prevalence of mortality among veterans. Together, the findings indicated that, under different circumstances, alcohol and other drug abuse may influence veterans' engagement in the abuse of opioids.

Demographic Factors and Opioid Use

Opioids have been used to treat and alleviate pain. When legally prescribed, opioids can relieve symptoms from illness and relax the body from pain following a surgical procedure or injury, such as severe pain resulting from trauma and post-surgical pain (Nadeau et al., 2021). Some of the of the opioids used for medical purposes include tramadol, fentanyl, and morphine. However, prolonged use, non-medical use, and use without medical supervision can result in health problems and opioid dependence (Hudgins et al., 2019). Studying OUD and treatment, Hoffman et al. (2019) stated that increased OUD was associated with enhanced consumption of pure heroin, opioid overdose, increased access to prescription opioid analgesics, and the introduction of illicit fentanyl compounds. This review section will discuss how gender, age, race, marital status, and prescription opioid use will be discussed.

Gender Differences in Prescription Opioid Use

Prescription opioid use is different between men and women, with numerous studies showing an inconsistency in opioid prescriptions between men and women. Preciado et al. (2020) examined the national gender differences in the prescription of opioid medication between 2006 and 2015. They reported that in hospital visits, men were prescribed opioid use at 10.4% compared to 9.4% of visits by women. Although women had higher opioid visits, men were more likely to be prescribed an opioid. Contrary to Preciado et al. (2020), Orlando et al. (2020), while studying the gender differences in medication use, found that the number of opioid prescriptions for women was higher than that of men. Consistent results were reported by Goetz et al. (2021), who reported that although men experienced chronic pain, women experienced a significantly greater number of chronic pains that increased their use and prescription of opioids. Increased prescription opioid use among women results from the chronic pain they experience, and as such, they use opioids to relieve pain.

Compared to men, women experience more acute and chronic pain, characterized by higher rates of musculoskeletal pain, osteoarthritis, abdominal pain, and postoperative pain. Goetz et al. (2021) asserted that the different pains experienced by women, such as neuropathic pain and postprocedural pain, increased their opioid use and prescription, which, if unchecked, led to addiction and uncontrolled use of drugs such as fentanyl and heroin. Khodneva et al. (2021) reported comparable results and established that more women received opioid prescription use and were at risk of sudden death, accidental death, and cardiovascular diseases than men. Although different from Khodneva et al.

(2021), Meade et al. (2023) reported that, compared to men, women were at a higher risk of filling an opioid prescription monthly as a result of low back pain, preoperative diagnosis of anxiety, depression, and tobacco use. Gender differences influence the use of opioids and opioid prescriptions.

Additional research has demonstrated higher opioid prescriptions and use among women than men. Silver and Hur (2020) quantitatively investigated gender differences in prescription opioid use and misuse. The logistic regression analysis of the collected data revealed that although men were at risk of increased opioid prescriptions, women reported higher prescription opioid use because of the numerous chronic pains. Studying prescription opioid misuse among school-aged adolescents, Carrasco-Garrido et al. (2022) analyzed a sample of 554 adolescents. They found that opioid misuse was more prevalent among boys than girls. The researchers further noted that the risks for opioid use and misuse among both genders included frequent use of sedatives, sleeping pills, misuse of tranquilizers, and illicit psychoactive drugs. Comparing gender differences in physical morbidity among opioid agonist treatment patients, Rolova et al. (2023; (Serdarevic et al., 2017) found women to have a higher prevalence of opioid agonist treatment than men. Across the reviewed literature, although men prescribed opioids, women, as a result of diverse pains such as postprocedural pain and abdominal pain, increased their prescription opioid use (Serdarevic et al., 2017).

Numerous other researchers have reported that prescription opioid use is influenced by gender (Goetz et al., 2021; Huhn & Dunn, 2020; Polenick et al., 2019). Quantitative research by Polenick et al. (2019) revealed that the gender of the patients

moderately influenced the relationship between loneliness and the illicit use of opioids. Additional findings revealed that illicit opioid use was higher among women than men, and marital status, depressive symptoms, and work status influenced use. Corroborative findings were reported by Huhn and Dunn (2020), who contended that opioid use was high among women who had experienced trauma due to intimate partner violence. The stigma associated with OUD was also associated with non-medical opioid use among women. Goetz et al. (2021) reiterated that, compared to men, women received higher volumes of opioid prescriptions, increasing the risks of opioid misuse and addiction. Taken together, researchers agree that while men have reported higher prescription opioid use, women have a higher and increased risk of opioid use and misuse.

Opioid Use and Age

Prescription opioid use is influenced by age. Osborne et al. (2020) investigated the age of first use of prescription opioids and prescription opioid non-medical use among older adolescents. The logistic regression analysis of the collected data revealed that an increase in age decreased the non-medical prescription of opioid use among adolescents aged 17 and 18. In a different study, Weesie et al. (2020) investigated whether the use of opioids increased with age in older adults. Analyzing primary care data from 2005 to 2017 established that opioid prescription changed with increasing age frequency, duration, and nature, despite the increased risk of harm to older adults.

Agreeing with Weesie et al. (2020), Dahlhamer et al. (2021) reported that increased prescription opioid use among adults in the United States was associated with chronic pain management, such as pain due to cancer and musculoskeletal diagnoses. The

researcher further noted that prescription opioids increased with age and declined among adults older than 65. In the reviewed studies, prescription opioid use increases with age and is associated with chronic pain experienced by adults.

Among adults, prescription opioid use increased among adults aged 18-64 but decreased among adults older than 65 years. Results similar to Dahlhamer et al. (2021) were reported by Wilson et al. (2021), who studied the trends of opioid use among first opioid prescription use among young adults and naïve youths. The increasing trajectory of opioid use was associated with age, as the risks of persistent opioid use were high among older adults. The results further revealed that short- and low-dose opioid prescriptions were associated with increased risks of persistent use among youths.

Corroborative findings were reiterated by Elmore et al. (2021), who reported that prescription opioid use among women of reproductive age in the United States increased among women aged 15 to 44. In prior research, Schuler et al. (2019) demonstrated that while increased prescription opioid use was high among older adults, young adults were reported to purchase prescription opioids at a higher rate and were at risk of misuse and subsequent opioid abuse.

Clinical pain management among older adults has increased the likelihood of prescription opioid use in this age group. Potru and Tang (2021) asserted that most older adults were diagnosed with painful and chronic conditions such as degeneration of the muscles, joints, and bones, and opioid medication was prescribed to ease that pain.

Although this is the case, the researcher established the need for more research on the particular use of opioids to alleviate chronic pain in older adults to minimize the risks

of opioid addiction. Corroborative results were reiterated by Peavy and Banta-Green (2021), who reported that, similar to older adults, prescription opioid use increased six-fold among individuals aged between 13-25 years. Prescription opioid use among adolescents was limited by people's negative attitudes and inaccurate beliefs about opioid medication, and difficulties accessing opioid medication reduced prescription opioid use among adolescents in the United States. Fergus et al. (2022) reported that among adolescents, prescription opioid use was limited by people's negative attitudes and inaccurate beliefs about opioid medication, and difficulties accessing opioid medication reduced prescription opioid use among adolescents in the United States. Fergus et al. (2022) reported that among young adults, opioid misuse was associated with a lack of college education and depression. Youths exposed to inpatient hospitalization were at increased risk of future opioid use and misuse. Across the reviewed study, prescription opioid use increased with age.

Opioid Use and Race

Prescription opioid use in the United States varies among the different racial and ethnic groups in the country. Drake et al. (2020) explored the impacts of opioid use and the epidemic among the Black and Hispanic communities in the United States. Analyzing longitudinal data from the Centers for Disease Control Multiple Cause of Death database between 1999-2017 established that among the different ethnic groups, opioid use and opioid-related deaths were high among whites and non-Hispanics. Greater opioid use and death were, however, reported among Black people during the same period. Consistent results were reported by Hirsh et al. (2020), who found that Black patients were at

increased risk for suboptimal pain care, increasing prescription opioid use, misuse, and addiction. Similar results were reported by Andraka-Christou (2021), who, while investigating racial and ethnic differences in the use of medical opioids and OUD, found that opioid misuse and opioid-related deaths were high among people of color compared to non-Hispanic white people.

Marginalized communities and people of low socioeconomic status are associated with lower rates of opioid prescription and under-treatment of pain in multiple noncancer healthcare facilities. Vitzthum et al. (2021) investigated socioeconomic discrepancies and racial and ethnic differences among older adults. They found that, compared to non-Hispanic White patients, the likelihood of prescription opioid use was lower among non-Hispanic Blacks and higher for Asian-Pacific Islanders. However, no statistically significant relationship existed between continued opioid use and ethnicity or race. Using data drawn from a national sample collected between 1999-2018, Schuler et al. (2021) reported that prescription opioid misuse was higher among non-Hispanic white individuals when compared to Hispanics, Asians, and Black people. Similarly, prescription opioid misuse was also higher among Native American individuals. At the same time, the use of heroin has significantly increased among white individuals. Agreeably, Morden et al. (2021) contended that although there was insufficient research on prescription opioid use among the different racial groups in the United States, the prevalence of opioid receipt was higher among white patients compared to Black patients. The inconsistent prescription opioid use among the different racial groups warrants additional research.

Differential pain management and prescription of opioids, as well as opioid-related deaths, are prevalent among different community groups in the United States. Exploring the trends in prescription opioid and nonopioid analgesic use by race, Cho and Chang (2021) and Bennett et al. (2022) found prescription opioid use was lower in Hispanics, Blacks, and Hispanics. However, the general finding is that prescription opioid use increased across the different races, with the use decreasing with the prescription and declining with the prescription limits. Flores et al. (2023) established that, compared to whites, ethnic minorities were prescribed opioids at lower rates and were also less likely to be diagnosed with pain disorders. The researchers further reported that although the prescription of opioids decreased nationally, white patients still experienced higher volumes of opioid prescriptions and elevated risks of OUD. Comparing racial and ethnic differences in preventing opioid overdose, Khan et al. (2023) reported that Black people had limited access to naloxone and prescription opioid use. Across the reviewed studies, the inconsistency in reported findings warrants additional research, hence the need for this study.

Opioid Use and Marital Status

Research has demonstrated that, concerning marital status, opioid use was higher among single people than among couples. Altekruse et al. (2020) investigated the risk factors for increased opioid overdose in the United States. Using data obtained from the mortality disparities in an American community study, the researchers revealed that the risks of opioid use were higher among widowed individuals than married people, with the prevalence also being higher among men than women. Corroborative results were

reported by Bockerman et al. (2020), who also investigated the factors determining the use of and prescription of opioids in the general population. Comparing the United States and Finland, the researchers explained that opioid use was high among unemployed and unmarried people. In earlier research, Khan et al. (2019) studied the relationship between opioid overdose and family opioid prescriptions to family members. The results indicated that opioid overdose was high among families with young children, increasing the number of opioids prescribed to family members.

Research has demonstrated a relationship between opioid use and an individual's marital status. For instance, Polenick et al. (2021) investigated the dyadic association between the risks of opioid use and the quality of relationships among couples. In the quantitative study with a heterosexual sample of 53 married and cohabiting couples, the researchers established that both men and women had moderate to high risks of nonmedical prescription opioid use. The risks of street opioid use were high among couples. The study further revealed that women who reported quality interpersonal relationships were at reduced risk of nonmedical opioid prescriptions and the use of street opioids.

Contrary to the findings reported by Polenick et al. (2021), Derrick et al. (2019) reported that poor-quality relationships between partners increased the risks of nonmedical opioid use. Similarly, poor communication between partners and increased cases of intimate partner violence exacerbated feelings of isolation and street opioid use or the use of methadone for OUD (Crowley & Miller, 2020). Taken together, the results

of this study indicate that positive and negative relationships among married individuals influenced the medical and nonmedical use of opioids.

Health Effects of Opioid Use Disorder Among Veterans

Physical Health Effects

Continued use of opioids can lead to individuals developing resistance to opioids, which may require larger amounts to achieve the anticipated result because of addiction and tolerance. Existing research indicates that the use of opioids may lead to severe addiction and tolerance among veterans with OUDs (Rhee & Rosenheck, 2019). Pitt et al. (2018) examined and explored the effects of OUD among veterans in the United States. Using thematic analysis, Pitt et al. (2018) reported that opioid use may lead to addiction and tolerance or resistance that requires more drugs to be influential among veterans due to prolonged use of opioid drugs to relieve pain during military service. These findings were also found in Lagisetty et al. (2021), who revealed that although several opioid-based medications exist among veterans, prolonged opioid use leads to OUD, causing addiction and tolerance that requires more significant amounts of drugs to provide the anticipated outcomes. The evidence discussed thus far indicates that opioid use leads to addiction and tolerance, which may require large amounts of opioid drugs to treat veterans.

The abrupt halt in using opioids can result in withdrawal symptoms such as muscle aches, nausea, insomnia, vomiting, diarrhea, and intense cravings for such substances among veterans. Evidence across extant literature indicates that opioid use withdrawal symptoms occur because the brain and the body become physically

dependent on the opioids, such that their withdrawal contributes to symptoms such as muscle aches, sweating, diarrhea, abdominal pains, and vomiting (Ashrafioun et al., 2020). In a quantitative study, Ching et al. (2021) investigated the health impact of opioid use on veterans in the United States. They found that OUD among veterans contributes to flu-like withdrawal symptoms such as nausea, muscle pains, chills, and sweating because of high physical dependence, making it difficult to withdraw from the use of opioid substances. On the same note, Celik et al. (2023) demonstrated that the withdrawal symptoms can be both physically and mentally distressing, which makes it difficult for veterans to quit its use without medication support and assistance, resulting in increased anxiety, irritability, and insomnia due to sleep disturbance, vomiting, nausea, and diarrhea. Combined, it can be demonstrated that OUD contributes to withdrawal symptoms such as vomiting, nausea, diarrhea, and intense cravings for more drugs among veterans.

The use of opioids can lead to a depressed central nervous system, contributing to slow breathing that threatens veterans' lives. Recent research indicates that opioid use can lead to respiratory depression by slowing down a veteran's rate of beating and the depth of every breath, contributing to severe cases of death (Watts et al., 2022). Mahoney et al. (2021) conducted a quantitative study to examine the effects of increased use of opioids among veterans in the United States. The findings revealed that increased opioid use among veterans contributed to increased deaths caused by breathing complications.

According to Mahoney et al. (2021), OUDs lead to hypoxia, where individuals experience insufficient oxygen supply to the body tissues, resulting in slow breathing due

to a depressed nervous system, affecting various organ systems. However, Gottlieb et al. (2023) analyzed opioid use problems among veterans in the United States. They found that OUD contributes to chronic lung complications that weaken the respiratory muscles, leading to breathing difficulties and chronic obstructive pulmonary disease. Increased use of opioid drugs among veterans has been attributed to high respiratory issues, including slow breathing and obstructive pulmonary disease development.

Mental Health Effects

OUD has been associated with mental health disorders such as depression and anxiety, which can worsen with continued use of opioids among veterans (Aldrich, 2018). Some studies have demonstrated that continued use of opioids can disrupt the natural balance of the brain's neurotransmitters, contributing to mood dysregulation manifested as symptoms of anxiety and depression among veterans (Frost et al., 2023; Martz, 2022; Peltier et al., 2021).

Using a quantitative study design, Beckman et al. (2022) explored the mental health effects associated with OUD among veterans in the United States. Beckman et al. (2022) established that anxiety and depression have been shared among veterans with OUD, demonstrating that those who quit or reduce the use of opioids have often experienced increased withdrawal symptoms, such as high levels of depression and anxiety. Consistent findings of Beckman et al. (2022) were reported in a quantitative study conducted by Jones et al. (2020), who demonstrated that the opioids used to relieve pain from injuries sustained by veterans from military service contribute to OUD, which has been related to increased anxiety and depression by worsening emotional distress

over time. It can be indicated that OUD contributes to mental health issues such as anxiety and depression among veterans.

Cognitive impairment has been linked with OUD among veterans who use it for pain relief. This chronic opioid use can impair cognitive function, such as memory loss, lack of attention, and decision-making. Veterans with OUDs have demonstrated increased cognitive impairment symptoms, including memory loss, lack of attention, short-term memory, and poor decision-making abilities (Kember et al., 2022). Lin et al. (2021) used a quantitative research design with 65,741 veterans with OUD who had served in the US military. The findings indicated that most veterans use more opioid drugs while in the service to relieve injury pains, contributing to a severe impact on their memory, especially prolonged use and high doses due to addiction. This contributes to memory challenges, such as the inability to remember critical recent events due to short memory and cognitive impairment (Lin et al., 2021).

Similarly, multiple regression results reported by Raines et al. (2020) indicated that OUD may contribute to functional impairment among veterans, likely leading to difficulty performing critical cognitive tasks effectively because of memory impairment. As per the findings discussed thus far, OUD has been the cause of cognitive impairments such as memory loss and lack of attention among veterans. Excessive use of opioids among veterans for pain relief can contribute to psychosis, characterized by increased hallucinations, delusions, and other symptoms of psychosis. Many studies have revealed that OUD can lead to psychosis, including increased delusions, hallucinations, and false

sensory perceptions, such as seeing imaginary occurrences contrary to the physical evidence due to impaired memory (Kinasz et al., 2020; De Aquino et al., 2019).

Other researchers, such as Toor et al. (2022), conducted a quantitative study to investigate the impact of opioid overuse on mental health among veterans. Toor et al. (2022) established that when some opioids are used in high doses with other substances, they can induce psychotic symptoms, including hallucinations and delusions, which are false beliefs contrary to the actual evidence of true events and happenings.

On the other hand, Hatoum et al. (2022) investigated the mental health effects of OUD among veterans in the United States. The results indicated that many veterans with OUD experience co-occurring mental health conditions, including anxiety, depression, and PTSD; this can later lead to an increased risk of developing psychosis complications such as hallucinations and delusions (Hatoum et al., 2022). Thus far, the findings above confirm that OUD among veterans contributes to impaired mental health symptoms such as hallucinations and delusions.

Social and Behavioral Effects

Individuals with OUD may withdraw from social interactions and experience strained relationships with family, friends, and colleagues. In a quantitative study, Bennett et al. (2022) found that addiction to opioid drugs contributes to OUD, leading to social isolation and functional impairment among veterans. This makes it difficult for veterans to engage in meaningful social interactions (Bennett et al., 2022). Confirming Bennett et al.'s (2022) findings, Yang et al. (2022) opined that veterans with OUD experience social phobia, contributing to their lack of meaningful social interaction due

to mental health issues. However, Stauffer et al. (2022) confirmed Yang et al.'s (2022) findings by conducting a quantitative study to investigate the social effects of OUD among veterans in the United States. The findings indicated that OUD among veterans could contribute to increased legal issues such as arrests and financial difficulties because of the high cost of obtaining opioids (Stauffer et al., 2022). The findings discussed thus far demonstrate that veterans with increased OUDs experienced social and behavioral impacts, including social isolation and strained relationships.

Increased OUD among veterans can interfere with their ability to maintain stable job opportunities and productivity because of their increased focus on using opioids. Challenges associated with OUD, including the inability to recall significant current events because of short memory and cognitive impairment, may lead to reduced productivity among veterans on employment (Vowles et al., 2023). According to Murphy (2020), individuals with cognitive impairment will likely experience decreased productivity and employment issues due to a lack of decision-making abilities and low memory capacity. A similar agreement was observed in Whipple et al. (2023), who revealed that using opioids led to limited access to job opportunities among veterans because of their dependence on opioid drugs, contributing to increased employment issues. The evidence reported above shows reduced productivity and employment problems as attributes of OUDs among veterans.

Medical Complications

Using injections among veterans for administering opioid drugs can lead to an increased risk of infections, including HIV, hepatitis B, and hepatitis. In a quantitative

study, Baumann et al. (2023) established that opioids relieve pain among injured veterans in the military. However, the prolonged use of opioids and abuse through shared injections can lead to cardiovascular complications and infections such as HIV and hepatitis B and A among veterans (Baumann et al., 2023). Although Baumann et al. (2023) used a quantitative study design, Lofwall and Fanucchi (2021) adopted a systematic literature review to examine opioid drug use and OUD among veteran women in the United States. The findings revealed that using opioids increased the rate of heart disease and infections among veterans using such substances in the United States (Lofwall & Fanucchi, 2021). According to Pals and Bratberg (2022), there is a significant rise in the cases of infections such as HIV and hepatitis B and A among veterans, as well as an increased rate of cardiovascular complications for those using opioids for pain relief. The use of opioids can significantly contribute to dangerous infectious diseases such as HIV and contribute to a high rate of heart complications among veterans.

Opioid overdose can be a significant risk to veterans, especially if the drug is administered in high doses or in combination with other substances. High mortality rates, cardiovascular complications, and chronic lung conditions have been associated with high opioid overdoses among veterans (Siglin et al., 2020). Doshi et al. (2019) indicated that the high rate of cardiovascular complications and in-hospital mortality was due to opioid overdose among veterans with addiction and tolerance symptoms. Hayes et al. (2020) also reported that excessive use of opioids could result in severe heart failure and lung complications among veterans, either because of overdose or prolonged use. While Hayes et al. (2020) confirmed that OUD leads to increased heart complications and

chronic lung conditions, Ogungbe et al. (2019) established that increased use of opioid drugs among veterans has been attributed to high respiratory problems such as slow rates of breathing and the development of obstructive pulmonary disease that can later contribute to death among the veterans. Such deaths are caused by lung and heart complications. Thus, the findings demonstrate that OUD contributes to medication complications such as infections and opioid overdoses, leading to organ complications and even death among veterans.

Oud Contributes to the Increased Healthcare Burden

A high rate of OUD among veterans can lead to increased hospitalizations because individuals with OUD often need regular hospitalizations for innumerable health problems, further straining healthcare resources. Bohringer et al. (2020) conducted a quantitative study to investigate the benefits and consequences of using opioids among users. Although Bohringer et al. (2020) did not focus on veterans, OUD was found to be a health burden among individuals, including the high cost of medication and the financial strain of buying these drugs among the users. Manhapra et al. (2020) reported similar findings to Bohringer et al. (2020) by revealing that the use of opioids among users may result in severe health complications, including respiratory infections, that may strain families' financial resources. Agreeing with Manhapra et al. (2020), Mooney (2022) indicated that opioid use could result in health complications such as cardiovascular complications and addiction, thus straining healthcare resources due to increased hospital admissions with OUD-related complications among veterans. From the

articles reviewed, it is evident that OUD can lead to healthcare burdens such as increased hospitalization, which strain healthcare resources.

