EFFECTIVENESS OF TREATMENT MODALITIES FOR THOSE WITH DIAGNOSED OPIOID USE DISORDER AND CO-OCCURRING DISORDERS

by

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Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

School of Behavioral Sciences

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2020

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ABSTRACT

Substance abuse has always been an issue in society. As time has passed, the adverse consequences of substance abuse have become more evident. These consequences include physical and mental addiction, disruption of purposeful and productive everyday life, disruption of the family unit, spread of diseases, and death. Recently, the rate of overdose has rapidly increased due to the potency and accessibility of illicit opiates. Fentanyl and carfentanyl have been added to many opioid and non-opioid substances to provide a more euphoric experience, to intensify the addiction of the client, and for economic reasons because they are much more potent than heroin. Unfortunately, these products are often deadly, and the number of overdoses has increased 500 percent over the past ten years in the United States. Individuals with substance addiction are very likely to have a co-occurring mental illness. In 2017, 7.9 million patients had diagnosed with co-occurring disorders. Treatments for those with substance use disorders and co-occurring disorders are under constant scrutiny for their effectiveness. This study investigates the effectiveness of methadone maintenance treatment comparatively with non-methadone treatments for those with opioid use disorder and co-occurring disorders. The data was gathered from an anonymous behavioral health treatment facility that specialized in substance use disorders in southern Massachusetts. The study analyzed archival data from 1,000 clients' treatment episodes over 1 year. The clients were randomly chosen, and treatment choices were identified. The length of time in treatment help to determine whether the treatment is successful or unsuccessful.

Keywords: methadone, medicated assisted treatments, non-medicated assisted treatments, opiates, substance use disorder, overdose, recidivism, harm reduction, modality.

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List of Abbreviations

American Society of Addiction Medicine (ASAM)

Attention Deficit Hyperactivity Disorder (ADHD)

Bureau of Substance Abuse Services (BSAS)

Centers for Disease Control and Prevention (CDC)

Diagnostic and Statistical Manual of Mental Disorders (DSM)

Gamma-aminobutyric acid (GABA)

Medicated Assisted Treatment (MAT)

Methadone Maintenance Treatment (MMT)

National Institute on Drug Abuse (NIDA)

Opioid Use Disorder (OUD)

Intensive Outpatient (IOP)

Post-Traumatic Stress Disorder (PTSD)

Substance Abuse and Mental Health Service Administration (SAMHSA)

CHAPTER ONE: INTRODUCTION

Overview

Opioids are the most dangerous illicit substances that are abused (Robinson et al., 2019). More people overdose on opiates than cocaine, amphetamines, stimulants, benzodiazepines, alcohol, and other categories combined (Bart, 2012). Over half of those who are addicted to opioids also have a mental health diagnosis (Bureau of Substance Abuse Services [BSAS], 2017). Opioids and opiates include heroin, oxycontin, oxycodone, fentanyl, carfentanyl, methadone, buprenorphine, morpheme, kratom, tramadol, codeine, hydrocodone, Vicodin, Percodan, Demerol, Tylox, and Percocet (BSAS, 2017). Many different treatments exist for those who are addicted to opioids and opiates. The most effective treatments are yet to be determined. This study attempts to provide insight into the effectiveness of methadone maintenance as a medicated assisted treatment versus non-medicated assisted treatments for opioid use disorder and for those with co-occurring opioid use disorder and a mental health disorder

Background

Opioids are synthetic and semisynthetic pain killers that are chemically derived from opiates (natural painkillers) to promote their final form (Keary et al., 2012). The only true opiates are poppy, morpheme, kratom, thebaine, and codeine (Keary et al., 2012). Semisynthetic opioids are derived from opiates with human intervention to obtain their final form (Kreek et al., 2005). These include heroin, hydrocodone, hydromorphone, oxycodone, oxymorphone, and buprenorphine, among others (Kreek et al., 2005). Synthetic opioids are one hundred percent chemically manufactured and include methadone, fentanyl, and tramadol (Kreek et al., 2005).

Opioid addiction is a disease that begins with an individual taking opiates, whether illicit or prescribed. Either way, it does not take a long time taking opioids before the individual becomes physically addicted. Many times, opioid use disorder begins with a patient taking a prescription for an injury, surgery, or illness. They may become addicted and when the prescription is discontinued by their doctor, they begin to buy it from the street. Prescription pain killers are much more expensive to buy from the street; therefore, individuals tend to buy a cheaper opioid, heroin (Mars et al., 2014).

Opioid addiction has caused social issues including crime, homelessness, prostitution, and violence. It has transformed neighborhoods into dangerous places, torn apart families, and caused children to grow up without their parents. Many people are incarcerated due to issues stemming from addiction. Many individuals have medical and physical problems due to addiction. Moreover, many abusers have died an untimely death (Okie, 2010).

Over half of individuals with opioid use disorder have also been diagnosed with a mental health disorder (BSAS, 2017). These diagnoses range from mild depression to schizophrenia. It is difficult to ascertain whether the substance use was a direct result of the mental health disorder, the mental health disorder is due to the substance use disorder, or individuals who are biologically or environmentally prone to one are prone to the other. The most common co-occurring mental health disorders are anxiety, depression, borderline personality disorder, and antisocial personality disorder (Swendsen et al., 2010). For those with a co-occurring disorder, if the mental health problems are not addressed in sync with the substance use issues, the patient will have a much higher chance of relapsing (Swendsen et al., 2010).

According to Dr. Schaler, author in the Psychiatric Times, many in the field of substance abuse treatment refuse to recognize substance use disorder as a disease because it begins

voluntarily (Schaler, 2002), while others point out that diseases such as lung cancer, obesity, and certain types of diabetes are also caused by a voluntary act by the patient, but are still socially accepted as diseases (Mauro et al., 2008). The fifth edition of the Diagnostic and Statistical Manual (DSM) recognized substance addiction as a disorder, whereas the prior DSMs classified addiction as substance dependence or substance abuse (American Psychiatric Association [APA], 2013). Classifying opioid addiction as a disorder is meaningful because it recognizes the patient's inability to stop using the substance without help. Insurance companies are now much more likely to pay for treatment for a clinically diagnosable disorder.

Treatments for substance use disorders, especially opioid use disorder, have progressed rapidly over the last 20 years. Other medicated assisted treatments include Suboxone, Subutex, Antabuse, Campral, methadone, and Vivitrol. Some of these treatments are relatively new. Suboxone was approved by the FDA to treat opiate addiction in 2002, methadone in the 1960s, and Vivitrol in 2017 (FDA, 2019). Treatments for those with co-occurring disorders can consist of substance use treatments in conjunction with psychiatric medication management, counseling, or both (Schuckit, 2006).

Although methadone has been present for decades, it has been used more prevalently only over the past ten years (BSAS, 2017). It remains a treatment that is not utilized in balance to the opiate epidemic because there is controversy, skepticism, and fear surrounding the nature of the treatment. Long-term effectiveness of methadone treatment has not been widely studied, nor has this been studied greatly as a treatment for those with co-occurring disorders.

Methadone maintenance treatment (MMT) was developed in 1964. It was created in response to the heroin epidemic that followed World War II, given in doses from 80 mg to 120 mg (Moskalewicz & Welbel, 2013). As methadone works in the same fashion as heroin,

presumably, the patient would not get sick from withdrawal symptoms, and therefore, would not feel the need to use heroin any longer. This was thought to quell opioid cravings. It was eventually given to pain clients as it is a synthetic opioid and works in the same fashion as an illicit opioid or opiate (Joseph et al., 2000).

Methadone was initially looked upon by the general public with disdain and still is in many sectors because it is a replacement opioid and not addressing a cure for the disease of opioid addiction (Dole, 1988). Proponents for MMT argue that it keeps clients from risky behaviors such as sharing needles, prostitution, and street violence, as well as reducing the risk of overdose. Opponents argue that it is a taxpayer-funded way for patients to continue to illicit opioid use and to obtain substance for free, without ever obtaining true sobriety or overcoming the issue of addiction (Dole, 1988). This appears to imply that MMT clients are not using it to get well but to continue in their addiction for free.

Over the years, many facets of MMT have proven original theories about the treatment wrong. For example, in the earlier years of MMT, the minimum dose that was thought to have any effect was 80 mg (Moskalewicz & Welbel, 2013). Now, clients are often treated with as little as 10 mg in some cases (D'Aunno et al., 2019). It was also initially thought that clients could easily wean themselves off MMT when it was deemed appropriate and that it was not as addictive as heroin (Joseph et al., 2000). It is now known that MMT is, arguably, more addictive than heroin, and it takes a very long time to comfortably wean off MMT (Bale et al., 1980). For example, many clinics only offer a methadone dose of 1 mg per week or less, which could take clients, even on a low dose of methadone, a very long time to comfortably wean off (Bransetter et al., 2008).

Some feel that it is very dangerous and is slowly becoming another substance to add to the drug trade (Keary et al., 2012). These opponents declare that it is irresponsible to prescribe methadone to clients as it enables and encourages their addiction. It has become a common substance available to be bought and sold illicitly on the streets in many areas. Many proponents feel that MMT is the answer to heroin addiction and should be made more easily available to a broad range of providers, administers, and clients (BSAS, 2017).

Problem Statement

Few studies investigated the effectiveness of MMT and non-MMT opiate treatments, such as intensive outpatient programs, individual and family counseling, psychoeducational groups, support groups, and psychiatric medication management. This is especially true for those who need treatment for a co-occurring disorder. Part of the rationale behind this appears to be that it is hard to measure what is, and what is not, proof of effective treatment. It is hard to measure accurately what constitutes a successful treatment episode (Drake et al., 2004).

The co-occurrence of a substance use disorder with a mental health disorder is very common. The addiction issue is the first issue treated, due to the risk of overdose and the severity of withdrawal symptoms. The imminence of treating the physical addiction often overshadows the importance of treating the mental health issues that are also present, and the mental health treatment is put off. When this happens, the client may become stuck in a revolving door of relapse. The same thing appears to happen in the research of treatment effectiveness for those with addiction. The importance of addressing those with a co-occurring disorder is overlooked, and the addiction is the only aspect studied. These studies do not offer an accurate representation of treatment effectiveness because appropriate treatments might not have been utilized.

Another problem is that most studies measure effectiveness by the client's initial abstinence from opiates. Many clients who participate in treatments do not wish to participate in studies. Numerous clients are lost to follow up, and many simply disappear from treatments for unknown reasons. This fact makes it difficult to determine the number of clients who have relapsed or the number of clients who stopped coming to treatment when they are feeling better and moving on with their lives healthily (Farabee et al., 2016).

Clients need to be followed past the point of their initial date of sobriety, for those with a co-occurring disorder and for those with opioid use disorder only, because the goal of substance use treatments is, all the same, to assist the client in gaining permanent sobriety. It needs to be known whether these treatments are helping the clients to stay clean and sober over a long period or they are relapsing immediately following treatments. If they continue to relapse in large numbers following a particular type of treatment, the treatment should not be offered as a viable treatment option. Not many studies have followed their participants all the way through to ascertain whether they have remained sober following their initial abstinence. It is difficult to say that a treatment is effective if it is only scrutinized while the medications are being initially administered. Opioid addiction is not simply a medical condition; it affects all aspects of the client's lives. Relationships issues, life skills, social skills, mental illness, housing, sexual issues, familial issues, and maternity and paternity issues all come along with opioid addiction for almost all with opioid addiction and co-occurring disorders (De Maeyer et al., 2013).

Still, another weakness of existing studies is that treatments receive much more scrutiny at the beginning of implementation. Most of these studies focused on the medical implications of the treatments: What receptors were affected and how the treatments would affect the brain. Theories that appear to drive most of these studies are medically-based, explaining the

physiology of how treatments work. Aspects other than medically substituting opioids or getting the client to somehow stop using them are not normally followed up with checking into the client's recidivism in treatment or success in aftercare treatment.

The problem with existing studies is that we do not have a comprehensive definition of effective treatment, we do not know if MAT is more effective than other types of treatment, and we lack any information on long-term abstinence which would indicate treatment success. Which treatments truly work best for long-term sobriety for those with opioid use disorder and co-occurring disorders?

Purpose Statement

The purpose of this study is to determine the long-term effectiveness of MMT and non-methadone treatments alone and in conjunction with other treatments for those with opioid use disorder and co-occurring disorders. Effectiveness is defined to include completion of treatment and non-recidivism within one year. Opioid addiction and co-occurring mental health disorders have been proven to have very high recidivism rates. It is crucial to determine what treatments are most effective for this population in the long term. As previously established, there has not been much research on the lasting effectiveness of MMT for opioid abusers and those with a co-occurring disorder (Fei et al., 2016; Kampman & Jarvis, 2015).

This study examined archival data from 1,000 records over one year of treatment. The record was analyzed from the start date of each record to 12 months after each treatment episode. These records were chosen from the archival database at a substance abuse and mental health treatment center in Massachusetts. All participants have been diagnosed with opioid use disorder. Half of them have additionally been diagnosed with a co-occurring disorder. Records were randomly chosen until 1,000 records representing different categories of treatment are obtained.

Non-MMT clients were treated with individual counseling, psychoeducational groups, support groups (such as Narcotics Anonymous), intensive outpatient, family intervention programs, partial hospitalization, residential treatment (half-way house, sober house), other medicated assisted treatments (Suboxone, Subutex, Antabuse, Campral, Vivitrol), and psychiatric medication management for those with a co-occurring disorder.

Of the one-thousand clients receiving outpatient treatments, those with co-occurring disorders and those without were chosen at random. Because the aim of the study is to determine the effectiveness of outpatient treatments in comorbid and non-comorbid patients, it was important to study the effects of those who were using one treatment only and those who were using more than one treatment. This helps to determine whether one treatment is sufficient for those with opioid use disorders and co-occurring disorders or it is more effective to use a treatment in conjunction with other treatment methods. For this reason, clients were chosen at random for those who were using one treatment only and those who were receiving more than one treatment simultaneously. The same was true for those without comorbidity and the non-MAT groups.

Success was measured in the completion of treatment. Completion of treatment was defined as those who remained in treatment for 1 year following initially obtaining sobriety, were transferred to another treatment program due to relocation of residence or graduating to a lower level of care, or were weaned off treatment properly in accordance with their treatment plan. Unsuccessful treatment was measured by those who relapsed, died by overdose, or left treatment due to other factors, such as administrative discharge (being removed from the program) due to violence at the program, threatening behavior at the program, having positive urine drug screens, or incarceration.

This study resolves the shortcomings of existing studies by comparing the long-term efficacy of OUD treatments. It also examines long-term outcomes of substance use disorder (SUD) treatments for those with opioid use disorder, as well as long-term outcomes for those with co-occurring disorders receiving SUD treatments. Finally, it examines the efficacy of OUD treatment alone, as well as in conjunction with other treatments.

Significance of the Study

This study contributes to the knowledge of the effectiveness of substance abuse treatments including methadone and non-methadone treatments for clients with and without co-occurring disorders in a way that would assist clinicians in helping clients to choose which outpatient treatment is the right treatment choice. It is not only important to know which treatments help the client to abstain from opioid use immediately and in the short term, but to know which treatments are effective in helping the client to remain sober (Bart, 2012). The goal for every client is to eventually live a happy and healthy life, which can only be achieved if they can stay sober (Stanbury, 2014). This study evaluates whether MMT or non-MMT are effective for clients to remain clean and sober (Nabipour et al., 2014). The data that was researched in this study can be shared with treatment facilities to assist them in effectively informing clients of appropriate treatment options for them without only being able to offer personal opinion of what they consider to be effective. This study also offers insight into the controversy previously discussed concerning the long-term effectiveness of methadone maintenance as a treatment.

Research Questions

RQ1: Is there a statistically significant difference between expected and actual success rates in those with opioid use disorder when treated with MMT?

RQ2: Is there a statistically significant difference between expected and actual success rate in those with opioid use disorder when treated with Suboxone?

RQ3: Is there a statistically significant difference between expected and actual success rates in those with opioid use disorder when treated with Vivitrol?

RQ4: Is there a statistically significant difference between the expected and actual success rates in those with opioid use disorder when treated with individual counseling?

RQ5: Is there a statistically significant difference between expected and actual success rates in those with opioid use disorder when treated with group counseling?

RQ6: Is there a statistically significant difference between the expected and actual success rates in those with opioid use disorder when treated with intensive outpatient (IOP)?

RQ7: Is there a statistically significant difference between expected and actual success rates in those with opioid use disorder when treated with psychiatry?

RQ8: Is there a statistically significant difference between expected and actual success rates in those with opioid use disorder when treated with family intervention?

Definitions

1. *Successful treatment*: one year of continued sobriety beginning at the start of treatment.
2. *Recidivism*: relapse into opioid use.
3. *Co-occurring disorder*: When a client is diagnosed with a mental health disorder and a substance use disorder.
4. *Expected outcome*: the quantitative outcome that is predicted.

