The Relationship Between Disability, Psychological Distress, and Opioid Use

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DEDICATION

This research project, along with any of the other successes in my life, could not have been possible with my parents and their never ending support for every endeavor that I have embarked upon.

To my fiancée Krista, for her unconditional love and sacrifice during this consuming process. I know it was not easy and I will be forever grateful for your patience.

Jack and Gunner, you taught me the patience that I needed to make it through without losing my sanity.

And finally, this dissertation is dedicated to the memory of my brother Nicholas William Evely and everything that could and should have been. I will strive to spend my remaining time living for both of us.

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Abstract

Background: The Center for Disease Control and Prevention (CDC) identifies opioid addiction as one of the greatest issues facing the United States, and the worst epidemic of its kind in the country's history. Approximately two million people in the United States present with an opioid use disorder (OUD) diagnosis. Mean annual estimated medical costs for opioid abusers were $15,884 in 2003, compared to $1,830 for individuals not abusing opioids, representing an estimated $78.5 billion in annual costs. **Objective:** The purpose of this study was to examine the relationship between disability, psychological distress, and opioid use. **Method:** A secondary data analysis of the 2017 National Survey on Drug Use and Health (NSDUH) was performed to explore these relationships. The sample size of the study was n = 56,276. Linear regression, logistic regression, and ANOVA with post hoc tests were utilized to analyze the sample. Approval to conduct this study was granted by the Millersville University Institutional Review Board. **Results:** Significant relationships were found between opioid use, psychological distress, education level, income, health status, emotional disability, and physical disability. **Discussion:** The results of this study suggest physical disability, health, income, and education affect levels of psychological distress and emotional disability. In turn, psychological distress and emotional disability are contributing factors of opioid misuse. Suggestions are provided on how to mitigate the effect these variables have on opioid use. It is hoped that this study will be expanded upon by other social workers with future research exploring these complex relationships.

Keywords: opioid, disability, psychological distress, biopsychosocial, strain theory

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CHAPTER 1: Introduction

Introduction

The Center for Disease Control and Prevention (CDC) identifies opioid addiction as one of the greatest issues facing the United States, and the worst epidemic of its kind in the country's history (CDC, 2018a; Kolodny et al., 2015; Rummans, Burton, & Dawson, 2018). Approximately two million people in the United States present with an opioid use disorder (OUD) diagnosis (Schuchat, Houry, & Guy, 2017). More broadly, 10 million Americans, which equals about four percent of the population, currently misuse opioid prescriptions (Skolnick, 2018). Misuse of opioid prescriptions can lead to overdose. Prevention of opioid pain reliever (OPR) overdose is one of the CDC's most urgent public health challenges (CDC, 2018a). From 1999 to 2011, the rate for OPR overdose deaths more than quadrupled from 2,479 deaths in 1999 to 11,693 deaths in 2011 (Kolodny et al., 2015). Opioid pain medications frequently serve as a principal treatment method for chronic pain, which is a leading reason for physician visits in the United States (Agarwal, Udoji, & Trescot, 2017).

Each opioid prescription overdose death correlates to nine individuals receiving substance abuse treatment, 35 related visits to emergency rooms, and 461 reports of non-medical use of opioid prescriptions (Manchikanti et al., 2012). An estimated 11.7 to 20.7 million individuals worldwide utilized illicit opioids at least once in 2009 (Oderda, Lake, Rudell, Rolan, & Masters, 2015). Mean annual estimated medical costs for opioid abusers were $15,884 in 2003, compared to $1,830 for individuals not abusing opioids, which is an 868% increase (Oderda, et al., 2015). Approximately two million people in the United States are diagnosed with OUD, representing an estimated $78.5 billion in annual costs (Florence, Zhou, Luo, & Xu, 2016). This includes expenditures in the workplace, criminal justice system and health care

system (Florence, et al., 2016). Heroin users are 19 times more likely to have misused an opioid in their past (Skolnick, 2018). This denotes a substantial change in how opioids are misused. During the1960s, more than 80% of opioid users reported that heroin was the first opioid used whereas now prescription opioids precede heroin use. The current trend seems to be that prescription opioid misuse predates heroin use. This shift may increase the risk and severity of opioid use. Individuals who might never have considered using heroin may be more likely to indulge in misuse of prescription opioids, considering them less risky than illegal forms of opioids. The false sense of security with prescription opioids could increase the potential for abuse and dependence (Skolnick, 2018).