Increased mortality risk has been associated with OUD among veterans. Opioid overdose can cause substance-related deaths worldwide, making the use of opioids the leading cause of public health distress. Research indicates that OUD can lead to respiratory depressions, which contribute to slowing down the veteran's depth of each breath, leading to increased mortality among the veterans (Ward et al., 2022). Warfield et al. (2022) conceptualized opioid use and health burden among veterans in the United States. They found that OUD may contribute to the development of lung problems due to chronic breathing complications, which can lead to increased mortality rates among veterans. In the same way, Joyce et al. (2023) analyzed OUDs and their health effects. They found that increased use of opioids leads to heart complications, including breathing problems and chronic obstructive pulmonary disease, which leads to sudden deaths among the veterans. Thus far, empirical evidence demonstrates that OUDs among veterans contribute to increased health burdens, such as high mortality risks due to health-related effects, including chronic lung complications and heart problems.

Opioid Use Treatment Strategies Among Veterans

Medication-Assisted Treatment

Medication-assisted treatment is one of the strategies healthcare workers use to treat opioid use among veterans. One of the effective medication-assisted treatment methods is the use of methadone, which helps to reduce opioid dependence by minimizing cravings and withdrawal symptoms such as anxiety, nausea, and muscle

aches (Ching et al., 2021). Similarly, the daily dose options provided by methadone result in less frequent drug use and the promotion of a consistent medication schedule that lowers opioid levels, fostering a more controlled condition and regaining stability in life (Albright et al., 2023). In a concurrent study, Gonçalves et al. (2023) also established that methadone's long half-life binds to opioid receptors in the brain, preventing withdrawal symptoms and reducing craving intensity, allowing individuals in recovery to focus on treatment without withdrawal discomfort. As per the findings of the reviewed studies, it is evident that methadone is a critical component in medication-assisted treatment programs for opioid dependence, aiding in reducing cravings and withdrawal symptoms and enabling veterans to regain control and sustain recovery.

Buprenorphine is another medication commonly used in medical-assisted treatment for OUDs among veterans. Several research studies have shown that buprenorphine, a partial opioid agonist, attaches to opioid receptors in the brain, similar to prescription pain relievers, delivering a weaker opioid effect that blocks the effects of other opioids while delivering a minor opioid impact (De Aquino et al., 2021; Arvanian et al., 2022; Youngblood et al., 2023). In agreement with the previous findings, Laffont et al. (2022), through a qualitative study, found that buprenorphine stabilizes the opioid receptors in the brain, lowering opioid cravings. Buprenorphine partially satisfies the brain's opioid requirement, lowering cravings and the temptation to use illegal opioids (Laffont et al., 2022). Corresponding results were reported by Orum et al. (2022), who revealed that buprenorphine helps alleviate withdrawal symptoms in veterans with OUD by providing a mild opioid effect, preventing withdrawal onset, and promoting stable,

manageable physical states. Thus far, the reviewed studies have shown that buprenorphine is a potent medication used to treat OUD among veterans, effectively reducing cravings, withdrawal symptoms, and illicit use by stabilizing the brain's opioid receptors as a partial agonist.

Naltrexone is another medicine used to treat OUD, notably among veterans, which reduces cravings and prevents relapse by blocking the effects of opioids in the brain. Naltrexone, unlike methadone or buprenorphine, is not an opioid, eliminating addiction risks and making it an appealing option for veterans who prefer non-opioid treatment (Nunes et al., 2021). On the same note, naltrexone is a powerful tool for preventing relapse by blocking the effects of opioids, making it less likely for veterans to experience euphoria if they attempt to use opioids while on the medication (Poliwoda et al., 2023). Consistent findings were established by Dara et al. (2023), revealing that naltrexone offers an alternative treatment option that does not require daily dosing, unlike methadone or buprenorphine, which require frequent administration, allowing veterans to tailor their recovery goals. Evidence in existing literature studies indicates that naltrexone is utilized in the medical-assisted treatment of OUDs among veterans by blocking opioid effects, reducing cravings, and preventing relapse through oral and extended-release formulations.

Behavioral Therapies

Behavioral therapies such as cognitive-behavioral therapy are a widely used therapeutic approach that can be beneficial for veterans in addressing negative thought patterns and behaviors related to opioid use. Cognitive-behavioral therapy assists

veterans in identifying triggers and cognitive distortions contributing to opioid use, allowing them to develop strategies to question and reframe their thought processes, reducing their likelihood of consuming opioids (Winner, 2021). Related findings were established by Watkins et al. (2023), who found that cognitive-behavioral therapy helps veterans manage OUD cravings, stress, and difficulties through relaxation exercises, problem-solving skills, and stress management techniques, promoting healthier emotional handling. Alluding to the previous findings, Speed et al. (2022), through a qualitative study with a sample of 21 veterans with OUDs, found that cognitive-behavioral therapy emphasizes the importance of positive activities as a substitute for opioid use, as veterans can experience achievement, joy, and contentment, reducing their opioid use urge. Combining the evidence from the reviewed studies, it is evident that CBT can improve veterans' treatment for OUD by addressing psychological and behavioral aspects, helping them identify and change negative thought patterns.

Contingency management is another behavioral therapy intervention that is effective in encouraging abstinence from opioids and promoting participation in treatment among veterans with OUD. According to Peter et al. (2023), contingency management promotes positive behavior change by providing immediate rewards for abstaining from opioids and linking them to active treatment, thereby strengthening the motivation to maintain the behaviors. Additionally, contingency management encourages veterans to engage in pro-social behaviors, such as attending therapy sessions, building a support network, and participating in activities that enhance their well-being (DeFulio, 2023). In a previous study, Higgins et al. (2019) found that contingency management

shifts the emphasis from the immediate gratification of opioid use to the long-term benefits of recovery, shifting from the pleasure of drug use to the long-term benefits of therapy. Overall, evidence in existing literature shows that contingency management promotes opioid abstinence and active treatment among veterans by providing positive reinforcement and rewards, enhancing motivation, and facilitating long-term recovery.

Behavioral therapy may also be encouraged with 12-step facilitation therapy, which supports treatment and recovery among veterans with OUDs. The 12-step facilitation program educates veterans about 12-step programs like Narcotics Anonymous, emphasizing their core beliefs, organizational structure, and support resources, including seeking peer help for opioid use treatment (Santa et al., 2021). In agreement with Santa et al. (2021), Woodhead et al. (2021) established that 12-step facilitation programs offer relapse prevention strategies and coping skills training to veterans, integrating 12-step principles and enhancing their ability to manage opioid cravings and stress and avoid relapse. Adopting a similar position, Brady et al. (2021) found that 12-step facilitation assists veterans in developing coping strategies to manage cravings and stress without using substances, such as relaxation techniques, mindfulness exercises, healthy activities, peer support, and 12-step program support networks. Thus far, the reviewed evidence has revealed that 12-step facilitation therapy is a valuable method for veterans to manage OUD, combining relapse prevention strategies and coping skills training with 12-step principles.

Individual Counseling

Establishing a strong therapeutic alliance between the counselor and the veteran in individual counseling sessions is essential for effectively treating OUDs among veterans. Counselors in a therapeutic partnership include veterans in treatment by involving them in setting treatment objectives, developing personalized plans, and deciding on the most effective approach, thereby empowering them and increasing their commitment to opioid use treatment (Kelley et al., 2022). Making a similar point, Breggin and Stolzer (2020) reported that counselors in individual counseling must show genuine empathy and understanding for veterans suffering from OUD, creating a safe environment in which they feel acknowledged and validated. Supporting the previous findings, Anvari et al. (2022) determined that counselors should take a nonjudgmental stance, acknowledging that addiction is a complex issue influenced by various factors, to foster an accepting environment where veterans can openly discuss their struggles with OUDs. Combining the evidence reviewed thus far, it is evident that in individual counseling, counselors can build a robust therapeutic relationship with veterans seeking OUD treatment, fostering effective communication, trust, and collaboration, enhancing the likelihood of successful outcomes.

In individual counseling sessions, psychoeducation provides veterans with information, knowledge, and understanding about OUD, its effects, and the treatment process. There is evidence in existing literature studies showing that psychoeducational activities assist veterans in comprehending OUD, its causes, risk factors, and neurobiological processes, thus helping them understand the best regimen for their

treatment (Raines et al., 2020; Betthauser et al., 2021). Similarly, psychoeducation teaches veterans about the effects of opioid use on their physical, mental, and social well-being, which may motivate them to seek treatment and make positive life changes (Purcell et al., 2021). Agreeing with Purcell et al. (2021), Gosens and Oudsten (2023) and Rieckmann et al. (2016) revealed that psychoeducation sessions in one-on-one counseling can help veterans understand the benefits, drawbacks, and effectiveness of medication-assisted treatment options for OUDs, enabling them to make informed decisions and address any concerns or misconceptions. The reviewed studies have shown that veterans with OUD can improve their recovery by receiving comprehensive psychoeducation in individual counseling.

Individual counseling for veterans with OUDs includes trauma-informed care, which recognizes the impact of trauma on veterans and integrates that understanding into the treatment process. Trauma-informed care emphasizes the importance of creating a safe environment for individual counseling sessions, intending to make veterans feel safe and at ease when discussing their trauma and OUD for effective treatment (Beckman et al., 2022). In a similar study, Scoglio et al. (2020) revealed that trauma-informed care fosters trust and collaboration between counselors and veterans, addressing trauma with an empathic, nonjudgmental approach, thus encouraging active engagement in treatment and allowing for joint decision-making and tailored treatment regimens. In support of the previous findings, Beckman et al. (2022) also determined that individual therapy sessions with trauma-informed care include trauma-informed evaluations to determine trauma history and symptoms, assisting in understanding the veteran’s impact on life and opioid

use for effective planning and treatment. Thus far, the reviewed studies have revealed that trauma-informed care in individual counseling helps veterans with OUDs address trauma's impact on substance use and recovery, promoting safety, trust, and collaboration through trauma-focused interventions.

Group Therapy

Group therapy is a valuable treatment for veterans with OUDs, providing a structured environment for peer interaction, sharing insights, and learning from one another. Group therapy fosters a sense of belonging and inclusion for veterans suffering from OUD, allowing them to connect with peers with similar experiences and counteracting the isolation and alienation felt by those suffering from OUDs, thus fostering their treatment (Perry et al., 2022). Agreeing with Perry et al. (2022), Mackey et al. (2020), through a systematic literature review of 40 studies, revealed that group therapy encourages peer support where veterans can learn from their peers' experiences, enhance their recovery efforts, and facilitate the exchange of knowledge, skills, and resources. On the same note, Morse et al. (2021) reported that group therapy provides a safe, supportive environment for veterans to express their emotions, offering peer support and understanding when facing challenges and intense emotions, thus enhancing the effectiveness of their OUD treatment. The reviewed studies have provided evidence that group therapy provides valuable peer support and connection for veterans with OUD, enhancing their recovery journey and contributing to long-term well-being.

Group therapy through skill-building groups provides education, teaches practical skills, and promotes behavior change strategies that support recovery from OUDs. Skill-

building groups in opioid use treatment teach veterans relapse prevention skills like trigger identification, coping strategies, problem-solving, and decision-making, allowing them to maintain sobriety (Seal et al., 2020). Corresponding findings were established by Pangarkar et al. (2019), who reported that veterans can reduce their reliance on opioids by practicing coping skills in skill-building groups, including mindfulness, relaxation techniques, and emotion regulation, to manage stress and emotional turmoil related to OUD. Similarly, skill-building groups focus on improving communication and interpersonal skills, allowing veterans to effectively express their needs, foster positive connections, and navigate social situations, ultimately enhancing their recovery process (Krawczyk et al., 2020). The reviewed studies show that skill-building groups offer veterans practical skills, knowledge, and peer support to enhance their recovery from OUD, empowering them to develop new skills, make informed choices, and actively participate in their recovery process.

Community Support and Resources

Community recovery support groups offer a structured environment for veterans to connect with peers in recovery, thus enhancing their healing process. Several research studies have shown that community recovery support groups enable veterans to share their experiences, challenges, and successes, providing valuable insights, advice, and inspiration and fostering hope and motivation for their OUD recovery journey (Brunet et al., 2022; Iheanacho et al., 2020). Consistent findings were revealed by Eddie et al. (2019), who found that community recovery support groups foster accountability by encouraging members to set goals, share progress, and keep commitments, enhancing

motivation and dedication among veterans in their OUD treatment. Alluding to the previous findings, Gordon et al. (2020) established that community recovery support groups offer veterans a structured routine, reducing substance use, providing a sense of purpose, and promoting stability and recovery. Thus far, the reviewed studies have provided evidence that community recovery support groups offer long-term, peer-led assistance to veterans recovering from OUD, enhancing their chances of sustained recovery through shared experiences, accountability, and practical skills.

Community support also gives veterans access to adequate resources to effectively manage OUDs. According to Sasson et al. (2023), access to education and training benefits veterans. It enables them to pursue higher education, vocational training, or job retraining, enhancing their long-term opioid use recovery and career prospects. Along the same lines, access to nonprofit organizations' resources offers veterans housing assistance, employment training, educational scholarships, counseling services, and peer support networks, which enhances their commitment to the treatment plan (Porcaro et al., 2021). Similar findings were reported by Frost et al. (2023), revealing that access to government resources such as the Vocational Rehabilitation and Employment Program assists veterans in securing and retaining employment through vocational counseling and job training, thus enhancing their recovery process. Overall, evidence reveals that access to resources is crucial for veterans recovering from OUD; providing essential services like housing, employment, and education is crucial in their recovery journey.

Summary

In summary, the literature referenced demonstrates the need to understand the effectiveness of specific treatment services before and after the intervention based on the type of treatment, mental disorders, and frequency of opioid use while controlling for demographic factors. Most of the studies reviewed focus on the effectiveness of a single type of treatment or one aspect of OUD recovery, making it challenging to assess the holistic impact of treatment services (Bennett Jr. et al., 2023; Bond et al., 2022). Consequently, an in-depth study that explores the phenomenon using multiple variables (Seal et al., 2020; Finlay et al., 2021). Additionally, based on the analysis conducted, there is a need to investigate the effectiveness of different treatment types (including medication-assisted treatment, counseling, and behavioral therapies) in depth. The link between OUD and mental health disorders is a very complex issue (Bennett et al., 2022; Meca et al., 2020). Consequently, there is a need for additional research that explores the effectiveness of treatment services for individuals with co-occurring mental disorders, given that most of the studies reviewed have not adequately addressed this population's unique needs (Finlay et al., 2021; Raines et al., 2020; Betthauser et al., 2021). While the articles reviewed underscore the link between opioid use and OUD among veterans, they have failed to offer an in-depth investigation of the efficacy and outcomes of opioid-based medications used for pain management among veterans (Seal et al., 2020; Finlay et al., 2021). Research is needed to evaluate the benefits and risks of these medications in the veteran population.

The current quantitative correlational research addressed the current gaps in the literature regarding the effectiveness of specific treatment services before and after the intervention based on the type of treatment, mental disorders, and frequency of opioid use while controlling for demographic factors. The findings add to existing literature knowledge about the effectiveness of specific treatment services before and after the intervention based on the type of treatment, mental disorders, and frequency of opioid use while controlling for demographic factors. This literature review offered the necessary tool for the research method (Chapter 3), which incorporates the research questions and the design format to carry out this study. The research method section discusses the recruitment of subjects, sampling methods used, collection of data, ethical procedures, and threats to validity.

Chapter 3: Research Method

Introduction

In this correlational quantitative research design, I sought to determine the differences between the effectiveness of OUD treatment services among veterans using opioids (as measured by mental health disorders) and the frequency of opioid use at discharge when controlling for age, gender, race, and marital status. The following research questions and hypotheses were addressed:

RQ1: Is there any significant difference between pre- and post-OUD 24-hour detoxification treatment services, residential/rehabilitation treatment services, ambulatory outpatient treatment services, frequency of opioid use at discharge, number of arrests, and mental disorder among veterans with OUD in NYS when controlling for age, gender, race, and marital status?

*H*01: There is no significant difference between pre- and post-OUD 24-hour detoxification treatment services and mental disorders among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*A1: There is a significant difference between pre- and post-OUD 24-hour detoxification treatment services and mental disorders among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*02: There is no significant difference between pre- and post-OUD 24-hour detoxification treatment services and frequency of opioid use at discharge among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*A2: There is a significant difference between pre- and post-OUD 24-hour detoxification treatment services and frequency of opioid use at discharge among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*03***:*** There is no significant difference between pre- and post-OUD rehab/residential treatment services and mental disorders among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*A3: There is a significant difference between pre- and post-OUD rehab/residential treatment services and mental disorders among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*04***:*** There is no significant difference between pre- and post-OUD rehab/residential treatment services and frequency of opioid use at discharge among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*A4: There is a significant difference between pre- and post-OUD rehab/residential treatment services and frequency of opioid use at discharge among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*05***:*** There is no significant difference between pre- and post-OUD ambulatory outpatient treatment services and mental disorders among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*A5: There is a significant difference between pre- and post-OUD ambulatory outpatient treatment services and mental disorders among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*06***:*** There is no significant difference between pre- and post-OUD ambulatory outpatient treatment services and frequency of opioid use at discharge among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

HA6: There is a significant difference between pre- and post-OUD ambulatory outpatient treatment services and frequency of opioid use at discharge among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

Chapter 3 contains an overview of the methodology used for this study. This overview will include the study design, population, sampling method, sample size, instrumentation, and data analysis methods. Ethical considerations and study limitations are also described.

Research Design and Rationale

I used the 2018–2020 TEDS-D from SAMHSA, a branch of the U.S. Department of Health and Human Services. The data used were deidentified and were publicly accessible. NYS data were extracted from the data sets for this analysis. I employed a nonexperimental quantitative study with a correlational design to determine if there are relationships between pre- and post-OUD 24-hour detoxification treatment services, residential/rehabilitation treatment services, ambulatory outpatient treatment services, frequency of opioid use at discharge, mental disorder, and number of arrests, among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

A nonexperimental quantitative methodology with a correlational design was most appropriate for this study. First, the study included numerical data that were analyzed to test hypotheses (McCusker & Gunaydin, 2015). Second, the choice of a

nonexperimental quantitative method with a correlational design ensured research objectivity as a researcher is separated from the research participants (McCusker & Gunaydin, 2015). Third, there was no manipulation of independent variables; thus, this study was a nonexperimental quantitative method with a correlational design (McCusker & Gunaydin, 2015). Additionally, a nonexperimental quantitative method with a correlational design was the correct design for the current study because the objective was to identify and evaluate the relationship between the dependent variables and the independent variables.

A quantitative research methodology uses numerical data that allow for statistical analyses, help reduce biases, and are based on an objectivity paradigm (Bowers, 2017). Quantitative research measures include statistical, mathematical, or numerical analyses of data collected through questionnaires and surveys or by the manipulation of preexisting statistical data using computational techniques. A qualitative approach was not appropriate because the study did not focus on exploring a phenomenon or establishing a theory, model, or definition (Allwood, 2012).

Due to the nature of the research questions, multinomial logistic regression and binomial logistic regression were the best fit for the analysis. Multinomial logistic regression predicts a nominal dependent variable given one or more independent variables (Lee et al., 2013). It is an extension of binomial logistic regression to allow for a dependent variable with more than two categories. The reason for considering multinomial logistic regression is that it can have nominal and continuous independent variables and can have interactions between independent variables to predict the

dependent variable (Hashimoto et al., 2019). This model can be used with any number of independent variables that are categorical or continuous (Hashimoto et al., 2019). A binomial logistic regression predicts the probability that an observation falls into one of two categories of a dichotomous dependent variable (mental disorder coded as 1 = *yes*, and 2 = *no*) based on one or more independent variables that can be either continuous or categorical (Harris, 2021). According to de Jong et al. (2019), multinomial logistic regression is used to predict a nominal dependent variable (number of arrests in this case: 0 = none, 1 = once, and 2 = two or more times) given one or more independent variables based on three or more independent groups (in this case treatment type: detoxification 24-hour service-hospital inpatient, rehab/residential, short term [30 days or fewer], and ambulatory, intensive outpatient). In addition, multinomial methods allow variables to be controlled for (in this case, age, gender, race, and marital status).

Methodology

Population

Background of NYS Population Characteristics

NYS is the third most populous state in the United States and was established on July 9, 1776, and its capital is Albany (Kästle, 2018). Among the 62 counties in NYS, Kings County has the highest population, while St. Lawrence County is the largest in land area (U.S. Census Bureau, 2023). In the northeastern United States, NYS shares borders with the Canadian provinces of Québec and Ontario to the northwest and the Atlantic coast to the southeast (Kästle, 2018). NYS also borders several U.S. states, including Vermont, Massachusetts, Connecticut, New Jersey, and Pennsylvania. The St.

Lawrence River forms a section of New York's border with Canada (Kästle, 2018). On July 26, 1788, NYS ratified the U.S. Constitution and became the 11th state to join the Union (Kästle, 2018). Known as "the Empire State," NYS covers an area of 141,299 km² (54,556 sq mi), making it slightly larger than Greece (131,957 km²) but able to fit into Texas almost five times (Kästle, 2018).

In 2021, the total population of New York was estimated to be 19,746,227 people, with 9,581,261 men and 10,164,966 women (U.S. Census Bureau, 2023). The state has 583,705 more women than men, which is 2.96% of the total population (U.S. Census Bureau, 2023). In 2021, about 3.86 million people in NYS were of Hispanic or Latino origin. Additionally, approximately 10.6 million White people and 2.65 million Black people lived in New York that year (U.S. Census Bureau, 2023). In 2021, about 14.1% of the population in NYS was between the ages of 25 and 34. A further 12.9% of the population of New York was between the ages of 35 and 44 years (U.S. Census Bureau, 2023). The percentage of individuals earning high school degrees or higher is 87.4%, and those with a bachelor's degrees or higher represent 38.1% (U.S. Census Bureau, 2023). The state median household income was $75,157. Employed individuals were estimated at 9,387.5, while unemployed individuals represented 384.7, and the state unemployment rate was 3.9% (U.S. Census Bureau, 2023). The mean age was estimated at 39.2.