5. *Psychiatry*: the study and treatment of mental illness, emotional disturbance, and abnormal behavior.
6. *Individual counseling*: counseling conducted on a one to one basis.
7. *Group counseling*: counseling and education conducted with one facilitator and multiple clients.
8. *Family intervention*: families intervening in a client's life to assist them in getting treatment for a substance use disorder.
9. *IOP*: a treatment modality where clients attend group and individual counseling for up to 6 hours a day, 3–5 days per week.
10. *Counseling*: guidance to assist in resolving social, psychological, and personal problems.

Summary

There are different options for the treatment of opioid use disorder and co-occurring mental health disorders. It can be difficult to determine which treatments are the best option for a patient seeking treatment. Part of the reason is that it is difficult to determine what constitutes an effective treatment and to keep track of patients after they leave treatment. This study attempts to define a successful treatment episode and compares different treatment modalities to each other to determine under what conditions are different opioid use disorder treatments effective.

CHAPTER TWO: LITERATURE REVIEW

Overview

Opioid addiction can stem from hereditary or environmental factors (Barry et al., 2014). One of the issues with opioid use is the fact that sometimes people who use them become physically addicted before they realize that it has happened (Herz & Shippenberg, 2012). Opioid addiction is very difficult to overcome due to neurochemical addiction (Herz & Shippenberg, 2012). By this time, the issue is out of control and the addiction begins to affect all other aspects of the person's life: Relationships suffer and daily activities begin to revolve around substance use. Quickly the person's life, inevitably, ends up in shambles. This can lead to crime and risky behaviors. This makes it extremely important to help those with addictions to heal. To do this treatment, providers must know the most effective treatment methods. The goal of treatment should be to help the client to get well for the rest of their life, not just in the near future.

There are different treatment methods for those with opioid use disorder. Some include medication treatments, some include therapies and education, as well as residential programs and family involvement (Saloner & Karhtikeyan, 2015). Treatments for those with mental health comorbidity usually include therapies and possibly medications (Saloner & Karthikeyan, 2015) and may be more intensive than those without comorbidity. MMT is a very popular outpatient treatment for those with opioid use disorder (Ball & Ross, 2012).

When treating opioid addiction, many options are available to the client. Over the past few years, it appears that MMT is the most utilized option for outpatient opioid use disorder treatment for those with and without co-occurring disorders (National Institute on Drug Abuse [NIDA], 2019). This writer has studied the benefits and disadvantages of MMT. It became

important to ascertain whether MMT is truly the most effective treatment option or other options are more effective. Thus, it became important to study this topic.

This literature review was conducted through searching the key phrases methadone, MMT, medicated assisted treatments, co-occurring disorders, history of substance use treatments, history of heroin, chemical composition of opiates and opioids, substance addiction treatments, effects of addiction, and long-term outcomes of substance abuse treatments. These searches were completed in the Liberty University online library, Google Scholar, and Mendeley, as well as researching the leading national agencies on substance abuse and treatment for those with SUD and co-occurring disorders. The references from particular informative articles were used to find additional sources on the searched topics.

Conceptual Framework

Maslow's Hierarchy of Needs proposes that all humans have basic needs that must be met for them to thrive (Mathes, 1981). Many needs can be measured on a case-by-case basis, but Maslow identifies the essentials that all needs as building blocks to a happy fulfilling life. These needs are physiological, safety, security, love, belonging, self-esteem, and self-actualization needs (Mathes, 1981). Physiological needs consist of air, water, food, sleep, clothing, and shelter (Mathes, 1981). Safety and security needs contain personal and financial safety, health and well-being, and safety against illness and injury (Mathes, 1981). Love and belonging needs consist of friendships, intimacy, and family (Mathes, 1981). Self-esteem needs include feeling important to and respected by others (Mathes, 1981). Self-actualization refers to a person recognizing their potential and reaching that potential (Mathes, 1981).

Sometimes, individuals use substances due to an inability to have these needs met. For instance, those who never learned how to establish a loving relationship with others have

difficulty cultivating relationships; therefore, they turn to substances to either numb this need or to give them synthetic courage to seek out to fulfill these needs. Those who have severe anxiety and cannot stop worrying about the affairs of the world use substances to quell their nervous feelings and feel safe and secure. Many substance addictions are developed due to reasons such as these.

This explanation of basic human needs is the basis of why treatment is provided to those with substance addiction and mental health problems. The goal is to help patients to experience these necessities so they can obtain fulfillment and happiness. Humanistic treatment methods can be so important in these instances. If the client becomes clean and sober but never addresses their human needs, relapse is inevitable. Some treatment methods could include counseling and support groups. When an individual has a substance addiction or a co-occurring disorder, one or more, if not all, of these needs can be interrupted or lost by the individual as a direct result of their addiction.

The conceptual framework for this study is the basis to determine whether MMT is the best treatment method to give clients with opioid use disorder and co-occurring disorders the best chance of thriving and obtaining their basic needs. It examines the effects of methadone treatments on opiate addiction and co-occurring disorders, as well as non-methadone treatments for opiate addiction and co-occurring disorders. The focus is placed on methadone as it is the most widely used medicated assisted treatment for those with opioid addictions (BSAS, 2017). This is achieved by evaluating one-thousand clients who utilized methadone maintenance and non-methadone treatments, and their outcomes over one year. Expected outcomes are predicted based on previous research. The expected outcomes for those who utilized methadone maintenance for treatment are under a 50% success rate (Maremmani et al., 2018). This

information is gathered from the archives of a substance use treatment facility in Massachusetts from the time of 2016 to 2017.

Theoretical Causes of SUDs

Substance use disorders usually have precursors, or risk factors, that can contribute to their development. Some are genetic, substance abuse trickling down from generation to generation (Swendsen et al., 2009). Many are environmental, including what happens in the household of upbringing, such as abuse, trauma, or substance use (Swendsen et al., 2009). Many times, precursors include environmental and genetic factors, which gives the individual an even greater chance of succumbing to SUD (Agrawal & Lynskey, 2008). The neighborhood in which one was raised and the circle of friends and acquaintances with whom one associate can be another precursor (Banducci et al., 2014). Although a family history of substance abuse and addiction does not guarantee the positivity of addiction in the next generation, there is a very high rate of those who have a substance abuse disorder having a family history of the same (Banducci et al., 2014).

Genetics can play a role in the cause of SUDs (Swendsen et al., 2009). The human genome contains units of DNA, which direct cellular activities (NIDA, 2019). Families can share many of these DNA sequences. Therefore, families often look alike, sound alike, or move alike. This is also why certain diseases and traits can be passed down from generation to generation. The same can be true for a person's increased risk for, or protection against, addiction (NIDA, 2019). If someone is an alcoholic, their children could be much more likely to become addicted to alcohol, if consumed, than someone who did not inherit these genetic traits (NIDA, 2019). This does not mean that it is inevitable that their children will become alcoholics, just that they could be predisposed (NIDA, 2019).

Theories Behind Treatment

When treating those with SUDs, several evidence-based psychological and psychosocial treatments are usually employed. Cognitive-behavioral treatments are utilized to curb behaviors that lead to drug use and its associated activities (Osher & Drake, 1996). These treatments include brief intervention, CBT, Motivational interviewing, relapse prevention, and contingency management (Jhanjee, 2014). Other treatment modalities include therapeutic communities, residential treatment, and support groups, including Alcoholics Anonymous and Narcotics Anonymous (Jhanjee, 2014).

Social control theory indicates that motivational factors utilized in the treatment of substance abusers include several different factors (NIDA, 2019). These often include family and friend relationships, parental responsibility, school, work, and religion, as well as other aspects of traditional society (Jhanjee, 2014). A good collaborative treatment plan includes familial support if available, peer support in the form of outpatient group therapy and support groups, as well as obtaining a sponsor, and securing employment to fulfill a sense of purpose (Drake et al., 2004).

As related to addiction, harm reduction theory puts forth the notion that allowing those who participate in risky behaviors associated to their drug use, such as prostitution, using dirty needles, sharing needles, overdose, and violence, would be safer if supervised while using substances (Wermeling, 2010). Harm reduction treatment methods do not cure the individual from their physical addiction but offer them a safer alternative to using street drugs (Hawk & D'Onofrio, 2015). These methods can help to avoid overdose and disease transmission. Practices in harm reduction include methadone maintenance, Suboxone maintenance, providing clients with clean needles and bleaching kits, and opioid injection sites (Jhanjee, 2014). Opioid

injection sites are places where individuals can take opioids under supervision (Wermeling, 2010). This is thought to be safer so the person is supervised while they are under the influence so that nothing bad would happen to them, and there is someone there to treat them in the event of an overdose (Wermeling, 2010).

Exposure theory deduces that a cause for addiction can be exposure to substances through no fault of the individual's (jointcommision.org). This includes instances such as fetal exposure in utero (jointcommision.org). Substance exposed newborns might have a higher risk of future addictive tendencies than those who were not exposed to substances (jointcommision.org). This can also apply to patients who were given opiates as a prescription to treat pain after illness or injury (jointcommision.org). There are also a number of those with an addiction who were given substances by their parents or older peers at a very young age (Swendsen et al., 2010). These scenarios can put the individual at great risk of developing a substance addiction.

Social learning theory contends that people are greatly affected by their families, peers, and communities (Akers et al., 1989). Individuals learn by observing. If a child observes that their father copes with stress by drinking, they learn that this is an acceptable coping mechanism. If they observe that friends have fun by smoking marijuana, they learn that a positive result comes from smoking marijuana. If a person becomes an addict, slowly over time their entire circle will become others who employ the same lifestyle (Akers et al., 1989). Interactions with healthy family and friends will dissipate and addiction becomes more accepted as the norm. This theory contends that 55% of adolescent substance abuse begins in this way (Akers et al., 1989).

Related Literature

Substance Use Disorders

Neurochemical addiction occurs when a person develops a tolerance to, as well as a dependence on, opioids or opiates (Herz & Shippenberg, 2012). This happens when the reward pathways in the brain are activated (Herz & Shippenberg, 2012). The neural system motivates the user to ensue with substance abuse and releases pleasure hormones (Herz & Shippenberg, 2012). Once the drug dependence has been created, it must be maintained or the brain releases physical and emotional cues to encourage the continued feeding to the reward pathways (Herz & Shippenberg, 2012).

Opioids affect the brain's communication system. The way that the brain sends and receives messages to itself, as well as how it processes information, is affected by different types of drugs (Herz & Shippenberg, 2012). Some drugs activate neurons while some inhibit them (Kreek et al., 2010). These effects can sometimes be permanent depending on the severity and length of the substance abuse (Kreek et al., 2010). The cognitive abilities of the brain can be decreased, as well as the memory, on a permanent or temporary basis (BSAS, 2016).

Drugs can also affect neurotransmitters such as dopamine and serotonin levels in the brain (Fischer & Ullsperger, 2017). Dopamine is a chemical that is produced in the brain to send messages to the limbic system (Fischer & Ullsperger, 2017). Serotonin acts in much the same way (Cools et al., 2011). These are chemicals that increase mood and increase feelings of pleasure and euphoria (Seo et al., 2008). Other brain chemicals that are affected by drug use are gamma-aminobutyric acid (GABA) and glutamate, which is a neurotransmitter that calms nervous activity, and norepinephrine, a neurotransmitter that affects how the body reacts to stress (Manchikanti, 2007).

Stimulants, such as cocaine and crack, affect dopamine and serotonin (Sora et al., 2001). They cause an excessive release of more dopamine than normal, thus producing a euphoric effect (Sora et al., 2001). Depressant drugs (alcohol, benzodiazepines, barbiturates, and others) suppress GABA and glutamate (Piepponen et al., 2002). This keeps the nervous system from being excited. Opiates bind to endorphin receptors (Bond et al., 1998). When these receptors are activated, they reduce physical pain (Bond et al., 1998). Therefore, opiates are prescribed for injuries and after surgeries. Drugs such as OxyContin and Percocet have the same effects as heroin (Evans, Lieber, & Power, 2019).

Physical, Cognitive, and Emotional Effects of Addiction

Physical problems caused by substance abuse include sleep problems, appetite issues, increased or decreased heart rate, high or low blood pressure, abnormal respiration, and chest and lung pain (Brick, 2012). Weight loss or gain is also a potential side effect (Brick, 2012). Long-term brain damage can occur, which is irreparable (Brick, 2012). Substance abuse frequently affects some areas of the brain that control sleep, learning, memory, and emotion (Gruber et al., 2007). Substance use can also cause degenerated nerve endings (Manchikanti, 2007).

Some drugs are psychoactive; they have a profound or significant effect on mental processing (Dictionary, 2016). These include alcohol, certain amphetamines, heroin, and marijuana (Julien, 2013). They can either heighten emotions or act as depressants (Julien, 2013). Long-term use of these drugs can permanently damage the brain's ability to recognize and exhibit emotion normally (Schiavone, Neri, & Harvey, 2019).

Some other health concerns associated with drug use can be heart attack, stroke, kidney and liver damage, seizures, cancer, and breathing problems (Julien, 2013). Certain diseases are

also associated with drug use. Commonly spread diseases with drug users are Hepatitis C and Human Immunodeficiency Virus (Friedman et al., 1993; Harris et al., 1993). These have a higher likelihood of transmission depending on the route of administration (Des Jarlais et al., 1989). Intravenous users have a higher likelihood of contracting these communicable diseases (AMA.org, 2013).

Excessive drinking can damage the liver. The liver processes and breaks down harmful substances (Leiber, 1994), including alcohol. When the liver has been breaking down excessive amounts of alcohol over a long period of time, it causes damage to the liver (Leiber, 1994). Thus, the liver stops functioning properly. A common sign of a damaged liver is yellowing of the skin, which is called jaundice (Rajagopal, Sangam, Singh, & Joginapally, 2015). Chronic inflammation of the liver can result in cirrhosis, which is a deterioration of the liver and can be fatal (Califano et al., 2001).

Diagnostic Criteria for a Substance Use Disorder

The following symptoms are used to diagnose SUDs: use more than intended, unsuccessful attempts to reduce usage; daily activities revolving around obtaining and using substance; craving; use causing significant impairment or distress resulting in failure to fulfill work obligations, school obligations, and home obligations; recurrent substance-related legal problems; withdrawal from family or friends; withdrawal or reduction in recreational activities/hobbies; recurrent use driving operating machinery; increasing dosage to achieve the desired effect; markedly reduced effect when the usual dose is used; presenting symptoms as blood or tissue concentration declines; and using substance to relieve withdrawal symptoms (APA, 2013).

If a client were to be specifically diagnosed with opioid use disorder, they would be diagnosed with some of the following symptoms: opioids taken in larger amounts or over a longer period than intended, unsuccessful attempts to cut down on use, a great deal of time is spent in obtaining opioids, a great deal of time is spent recovering from the opioids effects, cravings or a strong desire to use opioids, recurrent opioid use resulting in failure to fulfill life obligations, continued use despite having interpersonal problems resulting from use, important activities given up or reduced as a result of use, recurrent use even when it is in a hazardous situation, continued use despite having a physical or psychiatric problem as a result of use, tolerance to opioids, and withdrawal symptoms when opioids are not used (APA, 2013). It is important to note that this diagnosis is not meant for those taking opioids for pain appropriately under medical supervision.

Specifiers

A client must meet 2–3 of these symptoms to be classified as mild opioid use disorder (APA, 2013). They must meet 4–5 of these symptoms to be classified as having a moderate use disorder, and six or more symptoms would indicate a severe opioid use disorder (APA, 2013). In addition to specifying severity when diagnosing an opioid use disorder, the clinician must specify remission (APA, 2013). If a client is on methadone maintenance, the diagnosis should contain a specifier of “on agonist therapy” (APA, 2013). For one on Suboxone maintenance the specifier should be “on partial agonist therapy,” and for those on Vivitrol maintenance, the specifier should be “on ant-agonist” therapy (APA, 2013).

There are also specifiers for those who are in remission and are not using any medicated assisted therapies (APA, 2013). These include in early remission for those who have been clean for 4–11 months, in partial remission for those who have had up to 3 months of sobriety, or have

had a long-term remission spotted by a few times of usage, and in sustained remission for clients who have remained clean for 1 year or more (APA, 2013). Those who have remained sober for over one year will receive a different diagnosis and diagnosis code of opioid use disorder in sustained remission, F11.21, while all other opioid use disorders have a diagnosis code of F11.20 (APA, 2013).

Potential Causes for Substance Abuse

Trauma History

Studies have been conducted to ascertain whether depression is a clear indicator of substance use among juveniles (Lo & Cheng, 2007). This study implies that depression appears to be a mediating or moderating factor between childhood physical and sexual abuse and adulthood substance abuse (Friedman et al., 1993). This might indicate the use of substances to self-medicate depressive symptoms, which may have stemmed from childhood trauma (Lo & Cheng, 2007). It appears that childhood stressors are a common precursor to SUDs.

Many who suffer from substance abuse begin using substances to self-medicate symptoms arising from mental health or trauma issues (Garland, Pettus-Davis, & Howard, 2013). If a person suffers from depression, anxiety, or more serious mental health issues, illicit substances can seem to be a quick and easy way to numb emotional distress (Garland, Pettus-Davis, & Howard, 2013). This is especially true since the mental health profession is inundated with those who need treatment, and many are forced to go without getting the help that they need (Kohn et al., 2004).