Problem Statement

The misuse of prescription drugs is fueling the opioid epidemic. The opioid epidemic is fueled by the misuse of prescription drugs, an increase of heroin use, and the presence of synthetic opioids, such as fentanyl, which are highly potent and deadly (Skolnick, 2018). OPR use is directly related to heroin use, as 80% of heroin users admit using OPRs prior to any heroin use (Kolodny et al., 2015; Turk, Swanson, & Gatchel, 2008). Opioid prescriptions are also a precursor to injection heroin use by young, urban drug users (Lankenau et al., 2012). In 2015, prescription opioids were responsible for 22,598 deaths in the United States, more than the total for heroin and cocaine collectively (NIDA, 2019). The financial cost of treating chronic pain spans annually from $560 billion to $635 billion in the United States (Manchikanti et al., 2012). The over-prescription of pain medication is a leading contributor to opioid abuse (Agarwal, et al., 2017; Mistry, Bawor, Desai, Marsh, & Samaan, 2014). Approximately 15.3 million people reportedly used pharmaceutical drugs without a prescription in 2013, pain relievers being the most commonly used type of drug (Oderda, et al., 2015). Examples of commonly prescribed

opioids for analgesia or pain relief are codeine, morphine, methadone, oxycodone, and hydrocodone (CDC, 2018a). Opioids are the group of pharmaceuticals with the highest rate of prescription in the United States, with at least 245 million opioid first time prescriptions filled in 2014, not including refill prescriptions (Skolnick, 2018). There were approximately 318,000,000 people in the United States in 2014, which equals roughly 1.30 prescriptions per person (United States Census Bureau, 2019).

Treatment for opioid misuse can take many forms, depending on the individual's needs (Laudet, 2008; Veilleux, Colvin, Anderson, York, & Heinz, 2010). The level of care or treatment for opioid use disorder range from the highest level of detoxification (detox), short and long term inpatient rehabilitation (rehab), partial hospitalization facilities, intensive outpatient treatment, to the least restrictive level of treatment, which is individual therapy (Veilleux et al., 2010). Detox is a medically supervised process during which the body removes opioids via metabolization (Smith, 2009). Metabolization is the process by which opioids are broken down on the molecular level to enable them to perform a specific function in the body, such as dulling pain and slowing heart and breath rates. After metabolization, the opioids are then eliminated from the body (Smith, 2009).

The withdrawal process of opioids, which is excruciating, includes symptoms such as agitation, sweating, diarrhea, vomiting and powerful cravings (APA, 2013). The length of the detox process is dependent upon which opioid was last used (Rahimi-Movagha et al., 2018). Heroin withdrawal typically begins five hours after the last administration and less acute withdrawal symptoms can last for months, with strongest symptoms occurring two to four days after cessation (APA, 2013; Rahimi-Movagha et al., 2018). Inpatient rehabilitation takes place at a treatment facility, allows for stabilization via medications and/or therapeutic interventions and

lasts between two weeks to two years (Veilleux et al., 2010). Community based interventions include partial hospitalization programs (PHP), intensive outpatient programs (IOP), individual therapy, or non-therapeutic support groups, such as Narcotics Anonymous, Smart Recovery, and Phoenix Sport (NA, 2019; Veilleux et al., 2010).

Psychological distress is a condition of emotional strain often accompanied by symptoms of low mood and anxiety (Kessler et al., 2002; Mirowsky & Ross, 2003). There have been several past research studies exploring the relationship of psychological distress and the misuse of illicit substances (Green, Zebrak, Robertson, Fothergill, & Ensminger, 2012; Gyawali et al., 2016; Moller, Tait, & Byrne, 2012; Nordfjærn, 2010). More specifically, symptoms of psychological distress can predict whether or not a patient is prescribed an opioid by their physician, as well as the dosage and length of prescription time (Scherrer et al., 2013; Darnall, 2014). Patients who displayed symptoms of either depression or a substance use disorder had a higher number of prescriptions for opioids to deal with chronic pain, as compared to pain patients with symptoms of neither diagnosis, who more frequently receive anti-inflammatory medications (Darnell, 2014). These findings support that independent of the intensity of pain for a patient, psychological factors seem to influence the prescription of opioids (Darnell, 2014). Individuals with an opioid misuse disorder diagnosis also have increased rates of biological and social stressors, such as illness, family dysfunction, legal problems, and problems with employment (Askari, Hassanbeigi, & Fallazadeh, 2011). Psychological stress has been demonstrated to not only fulfill a meaningful function in the development of opioid misuse behaviors but is also a major contributing factor for relapse (Ungless, Argilli, & Bonci, 2010). According to Hassanbeigi (2013), the greater overall number of daily stressors that an individual faces directly correlates to their probability of experiencing cravings for the drug that they have a

diagnosis of misusing.