NYS has a vast number of freshwater lakes, ponds, and reservoirs, with over 7,600 in total. Additionally, the state has areas that border two of the Great Lakes and an extensive network of rivers and streams spanning over 70,000 miles (113,000 km). Among the notable rivers in New York are the St. Lawrence River, Hudson River, Black

River, Susquehanna River, and Delaware River. The state also boasts shorelines along Lake Ontario and Lake Erie. Oneida Lake is the largest lake within NYS, while to its west lies a group of 11 long and narrow lakes known as the Finger Lakes. Another noteworthy water body is Lake George in the Adirondack region, often referred to as the "Queen of American Lakes" and renowned for its popularity among tourists since the late 19th century. NYS offers various points of interest for visitors to explore. These include prominent sites such as the U.S. Military Academy at West Point, Castle Clinton, Fort Stanwix, Niagara Falls, the Statue of Liberty, and numerous national historic sites.

According to recent data from the NYS Health Foundation (2021), there has been growing diversity within the state's veteran population. Currently, minorities account for 23% of New York's veteran population. This percentage is projected to increase to nearly 30% by 2030. The largest minority groups among veterans are Black or African American (comprising 12% or approximately 91,000 individuals) and Hispanic (constituting 9% or around 67,000 individuals).

According to NYSHealth (2021), as of 2018, slightly more than half (400,000) of NYS veterans were 65 or older. The veteran population tends to be substantially older than the general population (NYSHealth, 2021). Approximately 13% of the state's veterans in 2020 were under 40 years old, mainly reflecting those who joined after 9/11, and the vast majority of veterans in NYS were male (92%), but the proportion of female veterans has been steadily rising and is expected to reach more than 10% by 2025 (NYSHealth, 2021). Long Island and New York City (specifically counties like Suffolk, Erie, King, Queens, and Nassau) are home to large numbers of veterans (NYSHealth,

2021). The highest concentrations of veterans are typically found in less populated and more rural counties such as New York's North Country and Southern Tier counties, which include Jefferson, Hamilton, Tioga, Clinton, and Chenango, in part because those populations tend to be older (NYSHealth, 2021). Knowing these demographic characteristics of NYS is paramount for undertaking this correlational design study.

Target Population

I used the 2018-2020 TEDS-D data set to conduct this analysis. The TEDS-D (2020) represents annual discharges from substance abuse treatment facilities. The data set used does not record all admissions or discharges but reports admissions to accredited treatment facilities for substance abuse that receive local and federal funding. TEDS-D (2020) records information for individuals ages 12 and older. Defining the target population is an essential part of protocol development to ensure that study participants are well suited to the research question. The target population is the entire group of people who share a common condition (disease process) or characteristic a researcher is interested in studying (Capili, 2021).

The target population considered in this study was veterans ages 18 years and older who have OUD. There has been a sharp rise in the number of patients diagnosed with OUD, from approximately 25,000 in 2003 to more than 61,000 in 2019 (U.S. Department of Veteran Affairs, 2021). In 2019, a study showed that 595,000 veterans ages 18 years and older used opioids, or 2.9 % of the total population (SAMHSA, 2020). In the same year, 3.9 million veterans ages 18 years and older had mental illness or OUD,

an increase of 6.5% over 2018, composed of an increase in both OUD and mental illness (SAMHSA, 2020).

Sampling and Sampling Procedures

The proposed study employed purposive sampling. Purposive sampling is a non-probability sampling technique in which the researcher relies on his judgment when choosing members of the population to participate in the study based on the population's characteristics and the study's objective (Yang & Banamah, 2014). Purposive sampling was conducted because it has certain advantages applicable to this study. These include greater accessibility, faster speed, and lower costs associated with recruiting samples for the analysis (Coy, 2008). A purposive sampling strategy was chosen for the study because participants needed to meet a specific set of inclusion criteria to be eligible to participate (Yang & Banamah, 2014). The inclusion criteria of the study included being 18 years of age or older, residing in NYS, a veteran, and currently being treated for OUD. Secondary data from TEDS-D were used for the analysis.

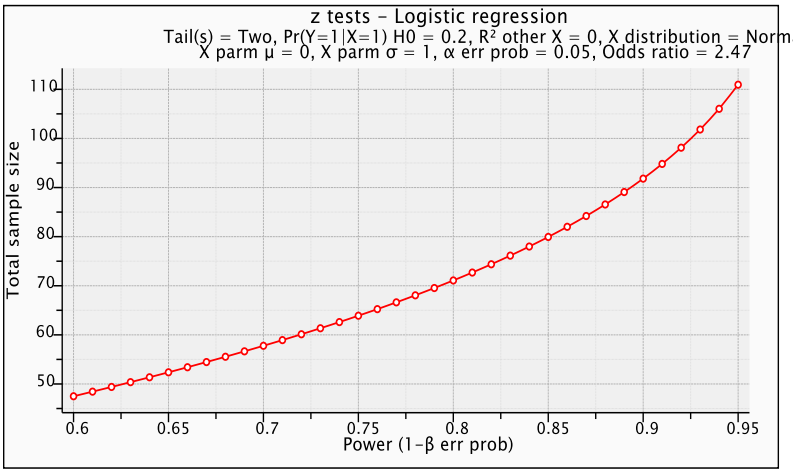
A priori power analysis was conducted using G*Power to determine the required minimum sample size for the study. Four factors were considered in the power analysis: significance level, effect size, the power of the test, and statistical technique. The significance level, also known as Type I error, refers to the chance of rejecting a null hypothesis given that it is true (Haas, 2012). Most quantitative studies use a 95% confidence level because it adequately provides enough statistical evidence for a test (Creswell & Poth, 2017). The effect size refers to the estimated measurement of the relationship between the considered variables (Cohen, 1988). Cohen (1988) categorizes

effect size into three categories: small, medium, and large. Berger et al. (2013) purported that a medium effect size is better as it strikes a balance between being too strict (small) and too lenient (large). The power of a test refers to the probability of correctly rejecting a null hypothesis (Sullivan & Feinn, 2012). In most quantitative studies, 80% power is usually used (Sullivan & Feinn, 2012). The statistical test used for this study was binary logistic regression.

The calculation of a minimum sample size for logistic regression requires previous knowledge, such as the expected odds ratio (effect size), the proportion of observations in either group of the dependent variable, and the distribution of each independent variable (Faul et al., 2009). If these are unknown, it is best to use an estimate to determine the appropriate sample size. Using G*Power, the minimum sample size was computed by utilizing a medium effect size of OR = 2.47, based on the categorization of effect sizes by Chinn (2000), who categorized odds ratios into small (OR = 1.44), medium (OR = 2.47), and large (OR = 4.25). To conduct binary logistic regression to detect a medium effect size of OR = 2.47, at the 5% significance level with 80% power, a minimum sample size of at least 72 (Figure 1). The TEDS-D for 2018, 2019, and 2020 consists of 264,431 cases for 2018, 258,940 cases for 2019, and 191,260 cases for 2020 available for analysis; thus, the minimum sample size is satisfied.

Figure 1

*G*Power Output for Minimum Sample Size Required for Binomial Logistic Regression*



Procedures for Recruitment, Participation, and Data Collection

After IRB approval, publicly available secondary TEDS data from 2018 to 2020 were downloaded from the SAMHSA website. The material contained in the TEDS-D document is presented in the public domain and does not require permission to be accessible (SAMHSA, 2021). Data are accessible on the SAMHSA. Because TEDS-D is the most trusted data source for substance abuse and mental health, it is generally accepted as reliable.

Participants can be accessed through the 2018-2020 TEDS-D archival data managed by the SAMHSA. TEDS-D data gathered information on individuals' demographics, their substance use pattern, and their admissions and treatment outcomes at discharges from all facilities receiving public funds. The data collected in the 2018-2020-TEDS-D concerned individuals aged 12 and older and the information was reported

from 46 states and the District of Columbia. The TEDS is composed of two major components, including admissions and discharges (SAMHSA, 2021). NYS data was extracted from the TEDS-D data sets, and participants in this study were veterans who reported using opioids.

Instrumentation and Operationalization of Constructs

The survey instrument tool applied in this correlational quantitative study to collect information from participants was the TEDS-D of 2018-2020. The reported data concerned all U.S. facilities receiving public funds for substance abuse treatment. The data collected comes from admissions and discharges. Only three states were excluded from TEDS-D 2018-2020, including Georgia, Oregon, and West Virginia, for a lack of sufficient data reporting (SAMHSA, 2021). The researcher used the 2020 TEDS-D codebook in the definition of the variables of interest.

Independent Variables

Treatment Types. Within the data set, there are eight types of treatments; however, they will be categorized into three types, which include: 1= detoxification 24-hour treatment service; 2= rehabilitation/residential; and 3: ambulatory outpatient treatment services. This variable will be measured at the nominal level of measurement.

Age. Using TEDS-D of 2018-2020, the variable was used as the date of birth of the patient at admission (SAMHSA, 2021). Age will be measured at the interval level by subtracting the year of birth from 2020 to give an approximate age in years.

Gender. The variable gender designates the subject's biological sex (Male and female) and is coded as zero for male and one for female. This is measured at the nominal level.

Race. This nominal variable will be operationalized as 1 = White, 2 = Black or African American, 3 = Asian, 4 = American Indian and Alaska Native, 5 = Native Hawaiian and other Pacific Islander, or 6 = other.

Marital Status. This nominal variable is operationalized in the TEDS-D as 1 = Never married, 2= Now married, 3 = Separated, and 4 = Divorced, widowed.

Dependent Variables

Frequency of Opioid Use at Discharge. Opioid use signifies other opiates/synthetics reported at admission by subjects as their primary substance use, including buprenorphine, codeine, hydrocodone, hydromorphone, meperidine, morphine, opium, oxycodone, pentazocine, propoxyphene, tramadol, and any drug having morphine-like effects (SAMHSA, 2021). This variable will be measured as categorical. It has two subcategories, including 1= substance reported at admissions) and 0 = substance not reported at admissions for easier analysis.

Mental Disorders. Mental disorder is a nominal dichotomous variable used to indicate whether the client has mental disorders, which is recorded as 1 = yes and 2 = no.

Data Analysis Plan

Analysis of the resulting quantitative data was conducted using the statistical software suite Statistical Package for the Social Sciences (SPSS) Version 23. The data was cleaned by examining the data set for missing data (Field, 2018). If a value is

missing, the entire case will be removed from the analysis (listwise deletion). In listwise deletion, a case is dropped from an analysis because it has a missing value in at least one of the specified variables.

Descriptive statistics of the data for the predictor and dependent variables will be reported. Frequency and percentage summaries will be obtained for categorical variables, while measures of central tendencies of means, standard deviations, and minimum and maximum values will be conducted for continuous variables. Both binary logistic regression and multinomial logistic regression were used to address the following research questions and hypotheses:

*H*01: There is no significant difference between pre- and post-OUD 24-hour detoxification treatment services and mental disorders among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*A1: There is a significant difference between pre- and post-OUD 24-hour detoxification treatment services and mental disorders among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*02: There is no significant difference between pre- and post-OUD 24-hour detoxification treatment services and frequency of opioid use at discharge among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*A2: There is a significant difference between pre- and post-OUD 24-hour detoxification treatment services and frequency of opioid use at discharge among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*03***:*** There is no significant difference between pre- and post-OUD rehab/residential treatment services and mental disorders among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*A3: There is a significant difference between pre- and post-OUD rehab/residential treatment services and mental disorders among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*04***:*** There is no significant difference between pre- and post-OUD rehab/residential treatment services and frequency of opioid use at discharge among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*A4: There is a significant difference between pre- and post-OUD rehab/residential treatment services and frequency of opioid use at discharge among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*05***:*** There is no significant difference between pre- and post-OUD ambulatory outpatient treatment services and mental disorders veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*A5: There is a significant difference between pre- and post-OUD ambulatory outpatient treatment services and mental disorders among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*06***:*** There is no significant difference between pre- and post-OUD ambulatory outpatient treatment services and frequency of opioid use at discharge among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

HA6: There is a significant difference between pre- and post-OUD ambulatory outpatient treatment services and frequency of opioid use at discharge among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

However, some assumptions were met before conducting binary and multinomial logistic regression. These included linearity between the continuous independent variables and the logit transformation of the dependent variable, the absence of multicollinearity, and the absence of significant outliers (Laerd Statistics, 2019). Linearity was tested using the Box-Tidwell procedure (Laerd Statistics, 2019). Multicollinearity was tested by calculating variance inflation factors (VIF), and any VIF over 9 was considered evidence of multicollinearity (Laerd Statistics, 2019). Standardized residuals were calculated to test for outliers. Any residual over 2.0 was considered an outlier (Laerd Statistics, 2019). Significance was assessed at the 5% level; thus, any p-value less than or equal to 0.05 was deemed significant. Table 1 below summarizes the data analysis that was conducted for each of the six hypotheses:

Table 1

Summary of Analysis

Research question(s), method, and design	Data collection tools and data sources	Data points	Data analysis
RQ1: Is there any significant difference between pre- and post-OUD 24 hours detoxification treatment services, residential/rehabilitation treatment services, ambulatory outpatient treatment services, frequency of opioid use at discharge, mental disorder among veterans with opioids use disorder in NYS when controlling for age, gender, race, and marital status?	Secondary data from the TEDS-D	The specific data points from the TEDS-D will include type of treatment, time-period, age, gender, race, and marital status, mental health, and frequency of use at discharge	Binary logistic regression
$H_0$1: There is a significant difference between pre- and post-OUD 24-hour detoxification treatment services and mental disorders among veterans with opioid use disorder in NYS when controlling for age, gender, race, and marital status.			Binary logistic regression
H_A1: There is no significant difference between pre- and post-OUD 24-hour detoxification treatment services and mental disorders among veterans with opioids use disorder in NYS when controlling for age, gender, race, and marital Status. Method: Quantitative Design: Correlational			Binary logistic regression
$H_0$2: There is a significant difference between pre- and post-OUD 24-hour detoxification treatment services and frequency of opioid use at discharge among veterans with opioid use disorder in NYS when controlling for age, gender, race, and marital status.			Binary logistic regression
H_A2: There is no significant difference between pre- and post-OUD 24-hour detoxification treatment services and frequency of opioid use at discharge among veterans with opioid use disorder in NYS when controlling for age, gender, race, and marital status. Method: Quantitative Design: Correlational			Binary logistic regression
$H_0$3: There is a significant difference between pre- and post-OUD rehab/residential treatment services and mental disorders among veterans with opioids use disorder in NYS when controlling for age, gender, race, and marital status. H_A3: There is no significant difference between pre- and post-OUD rehab/residential treatment services and mental disorders among veterans with opioids use disorder in NYS when controlling for age, gender, race, and marital status. Method: Quantitative Design: Correlational	Secondary data from TEDS-D	The specific data points from the TEDS-D will include type of treatment, time-period, age, gender, race, and marital status, mental health, and frequency of use at discharge	Multinominal logistic regression

Research question(s), method, and design	Data collection tools and data sources	Data points	Data analysis
$H_0$4: There is a significant difference between pre and post OUD rehab/residential treatment services and frequency of opioid use at discharge among veterans with opioids use disorder in NYS when controlling for age, gender, race, and marital status. H_A4: There is no significant difference between pre- and post-OUD rehab/residential treatment services and frequency of opioid use at discharge among veterans with opioids use disorder in NYS when controlling for age, gender, race, and marital status. Method: Quantitative Design: Correlational			Multinominal logistic regression
$H_0$5: There is a significant difference between pre- and post-OUD ambulatory outpatient treatment services and mental disorders veterans with opioids use disorder in NYS when controlling for age, gender, race, and marital status. H_A5: There is no significant difference between pre- and post-OUD ambulatory outpatient treatment services and mental disorders among veterans with opioids use disorder in NYS when controlling for age, gender, race, and marital status. Method: Quantitative Design: Correlational	Secondary data from TEDS-D		Multinominal logistic regression
$H_0$6: There is a significant difference between pre- and post-OUD ambulatory outpatient treatment services and frequency of opioid use at discharge among veterans with opioids use disorder in NYS when controlling for age, gender, race, and marital status. H_A6: There is no significant difference between pre- and post-OUD ambulatory outpatient treatment services and frequency of opioid use at discharge among veterans with opioids use disorder in NYS when controlling for age, gender, race, and marital status. Method: Quantitative Design: Correlational			Multinominal logistic regression

Threats to Validity

Validity consists of two types: external and internal validity. External validity refers to the degree to which the study results can be generalized to the population. Studies utilizing convenience sampling present challenges to external validity (Etikan, 2016). Studies that involve purposive samples may have issues with the generalizability of the study findings to broader populations of interest (Etikan, 2016).

Internal validity refers to the validity of the findings within the research study. Testing hypotheses can involve threats to the validity of interpretation for quantitative researchers. Quantitative research may involve rejecting null hypotheses or failing to reject null hypotheses (Martin & Bridgmon, 2012).

Internal validity refers to the validity of the findings within the research study. Testing hypotheses can involve threats to the validity of interpretation for quantitative researchers. Quantitative research may involve rejecting null hypotheses or failing to reject null hypotheses (Martin & Bridgmon, 2012). Consequently, threats to conclusive findings occur when quantitative researchers encounter a Type I error, which involves rejecting a valid null hypothesis (Ibrahim & Embat, 2013).

Ethical Procedures

Since an existing data set was used, this study did not require informed consent procedures. Data retrieved from the publicly available TEDS data from 2018-2020 were downloaded from the SAMHSA. No names were collected during the data collection process because participants were not identifiable in the data. No special precautions were required to safeguard the anonymity of participants.

Before analyzing the data sets in this correlational quantitative study, the proposal was submitted to the Walden University Institutional Review Boards (IRB) for review, and approval was obtained to ensure research compliance with the university's ethical standards and U.S. federal regulations. No conflict of interest was involved in this research, and the data set was publicly available.

Summary

The purpose of this quantitative study was to determine the differences between the effectiveness of OUD treatment services among veterans using opioids (as measured by mental health disorders) and the frequency of opioid use at discharge when controlling for age, gender, race, and marital status. Secondary data from the publicly available TEDS data from 2018-2020 were downloaded from the SAMHSA website. Binary and multinomial logistic regression were conducted with SPSS to address the research question and corresponding hypotheses. The next chapter, Chapter 4, discusses the introduction, data collection, and study outcomes.

Chapter 4: Results

Introduction

The situation that prompted this study was that NYS is home to millions of veterans, the fifth-largest veteran population in the country. Veterans represent a vulnerable population and are at higher risk for mental and physical health struggles. Mental health and OUD diagnoses are more prevalent among veterans with legal involvement than those without. Assessing the effectiveness of OUD treatment services in NYS is needed to address the pervasive, harmful, costly health impact and behavioral health needs of veterans involved in or at risk of involvement in the criminal and juvenile justice systems. The purpose of this quantitative study was to determine the differences between the effectiveness of OUD treatment services among veterans using opioids (as measured by mental health disorders) and the frequency of opioid use at discharge when controlling for age, gender, race, and marital status.

The following research questions and hypotheses were addressed:

RQ1: Is there any significant difference between pre- and post-OUD 24-hour detoxification treatment services, residential/rehabilitation treatment services, ambulatory outpatient treatment services, frequency of opioid use at discharge, and mental disorder among veterans with OUD in NYS when controlling for age, gender, race, and marital status?

*H*01: There is no significant difference between pre- and post-OUD 24-hour detoxification treatment services and mental disorders among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*A1: There is a significant difference between pre- and post-OUD 24-hour detoxification treatment services and mental disorders among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*02: There is no significant difference between pre- and post-OUD 24-hour detoxification treatment services and frequency of opioid use at discharge among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*A2: There is a significant difference between pre- and post-OUD 24-hour detoxification treatment services and frequency of opioid use at discharge among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*03***:*** There is no significant difference between pre- and post-OUD rehab/residential treatment services and mental disorders among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*A3: There is a significant difference between pre- and post-OUD rehab/residential treatment services and mental disorders among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*04***:*** There is no significant difference between pre- and post-OUD rehab/residential treatment services and frequency of opioid use at discharge among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*A4: There is a significant difference between pre- and post-OUD rehab/residential treatment services and frequency of opioid use at discharge among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*05***:*** There is no significant difference between pre- and post-OUD ambulatory outpatient treatment services and mental disorders among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*A5: There is a significant difference between pre- and post-OUD ambulatory outpatient treatment services and mental disorders among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*06***:*** There is no significant difference between pre- and post-OUD ambulatory outpatient treatment services and frequency of opioid use at discharge among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

HA6: There is a significant difference between pre- and post-OUD ambulatory outpatient treatment services and frequency of opioid use at discharge among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

The following is a discussion of the data collection procedures, a description of the study's population and sample, and a demographic description of the sample. Demographic descriptions include frequencies and percentages for categorical (nominal) variables and means and standard deviations for variables measured at the interval level of measurement. Also presented are the tests of parametric assumptions for the statistical analysis and the results of the statistical testing. This chapter concludes with a discussion of the results of this study.

Data Collection

I used the 2018-2020 TEDS-D data set to conduct this analysis. The TEDS-D (2020) represents annual discharges from substance abuse treatment facilities. Prior to

analyzing the data, I obtained the approval from the IRB (Approval Number 02-16-24-1025475). Within 4 days after the IRB approval, I accessed the SAMHSA website, and TEDS data sets were transferred to SPSS for analysis. I then extracted NYS (#36 in the codebook) data from the national survey and analyzed the variables of interest, which included marital status, age, gender, race, veteran status, type of treatment service/setting, other opiates/synthetics, frequency of use, arrests, and mental disorders. The population consisted of veterans 18 years of age or older being treated for substance abuse. The data set consisted of N = 168,833 participants, mostly men, 15,620 (92.8%). The most common age group was between 55 and 64 years, 5,313 (31.6%). Regarding race, most participants were Black or African American, 5,262 (54.2%). Most participants were never married, 5,252 (31.2%). This was followed by divorced, 3,158 (18.8%), now married, 2,668 (15.8%), and separated, 1,030 (6.1%). Tables 2 through 5 depict this information.