Waiting lists for a mental health treatment provider can be very lengthy and can take months to get appointments. When an appointment is obtained, it can be additional months to figure out the best treatment to help the individual (Sussman et al., 2008). Additionally, once the

client is addicted to a substance, it is difficult for them to remain faithful to their mental health treatment, and a lack of mental health treatment can create a vicious cycle (Kohn et al., 2004). Thus, the unavailability of mental health treatment is a common factor in substance addiction (Mojtabi, 2011).

Those who have suffered through childhood trauma often suffer from mental health issues such as post-traumatic stress disorder and reactive attachment disorder (Everett and Gallop, 2000). They often struggle with relationships due to having trust issues (Everett et al., 2000). The effects of childhood trauma often ruin people's adult lives (Edwards et al., 2003). Using substances in order to numb any unpleasantness happening in one's life is a common reason given for why individuals began using illicit substances (Sussman et al., 2008).

Familial Factors

Substance abuse appears to be a multigenerational issue (Goldberg & Gould, 2019). Children of substance abusers are more likely to become substance abusers themselves (Goldberg & Gould, 2019). Substance use becomes a normal occurrence and does not feel out of the ordinary to those who have parents who used substances (Kreek et al., 2005). They are also more likely to suffer in other areas of their lives, including their social environment. Initially, substance abuse in a family affects the overall functioning of the family (Mayes & Truman, 2002).

Sometimes, parents who are substance abusers encourage their children to do the same (Kelleher et al., 1994). A reason given by some who have encouraged their children to abuse substances was that it was more fun to use with a partner, and they wanted their children to have fun with them (Pears et al., 2007). It can also be due to the irresponsible and consuming nature of

substance abuse, which can cause the parent to not be careful in keeping their abuse issues from their child (Barnard & McKeganey, 2004).

Environmental Factors

Environment is, undoubtedly, a factor in substance abuse addiction (McLeod et al., 2004). For those who either grow up in a particular type of environment or reside or socialize in a type of environment, desensitization is inevitable (McLeod et al., 2004). When substance use does not feel like something out of the ordinary, it can easily become a normal occurrence in one's life. If a person's friends are frequently engaged in a certain activity, it becomes easier for one to become involved in the same activity (Kendler et al., 2003). This is especially true if the activity appears alluring, which substance use often does in the beginning. The long-term consequences are not always evident.

Another environmental factor that has been recently described as a public health crisis is the overprescribing of opioid pain relievers (Kolodny et al., 2015). This has shown itself to be a prominent gateway to an opioid use disorder. An increase in patients becoming addicted to prescription opioids has led to illicit Percocet and Oxycontin addictions, which often turn into heroin addictions as it is cheaper on the streets than opioid pills (Kolodny et al., 2015). From 1999 to 2011, the prescribing of opioid pain relievers increased by 500%, and the number of overdose deaths related to prescription opioids quadrupled (Kolodny et al., 2015).

Treatment Modalities for Opioid Use Disorder

Some modern substance abuse treatment models base their methods of treatment on social learning theory, meaning that the social context of the person's use is considered in their treatment planning (Peralta, & Steele, 2010). Social influences are all considered when trying to determine the precursors of the client's substance use issues and the proper level of care for the

client (Litt, 1996). Other modalities base their methods on medical interventions, such as methadone maintenance or Suboxone maintenance (Sittambalam et al., 2014). Some modalities base their methods on emotional and educational treatment methods including individual therapy and group treatment (McGinty et al., 2015). Many treatment options are available to those who are searching for help to end their substance abuse issues.

Non-Medicated Assisted Treatments

Outpatient treatment includes substance abuse counseling, family counseling, intensive outpatient programs, partial hospitalization programs, psychoeducational groups, support groups, residential treatments including half-way houses, sober houses, and therapeutic communities. Treatment is not the same for every client. Each client must be assessed for the most appropriate level of care that will provide them the best individual outcome. This is determined based on the client's substance addiction severity, life situation, and client choice.

Intensive Outpatient

IOP programs combine individual therapy with group psychoeducation, as well as peer support (Gruber et al., 2007). Clients can attend the program anywhere from three to 12 weeks (Gruber et al., 2007). This program is encouraged for clients who have been detoxed and stabilized on any medications that they might need for those with co-occurring disorders (Gossop et al., 1986). Clients are usually advised to attend this program for 3–6 weeks, and then follow up with slightly less intensive treatment (Blackmore, 2006).

Substance Abuse Disorder Counseling

SUD counseling is an approach in which clients should participate regardless of the type of treatment they are receiving (Furst, 2013). Following detoxification, the client's brain takes a minimum of one year to even begin to start to process things in the way that a normal brain does

(Talmadge, 2010). It can take this long or longer, depending on the amount of damage that has been done to the brain (Talmadge, 2010). This is usually determined by the amount, type, and length of time the substance is used (Urschel, 2009). The client would need intensive and continual support, as well as instruction on how to cope with everyday stressors (Kaiseler et al., 2009). Not only is there a strong probability that the client does not have appropriate coping skills due to reliance on substances for so long, but they also have probably not dealt with normal, everyday life for this duration. Many relapses are due to stressors that others would consider to be normal life stressors.

Individual Counseling

Individual counseling is an approach that all clients who have an opioid use disorder or a co-occurring disorder can benefit from, and is strongly encouraged for, all in recovery. Family support and peer mentoring are other forms of treatment for those who are in newfound recovery. Those who have a support system in their personal life have a much higher chance of maintaining their sobriety long term (Lorman, 2013).

Exercise as a Part of Outpatient Treatment

In outpatient treatment, clients are usually advised to incorporate exercise as a part of their collaborative treatment program (Gold, 1993). The human brain and pituitary gland create endorphins as a result of physical activity (Maldonado, Dauge, Callebert, Villette, Fournie-Zaluski, Feger, & Roques, 1989). The word endorphin comes from Greek, and literally means, "The morphine within." (Maldonado, Dauge, Callebert, Villette, Fournie-Zaluski, Feger, & Roques, 1989). Endorphins, which belong to a family of chemical compounds called peptides, act in a similar way as opiates in the brain (Maldonado, Dauge, Callebert, Villette, Fournie-Zaluski, Feger, & Roques, 1989).

Some scientists believe that natural endorphins hold the key to effective treatment of many mental illnesses and SUDs (Maldonado, Dauge, Callebert, Villette, Fournie-Zaluski, Feger, & Roques, 1989).

There have been specific instances of those who were prisoners of war and being tortured daily, who reported not physically feeling the pain (McFarlane, 2010). It is thought that this is a type of endorphin response that the brain creates to protect the body (Maldonado, Dauge, Callebert, Villette, Fournie-Zaluski, Feger, & Roques, 1989). There is some belief that endorphins are so powerful that they can assist in natural childbirth (Maldonado, Dauge, Callebert, Villette, Fournie-Zaluski, Feger, & Roques, 1989).

Because exercise releases natural endorphins, it is recommended in any type of holistic treatment plan (Lynch et al., 2013). Releasing natural endorphins gives a natural, healthy way to help control cravings and maintain sobriety (Brown et al., 2010). Some even recommend raising endorphins as a way of detoxifying naturally from illicit substances with no comfort medications utilized (Lorman, 2013). Exercise can greatly assist a client in obtaining sobriety and needs to be utilized in conjunction with other treatments.

Religiosity/Spirituality as a Part of Outpatient Treatment

Spirituality is a large part of substance abuse counseling, intensive outpatient programs, support groups such as NA (Narcotics Anonymous) and AA (Alcoholics Anonymous), and mental health counseling (Arnold et al., 2002). The very principles of AA, the 12 steps, are based on spirituality (Arnold et al., 2002). Spirituality appears to insulate against substance abuse to a certain extent, as those who consider themselves to be religious begin using illicit substances on a less frequent basis than those who do not consider themselves to be religious (Pardini et al., 2000). In addition, those who consider themselves to be religious, but use substances anyway,

reported that social bonding with other religious people helped them to remain sober (Pardini et al., 2000). Those who were not religious or spiritual had a higher rate of illicit substance use than those who were religious or spiritual (Allen & Lo, 2010).

Giordano et al.'s (2015) study showed that religiosity has an inverse effect on the students' likelihood to drink alcohol or use marijuana. Coping skills that are obtained through the individual's spirituality appear to influence abstaining from substance abuse (Giordano et al., 2015). Religiosity does not appear to make a difference in students' use of stimulants and benzodiazepines (Giordano et al., 2015).

Mason et al. (2009) conducted a study on men between the ages of 19–74 who had treatment at the Australian Salvation Army. About 75% of the participants reported that religion helped them in their recovery (Mason et al., 2009). Seventy-eight percent of them had reported using more than one substance (Mason et al., 2009). The majority of them reported that religious coping helped them with their level of craving (Mason et al., 2009).

Mindfulness as a Part of Treatment

Scientists have been studying the mind for thousands of years, and still do not have an accurate grasp on its potential. It is commonly agreed by scientists that only a small percentage of the mind is utilized (Bowen et al., 2009). Scientists are constantly working to find ways to assess the extent of the things that the mind can do (Thompson, 2010, pp. 3–65). Mindfulness is a therapeutic technique where the individual practices focusing on the feelings and sensations of the present moment to calm the mind (Dictionary, 2016). Mindfulness can be an important part of individual and group outpatient treatment (Thompson, 2010). Teaching clients to be mindful equips them to cope with life stressors (Bowen et al., 2009). Studies have shown that using mindfulness as a relapse prevention and treatment technique has reduced clients' short term

relapse and helped those with co-occurring SUD and depression or anxiety to manage their symptoms and remain clean (Roos et al., 2017).

Mindful thinking can help individuals to cope with stress (Bowen et al., 2006). Mindfulness is taking note of one's surrounding to calm the mind, which can be done as daily stress-relieving ritual or as a calming technique (Bowen et al., 2006). Mindfulness is learning how to do away with the fight or flight mentality (Holmes, 2009, pp. 36-38). It is responding to a distressing situation instead of reacting to it (Holmes, 2009, pp. 36-38). Since all of these symptoms are part of what clients go through in recovery and SUD/co-occurring disorder treatment, patients can use mindfulness as a coping technique (Tang et al., 2016).

There are health benefits associated with mindfully dealing with stressors (Holmes, 2009, pp. 36-38). The mind can be trained to effectively cope with stress (Enkema & Bowen, 2017). In images on an MRI, the gray brain matter increased and the white matter got denser as the client utilized brainpower to overcome stress (Valkanova et al., 2014, p. 891). In Russia, scientists and doctors are helping those who have had traumatic brain injuries to heal themselves by training their minds (Mckelvey & Dornan, 2004, 1459).

Medicated Assisted Treatments

Some theorize that substance abusers have a better chance of initial detoxification with medicated assisted treatments (Bell & Strang, 2020). Others argue that those who use medicated assisted treatments are not truly sober (Johnson & Hagström, 2005). There are different types of medicated assisted treatments.

Suboxone

Suboxone is a combination of buprenorphine and naloxone, usually administered in a sublingual film (Schwartz et al., 2012). Suboxone is considered a partial opioid agonist, meaning

that it activates the opioid receptors in the brain, but to a much lesser degree than a full agonist (Wakhlu, 2009). It is a partial agonist of the mu receptor and an antagonist of the kappa receptor (Sittambalam et al., 2014, pp. 1–6). Naltrexone in Suboxone makes the client almost immediately sick if they use opiates, putting them into withdrawals which include nausea, headache, sweating, vomiting, dizziness, aching limbs, and extreme irritability (Wakhlu, 2009). This makes Suboxone ideal to assist in withdrawal avoidance and as a deterrent to illicit opioids used properly.

Buprenorphine in Suboxone keep the client from having cravings and withdrawals if administered properly (Wakhlu, 2009). This effect keeps the client from feeling sick from the effects of opiate withdrawals (Finch et al., 2007). It is an alternative to methadone and is usually available as a take-home product, though with frequent office visits (Finch et al., 2007). This medication is not as strong as methadone and is thought to be safer (Finch et al., 2007). It does not have severe side effects for those without an allergy to buprenorphine or naltrexone (Walsh et al., 1995).

Despite its use as a deterrent, Suboxone does have the potential for abuse. In Furst's (2013) study, 14 Suboxone patients admitted to chronically using MAT on again off, while using opiates in between. They admitted to using MAT cognizantly for their substance abuse habit (Fusrt, 2013, pp. 53–67). This study appears to confirm that some clients abuse the MAT. Clients have also admitted to selling their prescription Suboxone for profit, instead of taking them as prescribed. Other disadvantages with Suboxone treatment include the DPH only providing waivers to doctors to prescribe to a limited number of patients (McLean & Kavanaugh, 2019), doctors not receiving proper training on how to educate the patients and how to properly treat a patient with Suboxone, and illicit drug dealers of prescription medications not being focused on

as much by police, as they are focused on more traditional illicit substance distribution (Kennedy-Hendricks et al., 2016).

Subutex

Subutex is buprenorphine without naltrexone (Simojoki et al., 2008, p. 16). It does not kick the opiates off of the receptors; therefore, it does not cause sickness and withdrawals if the client uses illicit opiates. Subutex is a partial agonist only (Smith et al., 2007). It is sometimes given to pregnant women as a heroin replacement (Meyer et al., 2015). In 2003, one-hundred inpatient patients in drug treatment facilities received Subutex to aid in their detoxification (Wallen et al., 2006). Ninety percent of them reported equal to or better than detox that they had had in the past with other forms of medicated assisted treatments (Wallen et al., 2006). From this overwhelming percentage, it can be concluded that Subutex aids in withdrawal symptoms from opioids. Subutex is not always a good choice for clients because they get medications that they can take home with them, and many clients end up selling their prescriptions while continuing to use substances illicitly (Smith et al., 2007).

Vivitrol

Vivitrol is a monthly injection that is administered to patients who abuse opiates or alcohol (Syed & Keating, 2013). Vivitrol is an antagonist, meaning that it blocks the opioid receptors (Syed & Keating, 2013). The effects of Vivitrol last for four weeks (Syed & Keating, 2013). If a client uses alcohol or opiates while Vivitrol is in their system, they become violently ill with vomiting as it gives immediate withdrawal symptoms (Krupitsky & Blokhina, 2010). Vivitrol takes away the opportunity to use substances impulsively. A drawback of Vivitrol is that sometimes an addict will attempt to break through the effects of the Vivitrol and will essentially take so many opiates that they overdose (Syed & Keating, 2013).

Antabuse

Antabuse works in the same manner as Vivitrol but is effective for alcohol use only (O'Farrell et al., 1995). It induces very unpleasant symptoms, including nausea, vomiting, headache, sweating, confusion, and loose bowels, if the client drinks alcohol (Cvek, 2012). The drawback to Antabuse is that the patient can choose not to take it if they have the desire to drink that day. This allows the patient to be impulsive and drink on a day that they have not taken the medication.

Campral/Baclofen

Campral is another medication that is used for the treatment of alcoholism (Elchisak, 2001). It is meant to help reduce the cravings for alcohol but does not make the patient ill if alcohol is ingested (Spanagel et al., 2013). Baclofen works in the same manner as Campral but is used to help control cravings for cocaine (Shoptaw et al., 2003). A drawback to both of these medications is that the client can decide not to take it day to day if they want to use alcohol or cocaine that day.

Narcan

Narcan (naloxone) is also available at many facilities for free. Narcan is a medication that is sprayed into the nasal cavity to bring someone back from an overdose (Li et al., 2018). Narcan works by expelling the opioids from their receptors, thus putting the client into immediate opiate withdrawals (Li et al., 2018). Usually, the client does not wake up pleasantly and can become violent or very agitated immediately. A drawback is that the effects of Narcan only last from 20 to 60 minutes, so the client must be brought to the emergency room for follow-up treatment or they could fall back into their overdosed state (Cools et al., 2011).

Methadone

Methadone is a manufactured opiate that was originally intended for use with pain sufferers (Fischer et al., 2005). It then began being used for opiate addicts to potentially help them to wean off opiates comfortably over time (Fischer et al., 2005). In the 1970s, it re-emerged as a pain therapy (Chary, 2018). It was created in the 1950s synthetically (Chary, 2018). and began being used to treat opioid addiction in the 1980s (White, 1998).

Methadone is a full agonist, meaning that it activates the opioid receptors in the brain, giving the full-opioid effect (Mattick et al., 2009). Other full agonists include heroin, oxycodone, morpheme, and opium (Joseph et al., 2000). When using MMT, the dose administered to the client is reduced gradually, usually about 5 mg per week but this can vary from a clinic to another. Although many have been able to titrate off MMT in the six-month time frame, many are unable to obtain success over such a short amount of time (Gossop et al., 2001). Many patients report that the period that it took for them to slowly come down on their methadone dose was longer than they had initially planned (Stancliff et al., 2002). For clients who are prescribed up to 250 mg comfortable weaning off the process can take a very long time.