Table 2

Gender of the Participants and Percentage NYS TEDS-D 2018–2020

	Frequency	Percent
Male	15,620	92.8
Female	1,213	7.2
Total	16,833	100.0

Table 3

Age Group of the Participants at Admission and Percentage NYS TEDS-D 2018–2020

	Frequency	Percent
21–24	320	1.9
25–29	1,090	6.5
30–34	1,705	10.1
35–39	1,691	10.0
40–44	1,268	7.5
45–49	1,497	8.9
50–54	2,718	16.1
55–64	5,313	31.6
65–95	1,231	7.3
Total	16,833	100.0

Table 4

Race of the Participants and Percentage NYS TEDS-D 2018–2020

	Frequency	Percent
Alaska Native	21	.1
American Indian	162	1.0
Black/African American	5,262	31.3
White	9,131	54.2
Asian	52	.3
Other single race	2,101	12.5
Native Hawaiian/Pacific Islander	48	.3
No response	56	.3
Total	16,833	100.0

Table 5

Marital Status of the Participants and Percentage NYS TEDS-D 2018–2020

	Frequency	Percent
Never married	5,253	31.2
Now married	2,668	15.8
Separated	1,030	6.1
Divorced	3,158	18.8
No response	4,724	28.1
Total	16,833	100.0

Five independent variables in this study included type of treatment plan, age, gender, race, and marital status. The two dependent variables included the frequency of opioid use and mental disorders. The type of treatment plan consisted of detox 24 hours, 4,815 (28.6%), rehab residential, 3,862 (22.9%), and ambulatory outpatient, 8,156 (48.5%). See Table 6.

Table 6

Opioid Use Disorder Treatment Types NYS TEDS-D 2018–2020

	Frequency	Percent
Detox 24 hour	4,815	28.6
Rehab/residential	3,862	22.9
Ambulatory/outpatient	8,156	48.5
Total	16,833	100.0

The frequency of opioid use included no use in the past month, 6,323 (37.7), some use, 1,949 (11.6%), and daily use, 998 (5.9%). See Table 7.

Table 7

Frequency of Opioid Use at Discharge and Percentage NYS TEDS-D 2018–2020

	Frequency	Percent
No use in the past month	6,323	37.6
Some use	1,949	11.6
Daily use	998	5.9
No response	7,563	44.9
Total	16,833	100.0

Regarding the number of arrests, most had no arrests: 11,660 (69.3). This was followed by once, 392 (2.3%), and two or more times, 31 (0.2%). Table 8 provides this information.

Table 8

Number of Arrests in the Past 30 Days Prior to Discharge and Percentage NYS TEDS-D 2018–2020

	Frequency	Percent
None	11,660	69.3
Once	392	2.3
two or more times	31	.2
No response	4,750	28.2
Total	16,833	100.0

Regarding the dependent variable mental disorders, most stated yes, 7,085 (42.1%), and 5,048 (30.0%) stated no (Table 9).

Table 9

Mental Disorder and Percentage NYS TEDS-D 2018–2020

	Frequency	Percent
No	5,049	30.0
Yes	7,085	42.1
No response	4,699	27.9
Total	16,833	100.0

Results

Results of Binary Logistic Regression

Three of the six null hypotheses tested entailed performing binary logistic regression with SPSS. These three hypotheses included:

H01: There is no significant difference between pre- and post-OUD 24-hour detoxification treatment services and mental disorders among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

H03: There is no significant difference between pre- and post-OUD rehab/residential treatment services and mental disorders among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

H05: There is no significant difference between pre- and post-OUD ambulatory outpatient treatment services and mental disorders among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

The binary logistic model tested was the following:

Logit (mental disorder) = bo Age + b1 Gender + b2 Race + b3 Marital Status + b4 Treatment Type.

The logistic regression model was statistically significant ($\chi 2(4) = 535.134$, $p < .001$. The model explained 5.9% (Nagelkerke R2) of the variance in mental disorders and correctly classified 60.8% of cases. After controlling for age, gender, race, and marital status, 24-hour detoxification treatment was not found to be statistically significant, compared with ambulatory/outpatient (the reference category), B = -0.301, OR = 0.740, p = .081. Thus, the first null hypothesis is not rejected, and it is concluded that, compared with ambulatory or outpatient treatment, detox 24-hour treatment services did not increase or decrease the likelihood of a mental disorder.

The third hypothesis included rehab/residential treatment services, which was statistically significant. Compared to Ambulatory/Outpatient, rehab/residential treatment services corresponded to an increase in the likelihood of mental disorder by 2.022 times (B = 0.704, OR = 2.022, $p < .001$). Thus, the third null hypothesis is rejected, and it is

concluded that, compared with Ambulatory/Outpatient treatment, rehab/residential treatment services increase the likelihood of a mental disorder.

The fifth hypothesis included ambulatory outpatient treatment services. Since this service was the reference category, the regression model had to be re-run in order to change the reference category and calculate the odds ratio for ambulatory outpatient treatment services. Compared to detox 24 hours, ambulatory and outpatient treatment services were not found to be significant (B = 0.310, OR = 1.364, p = .073). Thus, the fifth null hypothesis was not rejected, and it is concluded that ambulatory/outpatient treatment services do not increase or decrease the likelihood of mental disorders. See Tables 10 through 14.

Table 10

Omnibus Tests of Model Coefficients

$\chi 2$	Df	P
535.134	13	.000

Table 11

Model Summary

Cox & Snell R square	Nagelkerke R square
.044	.059

Table 12

Classification Table

Observed		Predicted		
		Co-occurring mental and substance use disorders		Percentage correct
		No	Yes	
Co-occurring mental and substance use disorders	No	1,553	3,415	31.3
	Yes	1,292	5,756	81.7
Overall percentage				60.8

Table 13

Results of Binary Logistic Regression (Ambulatory/Outpatient Reference Category NYS TEDS-D 2018–2020)

	B	S.E.	Wald	df	P	OR	95% C.I. for EXP(B)	
							Lower	Upper
AGE_IV	-.045	.009	23.508	1	.000	.956	.939	.974
GENDER_IV	.771	.078	97.264	1	.000	2.162	1.855	2.520
RACE_IV			53.565	6	.000			
RACE_IV (1)	-.989	.609	2.636	1	.104	.372	.113	1.227
RACE_IV (2)	-.441	.419	1.107	1	.293	.644	.283	1.463
RACE_IV (3)	-.740	.370	3.988	1	.046	.477	.231	.986
RACE_IV (4)	-.424	.369	1.321	1	.250	.654	.317	1.349
RACE_IV (5)	-.821	.491	2.800	1	.094	.440	.168	1.151
RACE_IV (6)	-.611	.372	2.698	1	.100	.543	.262	1.125
MARSTAT_IV			67.836	3	.000			
MARSTAT_IV (1)	-.105	.050	4.484	1	.034	.900	.817	.992
MARSTAT_IV (2)	-.410	.055	56.169	1	.000	.664	.596	.739
MARSTAT_IV (3)	.028	.076	.140	1	.708	1.029	.887	1.193
Ambulatory/outpatient			278.524	2	.000			
Detox 24 hour	-.301	.173	3.054	1	.081	.740	.528	1.037
Rehab/residential	.704	.043	269.805	1	.000	2.022	1.859	2.199
Constant	.392	.391	1.003	1	.317	1.480		

Table 14

Results of Binary Logistic Regression (Detox 24-Hour Treatment Reference Category NYS TED-S-D 2018–2020)

	B	S.E.	Wald	df	P	OR	95% C.I. for EXP(B)	
							Lower	Upper
AGE_IV	-.045	.009	23.508	1	.000	.956	.939	.974
GENDER_IV (1)	-.763	.078	94.814	1	.000	.466	.400	.544
RACE_IV			57.086	6	.000			
RACE_IV (1)	-1.007	.612	2.706	1	.100	.365	.110	1.213
RACE_IV (2)	-.476	.419	1.291	1	.256	.621	.274	1.412
RACE_IV (3)	-.753	.370	4.133	1	.042	.471	.228	.973
RACE_IV (4)	-.424	.369	1.322	1	.250	.654	.317	1.349
RACE_IV (5)	-.873	.491	3.165	1	.075	.418	.160	1.093
RACE_IV (6)	-.629	.372	2.862	1	.091	.533	.257	1.105
MARSTAT_IV			62.969	3	.000			
MARSTAT_IV (1)	-.091	.050	3.364	1	.067	.913	.828	1.006
MARSTAT_IV (2)	-.399	.055	52.436	1	.000	.671	.603	.748
MARSTAT_IV (3)	.014	.076	.032	1	.858	1.014	.873	1.177
Detox 24 hour			266.002	2	.000			
Rehab/residential	1.001	.175	32.575	1	.000	2.720	1.929	3.835
Ambulatory/outpatient	.310	.173	3.216	1	.073	1.364	.972	1.915
Constant	.735	.418	3.099	1	.078	2.086		

Results of Multinomial Regression

Multinomial regression was conducted in order to address these three null hypotheses:

*H*02: There is no significant difference between pre- and post-OUD 24-hour detoxification treatment services and frequency of opioid use at discharge among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*04***:*** There is no significant difference between pre- and post-OUD rehab/residential treatment services and frequency of opioid use at discharge among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

*H*06***:*** There is no significant difference between pre- and post-OUD ambulatory outpatient treatment services and frequency of opioid use at discharge among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

The reference category for the dependent variable is opioid daily use, and ambulatory/outpatient served as the reference category for service type. The second null hypothesis consisted of 24-hour detoxification treatment services. Detox 24 hr was found to be significant in both no opioid use (B = -2.653, OR = 0.070, $p < .001$) and some opioid use (B = -2.002, OR = 0.135, p = .007. Detox 24-hour treatment service decreases the likelihood of no opioid use and some opioid use compared with ambulatory outpatients. Thus, the second null hypothesis is rejected.

Regarding rehab/residential treatment services (the fourth null hypothesis), this treatment service was found to be significant in both no opioid use (B = 0.538, OR = 1.712, $p < .001$) and some use (B = -0.827, OR = .037, $p < .001$). Rehab/residential treatment services increase the likelihood of no opioid use and also decrease the likelihood of some use. Re-rerunning the multinomial regression model, compared to detox 24 hours a day, ambulatory/outpatient treatment services were not found to be significant. Thus, this sixth null hypothesis is not rejected, and it is concluded that ambulatory/outpatient treatment services did not increase or decrease the likelihood of opioid use. See Table 15.

Table 15

Results of Multinomial Regression, NYS TEDSD 2018–2020

Frequency of use at discharge (primary)[a]		B	SE	Wald	df	P	OR	95% C.I. for Exp(B) Lower Bound	Upper Bound
No use in the past month	Intercept	1.360	.686	3.928	1	.047			
	[AGE_IV=4]	.474	.304	2.433	1	.119	1.607	.885	2.915
	[AGE_IV=5]	-.031	.185	.028	1	.867	.970	.675	1.393
	[AGE_IV=6]	.185	.175	1.119	1	.290	1.203	.854	1.695
	[AGE_IV=7]	.157	.172	.838	1	.360	1.170	.836	1.640
	[AGE_IV=8]	.038	.181	.045	1	.832	1.039	.729	1.481
	[AGE_IV=9]	.025	.176	.020	1	.888	1.025	.726	1.447
	[AGE_IV=10]	.157	.162	.946	1	.331	1.170	.852	1.607
	[AGE_IV=11]	-.003	.147	.000	1	.984	.997	.747	1.331
	[AGE_IV=12]	0b	.	.	0	.	.	.	.
	[GENDER_IV=1]	.384	.119	10.378	1	.001	1.468	1.162	1.855
	[GENDER_IV=2]	0b	.	.	0	.	.	.	.
	[MARSTAT_IV=1]	-.262	.092	8.169	1	.004	.770	.643	.921
	[MARSTAT_IV=2]	.060	.106	.328	1	.567	1.062	.864	1.307
	[MARSTAT_IV=3]	.016	.146	.011	1	.915	1.016	.763	1.352
	[MARSTAT_IV=4]	0b	.	.	0	.	.	.	.
	[RACE_IV=1]	-1.922	.957	4.033	1	.045	.146	.022	.955
	[RACE_IV=2]	.553	.763	.526	1	.468	1.739	.390	7.758
	[RACE_IV=4]	-.052	.665	.006	1	.937	.949	.258	3.495
	[RACE_IV=5]	.230	.663	.120	1	.729	1.258	.343	4.614
	[RACE_IV=6]	.621	1.001	.385	1	.535	1.861	.262	13.235
	[RACE_IV=7]	-.312	.667	.219	1	.640	.732	.198	2.705
	[RACE_IV=9]	0b	.	.	0	.	.	.	.
	Detox 24 hr	-2.653	.234	128.199	1	.000	.070	.045	.112
	Rehab/Residential	.538	.080	45.091	1	.000	1.712	1.464	2.003
	ambulatory/outpatient	0b	.	.	0	.	.	.	.
Some use	Intercept	-.059	.855	.005	1	.945			
	[AGE_IV=4]	.652	.326	3.990	1	.046	1.920	1.012	3.640
	[AGE_IV=5]	-.341	.214	2.543	1	.111	.711	.468	1.081
	[AGE_IV=6]	-.006	.198	.001	1	.974	.994	.674	1.466
	[AGE_IV=7]	.115	.194	.352	1	.553	1.122	.767	1.641
	[AGE_IV=8]	-.117	.207	.320	1	.572	.890	.593	1.334
	[AGE_IV=9]	.107	.198	.293	1	.589	1.113	.755	1.641
	[AGE_IV=10]	.251	.182	1.906	1	.167	1.285	.900	1.835
	[AGE_IV=11]	.080	.167	.233	1	.629	1.084	.782	1.503
	[AGE_IV=12]	0b	.	.	0	.	.	.	.
	[GENDER_IV=1]	.275	.136	4.108	1	.043	1.316	1.009	1.717
	[GENDER_IV=2]	0b	.	.	0	.	.	.	.
	[MARSTAT_IV=1]	-.045	.104	.191	1	.662	.956	.779	1.172
	[MARSTAT_IV=2]	.039	.119	.107	1	.743	1.040	.823	1.314
	[MARSTAT_IV=3]	.149	.164	.828	1	.363	1.161	.842	1.600
	[MARSTAT_IV=4]	0b	.	.	0	.	.	.	.
	[RACE_IV=1]	.142	1.036	.019	1	.891	1.152	.151	8.784
	[RACE_IV=2]	.672	.936	.515	1	.473	1.957	.313	12.253
	[RACE_IV=4]	.712	.833	.729	1	.393	2.038	.398	10.435
	[RACE_IV=5]	.696	.831	.702	1	.402	2.007	.393	10.238
	[RACE_IV=6]	1.591	1.139	1.950	1	.163	4.909	.526	45.789
	[RACE_IV=7]	.352	.836	.177	1	.674	1.422	.276	7.314
	[RACE_IV=9]	0b	.	.	0	.	.	.	.
	Detox 24 hr	-1.346	.204	43.524	1	.000	.260	.174	.388
	Rehab/Residential	-.827	.100	69.085	1	.000	.437	.360	.531
	Ambulatory/outpatient	0b	.	.	0	.	.	.	.

Note. a. The reference category is Daily use. b. This parameter is set to zero because it is redundant.

Summary

The purpose of this correlational quantitative study was to determine the differences between the effectiveness of OUD treatment services among veterans using opioids (as measured by mental health disorders) and the frequency of opioid use at discharge when controlling for age, gender, race, and marital status.

Three of the six null hypotheses tested entailed performing binary logistic regression with SPSS. These three hypotheses included H01, H03, and H05. After controlling for age, gender, race, and marital status, 24-hour detoxification treatment was not found to be statistically significant compared with ambulatory/outpatient (the reference category). Thus, H01 was not rejected. The third hypothesis included rehab/residential treatment services, which was statistically significant. Compared to Ambulatory/Outpatient, rehab/residential treatment services corresponded to an increase in the likelihood of mental health disorders by 2.022 times ($B = 0.704$, $OR = 2.022$, $p < .001$). Thus, the third null hypothesis is rejected, and it is concluded that, compared with Ambulatory/Outpatient treatment, rehab/residential treatment services increase the likelihood of a mental health disorder. The fifth hypothesis included ambulatory outpatient treatment services. Compared to detox 24 hours, ambulatory and outpatient treatment services were not found to be significant ($B = 0.310$, $OR = 1.364$, $p = .073$). Thus, the fifth null hypothesis was not rejected.

Multinomial regression was conducted for H02, H04, and H06. The reference category for the dependent variable is opioid daily use, and ambulatory/outpatient served as the reference category for service type. The second null hypothesis consisted of 24-

hour detoxification treatment services. Detox 24 hr was found to be significant in both no opioid use (B = -2.653, OR = 0.070, $p < .001$) and some opioid use (B = -2.002, OR = 0.135, p = .007. Detox 24-hour treatment service decreases the likelihood of no opioid use and some opioid use compared with ambulatory outpatients. Thus, the second null hypothesis was rejected.

Regarding rehab/residential treatment services (the fourth null hypothesis), this treatment service was found to be significant in both no opioid use (B = 0.538, OR = 1.712, $p < .001$) and some use (B = -0.827, OR = .037, $p < .001$). Rehab/residential treatment services increase the likelihood of no opioid use and also decrease the likelihood of some use. Thus, H04 was rejected. Regarding H06, compared to detox 24 hours, ambulatory/outpatient treatment services were not found to be significant. Thus, this sixth null hypothesis is not rejected.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this correlational quantitative study was to determine the differences between the effectiveness of OUD treatment services among veterans using opioids (as measured by mental health disorders) and the frequency of opioid use at discharge when controlling for age, gender, race, and marital status. To address the research questions, the specific research design included a correlational design. A quantitative methodology with a correlational design was most appropriate because the objective was to identify and evaluate the differences between the dependent and independent variables. Due to the nature of the research questions, multinomial logistic regression and binomial logistic regression were the best fits for the analysis. Multinomial logistic regression predicts a nominal dependent variable given one or more independent variables (Lee et al., 2013).

The importance of this study was to provide information that could address opioid disorder treatments and their link to arrest and mental health outcomes. Veterans who suffer from OUDs have difficulty breaking their addiction on their own. Veterans who struggle with opioid addiction may be rehabilitated through effective treatments that reduce the addiction and consequently reduce the number of arrests. The research question that guided this study was: Is there any significant difference between pre- and post-OUD 24-hour detoxification treatment services, residential/rehabilitation treatment services, ambulatory outpatient treatment services, frequency of opioid use at discharge,

and mental disorder among veterans with OUD in NYS when controlling for age, gender, race, and marital status?

The findings indicate that 24-hour detoxification treatment is not found to be statistically significant compared with ambulatory/outpatient. Compared to ambulatory/outpatient, rehab/residential treatment services corresponded to an increase in the likelihood of mental disorders. Thus, the findings revealed that ambulatory/outpatient treatment and rehab/residential treatment services increased the likelihood of a mental disorder. However, compared to detox 24-hour treatment service, ambulatory and outpatient treatment services were not found to be significant, indicating that there was no significant difference between pre- and post-OUD ambulatory outpatient treatment services and mental disorders among veterans with OUD in NYS when controlling for age, gender, race, and marital status.

Multinomial regression results indicate that detox 24-hour treatment service is found to be significant in both no opioid use and some opioid use. Thus, detox 24-hour treatment service decreases the likelihood of no opioid use and some opioid use compared with ambulatory outpatient care. Regarding rehab/residential treatment services, this treatment service was found to be significant in both no opioid use and some use, indicating that rehab/residential treatment services increase the likelihood of no opioid use and also decrease the likelihood of some use. On the other hand, compared to detox 24-hour treatment services, ambulatory/outpatient treatment services were not found to be significant, and it was concluded that there is no significant difference between pre- and post-OUD ambulatory and outpatient treatment services and the

frequency of opioid use at discharge among veterans with OUD in NYS. Chapter 5 includes the interpretation of the findings, limitations of the study, recommendations, implications, and conclusion.

Interpretation of the Findings

The discussion and interpretation of the findings are based on the research question and hypotheses. Binary logistic regression and multinomial regression were used in the data analysis. Three of the six null hypotheses tested entailed performing binary logistic regression with SPSS. The three null hypotheses included $H_0$1, $H_0$3, and $H_0$5.

The results of the binary logistic regression analysis indicate that 24-hour detoxification treatment was not statistically significant compared with ambulatory or outpatient care. The results suggest that, when compared with ambulatory or outpatient treatment, detox 24-hour treatment services did not increase or decrease the likelihood of a mental health disorder among the veterans. The findings suggest that 24-hour detoxification treatment for veterans was not associated with an increase or decrease in the likelihood of a mental health disorder among veterans. This hypothesis addresses the research question and research problem by establishing that the 24-hour detoxification treatment type does not increase or decrease the likelihood of a mental health disorder among veterans.

Unlike the current study findings, although these findings indicate that 24-hour detoxification treatment of veterans is not associated with an increase or decrease in the likelihood of a mental health disorder among veterans, previous research demonstrated

that holistic/complementary therapies and medication-assisted treatment impact mental health disorders (Manhapra et al., 2020). The current research has, therefore, added to the body of empirical knowledge by establishing that the treatment type of 24-hour detoxification treatment does not contribute to the decrease or increase in the likelihood of a mental health disorder among veterans. The discrepancy in findings could be caused by different settings, populations, phenomena of study, and sample sizes used in these studies.

The treatment type of 24-hour detoxification was found not to be significantly associated with the likelihood of a mental health disorder among the veterans. This finding confirms previous research findings, which demonstrate that opioids, when used by individuals suffering from anxiety symptoms, are likely to increase unpredictability and uncertainty, making it difficult to offer treatment to these individuals and thus affecting their association with mental health disorders (McHugh et al., 2021). Initiating stepped care for opioid use and increased prescription treatment for opioids among veterans with mental health and chronic pain has led to veteran abuse of opioids (Gordon et al., 2020).