An advantage of methadone maintenance is that it is safer to treat pregnant women. When pregnant women have been using illicit opioids, it is safer to begin methadone maintenance than it is to detox her. The fetus is likely not able to tolerate the physical withdrawal symptoms that they will experience as a result of its inevitable addiction (Jones et al., 2007). Methadone doses are brought up consistently to pregnant women whenever withdrawal symptoms became apparent (Drozdick et al., 2002). By the end of the pregnancy, most women are dosed in the 150–180 mg daily dose to avoid withdrawal for the baby (Drozdick et al., 2002).

Methadone maintenance can help those who have a serious opioid addiction to remain safe if they are unable to stop using illicit opioids on their own for whatever reason. Higgins

blindly dosed 39 participants with methadone maintenance beginning at 30 milligrams. Half of the participants were given gradual reductions in their dose and half were not reduced, all unknowingly (Higgins et al., 1986). The half who were maintained at the original dose remained clean from opiates, determined by routine toxicity screens, but the group who had reductions all had illicit substances in their toxicity screens (Higgins et al., 1986). This could imply that methadone is a safer replacement, and therefore, is an effective deterrent to opioid abuse. In Paulus and Halliday's (1967) study, of one-hundred seventy-six patients were contacted after one year, 43% reported that they felt more confident in their ability to remain sober following treatment.

There have been some studies that have suggested that a client who is over the age of 30 with some type of familial support have a much higher chance of being successful on MMT (Stimmel & Kreek, 2000). Seventy-two percent of a 370-patient study in this category were able to maintain their sobriety past one year (Torrens et al., 1996). These clients were specifically described as residing with family or a significant other and were also abstaining from alcohol (Torrens et al., 1996).

A disadvantage of methadone maintenance is impaired driving. Some studies report that methadone maintenance causes this (Bernard et al., 2009). They followed those who were charged with driving violations who were found to have methadone on their blood (Bernard et al., 2009). It was then ascertained if the subjects were on methadone maintenance or if they were using street methadone (Bernard et al., 2009). These findings were collected between 2002 and 2006. Of the 635 drivers who were cited for driving under the influence, 502 were on methadone maintenance (Bernard et al., 2009). This can indicate that many are receiving a dose of methadone that is too great for their metabolism.

Another disadvantage can be health issues. There are side effects of prolonged methadone consumption. Some of these side effects include weight gain, headaches, nausea, exhaustion, tooth decay, methadone poisoning (which causes death), brain damage, osteoporosis, cognitive impairment, a continuation of drug dependency, reduction in heart functioning, organ deterioration, and low oxygen levels which cause a blue tint to the lips and fingernails (Ball & Ross, 2012; Benyamin et al., 2008; Kreek, 1973). Some of these effects can begin immediately, and some occur over time (Benyamin et al., 2008). Methadone can impact heart function: It prohibits the cardiac potassium channel HERG (a protein that helps to regulate heartbeat) and can cause prolonged QT interval, meaning the heart takes too long to recharge in between beats (Eap et al., 2007, 719–728). Three types of methadone are R-methadone, S-methadone, and RS-methadone. R-methadone appears to have a lesser effect on QT intervals (Eap et al., 2007, 719–728).

If the client gets incarcerated while on methadone maintenance, in many states they are not given their methadone doses, so they are forced to violently and painfully withdraw from the synthetic opioid (Rich et al., 2015). Another drawback of MMT is that the clients are chained to their location. They have to report to the clinic every morning for their dose. They are unable to go on vacation or make plans that take up their whole day, or even go away overnight. Going to the clinic daily can interfere with holidays, jobs, and can be a problem if the individual is sick. There are cases when clients can be prescribed a small amount of take-home methadone or be set up with guest dosing at another clinic, but this is not always granted as a client convenience.

Dental issues can be another drawback. Some types of methadone are made without sugar to try to reduce the risk of tooth decay (Dasanayake et al., 2010). Methadone is a medication that, even though most clinics use the sugar-free version, still promotes tooth decay in many

cases (Nathwani & Gallagher, 2008). Clients who are on methadone long-term run the risk of severe dental issues and tooth loss (Nathwani & Gallagher, 2008).

A drop in cognitive function can be another drawback to treatment. Prosser et al. (2006) sought to find out whether cognition levels dropped during and after MMT. They studied 29 former heroin addicts who were currently receiving MMT, 27 who were done with MMT, and 29 who had no history of drug dependence (Prosser et al., 2006). Participants who were in long-term MMT exhibited loss of cognitive functioning, while the loss of cognitive functioning of those who were on MMT was less (Prosser et al., 2006). The third group not using MMT exhibited no significant cognitive loss (Prosser et al., 2006).

Co-Occurring Disorders

Many who have opioid use disorder also have a mental health disorder. When this happens, it is called a co-occurring disorder or comorbidity (Minkoff, 2001). It is estimated that 17.5 million, or 8% of the population in the United States, have co-occurring disorders (Ogloff et al., 2015). Of this 8 only, 3% are estimated to receive treatment for both their SUD and their mental health disorder (Watkins et al., 2001). Clients who have a co-occurring disorder would face challenges, not only with having to overcome their substance use issues but dealing with their mental health issues as well. It can be a cyclical problem, as they often use illicit substances to address their mental health issues, which exacerbate their mental health issues, and the cycle continues.

When a client has a mental health disorder, it is important to treat mental health issues if the client is to remain clean and sober. Some ways to know if the client has a mental health disorder while not diagnosing them amid their addiction is to delve into their history. Often, the client has a history of psychiatric treatment and has received a diagnosis in the past, which can

indicate the presence of a mental health issue (Sacks et al., 2013). If the client's mental health symptoms were present before their addiction, a mental health issue can be indicated. If the client can recall experiencing specific symptoms in their childhood that are consistent with current mental health symptoms that indicate a particular disorder, a mental health diagnosis may be given (Swendsen et al., 2010).

There are many different diagnosable mental health disorders in the DSM 5. Some appear to have a stronger connection to a substance use disorder than others (Swendsen et al., 2010). Some of these disorders are major depressive disorder, generalized anxiety, panic disorder, bipolar 1 and 2 disorder, attention deficit hyperactivity disorder, schizoaffective disorder and schizophrenia, and post-traumatic stress disorder (PTSD) (Swendsen et al., 2010). There are also a few personality disorders that appear to have a strong connection to SUDs (Verheul, 2001). These include borderline personality disorder, antisocial personality disorder, histrionic personality disorder, narcissistic personality disorder, paranoid personality disorder, schizoid personality disorder, and schizotypal personality disorder (Verheul, 2001).

Major Depressive Disorder

Eighteen percent of clients who are diagnosed with major depression will have a history of a co-occurring substance abuse problem (de Graaf et al., 2002). Symptoms of depression include: depressed mood, diminished interest or pleasure, significant appetite or weight change, insomnia, diminished ability to think/concentrate, irritability, lack of motivation, indecisiveness, hypersomnia, psychomotor agitation, psychomotor retardation, social isolation, crying spells, psychotic symptoms, fatigue or loss of energy, feelings of worthlessness, excessive guilt, recurrent thoughts of death, decreased motivation, change in libido, feelings of hopelessness, feelings of helplessness (APA, 2013).

Generalized Anxiety Disorder

Fifty-nine percent of clients diagnosed with anxiety have a history of a co-occurring substance abuse disorder (de Graaf et al., 2002). Symptoms of anxiety include excessive and difficult to control anxiety and worry, restlessness, difficulty concentrating, or mind going blank, irritability, muscle tension, sleep disturbance, easily fatigued (APA, 2013).

Panic Disorder

Twenty percent of those diagnosed with panic disorder will have a history of a co-occurring SUD (de Graaf et al., 2002). Symptoms of panic include sweating, palpitation, pounding, accelerated heart rate, trembling or shaking, shortness of breath, feeling of choking, chest pain or discomfort, nausea, feeling dizzy, unsteady, and lightheaded, feeling of derealization, fear of losing control or going crazy, fear of dying, worry about consequences of attacks, chills or hot flushes, numbing or tingling sensations, feelings of unreality or being detached from oneself, persistent concern over additional attacks, maladaptive change in behavior related to attacks (APA, 2013).

Bipolar 1 and 2 Disorder

Thirty to 50% of those diagnosed with bipolar disorder will have a history of a substance abuse disorder (Substance Abuse and Mental Health Services Administration, 2016). Symptoms of mania include elevated mood with abnormally increased activity/energy, irritable mood with abnormally increased activity/energy, decreased need for sleep, talkative or pressured speech, racing thoughts, flight of ideas, distractibility, increase in goal-directed activity, inflated self-esteem or grandiosity, psychomotor agitation, excessive pleasurable activities with painful consequences, psychotic symptoms, depressed mood, diminished interest or pleasure, significant appetite or weight change, insomnia, diminished ability to think/concentrate, irritability, lack of

motivation, indecisiveness, hypersomnia, psychomotor agitation, psychomotor retardation, social isolation, crying spells, psychotic symptoms, fatigue or loss of energy, feelings of worthlessness, excessive guilt, recurrent thoughts of death, decreased motivation, change in libido, feelings of hopelessness, and feelings of helplessness (APA, 2013).

Schizoaffective Disorder

As many as half of clients who are diagnosed with schizoaffective disorder will be diagnosed with a co-occurring SUD (Dixon et al., 1991). Symptoms of schizoaffective disorder include delusions, hallucinations, disorganized speech, grossly disorganized behavior, catatonic, loss of interest, loss of pleasure, poverty of speech, poverty of thought, flattened affect, poor hygiene, social isolation with the following concurrent symptoms of an episode of a major mood disorder: depressed mood, diminished interest or pleasure, significant weight change, insomnia, hypersomnia, psychomotor agitation or retardation, fatigue or loss of energy, diminished ability to think or concentrate, indecisiveness, recurrent thoughts of death, feelings of worthlessness or excessive guilt, inflated self-esteem or grandiosity, decreased need for sleep, talkative or pressured speech, flight of ideas or racing thoughts, distractibility, increased goal-directed activity or psychomotor agitation, and excessive pleasurable activities with painful consequences (APA, 2013).

Schizophrenia

As many as half of those diagnosed with schizophrenia will have a history of a substance abuse disorder (Dixon et al., 1991). Symptoms of Schizophrenia include delusions, hallucinations, disorganized speech, grossly disorganized behavior, catatonic, loss of interest,

loss of pleasure, poverty of speech, poverty of thought, flattened affect, poor hygiene, social isolation (APA, 2013).

Attention Deficit Hyperactivity Disorder (ADHD)

Twenty-five percent of those diagnosed with SUD will also be diagnosed with ADHD (Slobodin, & Crunelle, 2019). Symptoms of ADHD include inattention to details, careless mistakes in work, difficulty sustaining attention in tasks or play, does not seem to listen, difficulty organizing tasks, avoids tasks requiring sustained mental effort, does not follow through on instructions, and fails to finish tasks, loses things necessary to tasks, easily distracted by extraneous stimuli, forgetful in daily activities, fidgets or squirms, leaves seat in classroom, runs about or climbs excessively when not appropriate, difficulty playing quietly, on the go, talks excessively, blurts out answers, difficulty waiting for turn, and interrupts or intrudes on others (APA, 2013).

Post-Traumatic Stress Disorder (PTSD)

Those who are diagnosed with PTSD are two to four times more likely to be diagnosed with a co-occurring SUD than those who are not diagnosed with PTSD (McCauley et al., 2012). Symptoms of PTSD include exposure to actual or threatened death, serious injury, or sexual violence in one or more of the following ways: directly experienced traumatic event, personally witnessed the event(s) occurring to others, learning a traumatic event occurred to close family or friend, repeated or extreme exposure to aversive details of traumatic event intrusive distressing recollections, repetitive play with traumatic themes expressed, distressing dreams related to traumatic event, frightening dreams may have not recognizable content, acts or feels as if event were recurring, trauma specific reenactment may occur in play, intense distress at exposure to cues, physiological reactivity to cues, difficulty falling asleep, difficulty staying asleep,

irritability and angry outbursts, difficulty concentrating, hypervigilance, exaggerated startle response, reckless or self-destructive behavior, avoids activities, places and people that remind of event, inability to remember aspects of traumatic event, persistent exaggerated negative beliefs about self, persistent distortions about cause of event leading to self-blame, persistent negative emotional state (fear, horror, anger, etc), diminished interest or participation in activities, detachment or estrangement from others, and inability to experience positive emotion (APA, 2013).

Personality Disorders

Personality disorders are characterized by a pervasive pattern of behaviors and maladaptive ways of relating to others and reacting to social cues (Shedler et al., 2010). These factors are maladaptive to the point of impeding life functioning and interpersonal functioning (Shedler et al., 2010). These disorders are thought to be caused by genetic and/or environmental factors (Shedler et al., 2010). Symptoms can be managed or alleviated over time with proper treatment, and insight on behalf of the client (Bateman et al., 2015). Treatments normally include psychotherapies and group therapies (Bateman et al., 2015) Personality disorders are grouped into clusters (Bateman et al., 2015). Cluster A includes disorders characterized as odd or eccentric (Bateman et al., 2015). Cluster B includes disorders characterized by extreme emotionality or erratic behavior (Bateman et al., 2015). Cluster C is characterized by appearing anxious or fearful (Bateman et al., 2015).

All personality disorder diagnosis requires the following: persistent maladaptive characteristics with two or more of the following: maladaptive cognition, affectivity, interpersonal functioning, and impulse control; significant distress or impaired functioning, and early onset adolescence or early adulthood (Zimmerman, 1994). Nine and one-third of the

population suffer from a personality disorder (Verheul, 2001). Some personality disorders are more commonly associated with SUDs.

Antisocial Personality Disorder

A very high rate of those who are diagnosed with an antisocial personality disorder will have a co-occurring SUD with an estimated percentage rate of co-occurrence at over 23% (Trull et al., 2010). Antisocial personality disorder is characterized by social irresponsibility, disregard for others' feelings or well-being, deceitfulness, and manipulative behaviors (APA, 2013). This personality disorder is usually revealed in the teenage years and follows the individual into the individual's adulthood (Myers et al., 1998).

Borderline Personality Disorder

Borderline personality disorder is highly comorbid with diagnosed SUDs, with an estimated percentage rate of 58.7% (Trull et al., 2010) (Sansone & Sansone, 2011). BPD symptoms include frantic efforts to avoid real or imagined abandonment, pattern of unstable or intense relationships, unstable self-image, and impulsivity in at least two potentially damaging areas (APA, 2013). It also includes recurrent suicidal or self-mutilating behaviors, affective instability and excessively reactive mood, chronic feelings of emptiness, transient and stress-related paranoia, and severe dissociative symptoms (APA, 2013).

Schizoid Personality Disorder

Just over 11% of those diagnosed with schizoid personality disorder will be dually diagnosed with a substance abuse disorder (Trull et al., 2010). This personality disorder is characterized by a lack of desire in close relationships with others, organizing one's life to avoid having to interact with other people, and preferring to be alone (APA, 2013). It might also

include enjoying few activities, not desiring sex, inability to relate to others, feeling indifferent to criticism or compliments, acting aloof, and showing little emotion (APA, 2013).

Schizotypal Personality Disorder

Over 16% of those who have schizotypal personality disorder also have been diagnosed with a substance use disorder (Trull et al., 2010). Schizotypal personality disorder is characterized by strange thinking patterns, odd behaviors, lack of emotion, absence of emotional responses to cues, odd speech, rambling speech, lack of close friends, socially anxious, and paranoid thinking (APA, 2013). The odds of an individual being diagnosed with schizoid personality disorder are between one and two percent (Trull et al., 2010).

Dependent Personality Disorder

Approximately 27.34% of those diagnosed with dependent personality disorder will also be diagnosed with a substance abuse problem (Trull et al., 2010). Dependent personality disorder is characterized by an inability to be independent. The individual depends on another person to fulfill all of his or her needs. Those with dependent personality disorder will have difficulty making everyday decisions without excessive reassurance from others, a need for others to assume responsibility for all major areas of his or her life, difficulty expressing disagreement for fear of not being liked, going to excessive lengths to obtain support, feeling of fear when alone due to the feeling that they cannot care for self, and seeking a new relationship desperately when a relationship ends (APA, 2013).

Paranoid personality disorder

Over 13% of those who have been diagnosed with paranoid personality disorder will also be diagnosed with a substance use disorder (Trull et al., 2010). This disorder is characterized by feeling as though others are out to get the individual for no apparent reason, and hypersensitive

to criticism (APA, 2013). The client might also be angry and hostile, short-tempered, argumentative, defensive, may appear to be eccentric, distrusting of others, even family members (APA, 2013).

Narcissistic personality disorder

Almost 12% of those diagnosed with narcissistic personality disorder will also be diagnosed with a substance use disorder (Trull et al., 2010). This disorder is characterized by emotional dysregulation, fragile self-esteem, and grandiosity (APA, 2013). These individuals might also have an inflated sense of importance, lack of empathy, need admiration from others, and have troubled relationships (APA, 2013).