The current study outcomes also refute past studies, which revealed that tele-prescription of buprenorphine and treatment among 12 veterans with opioid use disparities inversely promoted their frequent abuse of opioids after their treatment, leading to mental health disorders (Brunet et al., 2022; Gordon et al., 2020). Previous research did not focus on the 24-hour detoxification treatment type but indicated that naltrexone, unlike methadone or buprenorphine, eliminates addiction risks and makes it

an appealing option for veterans who prefer non-opioid treatment, which can be associated with mental health disorders among veterans (Nunes et al., 2021). This current study has contributed to the literature by establishing that the treatment type of 24-hour detoxification treatment is not associated with mental health disorders among veterans.

Regarding the third hypothesis, the results revealed that, compared to ambulatory/outpatient, rehab/residential treatment services corresponded to an increase in the likelihood of mental disorders among veterans. The findings indicate that rehab/residential treatment services increase the likelihood of a mental health disorder among the veterans. Thus, this hypothesis addresses the study problem and research question by revealing that rehab/residential treatment services increase the likelihood of a mental health disorder among veterans.

These findings contradict previous literature that associated opioid use for self-medication with mental health disorders by indicating that individuals with depressive symptoms are at high risk of misusing opioids as they intend to relieve themselves from these symptoms, leading to mental health disorders (Herlinger & Lingford, 2022; Rogers et al., 2021). Disconfirming current research findings, past studies have indicated that using opioids to relieve depressive symptoms is likely not to achieve the intended purpose as opioids affect the functionality of brains by lowering their effectiveness in treating depressive symptoms, contributing to mental health disorders (Herlinger Lingford, 2022; Rogers et al., 2021). The difference in findings could be due to different factors such as diverse settings used, sample size, the phenomenon of the study, and different variables adopted for investigation. The current study findings contribute to the

empirical knowledge by filling the gap in the literature regarding the association between the type of rehab/residential treatment services and mental health disorders among veterans.

The fifth hypothesis included ambulatory outpatient treatment services, and the binary logistic regression analysis results revealed that, compared to detox 24-hour treatment services, ambulatory and outpatient treatment services were not found to be significant. This indicates that ambulatory/outpatient treatment services do not increase or decrease the likelihood of mental health disorders. This finding suggests that ambulatory and outpatient treatment services do not lead to a decrease or increase in the likelihood of mental health disorders among veterans. The hypothesis addresses the research question and study problem by indicating that ambulatory/outpatient treatment services do not increase or decrease the likelihood of mental health disorders among veterans.

These findings are inconsistent with previous research findings by Ciucă et al. (2023), who established that individuals using opioids suffer from severe anxiety conditions with symptoms of panic attacks and tremors, leading to the development of mental health disorders. Individuals using opioids for self-medicating exacerbate their suffering, leading to mental health disorders (Ciucă et al., 2023). The findings add to this research by indicating that ambulatory and outpatient treatment services do not increase or decrease the likelihood of mental health disorders. Contingency management as a type of treatment was associated with positive behavior change by providing immediate rewards for abstaining from opioids and linking them to active treatment, thereby

strengthening the motivation to maintain the behaviors, leading to reduced mental health disorders (DeFulio, 2023; Peter et al., 2023). The current study findings provide valuable information contributing to the literature regarding the relationship between treatment type and mental health disorders among veterans by establishing that ambulatory or outpatient treatment services do not increase or decrease the likelihood of mental health disorders.

Three of the six null hypotheses tested entailed performing multinomial regression. The three null hypotheses included *H*02, *H*04, and *H*06. Regarding the second hypothesis, *H*02, the findings indicated that detox 24-hour treatment was found to be significant for both no opioid use and some opioid use. Thus, detox 24-hour treatment service decreases the likelihood of no opioid use and some opioid use compared with ambulatory outpatients among veterans. The hypothesis contributes to addressing the research question and the study problem by revealing that detox 24-hour treatment service decreases the likelihood of no opioid use and some opioid use among veterans.

While current study findings revealed that detox 24-hour treatment service decreases the likelihood of no opioid use and some opioid use among veterans, past studies indicated that cognitive-behavioral therapy emphasizing the importance of positive activities as a substitute for opioid use makes veterans experience achievement and contentment, thus reducing their OUD (Speed et al., 2022). The difference in findings could be due to the use of diverse study settings and target populations. In this regard, the current study adds to the empirical studies by revealing that detox 24-hour

treatment service decreases the likelihood of no opioid use and some opioid use among veterans.

The current research outcomes also refute other empirical studies that indicated that psycho-educational activities assist veterans in comprehending OUD, its causes, risk factors, and neurobiological processes, thus helping them understand the best regimen for their treatment, leading to a reduced likelihood of no use of opioids (Raines et al., 2020; Betthauser et al., 2021). Current research contributes to previous literature by establishing that a 24-hour detox treatment service decreases the likelihood of no opioid use and some opioid use among veterans.

Concerning the fourth hypothesis, the research outcomes indicated that rehab/residential treatment services were significant in both opioid use and some use. This suggests that rehab/residential treatment services increase the likelihood of no opioid use and also decrease the likelihood of some use. The findings addressed the problem and the research question of this study by establishing that rehab/residential treatment services increase the likelihood of no opioid use and also decrease the likelihood of some use among veterans. Unlike current study findings, other studies indicate that establishing a strong therapeutic alliance between the counselor and the veteran in individual counseling sessions is essential for effectively treating OUDs among veterans, contributing to no use of opioids (Kelley et al., 2022; Breggin & Stolzer, 2020). The current research outcome contributes to the empirical literature by indicating that rehab/residential treatment services increase the likelihood of no opioid use and also decrease the likelihood of using opioids.

The findings of the sixth null hypothesis revealed that, compared to detox 24-hour treatment, ambulatory/outpatient treatment services were not found to be significant. The results demonstrate that ambulatory/outpatient treatment services did not increase or decrease the likelihood of opioid use among veterans. This hypothesis addressed the research question and research problem by indicating that ambulatory/outpatient treatment services do decrease or increase the possibility of opioid use among veterans.

Whereas the current study indicates that ambulatory/outpatient treatment services did not increase or decrease the likelihood of opioid use among veterans, previous research indicates that 12-step facilitation programs offer relapse prevention strategies and coping skills training to veterans, which enhances their ability to manage opioid cravings and stress and avoid relapse, leading to reduced opioid use (Santa et al., 2021; Woodhead et al., 2020). 12-step facilitation assists veterans in developing coping strategies to manage cravings and stress without using substances, such as relaxation techniques, mindfulness exercises, healthy activities, peer support, and 12-step program support networks, which is an effective treatment type for reduced use of opioids (Brady et al., 2021). Current research contributes to previous knowledge regarding the type of treatment and opioid use among veterans by establishing that ambulatory/outpatient treatment services did not increase or decrease the likelihood of opioid use among veterans.

Limitations of the Study

Several limitations were identified in this study. The self-reporting data by individuals was one limitation of the study. This self-reporting data may limit the

reliability of the data tool if the participants were not truthful regarding the information provided. It is assumed, however, that the data was accurate and reliable. This study was also limited by convenience sampling, which limits the generalizability of study findings relative to probabilistic or random sampling techniques. Additionally, correlational design cannot deduce any cause-and-effect difference between the study variables, as independent variables cannot be manipulated. Also, the data set used in this study was based on information that treatment facilities reported. Treatment facilities may need to report all the required information, or they may be reporting inaccurate information. Also, deciding whether the archival data matches the research questions and recording the variables posed a challenge that may affect the validity of study outcomes. Assessment tools and quality control measures limited the study. Obtaining detailed descriptions of the population under study, assessment tools, and quality control measures posed a challenge to the researcher because the investigator had to obtain and study the codebook and other information provided by the Substance Abuse and Mental Health Services Administration (SAMHSA) database. The investigator had to ensure that all information provided was sufficient to assess the internal and external validity of the data and allow the investigator to determine whether or not there were enough cases in the data set to generate meaningful estimates about the topic.

Recommendations

Recommendations for Future Research

The recommendations for future research were based on limitations and study findings. The researcher adopted convenience sampling, which limits the generalizability

of study findings relative to probabilistic or random sampling techniques. Based on this limitation, the researcher recommends that future researchers should consider using probabilistic or random sampling techniques in their studies. This would enhance the validity and generalizability of the study's findings.

The correlational design adopted in this study cannot deduce any cause-and-effect difference between the study variables, as independent variables will not be manipulated. Also, the data set used in this study is based on information that treatment facilities reported. In this regard, further research should be conducted using an experimental design to allow the deduction of cause-and-effect relationships between the study variables. This would also allow the manipulation of independent variables. In this study, future researchers should determine how variables of age, gender, race, and marital status impact the relationship between treatment type, mental health disorder, and OUD among veterans.

Future research should be conducted using qualitative methodologies, including phenomenological study design. The research should explore the lived experiences of veterans regarding their perceptions of the effects of treatment types on mental health disorders and OUDs. Qualitative phenomenological research would provide in-depth and rich data regarding treatment types and how they impact mental health disorders and OUDs among veterans.

Recommendations for Practice

The study findings indicated that rehab/residential treatment services increase the likelihood of no opioid use and also decrease the likelihood of using opioids. The Veteran

Health Administration should adopt rehab/residential treatment services for veterans to reduce their use of opioids. Understanding how NYS veterans assess the severity of their OUD and the potential ramifications, both mental and physical, allows for the effective tailoring of interventions and treatment plans to veterans' specific needs.

Current research indicates that a 24-hour detox treatment service decreases the likelihood of no opioid use and some opioid use among veterans. Based on these findings, healthcare institutions treating veterans with OUD should implement a 24-hour detox treatment service after withdrawal to reduce the use of opioids among veterans in NYS. Providing a 24-hour detox treatment service ensures access to treatment for this vulnerable population in NYS. Contingency management encourages veterans to engage in pro-social behaviors, such as attending therapy sessions, building a support network, and participating in activities that enhance their well-being (DeFulio, 2023). Thus, engaging in a 24-hour detox treatment service would help veterans overcome issues of OUD.

The journey of veterans extends beyond the end of a war or their service. Similarly, recovery does not cease with the completion of a treatment plan. It is an ongoing process, and the availability of aftercare support greatly facilitates its continuation. Abrupt reintegration into society can be daunting and overwhelming for veterans who still feel uncertain about their own stability. Various care plans can be implemented to promote continuity of care for veterans who have been discharged from rehabilitation centres. Healthcare providers can still deliver patient-centred treatment to ensure that the veterans' experiences are integrated into care delivery. OUD treatment

programs can be designed and implemented effectively to enhance the odds of success for veterans suffering from opioid use disorders after discharge from the rehab centres. These plans should include the treatment facility collaborating with veterans and their families to offer a framework and support for recovery post-discharge. This includes facilitating communication between veterans and external sources of support, such as doctors, therapists, social workers, job coaches, family members, local support groups, outpatient therapy and counseling. Additional assistance may involve family support through support groups, medical oversight, finding suitable living arrangements, developing life skills and coping mechanisms, implementing strategies to prevent relapse, engaging in recreational activities, considering potential relocation to another residential treatment facility or group home, nursing home care, or remaining at home with continued care from healthcare professionals or therapists.

This will ensure that they receive ongoing support and necessary resources. Coordination with community partners can also help continue the delivery of care services to veterans discharged from the OUD rehab centres (Speed et al., 2022). Further, peer support programs can be implemented to promote the sharing of experiences to help veterans in their recovery process after being discharged. Establishing a Veterans' Health Administration (VHA) can help veteran's access primary care services to help them in recovery. Using telehealth services can also help reach out to veterans in remote care homes and other state residential facilities to improve continued access to therapy services after discharge from rehabilitation centres.

Implications

Implications for Positive Social Change

This study made several contributions to positive social change. The study findings would provide information that can address opioid disorder treatments and their link to arrest and mental health outcomes. It was known that veterans who suffer from OUDs have difficulty breaking their addiction on their own. Veterans who struggle with opioid addiction may be rehabilitated through effective treatments such as detox 24-hour treatment service decreases the likelihood of no opioid use, and some opioid use among veterans reduces the addiction and consequently reduces the number of arrests. This reduction would contribute to the positive growth of the community because effective treatment services tend to significantly lower mental disorders and criminal acts among veterans with OUD.

The study findings would provide great insight into treatment types such as detox 24-hour treatment services and rehab/residential treatment services. These treatment services could be used among veterans to enhance their health outcomes, including OUD and mental health disorders. The effectiveness of treatment services includes improving knowledge of treatment services, safety, and efficacy for veterans, providers, and legal system personnel. In addition, the study findings would improve veteran education about OUD treatment services and provide veterans with social support opportunities. As a result, public health professionals and healthcare providers could use the current study findings to deliver compassionate, patient-centered treatment, improve the quality of care, and ensure that the veterans' experiences are integrated into care delivery. When

OUD treatment programs are designed and implemented effectively, the odds of success for veterans suffering from OUDs significantly increase.

Discharged veterans require continued therapy services that can be offered by the treatment team after their discharge. Therefore, various roles can be played by this teacher during the discharge of veterans from the OUD rehabilitation facilities. One of the important roles played by this treatment team is the coordination of aftercare services to be offered to the discharged veterans including ensuring their outpatient therapy services and continued training programs. The treatment can also offer emotional support to the discharged veterans as well as monitor their progress and recommend adjustment plans for effective treatment services.

Theoretical Implications

The theoretical frameworks that ground this study include the Harm Reduction Framework created by the Substance Abuse and Mental Health Services Administration (SAMHSA) in 2021 (Framework for program evaluation - CDC, 2023) and the HBM. The Harm Reduction Framework was the first to fully describe harm reduction and its function within the Department of Health and Human Services (HHS), making it historically significant. The current findings support this framework by establishing that rehab/residential treatment services increase the likelihood of no opioid use and also decrease the likelihood of using opioids. Based on the Harm Reduction Framework, engaging in rehab/residential treatment services could help veterans reduce opioid use.

Harm reduction has occasionally been boiled down to a single service or set of services. The provision of evidence-based treatment, such as rehab/residential treatment

and detox 24-hour treatment services, is part of harm reduction as an approach with guiding principles and pillars that can be used in various contexts. Using the HBM helps in examining the psychological elements influencing veterans' decisions to participate in OUD treatment programs (Frost et al., 2023). It specifically examines how NYS veterans see OUD as a threat, the advantages and disadvantages of getting treatment, cues to act, and their confidence in their ability to follow the recommended treatment plan. The current study findings provide different treatment types and their association with OUD and mental health disorders among veterans. The result aligns with the HBM by influencing veterans' decisions to participate in OUD treatment programs such as rehab/residential treatment services and detox 24-hour treatment services.

Conclusion

The purpose of this quantitative study was to determine the differences between the effectiveness of OUD treatment services among veterans using opioids and the frequency of opioid use at discharge when controlling for age, gender, race, and marital status. This research provides information that can address opioid disorders and mental health treatments among veterans. Veterans who suffer from OUDs have difficulty breaking their addiction on their own, and they can be rehabilitated through effective treatments that reduce the addiction and consequently reduce the number of arrests, including 24-hour detoxification treatment, ambulatory outpatient treatment services, and residential/rehabilitation treatment services.

This research showed that a 24-hour detox treatment service decreases the likelihood of no opioid use and some opioid use compared with ambulatory outpatients.

Rehab/residential treatment services were also significant in both no opioid use and some use, indicating that Rehab/residential treatment services increase the likelihood of no opioid use and also decrease the likelihood of some use. Veterans can use these treatment types for the reduction of OUD and mental health disorders. The research provides important information concerning the treatment of veterans suffering from opioid use and mental health disorders.

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Appendix A: List of Abbreviations

AAC: American Addiction Centers

CBT: Cognitive Behavioral Therapy

CDC: Centers for Disease Control and Prevention

HBM: Health Belief Model

HHS: Health and Human Services

MAT : Medication-Assisted Treatment

MLR: Multinomial Logistic Regression

MOUD: Medication for Opioid Use Disorder

NIDA: National Institute on Drug Abuse

NYSDOH: New York State Department of Health

NYSDOEC : New York State Department of Environmental Conservation

NYSDVS : New York State Department of Veterans' Services

NYSHealth: New York State Health Foundation

NYSOA: New York State Office for the Aging

NYS: New York State

OTP : Opioid Treatment Program

OUD: Opioid Use Disorder

PSTD: Post-Traumatic Stress Disorder

SAMHSA: Substance Abuse and Mental Health Services Administration

SPSS: Statistical Package for the Social Sciences

TEDS : Treatment Episode Data Set

Appendix B: IRB Approval Number

Your IRB approval number is 02-16-24-1025475.

Appendix C: SPSS Outputs

Frequencies

[Data set1] C: NYS tedsd_puf_2018_2020.sav

Statistics

		Marital status	Co-occurring mental and substance use disorders	Gender	Arrests in past 30 days prior to discharge	Age at admission	Race	Frequency of use at discharge (primary)	Services_New
N	Valid	12109	12134	16833	12083	16833	16777	9270	16833
	Missing	4724	4699	0	4750	0	56	7563	0

Frequency Table

Marital status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never married	5253	31.2	43.4	43.4
	Now married	2668	15.8	22.0	65.4
	Separated	1030	6.1	8.5	73.9
	Divorced	3158	18.8	26.1	100.0

	Total	12109	71.9	100.0	
Missing	-9	4724	28.1		
Total		16833	100.0		

Co-occurring mental and substance use disorders

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	5049	30.0	41.6	41.6
	Yes	7085	42.1	58.4	100.0
	Total	12134	72.1	100.0	
Missing	-9	4699	27.9		
Total		16833	100.0		

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	15620	92.8	92.8	92.8
	Female	1213	7.2	7.2	100.0
	Total	16833	100.0	100.0	

Arrests in past 30 days prior to discharge

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None	11660	69.3	96.5	96.5
	Once	392	2.3	3.2	99.7

	two or more times	31	.2	.3	100.0
	Total	12083	71.8	100.0	
Missing	-9	4750	28.2		
Total		16833	100.0		

Age at admission

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	21-24	320	1.9	1.9	1.9
	25-29	1090	6.5	6.5	8.4
	30-34	1705	10.1	10.1	18.5
	35-39	1691	10.0	10.0	28.6
	40-44	1268	7.5	7.5	36.1
	45-49	1497	8.9	8.9	45.0
	50-54	2718	16.1	16.1	61.1
	55-64	5313	31.6	31.6	92.7
	65-95	1231	7.3	7.3	100.0
	Total	16833	100.0	100.0	

Race

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Alaska native	21	.1	.1	.1
	American Indian	162	1.0	1.0	1.1

	Black/African American	5262	31.3	31.4	32.5
	White	9131	54.2	54.4	86.9
	Asian	52	.3	.3	87.2
	Other single race	2101	12.5	12.5	99.7
	Native Hawaiian/Pacific Islander	48	.3	.3	100.0
	Total	16777	99.7	100.0	
Missing	-9	56	.3		
Total		16833	100.0		

Frequency of use at discharge (primary)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No use in the past month	6323	37.6	68.2	68.2
	Some use	1949	11.6	21.0	89.2
	Daily use	998	5.9	10.8	100.0
	Total	9270	55.1	100.0	
Missing	-9	7563	44.9		
Total		16833	100.0		

Services_New

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Detox 24 hr	4815	28.6	28.6	28.6

	Rehab/Residential	3862	22.9	22.9	51.5
	Ambulatory/Outpatient	8156	48.5	48.5	100.0
	Total	16833	100.0	100.0	

Logistic Regression

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	12016	71.4
	Missing Cases	4817	28.6
	Total	16833	100.0
Unselected Cases		0	.0
Total		16833	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
No	0
Yes	1

Categorical Variables Codings

		Frequency	Parameter coding					
			(1)	(2)	(3)	(4)	(5)	(6)
Race	Alaska native	18	1.000	.000	.000	.000	.000	.000
	American Indian	113	.000	1.000	.000	.000	.000	.000
	Black/African American	3512	.000	.000	1.000	.000	.000	.000
	White	6783	.000	.000	.000	1.000	.000	.000
	Asian	40	.000	.000	.000	.000	1.000	.000
	Other single race	1514	.000	.000	.000	.000	.000	1.000
	Native Hawaiian/Pacific Islander	36	.000	.000	.000	.000	.000	.000
Marital status	Never married	5218	1.000	.000	.000			
	Now married	2648	.000	1.000	.000			
	Separated	1025	.000	.000	1.000			
	Divorced	3125	.000	.000	.000			
Services_New	Detox 24 hr	142	1.000	.000				

	Rehab/Residential	3829	.000	1.000				
	Ambulatory/Outpatient	8045	.000	.000				

Classification Table[a,b]

Observed			Predicted		
			Co-occurring mental and substance use disorders		Percentage Correct
			No	Yes	
Step 0	Co-occurring mental and substance use disorders	No	0	4968	.0
		Yes	0	7048	100.0
	Overall Percentage				58.7

a. Constant is included in the model.

b. The cut value is .500.