Histrionic Personality Disorder

Almost 18% of those diagnosed with histrionic personality disorder will also have a co-occurring substance abuse disorder (Trull et al., 2010). This disorder is characterized by dramatic and attention-seeking behaviors (APA, 2013). Those who are histrionic need to be noticed and be dramatic or inappropriate things to get attention. They might have a distorted self-image and might manipulate to gain approval (APA, 2013).

It can be difficult when diagnosing a client to know if a substance abuse problem is causing the mental health issue, or if it is a symptom of a mental health issue (Minkoff, 2001). For this reason, it is always best practice to not diagnose a client with a mental illness until they have been clean and sober for a minimum of six months (APA, 2013). This can prove to be difficult because the client, if they are self-medicating, will likely have difficulty maintaining sobriety for six months if they are not medicated for their mental health. It is a difficulty that causes many individuals to become caught in the cycle of addiction.

Treatment for Those with Co-Occurring Disorders

Some who suffer from substance addiction also have a mental health diagnosis. Co-occurring disorder is a term for those who suffer from substance addiction and a mental health disorder. Some may require treatment with psychotropic medications to treat their mental health issues to remain sober, or else they may continue to self-medicate with illicit substances (Oldani, 2014). For those with a co-occurring disorder, the initial treatment can be very similar depending on the severity and nature of their mental health condition (Hegel, 1932).

If the client is already being treated for mental health issues and has an outpatient prescriber, their initial treatment is mostly the same as those without a co-occurring disorder (Drake et al., 2004). They need to be detoxed from the illicit substance while still being administered their mental health medication (Beaini et al., 2000). Clients who are not being treated for their mental health issues need what is called dual diagnosis treatment (McGinty et al., 2015). Dual diagnosis inpatient treatment consists of the client receiving medical detoxification from the addictive substance, while receiving mental health counseling and medication management from a psychiatric prescriber (Drake et al., 2004). Evidence has shown that co-occurring disorder should be treated simultaneously and that treating substance addiction only puts the client at risk for relapse (McKee, 2017). Despite this, accurate diagnosis of mental health disorders cannot take place until the client has been clean and sober for a minimum of six months unless they have been previously diagnosed. Substance abuse and withdrawal symptoms can induce depression and anxiety (Quello et al., 2005). These factors make accurate diagnosing and treatment complex for those with a co-occurring disorder (Quello et al., 2005). For these reasons, the client needs to maintain follow up treatment to assess their medication needs. Some clients may not need to treat mental health symptoms after their substance abuse issues are under control, and some may need to continue treating their mental health symptoms in order to remain

sober. Following this treatment, the client will follow the same treatment plan as a client who has a substance use disorder, but with the help of medication management and individual therapy by an outpatient therapist and a psychiatrist (Corrigan et al., 2009).

Many do not wish to address their mental health issues, either due to denial that they have an issue, embarrassment, or lack of motivation, as this type of treatment requires much follow up and consistency (Rohsenow et al., 2004). Those with a substance use disorder normally focus on the daily habit of obtaining and using substances. Therefore, consistency with many of the responsibilities of follow-up care is often not a priority (Andersson, Wenaas, & Nordfjærn, 2019). They might also be reluctant to seek mental health treatment due to the stigma placed upon those with a mental health disorder (Rohsenow et al., 2004). This is a portion of the reason why many begin using substances initially. It can be difficult to admit there is an emotional issue that needs treatment, so many self-medicate and become addicted before they can realize that it is happening (Barry et al., 2014).

Those with co-occurring disorders will need additional treatment along with substance abused treatment (Horsfall et al., 2009). If clients only treat the substance abuse issue and not the mental health problems, it is more likely that they will relapse. For the client to become truly healthy a well-rounded approach must be taken (Horsfall et al., 2009). This study will seek to study the effectiveness of MMT for those with and without co-occurring disorders to assess how effective MMT is for those with a substance abuse problem only, and for those with a co-occurring disorder.

Summary

There are different reasons that people become substance abusers. Some appear to be genetic and some appear to be environmental (Swendsen et al., 2009). There are times when the

issue appears to be connected to childhood or adulthood trauma which can change the brain synapsis makeup (Friedman et al., 1993). Sometimes it seems that there is no precursor at all, but this is not usually the case. It appears that substance addiction is often co-occurring with mental health disorders (Garland, Pettus-Davis, & Howard, 2013). This seems to imply that one causes the other; therefore, both need to be treated for the client to obtain a healthy mind and body.

Neurochemical addiction happens when the individual develops a dependence on a substance (Herz & Shippenberg, 2012). The pleasure pathways are activated, and the client finds it increasingly difficult to resist the urge to use the substance (Herz & Shippenberg, 2012). The client gets physically ill if they do not consistently have the substance as the body now expects it. This can happen with opioids, benzodiazepines, and alcohol.

Physiologically, the allure of using illicit substances is the way that it makes the user feel. Euphoria is a common effect, as is an increase in dopamine and serotonin (Herz & Shippenberg, 2012). Opiates numb emotions and cause the user to experience a "high" feeling when used in excess. Physical pain is also negated with opioid use (Bond et al., 1998). Physical addiction comes quickly with regular opiate use (Herz & Shippenberg, 2012).

Theories of why individuals become addicted to substances vary. Sometimes there are numerous reasons for one's addiction issues. One theory is social learning theory which indicates such things as growing up around substance users in the family or in the neighborhood (Akers et al., 1989). This theory can also have to do with the individual's peers and what they choose to spend their time doing (Peralta & Steele, 2010). Observing addictive behaviors can elicit the same behaviors in the individual.

Another theory of addiction is that it is genetic. This theory deduces that addiction is a genetic disorder that is passed down from generation to generation and predisposes individuals to addictive tendencies (NIDA, 2019). Exposure theory indicates that individuals who are unwittingly exposed to illicit substances become physically addicted due to being exposed (jointcomission.org). This theory implies that individuals such as substance-exposed newborns are much more likely to become addicted to substances later in life.

Social control theory suggests that there is an array of outside influences that affect an individual's chances of success in obtaining and maintaining sobriety (NIDA, 2019). Some of these influences include family, friends, employment, and education. This theory contends that those who have strong outside supports and protective factors have a greater chance of success (NIDA, 2019).

Harm reduction theory contends that assisting substance users to use in a safe environment while not forcing them to stop their behaviors reduces illness and death by overdose and disease (Wermeling, 2010). Clients might be given clean needles or bleaching kits for their needles. Clients might also be given medications that satiate their opioid addiction but are administered daily by professionals who monitor the clients closely for safety and compliance.

There are many options for addiction treatment. Some of these include medicated treatments like Suboxone, methadone, and Vivitrol (Bell & Strang, 2020). Some treatments are not medication-related, like therapy and group attendance (Furst, 2013). Many clients who have a substance addiction problem also have a mental health issue (Minkoff, 2001). For substance use treatment to be effective for someone with comorbidity their mental health issues must be treated (Sacks et al., 2013). This usually consists of individual therapy and possibly medication management. Some other types of non-medicated treatment usually employed with substance

abusers include CBT, motivational interviewing, relapse prevention, and contingency management (Jhanjee, 2014). Other treatment modalities include therapeutic communities, residential treatment, and support groups, including Alcoholics Anonymous and Narcotics Anonymous (Jhanjee, 2014).

It can be difficult to determine if a substance use disorder is caused by a mental health disorder or if the opposite is true (Minkoff, 2001). Those with a co-occurring disorder require a more diversified treatment approach that addresses SUD along with the mental health issue (Watkins et al., 2001). If one is treated without the other the chances of success are not as promising.

After much investigation, the research appears to show a lack of information on how MMT impacts non-recidivism in treatment. When an individual with an addiction problem chooses to obtain MMT as their treatment method, it is unknown if this method truly affects the client's long-term sobriety, or if the client has a high likelihood of relapse, compared to other forms of treatment. This also appears to be the case for non-methadone treatments. While studies have been completed on the effectiveness of treatments in stopping illicit substance use, they normally do not follow through with the client to assess their quality of life and ability to remain sober.

When researching MMT many consistencies emerge. Some of these consistencies are that MMT has shown to reduce harm from those who had risky opioid use behaviors, such as needle sharing and selling sex for substances. The focus of most research has been on getting clients off the street and away from risky behaviors initially. Monitored MMT doses also ensure that there is no danger of overdose if the client does not continue to use illicitly in addition to MMT. Another consistency is that MMT allows treatment providers to monitor clients closely and

consistently. For clients with co-occurring disorders, their mental health treatment can be monitored as well as their mental status. It can also keep the clients accountable for their mental health treatment regimen.

What the research on MMT has not shown is how effective it is to help the clients obtain their sobriety long term. It also has not shown if it is more effective than other kinds of outpatient substance use treatment. Research has also not shown if MMT treatment is any difference in effectiveness for clients with a co-occurring disorder as opposed to those without. The research has grouped all the clients and has not considered that there might be a difference in effectiveness between those with a co-occurring disorder and those without.

It has not been shown if MMT is the best treatment choice for those with co-occurring disorders, if they are more likely to be consistent with treatment, or if they are more likely to maintain their sobriety long term, or if another treatment is more effective. Most studies also do not show the rate of recidivism in treatment within one year. The research shows that there is a good rate of clients stopping the illicit use initially, but if the client relapses and is in and out of treatment repeatedly, showing an ineffectiveness in the treatment, has not been shown. This is true for those with and without co-occurring disorders.

The reason this writer chose to compare methadone treatment to all other treatments is due to the sheer number of clients that are treated with methadone maintenance as opposed to other forms of treatment. It must be determined if this is the best treatment method for clients to get better permanently. This is a neglected area of study, especially for those with co-occurring disorders. This writer chose to approach this research based on Maslow's hierarchy of needs. This is because the purpose of any type of treatment is to help the clients to obtain their basic needs so they can live a happy life. As the clients are stable in their basic needs, they can move

onto less basic needs and accomplish becoming productive members of society and fulfilled human beings.

CHAPTER THREE: METHOD

Overview

This research involved archival data analysis using data collected from a mental health and addiction treatment center in Massachusetts to determine under what conditions outpatient opioid addiction treatment are most effective. Information collected pertains to the client's diagnosis, treatment modality, length of time in treatment, gender, race/ethnicity, age, and reason for discharge from treatment. This facility provides treatment services including MMT, Suboxone treatment, Vivitrol treatment, individual counseling, psychiatry, psychoeducational groups, intensive outpatient, inpatient detoxification, inpatient dual diagnosis services, and health care services, all directed toward those with substance abuse issues and co-occurring disorders. This data was used to determine under which circumstances different treatment modalities provide better than expected treatment outcomes. Having a large data source from which to draw can impact treatment by analyzing patterns in the effectiveness of different kinds of treatment modalities. This can help providers to adjust treatments to more effective methods to help clients to achieve long-term sobriety. The detailed data collection and analysis process is described in this chapter.

Design

Statistical analysis allows researchers to predict future outcomes of a large population by analyzing a sample of data from a smaller population (Johnson & Wichern, 2002). This is important in making decisions about future treatment methods. For this study, a quantitative, categorical research design using archival data was utilized. A type of analysis called a classification tree analysis, or decision tree analysis, was used to determine whether the desired target is being reached. A classification tree can help to depict how variables can affect an

outcome (Song & Ying, 2015). In this study, the tree would allow analysis of how different addiction and mental health treatments affect client success in staying clean from opioids long term. This type of analysis is often used for program evaluation (Taxman & Kitsantas, 2009). This use is consistent with this study due to all the data coming from a sole treatment facility. These types of studies have been completed in similar programs such as jails and in public health settings. Stalans et al. (2004) analyzed recidivism in incarceration with violent offenders who were on probation following release from prison. They used the classification tree analysis model to depict variables that affected the prisoners' outcomes. Lemon et al. (2003) analyzed the effectiveness of classification tree analysis in public health programs and programs servicing at-risk populations. They concluded that CTA was able to efficiently classify the population into "meaningful subgroups" (Lemon et al., 2003). It found that CTA was a helpful research tool (Lemon et al., 2003). They also cited examples of CTA studies used in the public health center assessing the effectiveness of treatments for those who received caesarian sections, influenza treatment, and treatment for obesity (Lemon et al., 2003).

A categorical study is appropriate because this study examines the characteristics of each category that contribute to success in sobriety. This is one way to conduct research when there is no experiment happening (archival data sets). It is used to ascertain the conditions under which certain treatments are most successful by comparing the expected success rate to the actual success rate. This type of study allows for no manipulation of treatment factors. It is often used in studies that include psychological factors (Thompson, 2010).

Treatment success was measured in the completion of treatment. Completion of treatment was defined as those who remain in treatment without relapse for 1 year following initially obtaining sobriety and enrolling in treatment or those who were weaned off treatment properly in

accordance with their treatment plan. Unsuccessful treatment was measured by those who relapsed, died, or left treatment due to other factors, such as administrative discharge (being removed from the program), having positive urine drug screens, or incarceration.

Research Questions

The overarching research question is: Under what conditions are outpatient opioid addiction treatment most successful?

RQ1: Is there a statistically significant difference between expected and actual success rates in those with opioid use disorder when treated with MMT?

RQ2: Is there a statistically significant difference between expected and actual success rate in those with opioid use disorder when treated with Suboxone?

RQ3: Is there a statistically significant difference between expected and actual success rates in those with opioid use disorder when treated with Vivitrol?

RQ4: Is there a statistically significant difference between the expected and actual success rates in those with opioid use disorder when treated with individual counseling?

RQ5: Is there a statistically significant difference between expected and actual success rates in those with opioid use disorder when treated with group counseling?

RQ6: Is there a statistically significant difference between the expected and actual success rates in those with opioid use disorder when treated with IOP?

RQ7: Is there a statistically significant difference between expected and actual success rates in those with opioid use disorder when treated with psychiatry?

RQ8: Is there a statistically significant difference between expected and actual success rates in those with opioid use disorder when treated with family intervention?

Hypothesis

$H_0$1: There will not be a statistically significant difference between the average (overall sample) success rate and actual success rates in those with opioid use disorder or a co-occurring disorder when treated with MMT.

$H_0$2: There will not be a statistically significant difference between the average overall sample success rate and actual success rates in those with opioid use disorder or a co-occurring disorder when treated with Suboxone.

$H_0$3: There will not be a statistically significant difference between the average overall sample success rate and actual success rates in those with opioid use disorder or a co-occurring disorder when treated with Vivitrol.

$H_0$4: There will not be a statistically significant difference between the expected overall sample success rate and actual success rates in those with opioid use disorder or a co-occurring disorder when treated with individual counseling.

$H_0$5: There will not be a statistically significant difference between the expected overall sample success rate and actual success rates in those with opioid use disorder or a co-occurring disorder when treated with group counseling.

$H_0$6: There will not be a statistically significant difference between the average sample success rate and actual success rates in those with opioid use disorder or a co-occurring disorder when treated with IOP.

$H_0$7: There will be a statistically significant difference between expected and actual success rates (long-term sobriety) in those with opioid use disorders when treated with psychiatry.

$H_0$8: There will be a statistically significant difference between expected and actual success rates (long-term sobriety) in those with opioid use disorders and co-occurring disorders when treated with family intervention.

Participants

The location of the treatment facility, providing the data of this study, is in a city that is characterized by blue-collar workers, high rates of lower-income families, and higher than normal rates of individuals who abuse heroin. According to facility records the clients serviced at this facility are primarily from Massachusetts and Rhode Island. The clientele of this facility range in age from 18 to 80, with most being between the ages of 22–45, according to the records. The area where the data was collected has suffered many deaths due to the opioid epidemic. In 2016 65 people died from opioids overdosed in this area (Centers for Disease Control and Prevention [CDC], 2017). This is triple the amount that of deaths due to opioid overdose in 2012 (CDC, 2017). As the city's populace is approximately 88,000 residents, this means that one out of every 1,354 died from an opioid overdose, which is more than five people per month.

The participants of this study were opioid users randomly drawn from a convenience sample of archival data, gathered from the treatment facility, by a computer-generated draw. The data was drawn from clients who began treatment in, or prior to, July 2016, and were followed until a year from the beginning of individual treatment episodes. Unsuccessful clients are those who have dropped out of treatment prior to one year, without transferring to another program or completing a medication taper consistent with their treatment plan. Successful treatment includes clients who have remained in treatment for one year without relapsing, those who have transferred to another treatment program, or those who have tapered off their medication in compliance with their treatment plan. The data gathered included treatment modality, age,

race/ethnicity, gender, diagnoses (SUD and co-occurring), length of time in treatment, and reasons for discharge from treatment, when available.

Clients who presented were assessed by an extensive intake evaluation at the treatment facility and were determined to have opioid use disorder or a -co-occurring disorder. All the archival information for this study was collected by master's level clinicians who have been trained to assess and give diagnostic impressions of each client. They have also been trained to recommend treatment options based on the desires and needs of individual clients.

All participants remained confidential, and the data collected was archival data that had been reported from this treatment facility to the BSAS. The clients were a mix of race, age, and gender. Many were homeless and unemployed with limited social supports. Many were involved in risky behaviors such as crime and promiscuity.