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	AGE_IV	42.634	1	.000
		GENDER_IV	100.632	1	.000
		RACE_IV	39.501	6	.000
		RACE_IV (1)	1.501	1	.220
		RACE_IV (2)	.272	1	.602
		RACE_IV (3)	26.745	1	.000
		RACE_IV (4)	32.858	1	.000
		RACE_IV (5)	.627	1	.428
		RACE_IV (6)	2.450	1	.118
		MARSTAT_IV	84.101	3	.000
		MARSTAT_IV (1)	9.944	1	.002
		MARSTAT_IV (2)	82.464	1	.000
		MARSTAT_IV (3)	5.322	1	.021
	Overall Statistics		239.689	11	.000

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	245.948	11	.000
	Block	245.948	11	.000
	Model	245.948	11	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	16049.892[a]	.020	.027

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	34.770	8	.000

Contingency Table for Hosmer and Lemeshow Test

	Co-occurring mental and substance use disorders = No	Co-occurring mental and substance use disorders = Yes	Total

		Observed	Expected	Observed	Expected	
Step 1	1	634	586.590	467	514.410	1101
	2	569	575.658	619	612.342	1188
	3	501	572.412	745	673.588	1246
	4	529	541.545	693	680.455	1222
	5	511	505.496	679	684.504	1190
	6	496	460.190	649	684.810	1145
	7	519	517.248	822	823.752	1341
	8	460	486.823	842	815.177	1302
	9	463	437.791	752	777.209	1215
	10	286	284.248	780	781.752	1066

Classification Table[a]

			Predicted		
			Co-occurring mental and substance use disorders		Percentage Correct
	Observed		No	Yes	
Step 1	Co-occurring mental and substance use disorders	No	634	4334	12.8
		Yes	467	6581	93.4
	Overall Percentage				60.0

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	AGE_IV	-.030	.009	10.638	1	.001	.971	.954	.988
	GENDER_IV	.710	.077	83.964	1	.000	2.034	1.747	2.367
	RACE_IV			32.070	6	.000			
	RACE_IV (1)	-1.028	.603	2.906	1	.088	.358	.110	1.166
	RACE_IV (2)	-.405	.415	.954	1	.329	.667	.296	1.503
	RACE_IV (3)	-.618	.367	2.825	1	.093	.539	.262	1.108
	RACE_IV (4)	-.390	.366	1.134	1	.287	.677	.330	1.388
	RACE_IV (5)	-.744	.485	2.351	1	.125	.475	.184	1.230
	RACE_IV (6)	-.557	.369	2.271	1	.132	.573	.278	1.182
	MARSTAT_IV			88.387	3	.000			
	MARSTAT_IV (1)	-.078	.049	2.532	1	.112	.925	.841	1.018
	MARSTAT_IV (2)	-.451	.054	69.767	1	.000	.637	.573	.708
	MARSTAT_IV (3)	.033	.075	.193	1	.661	1.033	.892	1.197
	Constant	.467	.388	1.449	1	.229	1.596		

a. Variable(s) entered on step 1: AGE_IV, GENDER_IV, RACE_IV, MARSTAT_IV.

Omnibus Tests of Model Coefficients

	Chi-square	df	Sig.

Step 1	Step	289.186	2	.000
	Block	289.186	2	.000
	Model	535.134	13	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	15760.706[a]	.044	.059

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	12.230	8	.141

Contingency Table for Hosmer and Lemeshow Test

		Co-occurring mental and substance use disorders = No		Co-occurring mental and substance use disorders = Yes		
		Observed	Expected	Observed	Expected	Total
Step 1	1	690	672.266	483	500.734	1173
	2	628	626.250	557	558.750	1185
	3	555	601.475	654	607.525	1209

	4	557	535.212	607	628.788	1164
	5	486	489.506	641	637.494	1127
	6	545	539.840	772	777.160	1317
	7	453	438.122	705	719.878	1158
	8	390	408.555	800	781.445	1190
	9	350	345.738	830	834.262	1180
	10	314	311.038	999	1001.962	1313

Classification Table[a]

			Predicted		
			Co-occurring mental and substance use disorders		Percentage Correct
	Observed		No	Yes	
Step 1	Co-occurring mental and substance use disorders	No	1553	3415	31.3
		Yes	1292	5756	81.7
	Overall Percentage				60.8

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	AGE_IV	-.045	.009	23.508	1	.000	.956	.939	.974

	GENDER_IV	.771	.078	97.264	1	.000	2.162	1.855	2.520
	RACE_IV			53.565	6	.000			
	RACE_IV (1)	-.989	.609	2.636	1	.104	.372	.113	1.227
	RACE_IV (2)	-.441	.419	1.107	1	.293	.644	.283	1.463
	RACE_IV (3)	-.740	.370	3.988	1	.046	.477	.231	.986
	RACE_IV (4)	-.424	.369	1.321	1	.250	.654	.317	1.349
	RACE_IV (5)	-.821	.491	2.800	1	.094	.440	.168	1.151
	RACE_IV (6)	-.611	.372	2.698	1	.100	.543	.262	1.125
	MARSTAT_IV			67.836	3	.000			
	MARSTAT_IV (1)	-.105	.050	4.484	1	.034	.900	.817	.992
	MARSTAT_IV (2)	-.410	.055	56.169	1	.000	.664	.596	.739
	MARSTAT_IV (3)	.028	.076	.140	1	.708	1.029	.887	1.193
	Services_New_IV			278.524	2	.000			
	Services_New_IV (1)	-.301	.173	3.054	1	.081	.740	.528	1.037
	Services_New_IV (2)	.704	.043	269.805	1	.000	2.022	1.859	2.199
	Constant	.392	.391	1.003	1	.317	1.480		

a. Variable(s) entered on step 1: Services_New_IV.

Crosstabs

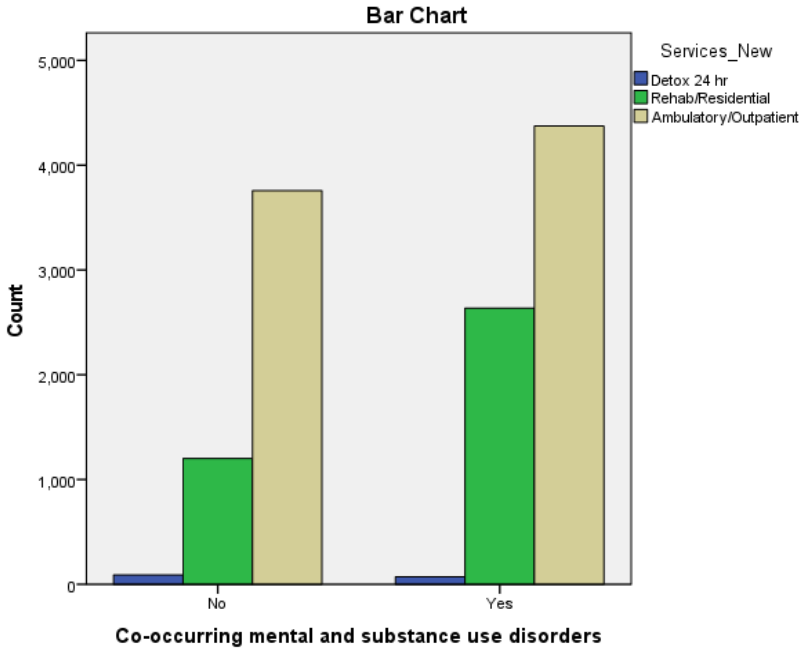
Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Services_New * Arrests in past 30 days prior to admission	12166	72.3%	4667	27.7%	16833	100.0%

Co-occurring mental and substance use disorders * Services_New Crosstabulation

			Services_New			
			Detox 24 hr	Rehab/ Residential	Ambulatory/ Outpatient	Total
Co-occurring mental and substance use disorders	No	Count	90	1201	3758	5049
		% within Co-occurring mental and substance use disorders	1.8%	23.8%	74.4%	100.0%
		% within Services_New	55.2%	31.3%	46.2%	41.6%
	Yes	Count	73	2637	4375	7085
		% within Co-occurring mental and substance use disorders	1.0%	37.2%	61.8%	100.0%
		% within Services_New	44.8%	68.7%	53.8%	58.4%
Total		Count	163	3838	8133	12134
		% within Co-occurring mental and substance use disorders	1.3%	31.6%	67.0%	100.0%

% within Services_New	100.0%	100.0%	100.0 %	100.0%



Nominal Regression

[Data set1] C: NYS tedsd_puf_2018_2020.sav

Case Processing Summary

		N	Marginal Percentage
Arrests in past 30 days prior to discharge	None	11577	96.5%
	Once	385	3.2%
	two or more times	29	0.2%
Services_New	Detox 24 hr	118	1.0%
	Rehab/Residential	3845	32.1%
	Ambulatory/Outpatient	8028	67.0%
Valid		11991	100.0%
Missing		4842	
Total		16833	
Subpopulation		541[a]	

a. The dependent variable has only one value observed in 393 (72.6%) subpopulations.

Model Fitting Information

Model	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	978.444			
Final	871.861	106.583	12	.000

Likelihood Ratio Tests

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	871.861[a]	.000	0	.
MARSTAT_IV	874.468	2.607	2	.272
GENDER_IV	874.782	2.921	2	.232
AGE_IV	945.394	73.533	2	.000
RACE_IV	875.688	3.827	2	.148
Services_New_IV	893.043	21.182	4	.000

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

Parameter Estimates

Arrests in past 30 days prior to discharge[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
None	Intercept	3.317	1.423	5.432	1	.020			
	MARSTAT_IV	-.209	.156	1.797	1	.180	.811	.597	1.102
	GENDER_IV	-.601	.502	1.432	1	.231	.549	.205	1.467
	AGE_IV	.303	.088	11.763	1	.001	1.354	1.139	1.610
	RACE_IV	.297	.199	2.230	1	.135	1.346	.911	1.989
	[Services_New_IV=1.00]	-2.617	.641	16.673	1	.000	.073	.021	.256
	[Services_New_IV=2.00]	-.106	.431	.060	1	.806	.900	.387	2.094
	[Services_New_IV=3.00]	0[b]	.	.	0	.	.	.	.
Once	Intercept	2.100	1.480	2.012	1	.156			
	MARSTAT_IV	-.167	.162	1.060	1	.303	.846	.616	1.163

	GENDER_IV	-.841	.536	2.467	1	.116	.431	.151	1.232
	AGE_IV	.117	.091	1.650	1	.199	1.124	.940	1.344
	RACE_IV	.226	.206	1.205	1	.272	1.254	.837	1.878
	[Services_New_IV=1.00]	-2.002	.738	7.359	1	.007	.135	.032	.574
	[Services_New_IV=2.00]	-.472	.448	1.110	1	.292	.624	.260	1.500
	[Services_New_IV=3.00]	0[b]	.	.	0	.	.	.	.

a. The reference category is: two or more times.

b. This parameter is set to zero because it is redundant.

Crosstabs

[Data set1] C: NYS tedsd_puf_2018_2020.sav

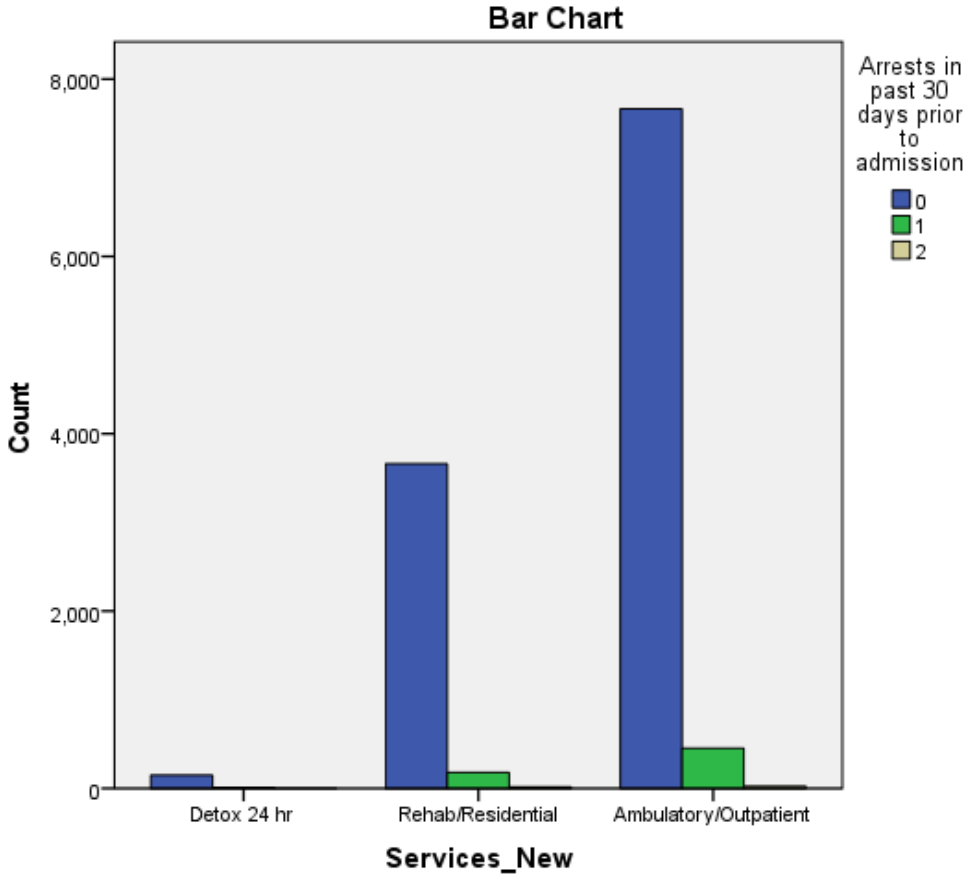
Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Services_New * Arrests in past 30 days prior to admission	12166	72.3%	4667	27.7%	16833	100.0%

Services_New * Arrests in past 30 days prior to admission Crosstabulation

Count

		Arrests in past 30 days prior to admission			
		0	1	2	Total
Services_New	Detox 24 hr	150	12	2	164
	Rehab/Residential	3662	180	18	3860
	Ambulatory/Outpatient	7665	453	24	8142
Total		11477	645	44	12166



Crosstabs

[Data set1] C: NYS tedsd_puf_2018_2020.sav

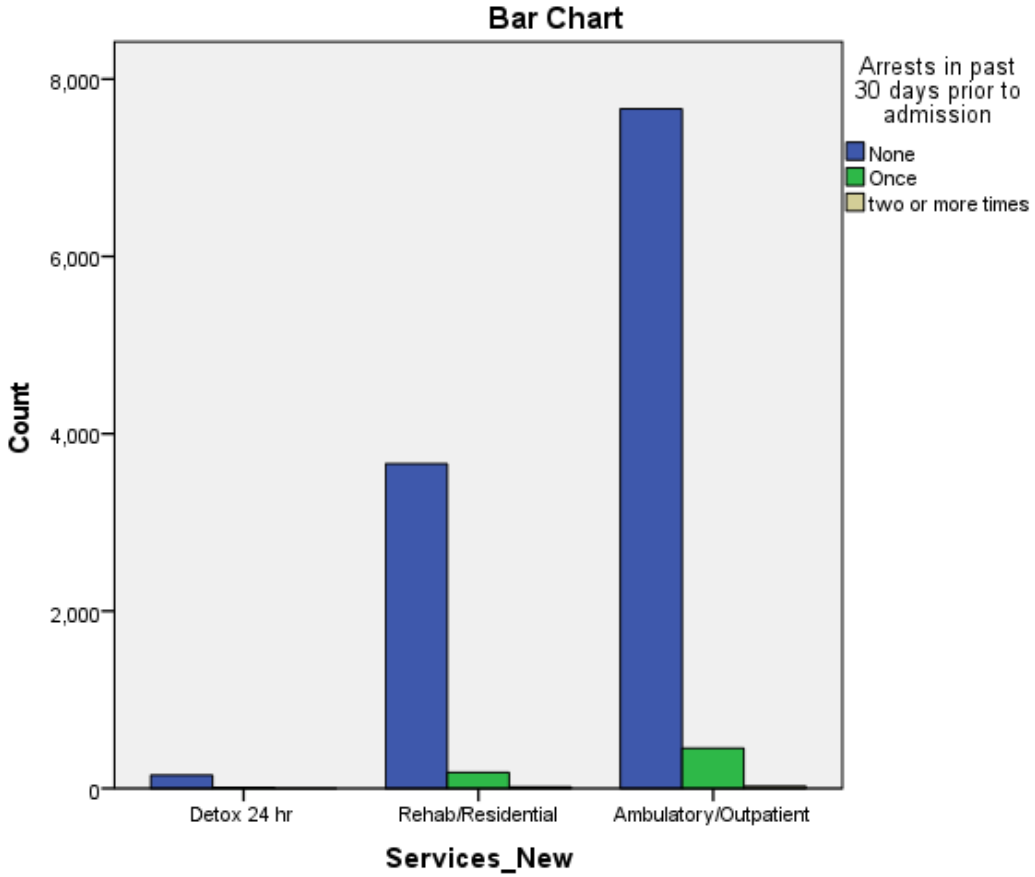
Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Services_New * Arrests in past 30 days prior to admission	12166	72.3%	4667	27.7%	16833	100.0%

Services_New * Arrests in past 30 days prior to admission Crosstabulation

Count

		Arrests in past 30 days prior to admission			
		None	Once	two or more times	Total
Services_New	Detox 24 hr	150	12	2	164
	Rehab/Residential	3662	180	18	3860
	Ambulatory/Outpatient	7665	453	24	8142
Total		11477	645	44	12166


Bar Chart
Count
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6,000
4,000
2,000
0
Detox 24 hr
Rehab/Residential
Ambulatory/Outpatient
Services_New
Arrests in past 30 days prior to admission
None
Once
two or more times

Crosstabs

[Data set1] C: NYS tedsd_puf_2018_2020.sav

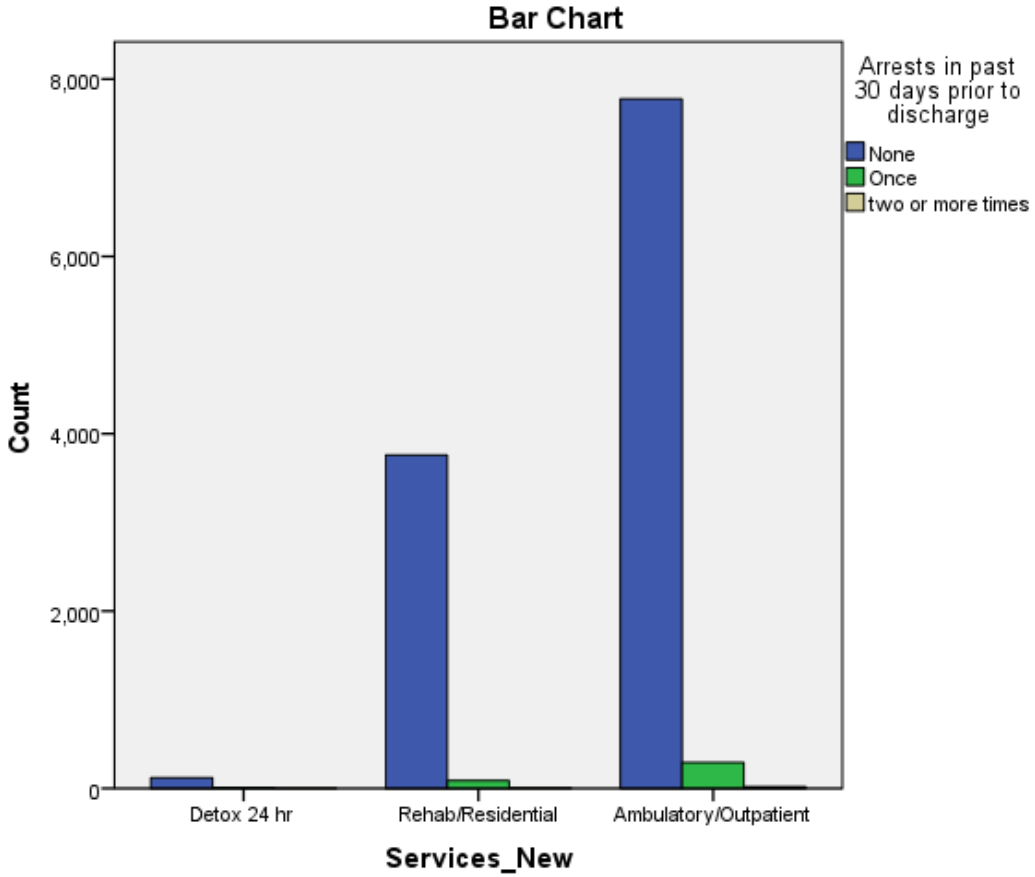
Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Services_New * Arrests in past 30 days prior to discharge	12083	71.8%	4750	28.2%	16833	100.0 %

Services_New * Arrests in past 30 days prior to discharge Crosstabulation

Count

		Arrests in past 30 days prior to discharge			
		None	Once	two or more times	Total
Services_New	Detox 24 hr	122	9	3	134
	Rehab/Residential	3761	90	8	3859
	Ambulatory/Outpatient	7777	293	20	8090
Total		11660	392	31	12083