Treatment Choice

When the assessment is complete, recommendations are either confirmed from the original triage clinician or, depending on the detailed information obtained, the recommendation could be changed by the evaluating clinician. Ultimately, the treatment option is chosen by the client and the clinician together. The client is not forced into any type of treatment, however, if the clinician does not feel that the client is appropriate for their preferred treatment, they are not offered that option for treatment.

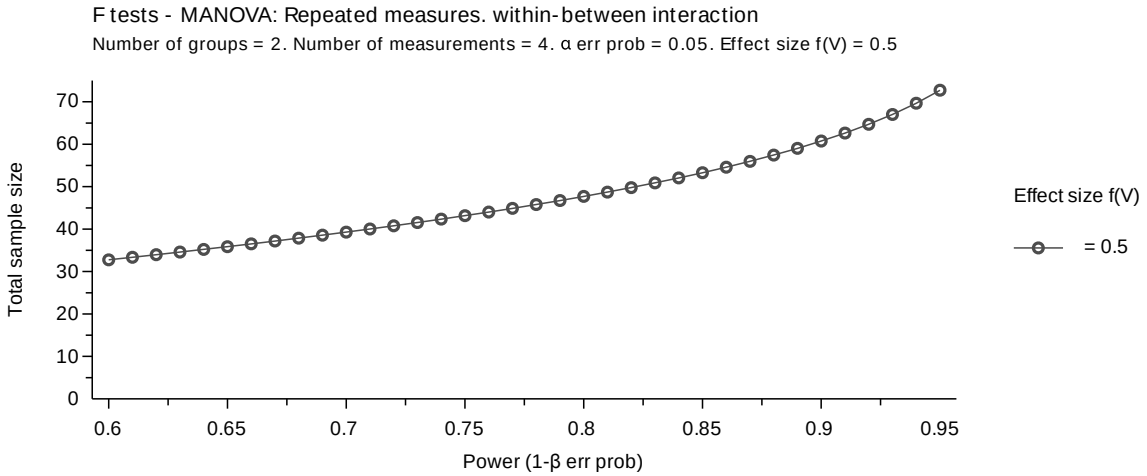
Criteria for treatment depends on the specific treatment options. If a client wishes to pursue MMT they have had an opiate addiction for a minimum of six months. Clients do not have to be actively using opiates, but those in full remission do not qualify. The same requirements apply for Suboxone treatment, except that the client must not have any opiates in their system at the time of the first dose of Suboxone. This means that the client cannot have

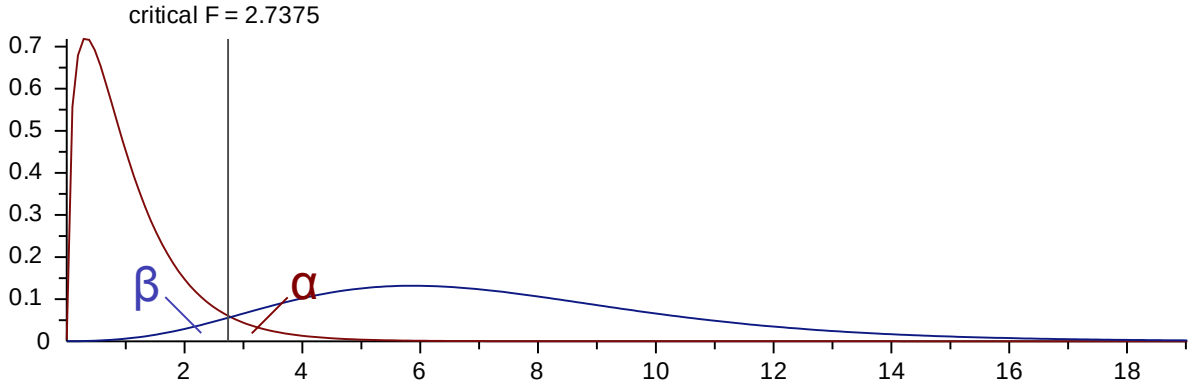
used any opiates for three days prior to their first dose. For clients seeking Vivitrol, they must be opiate free for 10 days prior to receiving the injection. For this reason, many clients go into inpatient detox and receive their first injection before leaving treatment. For a client to qualify for all other outpatient treatments, including counseling, intensive outpatient, and group therapy, the client does not have to be clean and sober; however, they cannot show up to treatment while under the influence or they will be asked to leave for the day. The reason for this is that they are a barrier to other clients in this condition, and they cannot gain anything from treatment if they are not lucid.

The client data is saved in the facility's computer system through their data analytics department, and it is also reported to BSAS. This data is used to attempt to improve treatment and increase the effectiveness in assisting clients in obtaining and maintaining sobriety. The data analytics department has access to programs that can run statistics to answer many questions that might be addressed. For example, questions can be answered such as how many clients who were referred to inpatient treatment completed their treatment episode in January 2017. This helps to improve treatment practices and to explore new treatment methods.

Sample Size

For this study, the sample studied was 1,000 clients. G*Power (G*power for MAC version 3.1.9.3) was used to determine the appropriateness of this sample size. This program determined that the minimum sample size would be 73 participants when the effect size is 50%, the margin of error is 5%, and the statistical power is 95%. Therefore, the sample size that would be used was more than adequate.





Note. Reprinted from G*Power, retrieved from https://www.g-power.com/ Faul, F., Erdfelder, E., Lang, A.-G. & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39, 175

Procedure

Sample Data Collection

The quality analytics department of the treatment center has access to over 5,000 records of clients presenting for treatment. This department retrieved only information from clients who have been diagnosed with opioid use disorder or opioid use disorder and a co-occurring mental illness. The information drawn included type of treatment, age, race, gender, diagnosis, length of time in treatment, and reasons for discharge from treatment when available on 5,000 randomly chosen records. This writer then stripped the records of names manually in front of the outpatient director of the treatment facility, shredded the names, assigned each client a number, and sorted the numbers using the app Random Num for the Apple iPhone, which chose 1,000 random numbers. This ensured that the sample is randomly drawn.

Data Entry

Once obtained from the treatment facility, each record was manually entered into SPSS. For each participant, the information to be retrieved and recorded includes gender, racial/ethnic background, diagnosis, treatment modality, and whether treatment was successful, defined as remaining in treatment for 1 year without relapsing. Each of the 1,000 records was manually entered into SPSS according to the following codes:

- Gender (M male; F female)
- Racial/ethnic background (CA Caucasian; AA African American; HA Hispanic; AS Asian; EE eastern European; NA other)
- Diagnosis (OP opioid use disorder alone; CO co-occurring opioid use disorder and a mental health disorder)

- Treatment (MMT; BUP for Buprenorphine, Suboxone, Sublocaid, Zubsolv, Bunavil; IOP intensive outpatient; THE therapy, PSY psychiatry; VIV Vivitrol)
- Treatment success (Y yes; N no)

Data Analysis

Determining Success Rate of the Sample

CHAID is a decision tree model that stands for chi-square automatic interaction detection. This model performed the chi-square test many times to choose the predictors that produce outcomes that are the closest to the projected target outcomes (Milanović & Stamenković, 2016). CHAID was used to calculate the overall success rate of the sample. This rate was used as a point of comparison for each category. Comparing the number of people who remain in, and complete treatment, instead of relapsing, between MMT and other modalities of substance abuse treatment, allows an understanding of the effectiveness of each type of treatment for long-term sobriety.

The chi-square test split the branches, or nodes, of the category tree until there is no statistically significant difference between the nodes. Each cell of the tree represented a unique combination of variables. Then, each cell's success rate was compared to the overall population's success rate. This helps to predict which treatments have better than expected success rates from the categories of treatments studied (Milanović & Stamenković, 2016).

Determining the Success Rate of Each Cell

In classification tree analysis, records branch off at each cut point. For example, one cut point might be gender. Each of these "male" and "female" branched further branches off at additional cut points. Each record was eventually assigned to a cell determined by unique characteristics. For example, one cell might consist of male African American clients with opioid

use disorder alone who were treated with MMT only. As an example, if 20 records are assigned to this cell, and ten of these records indicate successful treatment, then the success rate of this cell is 50%. This figure is then compared to the success rate of the entire sample, and SPSS determines whether a difference in success rate of any individual cell is statistically significant. Comparing the number of people who remain in, and complete treatment, instead of relapsing, between MMT and other modalities of substance abuse treatment, offers an understanding of the effectiveness of each type of treatment for long-term sobriety.

Summary

Information concerning the client's diagnosis selected treatment modality, and other factors was collected from a drug treatment facility in Massachusetts. This information was analyzed using a category tree analysis in SPSS to determine under what conditions are treatments the most effective. This analysis could help to give treatment providers useful information pertaining to the increasing effectiveness of treatments for opioid users.

CHAPTER FOUR: FINDINGS

Overview

The purpose of this study is to assess which treatments for opioid use disorder patients have had the most success and what factors contributed to the success. The data that was utilized for this study was archival data from 2016 to 2018 of 1,000 patients randomly drawn from a pool of 5,000 records from a substance use treatment facility in Massachusetts. The data collected by this writer was analyzed through the statistical analysis software SPSS. This writer entered all the collected data into SPSS and used the information to complete a category tree analysis using CHAID. This presented a category tree that provided a visual representation of the factors that most influenced the client's longevity in treatment. Longevity in treatment is important in determining which treatments are effective because the brain takes time to heal from opioid addiction and must be given time (Brick, 2012). If clients are dropping out of treatment early, it can be assumed that they are not recovered and have a high probability of not abstaining from illicit substances. This chapter provides specific measures and information to support the findings of this study.

This chapter begins with the descriptive information included in the CTA. This includes demographic information for the participants and length of time in treatment for all treatment categories. Next, the results of the CTA are thoroughly explained with each of the research questions and hypotheses addressed. Finally, the implications of the results are discussed as well as the limitations of the study and suggestions for further research. The conclusion ends the chapter and wraps up all the findings of the CTA.

Descriptive Statistics

It was originally planned that the definition of successful treatment would be defined as any client who had been in treatment for 12 months or more, however, after collecting the data it was discovered that not enough of the sample population had achieved this length of time in treatment. Therefore, the definition of success was revised to be defined as six months or more in treatment. Other studies have defined a successful treatment episode as 6 months length of time (Grall-Bronnec et al., 2019). Since successful treatment is defined as 6 months or more in treatment, there were 543 successful clients.

Table 1

Length of Time in Treatment

Time period	Number	Percent
Less than 3 months	273	27.3
3-6 months	184	18.4
6-9 months	198	19.8
9-12 months	153	15.3
more than 12 months	192	19.2
total	1,000	100

Of the 1,000 participants included in the sample 27.3% (n=273) remained in treatment for less than 3 months. Of the overall sample 18.4% (n=184) remained in treatment for 3–6 months, 19.8% (n= 198) who were in treatment for 6–9 months, and 15.3% (n= 153) for 9–12 months. The clients who remained in treatment for 12 or more months accounted for 19.2% (n=192).

Table 2

Gender

Gender	Number	Percent
male	362	66.7
female	179	33
Identified transgender	2	.3
total	543	100

Of the 1,000-participant sample, 543 were successful. The sample included two people who identified themselves as transgender (.3%), 66.7% men (n=362) and 33% women (n=179). Thus, the majority of the successful population was male.

Table 3

Ethnicity

Ethnicity	Number	Percent
Caucasian	412	75.9
African American	77	14.2
Hispanic	17	3.1
Asian	3	.55
European	27	5
Unknown	7	1.2
total	543	100

Caucasians accounted for most of the successful portion of the sample with 75.9% (n=412). The rest of the successful portion of the sample consisted of African Americans 14.2% (n=77); 3.1% Hispanics (n=17); 0.55% ; Asians (n=3); 5% Europeans (n=27); and 1.2% unknown (n=7).

Table 4

Employment

Employment	Number	Percent
employed	115	21.2
unemployed	406	75
unknown	22	4.1
total	543	100

Of the 546 successful participants in the sample, 21.2% were employed (115). There were 75% (n=406) who were unemployed. The last 4.1% (n=22) employment status was unknown.

Table 5

Housing

Status	Number	Percent
Not homeless	441	81.2
homeless	92	16.9
unknown	10	1.8
total	543	100

Of the 543, 81.2% (n=441) were not homeless and 16.9% (n=92) were homeless. There were 1.8% (n=10) whose housing status was unknown. The unknown portion of the sample could be due to frequent changes in housing status.

Treatments

The original proposal identified treatment categories of methadone maintenance, Suboxone, Vivitrol, psychiatry, individual counseling, group counseling, family intervention, and IOP, but as this data was being analyzed it was determined that there were additional categories that should be added for those who were involved in multiple treatments in conjunction with each other. These situations represented a large portion of the data. Additional categories that were analyzed include methadone and counseling; methadone with counseling and psychiatry; Vivitrol and counseling; Vivitrol with counseling and psychiatry; Suboxone and counseling; Suboxone with counseling and psychiatry; group counseling and individual counseling; and psychiatry with counseling. It was also determined that there was no way to access information concerning family intervention from the data provided. Therefore, this category was eliminated. The category of psychiatry alone as a treatment was also omitted due to there being no participants in this category.

Table 6

Treatment Modality

Modality	**Number 6-9 mo.**	**Number 9-12 mo.**	**Number >12 mo.**	**TOTAL**	**percent**
Methadone	23	19	33	75	13.8
Suboxone	11	7	10	28	5.2
Individual counseling	13	10	6	29	5.3
Group counseling	11	6	4	21	3.8
IOP	1	0	1	2	.37
Vivitrol	3	3	4	10	1.8
Suboxone and counseling	19	7	11	37	6.9
Suboxone, psychiatry, and counseling	9	7	6	22	4
Methadone and counseling	23	26	39	88	16.2
Methadone, psychiatry, and counseling	28	13	27	68	12.5
Individual and group counseling	15	19	8	69	12.7
Vivitrol, psychiatry, and counseling	11	6	4	32	5.8
Vivitrol and counseling	2	4	1	12	.18
Psychiatry and counseling	29	19	38	144	26.5
Total	198	153	192	543	100

Of the successful portion of the sample, being defined as 6 months or more in treatment, 13.8% (n=75) people were being treated with methadone. There were 5.2% (n=28) participants in Suboxone treatment, and 5.3% (n=29) participants in individual counseling. Group counseling accounted for 3.9% (n=21), while .4% (n=2) utilized intensive outpatient (IOP). There were 1.8% (n=10) in Vivitrol treatment. Suboxone and counseling accounted for 8.1% (n=44) of the sample, while 4.1% (n=22) who engaged in psychiatry, counseling, and Suboxone treatment

simultaneously. There were 16.2% (n=88) participants in methadone and counseling treatment simultaneously. Psychiatry, counseling, and methadone simultaneously accounted for 10.6% (n=58) of the sample. There were 7.7% (n=42) participants in individual counseling and groups simultaneously. There were 3.9% (n=21) participants in psychiatry, counseling, and Vivitrol simultaneously. Seven participants (1.3%) who were in Vivitrol and counseling simultaneously, and 15.8% (n=86) participants in psychiatry and counseling simultaneously.

Of the total sample, 198 participants remained in treatment for 6–9 months. This is 19.8% of the total sample. There were 23 (2.3%) participants in methadone treatment for 6–9 months, 11 (1.1%) in Suboxone, and 13 (1.3%) in individual counseling. There were 11 (1.1%) in group counseling, 0 in IOP, and 3 (.3%) in Vivitrol. There were 19 (1.9%) in Suboxone and counseling simultaneously, and 9 (.9%) in psychiatry, counseling, and Suboxone simultaneously. There were 23 (2.3%) in methadone and counseling simultaneously. Of the total population, there were 28 (2.8%) in psychiatry, counseling, and methadone simultaneously, 15 (1.5%) in individual and group counseling simultaneously, and 11 (1.1%) in psychiatry, counseling, and Vivitrol simultaneously. There were 2 (.2%) in Vivitrol and counseling simultaneously, and 29 (2.9%) in psychiatry and counseling simultaneously.

Of the total sample, 153 (15.3%) participants remained in treatment for 9–12 months. There were 19 (1.9%) participants in methadone treatment for 3–6 months, 7 (.7%) in Suboxone, 10 in individual counseling, 6 (.6%) in group counseling, 0 in IOP, 3(.3%) in Vivitrol, 14 (1.4%) in Suboxone and counseling simultaneously, and 13 (1.3%) utilized psychiatry, counseling, and methadone simultaneously. Of the total sample 26 (2.6%) utilized methadone and counseling simultaneously. Of the total population 13 (1.3%) utilized psychiatry, counseling, and methadone simultaneously, 19 (1.9%) utilized individual and group counseling simultaneously, and 6 (.6%)

utilized psychiatry, counseling, and Vivitrol simultaneously. Out of the entire sample, 4 (.4%) utilized Vivitrol and counseling simultaneously, and 19 (1.9%) utilized psychiatry and counseling simultaneously.

Of the total sample, 192 participants stayed in treatment for 12 or more months. This is 19.2% of the total sample. Of the 192 participants 33 (3.3%) participants utilized methadone treatment, 10 (1%) participants utilized Suboxone treatment, 6 (.6%) participants utilized individual counseling, 4 (.4%) participants utilized group counseling, 26 (2.6%) participants utilized IOP treatment, and 6 (.6%) participants utilized Vivitrol treatment. Of the 192 participants, 22 (2.2%) utilized Suboxone and counseling, 17 (1.7%) utilized psychiatry, counseling, and Suboxone simultaneously, 29 (2.9%) utilized methadone and counseling simultaneously. Of the total population 31 (3.1%) utilized psychiatry, counseling, and methadone simultaneously, 10 (1%) utilized individual and group counseling simultaneously, and 6 (.6%) utilized psychiatry, counseling, and Vivitrol simultaneously. Out of the entire sample, 4 (.4%) utilized Vivitrol and counseling simultaneously, and 38 (3.8%) utilized psychiatry and counseling simultaneously.

Conclusion

The treatment modalities that had the most patients who were successfully included methadone, methadone with counseling, and methadone with psychiatry and counseling. There were far more men who were successful than women with a 66.7 % success rate. Caucasian ethnicity had the most successful clients with 75.9 %. Seventy-five percent of successful clients were unemployed. Eighty-one percent of the successful population were not homeless. These percentages appear to insinuate that an unemployed male who is not homeless, who utilized

methadone treatment alone or in conjunction with another treatment, would have the highest chance of being successful.

Results

Statistical Test and Assumptions

CTA can give an easy to understand the depiction of relationships between groups that can assist in predicting events (Aksu, & Reyhanlioglu Keceoglu,2019). The results analyzed in the category tree were taken from the successful portion of the population since the factors of successful treatments are what is examined. The categories that were considered successful treatments are 6–9 months, 9–12 months, and more than 12 months. These three categories together contain 543 participants, meaning 54.3% of the participants in the study are considered to be successful.

For the supporting research questions and hypothesis, the assumptions of normality tests were different from the overall CTA assumptions. This writer used a one-sample t test to analyze the means of the average (expected) success rate as compared to the actual success rate for each question to determine whether the difference is statistically significant. In order to use an independent samples *t* test, each subject must fit into only one category, and the dependent variable must be normally distributed. This writer used a simple histogram to observe that there was a normally distributed bell curve for each sample. This helped to illustrate that the data is normal and meets the assumption (Leander & Norgren, 2019).

The CTA analyzed the factors contributing to successful treatment episodes, which included those clients in treatment for 6–9 months, 9–12 months, and 12 months or more. The CTA separates the root node into branches based on the most strongly predictive factors. For instance, if the gender factor was demonstrated to be a factor predictive of treatment success, the

tree would split into female and male category branches, with the male records assigned to the male category branch and the female records assigned to the female category branch. The most influential factors create branch splits higher in the tree, and the less influential factors create branch splits lower in the tree.

After the branches have been split according to the factors that are most predictive of treatment success, each record is designated to a node. A node, for instance, could contain all records of males who were employed and treated with IOP. The analysis for this study utilized a node minimum of 5, meaning that the branches could no longer split if this required a resulting node to contain fewer than five records.

The significance level for the decision tree was set at $\alpha=.1$. This was done because when the significance level was set at $\alpha=.05$ only a few factors were deemed significant, meaning there were too few categories to have a valid study. When this writer changed the significance level to $\alpha=.1$, the CTA generated better results and multiple variables were considered significant. This gave this writer more predictors of success. The classification tree can also be set to merge categories (combine multiple variables into one category) in its branches or to not merge them depending on the significance level set for merging categories. For example, if there was not a big difference between the significance of methadone and Suboxone the study would combine these two categories into one node. This CTA was created with a .5 significance level for merging categories to prevent the categories from merging together. This allowed this writer to analyze each category more thoroughly. Although this did prevent many of the categories from merging, the .5 significance level was still not enough to prevent every category from merging. The categories that merged were psychiatry, counseling and methadone merged with IOP; psychiatry, counseling, and Vivitrol and group counseling merged with group counseling.

The overarching research question was: Under what conditions are opioid use disorder treatment successful? The assumption tests used for a CTA include random sampling, a single category assignment of subjects, and the algorithm being accurately placed into the correct node (Milanović & Stamenković, 2016). This writer ensured that sampling was random from a collection of 5,000 records by choosing 1,000 records with randomly assigned numbers assigned to each client with the app Random Num for the iPhone. The CTA program automatically guaranteed that each subject was placed in only one category.

Hypotheses

RQ1: Is there a statistically significant difference between expected and actual success rates in those with opioid use disorder when treated with MMT?

$H_0$1: There will not be a statistically significant difference between the average (overall sample) success rate and actual success rates in those with opioid use disorder or a co-occurring disorder when treated with MMT.

The success rate of those on MMT was 56.4%. When tested against the overall sample success rate (54.3%) with a one-sample *t* test (confidence interval 95%), it is determined that there is not a significant difference (t=2.899, p=.101). Therefore, the null hypothesis is not rejected as those treated with this modality did not have a significantly higher than average rate of treatment success.

The success rate of those treated with MMT and counseling was 63% when tested against the overall sample success rate (54.3%) with a one-sample *t* test (confidence interval 95 %) it is determined that there is a significant difference (t=3.341, p=.079). Therefore, the null hypothesis is rejected as those treated with this modality have a significantly higher than average rate of treatment success.

The success rate of those treated with MMT, psychiatry, and counseling was 48.7% when tested against the overall sample success rate (54.3%) with a one-sample t test it is determined that there is a not significant difference (t=2.011, p=.182). Therefore, the use of MMT is predictive of treatment success when used in conjunction with counseling.

RQ2: Is there a statistically significant difference between expected and actual success rate in those with opioid use disorder when treated with Suboxone?

$H_0$2: There will not be a statistically significant difference between the average overall sample success rate and actual success rates in those with opioid use disorder or a co-occurring disorder when treated with Suboxone.

The success rate of those on Suboxone was 48.3%. When tested against the overall sample success rate (54.3%) with a one-sample t test (confidence interval 95%) it is determined that there is a significant difference (t=-2.993, p=.096). Therefore, the null hypothesis is rejected, but those treated with this modality have a significantly lower than average rate of treatment success.

The success rate of those treated with Suboxone and counseling was 52% when tested against the overall sample success rate (54.3%) with a one-sample t test (confidence interval 95%) it is determined that there is not a significant difference (t=.744, p=.534). Therefore, the null hypothesis is not rejected.

The success rate of those treated with Suboxone, psychiatry, and counseling was 49% when tested against the overall sample success rate (54.3%) with a one-sample t test it is determined that there is a significant difference (t=-6.346, p=.024). Therefore, the use of Suboxone is not predictive of treatment success.

RQ3: Is there a statistically significant difference between expected and actual success rates in those with opioid use disorder when treated with Vivitrol?

$H_0$3: There will not be a statistically significant difference between the average overall sample success rate and actual success rates in those with opioid use disorder or a co-occurring disorder when treated with Vivitrol.

The success rate of those on Vivitrol was 55.6% when tested against the overall sample success rate (54.3%) with a one-sample t test (confidence interval 95%) it is determined that there is a significant difference (t=-28.790, p=.001). Therefore, the null hypothesis is rejected, as those treated with this modality have a significantly higher than average rate of treatment success.

The success rate of those treated with Vivitrol, psychiatry, and counseling was 66% when tested against the overall sample success rate (54.3%) with a one-sample t test (confidence interval 95%) it is determined that there is not a significant difference (t=-2.849, p=.104). Therefore, the null hypothesis is not rejected.

The success rate of those treated with Vivitrol and counseling was 58% when tested against the overall sample success rate (54.3%) with a one-sample t test (confidence interval 95%) it is determined that there is a significant difference (t=-12.015, p=.007). Therefore, the use of Vivitrol is predictive of treatment success when used alone or in conjunction with counseling, but only in the absence of psychiatry.

RQ4: Is there a statistically significant difference between the expected and actual success rates in those with opioid use disorder when treated with individual counseling?

$H_0$4: There will not be a statistically significant difference between the expected overall sample success rate and actual success rates in those with opioid use disorder or a co-occurring disorder when treated with individual counseling.

The success rate of those in individual counseling was 41% when tested against the overall sample success rate (54.3%) with a one-sample t test (confidence interval 95 %) it is determined that there is not a significant difference (t=-1.609, p=.249). Therefore, the null hypothesis is not rejected.

The success rate of those treated with individual counseling and psychiatry was 60% when tested against the overall sample success rate (54.3%) with a one-sample t test (confidence interval 95%) it is determined that there is not a significant difference (t=2.868, p=.103). Therefore, the null hypothesis is not rejected.

The success rate of those treated with individual counseling and group counseling was 61% when tested against the overall sample success rate (54.3%) with a one-sample t test (confidence interval 95%) it is determined that there is not a significant difference (t=.333, p=.771). Therefore, the use of individual counseling alone is not predictive of treatment success.

RQ5: Is there a statistically significant difference between expected and actual success rates in those with opioid use disorder when treated with group counseling?

$H_0$5: There will not be a statistically significant difference between the expected overall sample success rate and actual success rates in those with opioid use disorder or a co-occurring disorder when treated with group counseling.

The success rate of those in group counseling was 53% when tested against the overall sample success rate (54.3%) with a one-sample t test (confidence interval 95 %) it is determined

that there is a not a significant difference (t=-2.849, p=.104). Therefore, the use of group counseling alone is not predictive of treatment success.

RQ6: Is there a statistically significant difference between the expected and actual success rates in those with opioid use disorder when treated with IOP?

$H_0$6: There will not be a statistically significant difference between the average sample success rate and actual success rates in those with opioid use disorder or a co-occurring disorder when treated with IOP.

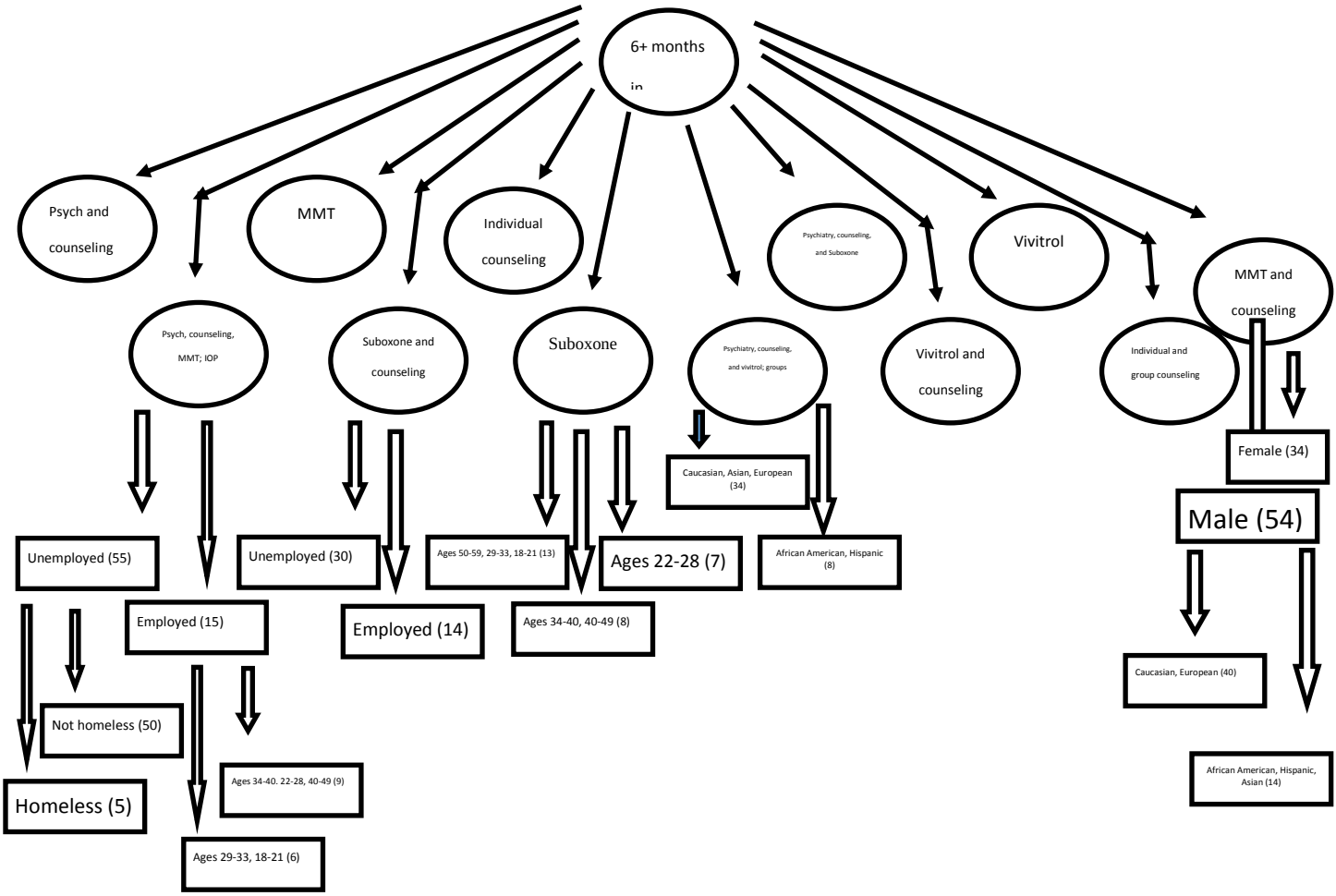
The success rate of those in IOP was 6% when tested against the overall sample success rate (54.3%) with a one-sample t test (confidence interval 95 %) it is determined that there is a significant difference (t=-36.790, p=.001). Therefore, the use of IOP alone is not predictive of treatment success.

RQ7: Is there a statistically significant difference between expected and actual success rates in those with opioid use disorder when treated with psychiatry? This question was omitted due to the lack of data available for this category.

RQ8: Is there a statistically significant difference between expected and actual success rates in those with opioid use disorder when treated with family intervention? This question was omitted due to lack of data available for this category.

Figure 1

Successful treatment episodes and variables



The first branch splits of the CTA were treatment types. This means that treatment type was the most important factor contributing to success. The next branches (second most important factors) were employment, age, ethnicity, and gender. The last branches (the next most influential factors) were housing status and ethnicity. The most important factor influencing treatment success was the type of treatment in which the client participated.

The root node split into 12 child nodes, one for each treatment modality included in the study with two categories merging on two accounts (p=0.031). The 12 child nodes include

psychiatry and counseling; psychiatry; counseling; and methadone merged with IOP; methadone; Suboxone and counseling; individual counseling; Suboxone; group counseling merged with psychiatry with counseling and Vivitrol; psychiatry with counseling and Suboxone; Vivitrol and counseling; Vivitrol; individual counseling with group counseling; and methadone with counseling. Nodes 15–32 were the next most influential factors under various treatment types.

As the data was analyzed it was apparent that two variables contribute a role in treatment episodes. Therefore, employment status and housing status were added to the study. Whether the client had OUD only, or a co-occurring disorder was not a significant factor in treatment success, so it was omitted from the results.

Table 7

Tier 2 Influenced psychiatry with counseling and methadone or IOP

Influenced psychiatry with counseling and methadone; IOP (tier 2)	**Number**	**Percent**
Employed or unknown	15	2.8
Unemployed	55	10.1
total	70	12.9

When a client is homeless, they have many more barriers to attending treatment, and even more barriers to obtaining success (Klop et al., 2018). Employment could affect treatment in ways that are conducive to treatment or the opposite. Employment is a goal for many of those who are healing from OUD. Keeping employment could help motivate clients to remain in treatment (Dunn et al., 2013). Employment was a predictor of success for those who were treated with psychiatry in conjunction with counseling as well as those who were treated with methadone merged with IOP

Table 8

Tier 3 Influenced psychiatry with counseling and methadone or IOP and were unemployed

Influenced psychiatry with counseling and methadone; IOP and were unemployed (tier 3)	Number	Percent
Homeless	5	0.9
Not homeless	50	9.2
total	55	10.1

For those who were unemployed, the next most influential factor in psychiatry with counseling and methadone, as well as IOP was housing status (p=0.042). There were 50 (9.2%) participants who were not homeless but were unemployed and had a successful treatment episode with psychiatry in conjunction with counseling, and methadone or IOP. Five clients (0.9%) who were homeless and unemployed had a successful treatment experience with this same treatment modality.

Table 9

Tier 3 Influenced psychiatry with counseling and methadone; IOP and were employed or unknown employment status

Influenced psychiatry with counseling and methadone; IOP and were employed or unknown employment status (tier 3)	Number	Percent
Ages 22–28, 34–40, and 40–49	9	1.7
Ages 18–21 and 29–33	6	1.1
total	15	2.8

For those who were employed, or their employment status was unknown, and chose the treatment of either psychiatry, counseling, and methadone or IOP, the next most influential factor in their success was age (p=0.017). Nine (1.7%) clients who were in the age ranges of 22–28, 34–40, and 40–49 had success with this treatment. Six clients (1.1%) between the ages of 18–21 or 29–33 also were successful.