Bar Chart
8,000
6,000
4,000
2,000
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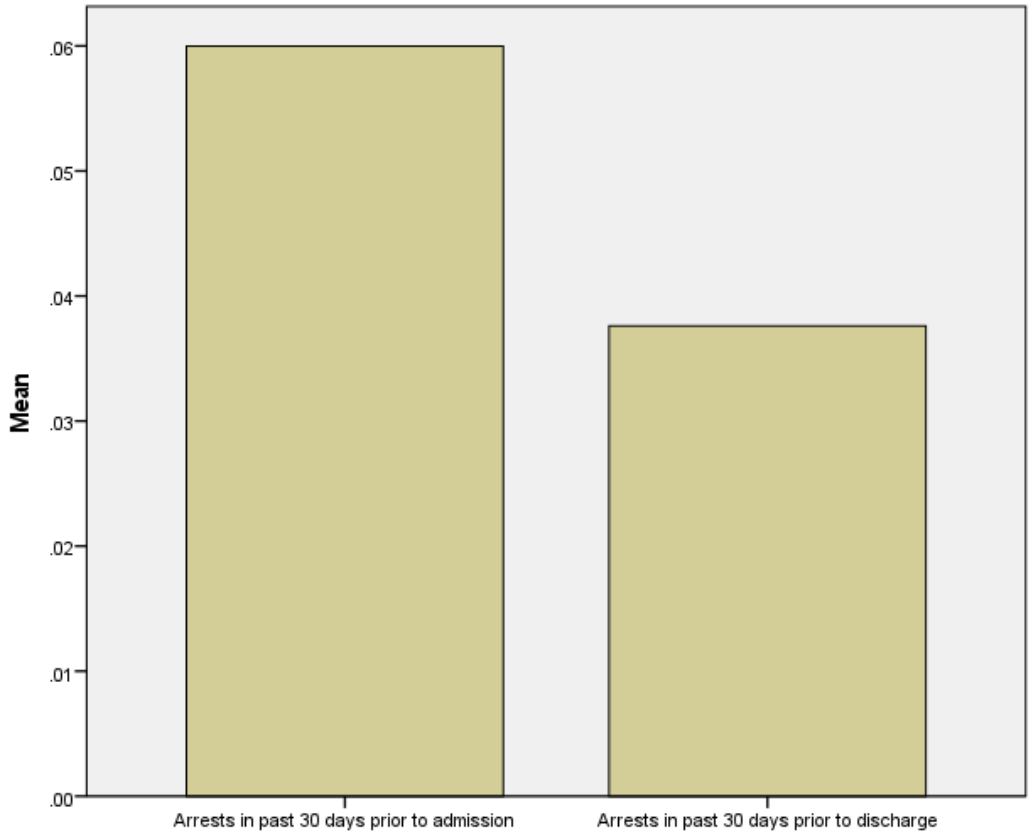
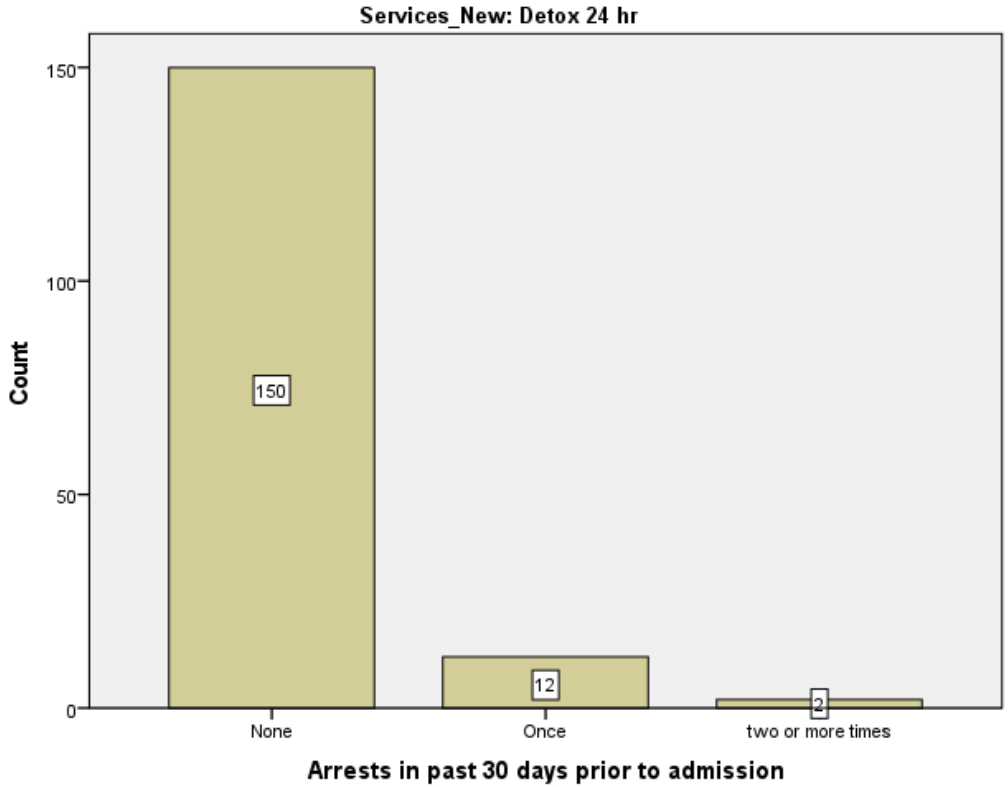
Count
Detox 24 hr
Rehab/Residential
Ambulatory/Outpatient
Services_New
Arrests in past 30 days prior to discharge
None
Once
two or more times

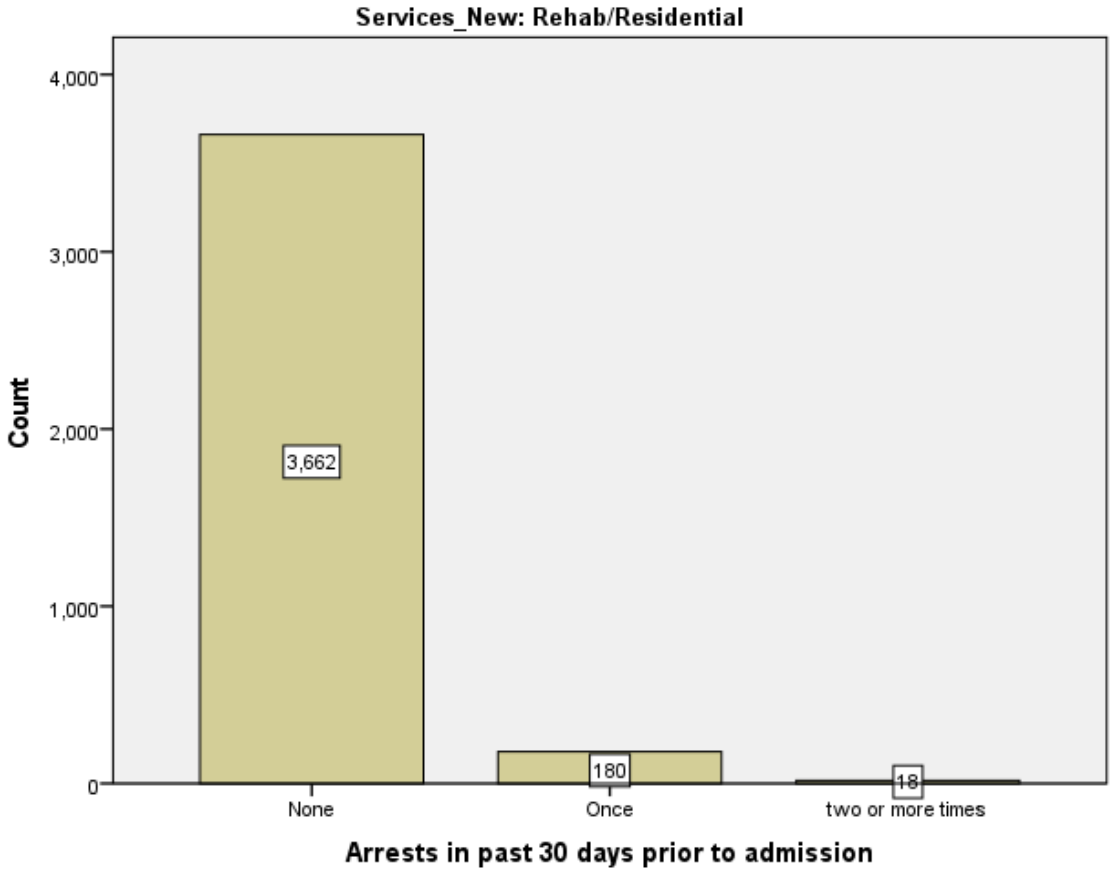


Graph

Graph

[Data set1] C: NYS tedsd_puf_2018_2020.sav


Services_New: Detox 24 hr
Count
150
100
50
0
150
12
2
None
Once
two or more times
Arrests in past 30 days prior to admission


Services_New: Rehab/Residential
Count
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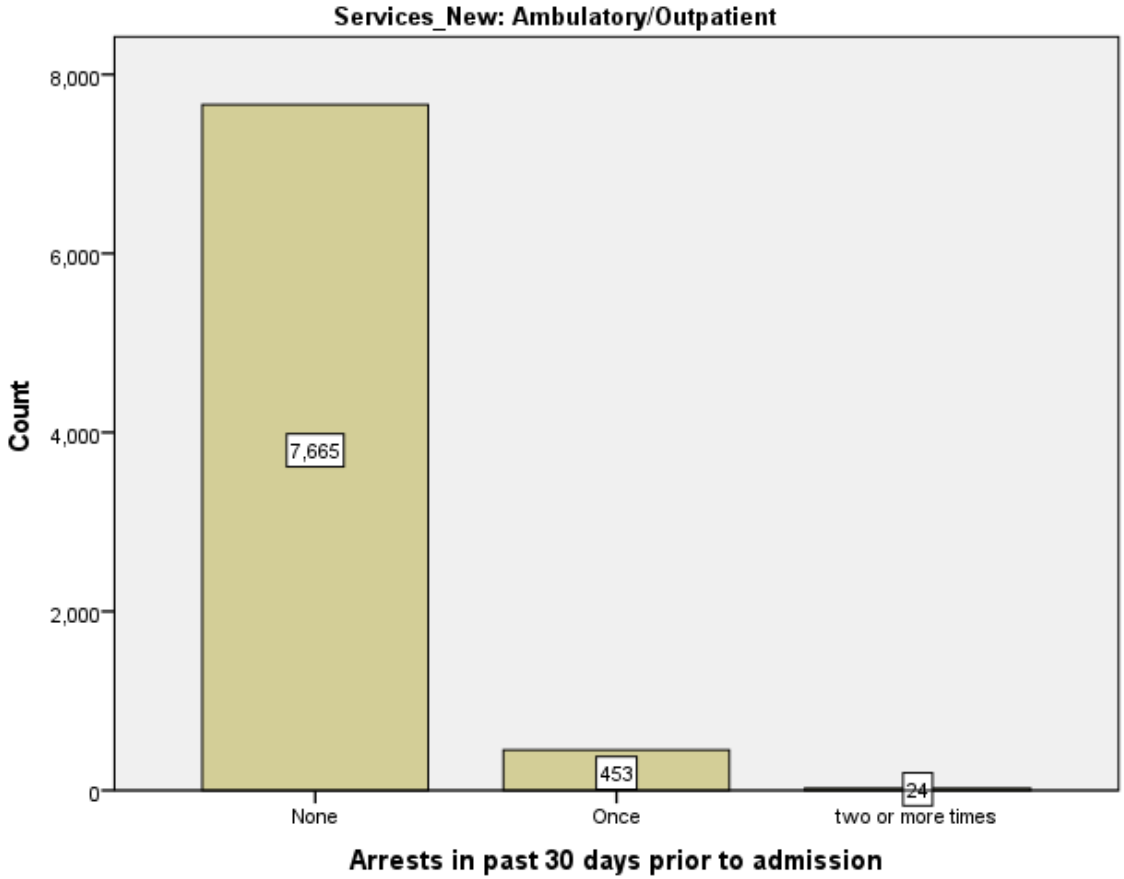
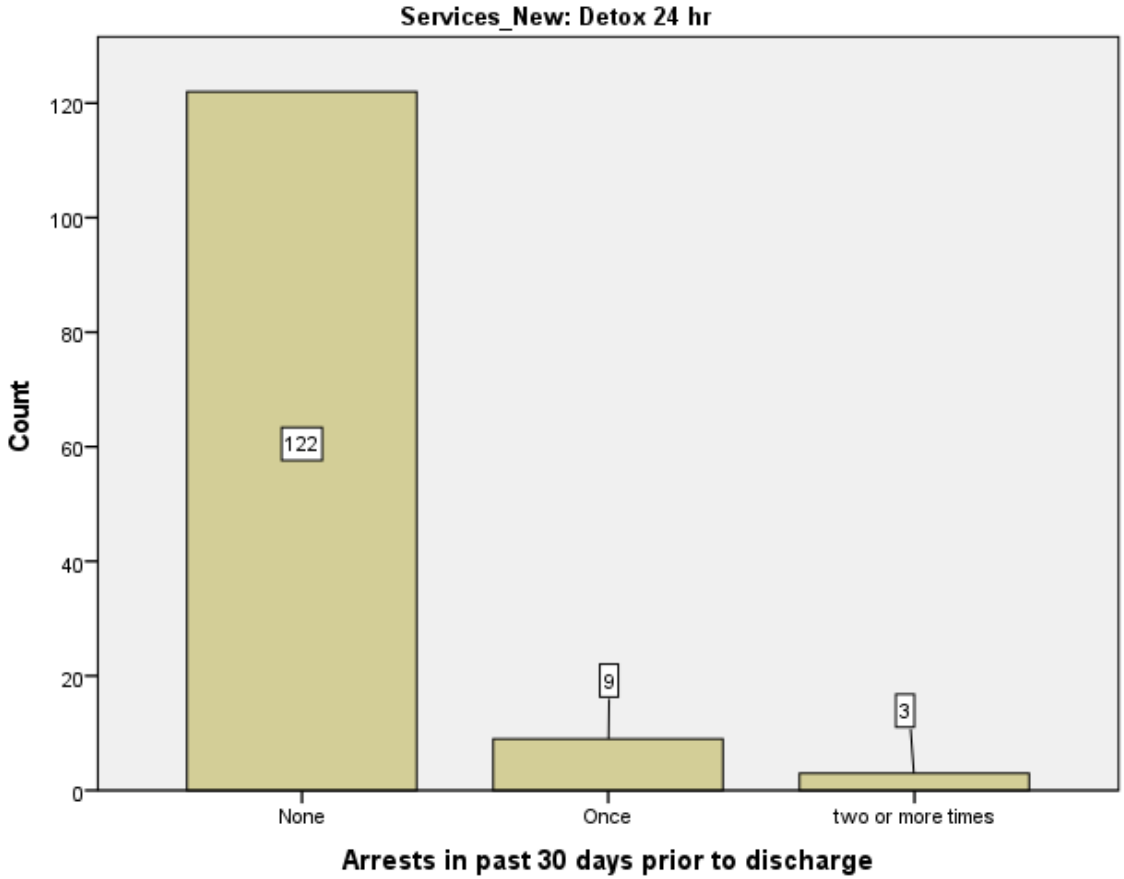
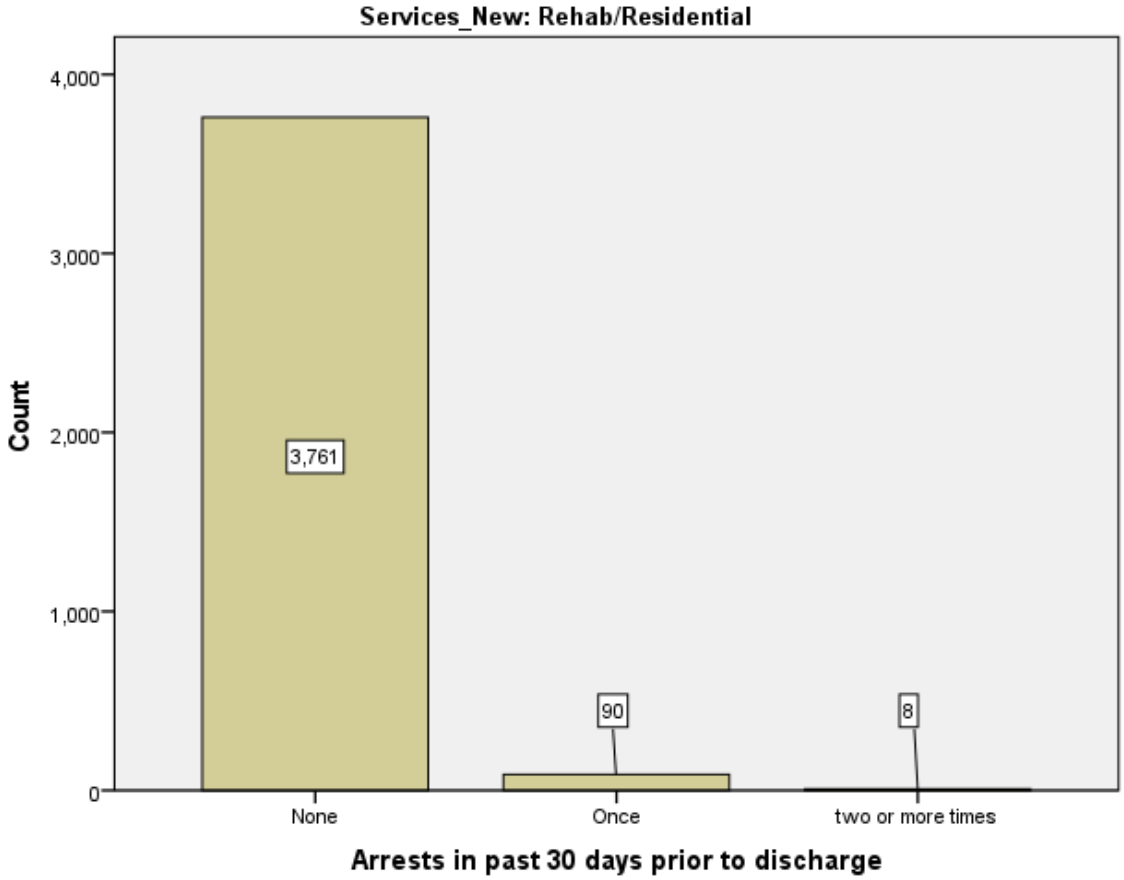
3,000
2,000
1,000
0
3,662
180
18
None
Once
two or more times
Arrests in past 30 days prior to admission



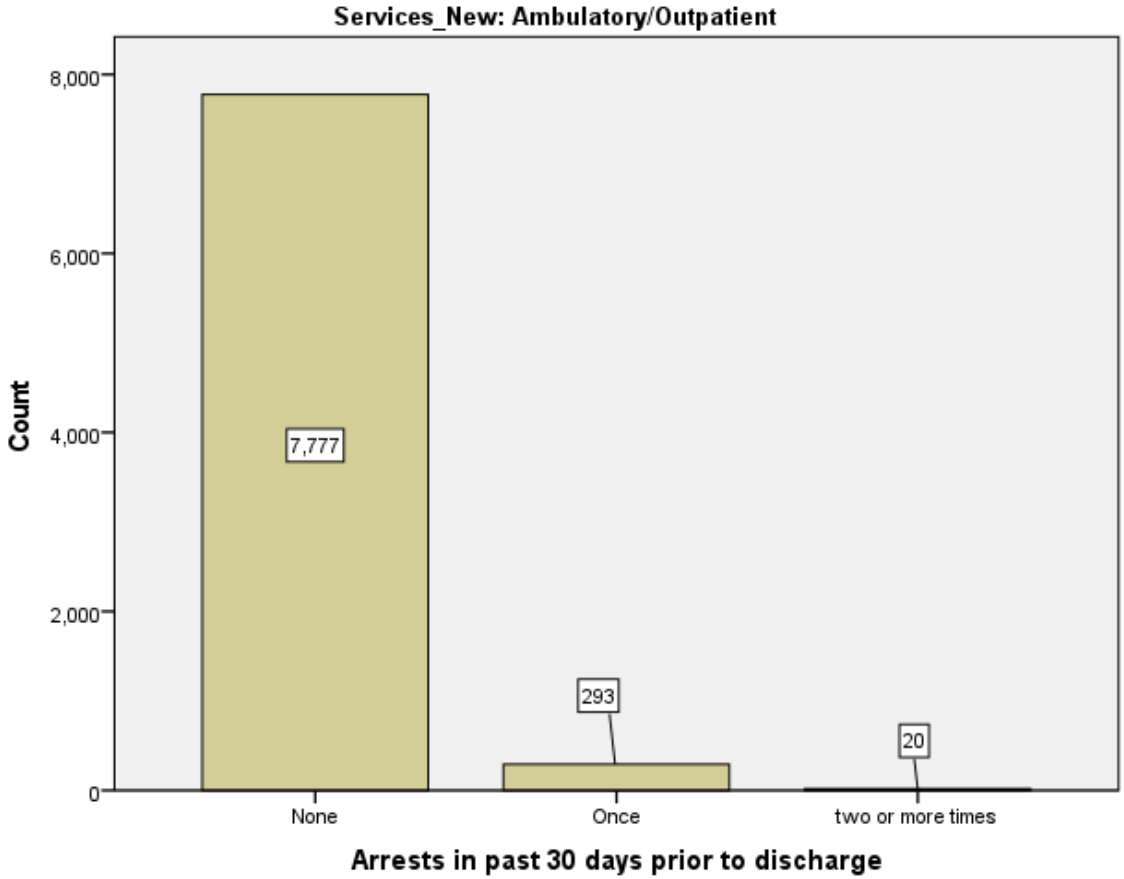
Graph

[Data set1] C: NYS tedsd_puf_2018_2020.sav


Services_New: Detox 24 hr
Count
120
100
80
60
40
20
0
122
9
3
None
Once
two or more times
Arrests in past 30 days prior to discharge



Logistic Regression


Services_New: Ambulatory/Outpatient
Count
8,000
6,000
4,000
2,000
0
7,777
293
20
None
Once
two or more times
Arrests in past 30 days prior to discharge

Logistic Regression

[Data set1] C: NYS tedsd_puf_2018_2020.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	12016	71.4
	Missing Cases	4817	28.6
	Total	16833	100.0
Unselected Cases		0	.0
Total		16833	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
No	0
Yes	1

Categorical Variables Codings

		Frequency	Parameter coding	
			(1)	(2)
Services_New	Detox 24 hr	142	1.000	.000
	Rehab/Residential	3829	.000	1.000
	Ambulatory/Outpatient	8045	.000	.000

Classification Table[a, b]

Observed			Predicted		
			Co-occurring mental and substance use disorders		Percentage Correct
			No	Yes	
Step 0	Co-occurring mental and substance use disorders	No	0	4968	.0
		Yes	0	7048	100.0
	Overall Percentage				58.7

a. Constant is included in the model.
b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.350	.019	356.406	1	.000	1.419

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	AGE_IV	42.634	1	.000
		GENDER_IV	100.632	1	.000
		RACE_IV	2.667	1	.102
		MARSTAT_IV	3.147	1	.076
	Overall Statistics		139.284	4	.000

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	145.022	4	.000
	Block	145.022	4	.000
	Model	145.022	4	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	16150.818[a]	.012	.016

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	52.601	8	.000

Contingency Table for Hosmer and Lemeshow Test

		Co-occurring mental and substance use disorders = No		Co-occurring mental and substance use disorders = Yes		
		Observed	Expected	Observed	Expected	Total
Step 1	1	549	601.994	733	680.006	1282
	2	610	577.976	652	684.024	1262
	3	605	563.848	658	699.152	1263
	4	635	572.728	683	745.272	1318
	5	503	524.357	727	705.643	1230
	6	443	509.292	779	712.708	1222

	7	424	457.487	703	669.513	1127
	8	500	479.976	713	733.024	1213
	9	469	449.789	733	752.211	1202
	10	230	230.554	667	666.446	897

Classification Table[a]

			Predicted		
			Co-occurring mental and substance use disorders		Percentage Correct
	Observed		No	Yes	
Step 1	Co-occurring mental and substance use disorders	No	0	4968	.0
		Yes	0	7048	100.0
	Overall Percentage				58.7

a. The cut value is .500

Variables in the Equation

								95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1[a]	AGE_IV	-.050	.009	32.289	1	.000	.952	.935	.968
	GENDER_IV	.699	.077	82.053	1	.000	2.011	1.729	2.339
	RACE_IV	.014	.019	.558	1	.455	1.015	.977	1.054
	MARSTAT_IV	.053	.016	11.282	1	.001	1.054	1.022	1.087
	Constant	-.141	.161	.769	1	.381	.869		

a. Variable(s) entered on step 1: AGE_IV, GENDER_IV, RACE_IV, MARSTAT_IV.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	294.225	2	.000
	Block	294.225	2	.000
	Model	439.247	6	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	15856.593[a]	.036	.048

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	23.148	8	.003

Contingency Table for Hosmer and Lemeshow Test

	Co-occurring mental and substance use disorders = No	Co-occurring mental and substance use disorders = Yes	Total

		Observed	Expected	Observed	Expected	
Step 1	1	686	671.324	565	579.676	1251
	2	670	634.536	577	612.464	1247
	3	577	594.364	638	620.636	1215
	4	519	559.280	672	631.720	1191
	5	513	531.456	675	656.544	1188
	6	506	505.018	690	690.982	1196
	7	471	448.858	759	781.142	1230
	8	407	395.333	792	803.667	1199
	9	324	359.596	880	844.404	1204
	10	295	268.235	800	826.765	1095

Classification Table[a]

			Predicted		
			Co-occurring mental and substance use disorders		Percentage Correct
	Observed		No	Yes	
Step 1	Co-occurring mental and substance use disorders	No	1242	3726	25.0
		Yes	1031	6017	85.4
	Overall Percentage				60.4

a. The cut value is .500

Variables in the Equation

							95% C.I.for EXP(B)	
	B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper

Step 1[a]	AGE_IV	-.067	.009	57.095	1	.000	.935	.919	.951
	GENDER_IV	.760	.078	95.219	1	.000	2.137	1.835	2.490
	RACE_IV	.034	.020	3.028	1	.082	1.035	.996	1.075
	MARSTAT_IV	.063	.016	15.759	1	.000	1.065	1.032	1.099
	Services_New_IV			283.350	2	.000			
	Services_New_IV (1)	-.265	.172	2.389	1	.122	.767	.548	1.074
	Services_New_IV (2)	.702	.042	275.792	1	.000	2.018	1.857	2.192
	Constant	-.380	.163	5.438	1	.020	.684		

a. Variable(s) entered on step 1: Services_New_IV.

Logistic Regression

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	12016	71.4
	Missing Cases	4817	28.6
	Total	16833	100.0
Unselected Cases		0	.0
Total		16833	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
No	0
Yes	1

Categorical Variables Codings

			Parameter coding	
		Frequency	(1)	(2)
Services_New	Detox 24 hr	142	.000	.000
	Rehab/Residential	3829	1.000	.000
	Ambulatory/Outpatient	8045	.000	1.000

Classification Table[a, b]

			Predicted		
			Co-occurring mental and substance use disorders		Percentage
	Observed		No	Yes	Correct
Step 0	Co-occurring mental and substance use disorders	No	0	4968	.0
		Yes	0	7048	100.0
	Overall Percentage				58.7

a. Constant is included in the model.
b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.350	.019	356.406	1	.000	1.419

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	AGE_IV	42.634	1	.000
		GENDER_IV	100.632	1	.000
		RACE_IV	2.667	1	.102

	MARSTAT_IV	3.147	1	.076
Overall Statistics		139.284	4	.000

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	145.022	4	.000
	Block	145.022	4	.000
	Model	145.022	4	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	16150.818[a]	.012	.016

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	52.601	8	.000

Contingency Table for Hosmer and Lemeshow Test

		Co-occurring mental and substance use disorders = No		Co-occurring mental and substance use disorders = Yes		
		Observed	Expected	Observed	Expected	Total
Step 1	1	549	601.994	733	680.006	1282
	2	610	577.976	652	684.024	1262
	3	605	563.848	658	699.152	1263
	4	635	572.728	683	745.272	1318
	5	503	524.357	727	705.643	1230
	6	443	509.292	779	712.708	1222
	7	424	457.487	703	669.513	1127
	8	500	479.976	713	733.024	1213
	9	469	449.789	733	752.211	1202
	10	230	230.554	667	666.446	897

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	AGE_IV	-.050	.009	32.289	1	.000	.952	.935	.968
	GENDER_IV	.699	.077	82.053	1	.000	2.011	1.729	2.339
	RACE_IV	.014	.019	.558	1	.455	1.015	.977	1.054
	MARSTAT_IV	.053	.016	11.282	1	.001	1.054	1.022	1.087
	Constant	-.141	.161	.769	1	.381	.869		

a. Variable(s) entered on step 1: AGE_IV, GENDER_IV, RACE_IV, MARSTAT_IV.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	294.225	2	.000
	Block	294.225	2	.000
	Model	439.247	6	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	15856.593[a]	.036	.048

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	23.148	8	.003

Contingency Table for Hosmer and Lemeshow Test

		Co-occurring mental and substance use disorders = No		Co-occurring mental and substance use disorders = Yes		
		Observed	Expected	Observed	Expected	Total
Step 1	1	686	671.324	565	579.676	1251
	2	670	634.536	577	612.464	1247
	3	577	594.364	638	620.636	1215
	4	519	559.280	672	631.720	1191
	5	513	531.456	675	656.544	1188
	6	506	505.018	690	690.982	1196
	7	471	448.858	759	781.142	1230
	8	407	395.333	792	803.667	1199
	9	324	359.596	880	844.404	1204

10	295	268.235	800	826.765	1095

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	AGE_IV	-.067	.009	57.095	1	.000	.935	.919	.951
	GENDER_IV	.760	.078	95.219	1	.000	2.137	1.835	2.490
	RACE_IV	.034	.020	3.028	1	.082	1.035	.996	1.075
	MARSTAT_IV	.063	.016	15.759	1	.000	1.065	1.032	1.099
	Detox/24hr			283.350	2	.000			
	Rehab/Residential	.967	.174	30.985	1	.000	2.631	1.871	3.698
	Ambulatory/Outpatient	.265	.172	2.389	1	.122	1.304	.931	1.825
	Constant	-.646	.236	7.453	1	.006	.524		

a. Variable(s) entered on step 1: Services_New_IV.

Logistic Regression

[Data set1] C: NYS tedsd_puf_2018_2020.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	12016	71.4
	Missing Cases	4817	28.6
	Total	16833	100.0

Unselected Cases	0	.0
Total	16833	100.0

a. If weight is in effect, see classification table for the total number of cases.

Categorical Variables Codings

		Frequency	Parameter coding							
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Age at admission	21-24	271	1.000	.000	.000	.000	.000	.000	.000	.000
	25-29	881	.000	1.000	.000	.000	.000	.000	.000	.000
	30-34	1292	.000	.000	1.000	.000	.000	.000	.000	.000
	35-39	1303	.000	.000	.000	1.000	.000	.000	.000	.000
	40-44	940	.000	.000	.000	.000	1.000	.000	.000	.000
	45-49	1118	.000	.000	.000	.000	.000	1.000	.000	.000
	50-54	1879	.000	.000	.000	.000	.000	.000	1.000	.000
	55-64	3501	.000	.000	.000	.000	.000	.000	.000	1.000
	65-95	831	.000	.000	.000	.000	.000	.000	.000	.000
Race	Alaska native	18	1.000	.000	.000	.000	.000	.000		
	American Indian	113	.000	1.000	.000	.000	.000	.000		
	Black/African American	3512	.000	.000	1.000	.000	.000	.000		
	White	6783	.000	.000	.000	1.000	.000	.000		
	Asian	40	.000	.000	.000	.000	1.000	.000		
	Other single race	1514	.000	.000	.000	.000	.000	1.000		
	Native Hawaiian/Pacific Islander	36	.000	.000	.000	.000	.000	.000		
Marital status	Never married	5218	1.000	.000	.000					
	Now married	2648	.000	1.000	.000					
	Separated	1025	.000	.000	1.000					
	Divorced	3125	.000	.000	.000					
Services_New	Detox 24 hr	142	.000	.000						

	Rehab/Residential	3829	1.000	.000						
	Ambulatory/Outpatient	8045	.000	1.000						
Gender	Male	11065	1.000							
	Female	951	.000							

Classification Table[a,b]

			Predicted		
			Co-occurring mental and substance use disorders		Percentage
	Observed		No	Yes	Correct
Step 0	Co-occurring mental and substance use disorders	No	0	4968	.0
		Yes	0	7048	100.0
	Overall Percentage				58.7

a. Constant is included in the model.
b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.350	.019	356.406	1	.000	1.419

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	AGE_IV	124.729	8	.000
		AGE_IV (1)	3.482	1	.062
		AGE_IV (2)	.230	1	.631
		AGE_IV (3)	26.557	1	.000
		AGE_IV (4)	13.523	1	.000
		AGE_IV (5)	6.743	1	.009
		AGE_IV (6)	.073	1	.787

AGE_IV (7)	1.878	1	.171
AGE_IV (8)	9.478	1	.002
GENDER_IV (1)	100.632	1	.000
RACE_IV	39.501	6	.000
RACE_IV (1)	1.501	1	.220
RACE_IV (2)	.272	1	.602
RACE_IV (3)	26.745	1	.000
RACE_IV (4)	32.858	1	.000
RACE_IV (5)	.627	1	.428
RACE_IV (6)	2.450	1	.118
MARSTAT_IV	84.101	3	.000
MARSTAT_IV (1)	9.944	1	.002
MARSTAT_IV (2)	82.464	1	.000
MARSTAT_IV (3)	5.322	1	.021
Overall Statistics	316.922	18	.000

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	323.589	18	.000
	Block	323.589	18	.000
	Model	323.589	18	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	15972.250[a]	.027	.036

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	21.741	8	.005

Contingency Table for Hosmer and Lemeshow Test

		Co-occurring mental and substance use disorders = No		Co-occurring mental and substance use disorders = Yes		
		Observed	Expected	Observed	Expected	Total
Step 1	1	657	665.350	522	513.650	1179
	2	669	619.400	600	649.600	1269
	3	543	554.525	672	660.475	1215
	4	528	534.748	688	681.252	1216
	5	442	492.842	724	673.158	1166
	6	491	494.739	737	733.261	1228
	7	472	441.815	685	715.185	1157
	8	466	464.864	821	822.136	1287
	9	426	416.890	797	806.110	1223

	10	274	282.826	802	793.174	1076

Classification Table[a]

			Predicted		
			Co-occurring mental and substance use disorders		
	Observed		No	Yes	Percentage Correct
Step 1	Co-occurring mental and substance use disorders	No	771	4197	15.5
		Yes	639	6409	90.9
	Overall Percentage				59.8

a. The cut value is .500

Variables in the Equation

								95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1[a]	AGE_IV			87.766	8	.000			
	AGE_IV (1)	.140	.145	.935	1	.334	1.151	.866	1.529
	AGE_IV (2)	.367	.102	12.967	1	.000	1.443	1.182	1.763
	AGE_IV (3)	.712	.094	57.277	1	.000	2.038	1.695	2.450
	AGE_IV (4)	.630	.093	45.903	1	.000	1.877	1.565	2.252
	AGE_IV (5)	.647	.099	42.945	1	.000	1.910	1.574	2.318
	AGE_IV (6)	.501	.094	28.472	1	.000	1.651	1.373	1.984
	AGE_IV (7)	.576	.086	45.127	1	.000	1.779	1.504	2.105
	AGE_IV (8)	.459	.079	33.385	1	.000	1.582	1.354	1.849
	GENDER_IV (1)	-.705	.078	82.212	1	.000	.494	.424	.576
	RACE_IV			37.197	6	.000			
	RACE_IV (1)	-1.044	.606	2.969	1	.085	.352	.107	1.154

	RACE_IV (2)	-.443	.415	1.142	1	.285	.642	.285	1.447
	RACE_IV (3)	-.637	.368	2.995	1	.084	.529	.257	1.088
	RACE_IV (4)	-.388	.367	1.121	1	.290	.678	.330	1.392
	RACE_IV (5)	-.798	.486	2.696	1	.101	.450	.174	1.167
	RACE_IV (6)	-.577	.370	2.435	1	.119	.562	.272	1.159
	MARSTAT_IV			80.972	3	.000			
	MARSTAT_IV (1)	-.065	.049	1.766	1	.184	.937	.850	1.032
	MARSTAT_IV (2)	-.435	.054	64.029	1	.000	.647	.582	.720
	MARSTAT_IV (3)	.017	.075	.049	1	.824	1.017	.878	1.178
	Constant	1.122	.381	8.657	1	.003	3.072		

a. Variable(s) entered on step 1: AGE_IV, GENDER_IV, RACE_IV, MARSTAT_IV.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	275.755	2	.000
	Block	275.755	2	.000
	Model	599.344	20	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square

1	15696.495[a]	.049	.066

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	6.637	8	.576

Contingency Table for Hosmer and Lemeshow Test

		Co-occurring mental and substance use disorders = No		Co-occurring mental and substance use disorders = Yes		
		Observed	Expected	Observed	Expected	Total
Step 1	1	771	786.888	563	547.112	1334
	2	609	603.988	541	546.012	1150
	3	639	619.110	621	640.890	1260
	4	517	547.918	681	650.082	1198
	5	526	511.796	662	676.204	1188
	6	467	458.572	691	699.428	1158
	7	452	447.271	759	763.729	1211
	8	391	399.092	802	793.908	1193
	9	340	337.794	845	847.206	1185
	10	256	255.570	883	883.430	1139

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	AGE_IV			87.055	8	.000			
	AGE_IV (1)	.239	.147	2.656	1	.103	1.270	.953	1.694
	AGE_IV (2)	.413	.103	16.069	1	.000	1.512	1.235	1.850
	AGE_IV (3)	.741	.095	60.743	1	.000	2.098	1.742	2.528
	AGE_IV (4)	.647	.094	47.408	1	.000	1.910	1.589	2.297
	AGE_IV (5)	.647	.100	41.975	1	.000	1.910	1.570	2.323
	AGE_IV (6)	.511	.095	28.916	1	.000	1.667	1.384	2.008
	AGE_IV (7)	.542	.087	39.092	1	.000	1.720	1.451	2.039
	AGE_IV (8)	.400	.080	24.741	1	.000	1.492	1.274	1.746
	GENDER_IV (1)	-.763	.078	94.814	1	.000	.466	.400	.544
	RACE_IV			57.086	6	.000			
	RACE_IV (1)	-1.007	.612	2.706	1	.100	.365	.110	1.213
	RACE_IV (2)	-.476	.419	1.291	1	.256	.621	.274	1.412
	RACE_IV (3)	-.753	.370	4.133	1	.042	.471	.228	.973
	RACE_IV (4)	-.424	.369	1.322	1	.250	.654	.317	1.349
	RACE_IV (5)	-.873	.491	3.165	1	.075	.418	.160	1.093
	RACE_IV (6)	-.629	.372	2.862	1	.091	.533	.257	1.105
	MARSTAT_IV			62.969	3	.000			
	MARSTAT_IV (1)	-.091	.050	3.364	1	.067	.913	.828	1.006
	MARSTAT_IV (2)	-.399	.055	52.436	1	.000	.671	.603	.748
	MARSTAT_IV (3)	.014	.076	.032	1	.858	1.014	.873	1.177
	Detox 24 hr			266.002	2	.000			
	Rehab/Residential	1.001	.175	32.575	1	.000	2.720	1.929	3.835

	Ambulatory/Outpatient	.310	.173	3.216	1	.073	1.364	.972	1.915
	Constant	.735	.418	3.099	1	.078	2.086		

a. Variable(s) entered on step 1: Services_New_IV.

Nominal Regression

[Data set1] C: NYS tedsd_puf_2018_2020.sav

Case Processing Summary

		N	Marginal Percentage
Frequency of use at discharge (primary)	No use in the past month	6290	68.4%
	Some use	1924	20.9%
	Daily use	980	10.7%
Age at admission	21-24	205	2.2%
	25-29	640	7.0%
	30-34	970	10.6%
	35-39	1028	11.2%
	40-44	715	7.8%
	45-49	840	9.1%
	50-54	1436	15.6%
	55-64	2679	29.1%
	65-95	681	7.4%
Gender	Male	8465	92.1%
	Female	729	7.9%
Marital status	Never married	3943	42.9%
	Now married	2079	22.6%
	Separated	778	8.5%

	Divorced	2394	26.0%
Race	Alaska native	15	0.2%
	American Indian	90	1.0%
	Black/African American	2689	29.2%
	White	5184	56.4%
	Asian	34	0.4%
	Other single race	1160	12.6%
	Native Hawaiian/Pacific Islander	22	0.2%
Services_New	Detox 24 hr	138	1.5%
	Rehab/Residential	3022	32.9%
	Ambulatory/Outpatient	6034	65.6%
Valid		9194	100.0%
Missing		7639	
Total		16833	
Subpopulation		517[a]	

a. The dependent variable has only one value observed in 223 (43.1%) subpopulations.

Model Fitting Information

	Model Fitting Criteria	Likelihood Ratio Tests		
Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	3107.352			
Final	2360.797	746.555	40	.000

Pseudo R-Square

Cox and Snell	.078
Nagelkerke	.096
McFadden	.049

Likelihood Ratio Tests

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	2360.797[a]	.000	0	.
AGE_IV	2391.713	30.916	16	.014
GENDER_IV	2370.773	9.977	2	.007
MARSTAT_IV	2385.877	25.080	6	.000
RACE_IV	2424.219	63.422	12	.000
Services_New_IV	2995.485	634.688	4	.000

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

Parameter Estimates

Frequency of use at discharge (primary)[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
No use in the past month	Intercept	1.360	.686	3.928	1	.047			
	[AGE_IV=4]	.474	.304	2.433	1	.119	1.607	.885	2.915
	[AGE_IV=5]	-.031	.185	.028	1	.867	.970	.675	1.393
	[AGE_IV=6]	.185	.175	1.119	1	.290	1.203	.854	1.695
	[AGE_IV=7]	.157	.172	.838	1	.360	1.170	.836	1.640
	[AGE_IV=8]	.038	.181	.045	1	.832	1.039	.729	1.481
	[AGE_IV=9]	.025	.176	.020	1	.888	1.025	.726	1.447
	[AGE_IV=10]	.157	.162	.946	1	.331	1.170	.852	1.607
	[AGE_IV=11]	-.003	.147	.000	1	.984	.997	.747	1.331
	[AGE_IV=12]	0[b]	.	.	0	.	.	.	.
	[GENDER_IV=1]	.384	.119	10.378	1	.001	1.468	1.162	1.855
	[GENDER_IV=2]	0[b]	.	.	0	.	.	.	.
	[MARSTAT_IV=1]	-.262	.092	8.169	1	.004	.770	.643	.921
	[MARSTAT_IV=2]	.060	.106	.328	1	.567	1.062	.864	1.307
	[MARSTAT_IV=3]	.016	.146	.011	1	.915	1.016	.763	1.352
	[MARSTAT_IV=4]	0[b]	.	.	0	.	.	.	.

	[RACE_IV=1]	-1.922	.957	4.033	1	.045	.146	.022	.955
	[RACE_IV=2]	.553	.763	.526	1	.468	1.739	.390	7.758
	[RACE_IV=4]	-.052	.665	.006	1	.937	.949	.258	3.495
	[RACE_IV=5]	.230	.663	.120	1	.729	1.258	.343	4.614
	[RACE_IV=6]	.621	1.001	.385	1	.535	1.861	.262	13.235
	[RACE_IV=7]	-.312	.667	.219	1	.640	.732	.198	2.705
	[RACE_IV=9]	0[b]	.	.	0	.	.	.	.
	[Services_New_IV=1.00]	-2.653	.234	128.199	1	.000	.070	.045	.112
	[Services_New_IV=2.00]	.538	.080	45.091	1	.000	1.712	1.464	2.003
	[Services_New_IV=3.00]	0[b]	.	.	0	.	.	.	.
Some use	Intercept	-.059	.855	.005	1	.945			
	[AGE_IV=4]	.652	.326	3.990	1	.046	1.920	1.012	3.640
	[AGE_IV=5]	-.341	.214	2.543	1	.111	.711	.468	1.081
	[AGE_IV=6]	-.006	.198	.001	1	.974	.994	.674	1.466
	[AGE_IV=7]	.115	.194	.352	1	.553	1.122	.767	1.641
	[AGE_IV=8]	-.117	.207	.320	1	.572	.890	.593	1.334
	[AGE_IV=9]	.107	.198	.293	1	.589	1.113	.755	1.641
	[AGE_IV=10]	.251	.182	1.906	1	.167	1.285	.900	1.835
	[AGE_IV=11]	.080	.167	.233	1	.629	1.084	.782	1.503
	[AGE_IV=12]	0[b]	.	.	0	.	.	.	.
	[GENDER_IV=1]	.275	.136	4.108	1	.043	1.316	1.009	1.717

	[GENDER_IV=2]	0[b]	.	.	0	.	.	.	.
	[MARSTAT_IV=1]	-.045	.104	.191	1	.662	.956	.779	1.172
	[MARSTAT_IV=2]	.039	.119	.107	1	.743	1.040	.823	1.314
	[MARSTAT_IV=3]	.149	.164	.828	1	.363	1.161	.842	1.600
	[MARSTAT_IV=4]	0[b]	.	.	0	.	.	.	.
	[RACE_IV=1]	.142	1.036	.019	1	.891	1.152	.151	8.784
	[RACE_IV=2]	.672	.936	.515	1	.473	1.957	.313	12.253
	[RACE_IV=4]	.712	.833	.729	1	.393	2.038	.398	10.435
	[RACE_IV=5]	.696	.831	.702	1	.402	2.007	.393	10.238
	[RACE_IV=6]	1.591	1.139	1.950	1	.163	4.909	.526	45.789
	[RACE_IV=7]	.352	.836	.177	1	.674	1.422	.276	7.314
	[RACE_IV=9]	0[b]	.	.	0	.	.	.	.
	[Services_New_IV=1.00]	-1.346	.204	43.524	1	.000	.260	.174	.388
	[Services_New_IV=2.00]	-.827	.100	69.085	1	.000	.437	.360	.531
	[Services_New_IV=3.00]	0[b]	.	.	0	.	.	.	.

a. The reference category is: Daily use.

b. This parameter is set to zero because it is redundant.