Table 10

Influenced Suboxone and counseling

Influenced Suboxone and counseling	Number	Percent
Employed	14	2.6
Unemployed or unknown	30	5.5
total	44	8.1

Employment and age were predictors of success for those who were treated Suboxone maintenance in conjunction with counseling. This category contributed to 8.1% of the sample. Most of the clients who utilized this treatment modality were unemployed.

Table 11

Tier 2-c Influenced Suboxone

Influenced Suboxone	Number	Percent
Ages 19–21, 29–33, 50–59	13	2.4
Ages 34–40, 40–49	8	1.5
Ages 22–28	7	1.3
total	28	5.2

Age was a significant factor in successful treatment for those who were treated with Suboxone. Clients who were 19–21, 29–33, and 50–59 had a 2.4% success rate. Clients aged 34–40 and 40–49 had the second-highest success rate in this category with 1.5%, and ages 22–28 has the least amount of successful clients.

Table 12.

Tier 2-d Influenced group counseling or Vivitrol with psychiatry and counseling

Influenced group counseling or Vivitrol with psychiatry and counseling	Number	Percent
Caucasian, European, and unknown ethnicities	34	6.3
African American, Hispanic	8	1.5
total	42	7.8

Ethnicity was a predictor of success for those who were treated with group counseling. Those treated with Vivitrol used in collaboration with psychiatry and counseling also had success. The ethnicity with the most success were Caucasians, Europeans, and unknown ethnicities.

Table 13

Tier 2-e Influenced methadone and counseling

Influenced methadone and counseling	Number	Percent
Male	54	9.9
Female	34	6.3
total	88	16.2

A significant variable for the treatment modality of methadone in conjunction with counseling was gender. The above table demonstrates that more men were successful with this treatment, percentage wise, than females. The total number of males and females who utilized this treatment was 88.

Table 14

Tier 3-b Influenced methadone and counseling

Influenced methadone and counseling (tier 3)	Number	Percent
Caucasian, European, and unknown	40	7.4
African American, Hispanic, Asian	14	2.6
total	54	10

The next most influential variable for success in methadone and counseling together for males was ethnicity. The most successful ethnicities were Caucasians and Europeans. The second most successful group was African Americans, Hispanics, and Asians.

Summary

This study was created to determine under what conditions are opioid use disorder treatment most effective. After analyzing data collected on one-thousand patients, some

treatments proved to be more effective than others. A treatment modality that was shown to be significantly more successful than the overall success rate was vivitrol, which was an unexpected outcome. Some factors were significant in influencing the success of these treatments. There were a few treatment modalities that did not have any significant factors influencing their success. These modalities include psychiatry in conjunction with counseling; methadone; psychiatry along with counseling and Suboxone; Vivitrol; Vivitrol with counseling; and individual counseling together with group counseling. An area that was, surprisingly, not included in the CTA due to it not being a significant variable to treatment success was mental health. This is curious and could be an area for further study.

CHAPTER FIVE: CONCLUSION

Overview

This study was performed to determine under what conditions OUD treatment is most effective. A random sample of 1,000 patients from a drug treatment center in Massachusetts that provides multiple types of treatments for those with OUD was collected and analyzed for successful treatment episodes. A successful treatment episode was defined as six months or longer. Variables pertaining to the patients who were deemed to have been successful were analyzed to determine which variables could have contributed to the patient's success. In this chapter, the results of the study are discussed along with the literature that was provided. To conclude the chapter the implications of the study, as well as the limitations of the study and suggestions for future research, are given.

Discussion

This study was performed to ascertain under what conditions OUD treatment is most effective. Some treatments produced higher than expected success rates, while some were lower than expected.

Methadone

The first question explored was, "Is there a significant difference between actual and expected success rates in those with opioid use disorder when treated with methadone maintenance?" The use of MMT was predictive of treatment success only when used in conjunction with counseling.

This appears to contradict some of the literature that was researched which promoted methadone as a superior treatment to most other treatments. Studies were done by Higgins & company and Paulus & Halliday suggested that methadone was a very effective replacement

therapy and clients were able to abstain from illicit opioids at a high rate (Mattick et al., 2014). The study even gave half of the patients a reduced dose and half a consistently higher dose of methadone and reported that the patients with the reduced dose had illicit drugs in their system, while the others did not. While methadone used alone did not have a significantly better success rate when used in conjunction with counseling it did. This suggests that simply treating the physical symptoms of OUD is not enough. Working on the emotional and cognitive reasons for why one uses opioids is crucial to successful healing as Bowen states in his writings (Bowen et al., 2017). Methadone. psychiatry, and counseling all used in conjunction not having a significantly better success rate than other treatments could be due to the level of psychiatric severity of these patients. It could be that methadone is not the best OUD treatment for those with psychiatric issues.

Suboxone

Suboxone as a solo treatment was determined to have a significantly lower success rate than average. Suboxone, when used with counseling, did not have a significant difference in success from the average success rate. Suboxone when used with counseling and psychiatry also had a significantly lower success rate than other treatments. This could be due to the immense potential for abusing this medication, as well as not taking the medications properly to sell, or to allow illicit opioid use as described in studies by Furst (2013) and McLean and Kavanaugh (2019). If the patients are not using this medication properly, premature relapse is inevitable.

Vivitrol

Vivitrol alone was deemed to be more successful than the average success rate, as was Vivitrol in conjunction with counseling. Also, when Vivitrol was utilized with counseling and psychiatry there was a significant difference between these treatments and the average treatment

success rate. Therefore, the use of Vivitrol is predictive of treatment success when used alone or in conjunction with counseling, but only in the absence of psychiatry.

Vivitrol is a long-acting medication that is in the patient's system for 1 month at a time, therefore taking away the temptation to not take the medication or sell it. It will also cause the patient extreme discomfort if the patient does use an illicit opioid. These factors could contribute to the successful nature of this medication and were discussed in the literature review in reference to studies by Syed and Keating (2013). These results appear to support their findings. Although Vivitrol was deemed to be a successful treatment when used by itself and in conjunction with other treatments, no variables were significant enough to be included as being influential to this treatment modality.

Counseling, Group Counseling, IOP, and Psychiatry

Those treated with counseling, counseling with psychiatry, IOP, and counseling along with group counseling were not significantly more, or less, successful than other treatments. Considering that some of the other treatments consist of powerful narcotic medications, it is significant that counseling was just as effective, even though it was not more effective than these treatments. This speaks to how effective developing coping skills to manage damage from past traumas, maladaptive thinking patterns, and dysfunctional behaviors can be for an invested patient. Lorman (2013) concurs with this assumption and reported that those who actively institute the content of their work done in counseling in their lives can achieve great success.

Group counseling and intensive outpatient both were not significantly more or less successful than other treatments. Kaisler et al. (2009) stated that patients need consistent support in their first year of recovery as their brains are still healing from the addiction. Both types of treatment weigh heavily on peer support. Lorman (2013) discussed the importance of peer

support in the recovery process as well. He states that those with peer support have a much better chance of successful recovery.

Predictive Factors

This analysis has also provided some insight into factors that could influence success in opioid use disorder treatments. The treatment modalities had a significant variance between them. This outcome suggests that not all treatments are equal, and some appear to be more successful than others under certain conditions. A few more factors were added to the data than were originally planned. Employment status and housing status were added because there were significant amounts of information on these two variables to suggest that these could be significant variables to treatment success. Employment was an influential variable in treatments including psychiatry with counseling and methadone, IOP, and Suboxone with counseling. Housing status was a significant factor in successful treatment episodes including psychiatry with counseling and methadone, IOP, and Suboxone with counseling.

One of the variables that contributed to some successful treatment episodes was ethnicity. Ethnicity played a part in group counseling as well as psychiatry in conjunction with counseling and Vivitrol. It also played a part in methadone maintenance along with counseling. Those who were Caucasian or European were more likely to make it to the 6-month mark than Hispanics, African Americans, and Asians. This could be because the geographical area is predominantly Caucasian/European. Culture could also play a part in the difference in successful cases between Caucasians and other ethnicities. Some cultures see asking for help as a weakness or embarrassment (Paul et al., 2020). Some do not recognize SUDs as actual medical, diagnosable conditions, but only as poor choices easily remedied by making good choices, depending on the attitudes of the country of origin concerning substance use (Paul et al., 2020). Many cultures see

alcohol abuse as much more acceptable than drug abuse (Paul et al., 2020). Some do not understand the details of the treatment due to language barriers (Paul et al., 2020).

Another variable that was significant to some successful treatment methods was age in that those who are of 18–21, 28–33, and 50–59 are more likely to make it to the 6-month mark than the other age brackets. Curiously, this skips an age bracket between each age category. Some reasons that these age brackets were more successful could be that those in the 18–21 range most likely have not been using for too long, so this could be their first, or one of their first, treatment attempts (Mohammad, Busse, Shub, & Sarkar, 2016). Suboxone is the less potent of the MAT choices, and it does not require as intense a commitment as the client is not required to present to treatment every day like they are with methadone maintenance (Mattick et al., 2014). Those who are 50–59 have usually been battling their addiction for years. Clients who make it to this age in active substance use are battered and tired. They will, many times, seek a low maintenance treatment that can still help them while not imposing too greatly on their lives maintenance (Mattick et al., 2014). Those who are 28–33 are usually getting married, settling on careers, feeling like they need to get their life in order. They may have young children and need treatment where they can still work or function as normally as possible in whatever capacity (Mohammad et al., 2016).

Employment was also a significant factor in successful treatments in that those who were unemployed were more likely to make it to the 6-month mark. This could be due to those who are unemployed having more time to engage in their treatment (Dunn et al., 2013). Unemployed patients may also have more treatment access because they have state insurance that covers more than insurance they might have, or lack thereof, if they were working (Dunn et al., 2013).

Those who were employed also had some treatment success, primarily with Suboxone maintenance (Dunn et al., 2013). Clients can take Suboxone just like any other prescription. They do not need to come into treatment daily. Also, it is more difficult to use illicit opioids while on Suboxone because of naloxone which causes illness if used with street opiates (Tanner et al., 2011). Consequently, someone who is employed may be able to do this with minimal discomfort and life disruption.

Gender was a significant variable for those who had success in methadone in conjunction with counseling. Fifty-four (8.3 %) males were successful as opposed to 34 (9.7%) females. Females have been shown to use substances to cope with negative feelings most of the time while men use more for the pleasure it gives them (Cornish et al., 2010). Because of this females might be able to remain sober for longer periods of time if they are in treatment because they are addressing the reasons that they began using opiates in the first place. Although percentage-wise females were more successful than males, it is interesting to note the large gap in how many men presented for treatment as opposed to females. In the overall sample, there were 647 males included and 349 females. It is a possibility that a large reason for so many more men seeking treatment is because women are more likely to have responsibilities with caring for children or other family members. This can contribute to either not being able to come for treatment or for fear of losing custody of their children. Although SUD treatment is here to help, professionals have still mandated reporters. If a mother presents for treatment and discloses that she has been using illicit substances daily, and is the primary caregiver of young children, there is a strong possibility that she would be reported to the department of children and families. This could result in the children being removed from the home (Suchman, 2016). Another reason that women might not seek treatment as often as men is stigma. If the woman is a mother they might

fear judgment by treatment professionals, or might be unable to cope with the judgment they place upon themselves (Gartner et al., 2018).

Homelessness also presented itself as a significant factor in treatment success in that those who are homeless are less likely to make it to the 6-month mark. When a client is homeless, they have less access to things that are essential to normal everyday living. These things could be showers, clean clothing, and access to transportation, food, and proper rest. It is not surprising that so many more people have had success with treatments who are not homeless and do not have to contend with all of these barriers (Klop et al., 2018). Clients who are homeless also normally have less access to healthy supports (Klop et al., 2018). If a person is homeless it is usually as a last resort, meaning they no longer have support from their loved ones

Implications

Implications of the study are tremendously important. When treating families and communities, substance abuse is a topic that will inevitably be an issue. Addiction has become a prominent problem in America. Many families and marriages have been damaged or destroyed by addiction. Finding out how to help the treatment to be the most successful that it can be and studying which treatments might be the best suited to the individual can not only save lives, but it can save families.

A Christian worldview comes into play in different ways in this study. The Bible tells us to only depend on God. When a person is dependent on anything other than God the consequences can be disastrous. The Great Healer is the ultimate way to health, recovery, and contented, productive living. He gives treatment providers the tools necessary to assist those with addiction to become well enough to be able to seek Him and depend on Him for continued abstinence and thriving in their lives, communities, and families. When a Christian treatment

provider is treating a patient who might not be Christian themselves, or might not even believe in God, a Christian worldview can still be implemented into the treatment given. Because God is the Great Healer, all effective treatments come from Him. Although the patient might not wittingly rely on God themselves for their healing, Christian treatment providers can still give them divine tools for them to use in their lives and in their recovery.

Limitations

This study had some limitations due to uncontrollable factors. One of those limitations was that this writer did not have access to data concerning client's natural supports, which is known to be an influential factor in client success (Klostermann & O'Farrell, 2013). Clients may feel more of a responsibility to remain clean and sober knowing that they are not only affecting themselves but their loved ones as well. They also have someone to lean on when they are feeling weak or having cravings to go back to their old lifestyle. Natural supports also have greater influence when it comes to guiding the person in early recovery toward healthy environments and behaviors (Lorman, 2013).

Another limitation of this study was that this writer had to deviate from the original plan of defining successful treatment as 1 year. This writer changed the definition of successful treatment to six months. This was due to not enough clients making it in treatment to this point for the study to be viable. There have been some studies done that indicate that six months is an acceptable definition of a successful treatment episode (Grall-Bronner et al., 2019). A shorter time frame could have affected the results in that patient's brains are not yet healed from an opioid addiction after 6 months. It would be more indicative of long-term success to be able to study patients who have remained in treatment until their brain functioning has returned to normal.

A third limitation of the study was that the data was from one specific region and therefore could only provide specific information pertaining to this area. Different regions of the country have different severities of different types of substances, though opioids are everywhere. Treatment options and availability vary from area to area, and lack of availability to treatment could significantly affect treatment success in other areas.

Recommendations for Future Research

This study addressed OUD treatments and conditions affecting these treatments. In doing this some unexplored questions came about that would benefit from further research. One of these topics is how important are natural supports to those seeking sobriety from illicit and mind-altering substances. This could be studied in conjunction with determining how those with addiction affect the family unit, and how they affect their communities. Families are often destroyed by this issue (Klop et al., 2018). Those with addiction act in ways that they never would normally, causing pain and often feeling of betrayal and helplessness. Substance use has had a profound impact on many communities and neighborhoods. It would be interesting to delve deeper into specific consequences on the people around the person with addiction.

Another topic that piqued the interest of this writer while studying the results was how motherhood affects SUD treatment. Some possible issues for mothers who are seeking treatment were brought up, but this topic could greatly benefit many who are mothers or have loved ones who are mothers, who suffer from a substance use disorder. A study about this could reduce stigma and bring awareness to an often-neglected demographic of women who are struggling and are desperate for help. This type of study could also help to develop strategies for how to combat some of the issues that might prevent them from getting help.

Another recommendation for further study is how the same factors influence similar treatments in other regions of the country. Further research on these factors could greatly influence how treatment is conducted, as well as influencing understanding of the importance of a holistic approach to treatment for opioid use disorder. A study such as this could also help communities to access necessary funding to assist in successful treatment.

Summary

The purpose of this study was to ascertain under what conditions are OUD treatment most effective. This study provided important data to help treatment providers to understand what could contribute to successful opioid use disorder treatment in the future. This is important for the obvious reason for saving lives, but it is also important because addiction affects, families, communities, public safety, public health care, and more. Knowing which factors influence which treatments, and which treatment are consistently effective, is extremely useful information. For example, if it is determined that homelessness is a barrier to successful treatment, an agency might hire someone to assist clients in obtaining a bed at a shelter while they participate in treatment. This is just an example of why this is an important topic of study.

Treatment was considered to be successful if the client stayed in treatment for 6 months or more. The treatments that predicted a higher than average treatment success are considered to be successful treatments based on being in treatment for 6 months or longer include psychiatry, Vivitrol, and counseling, methadone, and counseling, individual and group counseling, psychiatry and counseling, Vivitrol and counseling, psychiatry methadone and counseling, and methadone.

The other factors that were the most influential to successful treatment were ethnicity, age, housing status, employment status, and gender. Different factors appear to influence various

treatment modalities distinctively. There are many different possible reasons why these factors influence treatments differently. Some of the most important implications of the study appear to gravitate toward how the patient's lifestyle and culture affect their success in abstaining from opioids. This could be telling that basic needs are important to success in other areas. Perhaps client's human needs should be addressed in conjunction with their treatment to help them have a chance of getting clean and sober. This could include things such as housing support, family support, and cultural considerations.

Although some of the treatments studied were less successful than anticipated, none were shown to not be successful at all. Every single treatment that was studied had some success. This shows that there is value in every effort that is being put forth by treatment providers to this very involved and complicated type of illness. Using the information gathered by this study could hopefully encourage those who are working in this field and motivate neglected areas to be addressed. Although this study has provided many answers it has also produced more questions and avenues for others to continue to research.

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