Disability is associated with decreased functioning from a disease, disorder, or injury which impairs an individual's ability to interact with their environment (Leonardi, Bickenbach, Ustun, Kostanjsek, & Chatterji, 2006). Disability may affect physical, psychological or social functioning (Leonardi et al., 2006). Opioids are often utilized to treat a variety of disabilities, particularly those that cause pain (Leonardi et al., 2006). Burgess, Siddiqui, and Burgess (2014) characterize pain as a sensation that is subjectively related to an individual's emotional state and their overall well-being. Prescribing opioids for acute or surgical trauma is more straightforward than in the case of patients with chronic or ongoing pain (Burgess, Siddiqui, & Burgess, 2014). There is an association between disability and high rates of chronic pain (Blanco et al., 2016). One-third of the American population has a form of chronic pain. Chronic pain is a prevalent reason leading to patients seeking medication intervention (Blanco et al., 2016). There is little evidence suggesting any benefit of long-term opioid prescription for disabled patients (Dowell, Haegerich, & Chou, 2016). Over 50 million people living in America have a type of disability, including emotional and physical (McDorman, 2017). Individuals with chronic pain as a symptom of their disability are often more sensitive to pain when they have an existing opioid use disorder diagnosis (Dunn, Brooner & Clark, 2014). A co-occurring opioid use disorder diagnosis may further reduce quality of life for a disabled individual (McDorman, 2017). This reduction in quality of life may occur through the inability to establish or maintain personal care skills. Quality of life can also be diminished through negative health related effects of substance misuse, and from limited accessibility to health-related services (Koch & Koch, 2014).

Relevance to Social Work

Prescription opioid abuse should be of concern to social workers for several reasons. Vulnerable populations are especially susceptible to opioid addiction and abuse (Manchikanti et al., 2012; Rummans, Burton, & Dawson, 2018). These include individuals struggling with unemployment, history of incarceration, and a mental health diagnosis. Individuals struggling with unemployment, incarceration, and a mental health diagnosis are at elevated risk of opioid abuse (Manchikanti et al., 2012; Webster, 2017).

Substance use disorders impact not only the individual addicted but also the entire family. Many of the values issued by the National Association of Social Workers encourage social workers to intervene and assist those impacted by substance abuse disorders. These include social justice, the importance of human relationships, and competence (NASW, 2017). Since many of the affected individuals are vulnerable populations, the value of social justice implores social workers to challenge the issue of addiction by utilizing the most current research. Social work acknowledges the importance of health care equality and the opportunity for all individuals to receive the best treatment possible (NASW, 2017). The family unit often experiences disruption due to substance use. These disruptions can include the placement of children in foster care, loss of employment and income, and death of a family member from overdose (Florence, Zhou, Luo, & Xu, 2016; Mowbray, Victor, Ryan, Moore & Perron 2017; Currie, Jin, & Schnell, 2019). Social workers are responsible for recognizing the central importance of human relationships, the most fundamental being family relationships. Finally, social workers must enhance their competence and professional expertise, particularly regarding evidence-based practice (NASW, 2017).

The field of social work contains a great deal of research promoting evidence-based substance abuse services. If examining biological, psychological, and social risk factors may improve treatment outcomes and decrease the risk of opioid abuse, then social workers have an ethical obligation to utilize this approach as a best practice to assist clients with the most effective treatment methods. This study intends to enhance this area of research and expand the scope of evidence-based practice for the social work discipline.

Scientific studies integrating biological and social research have grown in recent years, however, the field of social work has not integrated this research as readily as other social sciences, such as psychology, sociology, and anthropology (Maynard, Boutwell, Vaughn, Naeger, & Dell, 2018). Although social work readily embraces the biopsychosocial model on the surface, the biological domain is often ignored in favor of the psychosocial (Saleebey, 1992). One impediment to utilizing an integrated approach is the failure of social work to synthesize research from the biological and social sciences (McCutcheon, 2006). One reason for the lack of synthesis between disciplines is a history of poor communication of research across disciplines. A biopsychosocial approach is conceptually broad which makes it difficult for any one discipline to collect and test all the necessary data for interdisciplinary research. Social work excels at working across disciplines and is in a position to support the synthesis of behavioral and sociological research and integrate the findings into practices that may translate into educational gains. Maynard et al. (2018) identify research involving the physiological roots of behavior (such as overall health and disability status) as one of three topics that are particularly salient for the research agenda of social work, the other two being neurobiological research and genetic research.

Gaining a better understanding of the multifaceted components of addiction may guide policy to reflect a holistic review rather than the current punitive model of addiction prevention and treatment. Social workers, including clinicians and researchers, should communicate research findings in a responsible and understandable manner, including clearly communicating the complexity of biological, psychological, and social factors of pain management and addiction risk. Clear and open communication of research findings will help to mitigate discrimination and stigmatization of clients based on their diagnoses (Chapman et al., 2018). It should be noted that for the remainder of this study, the term opioid use will be used to describe the misuse or abuse of opioids. The use prescription opioids as directed by a physician will not be explored by this research study.

Literature Review

Opioid Use Disorder

Opioid applies to any substance which produces analgesic effects through acting on opioid receptors located in the brain, spinal cord, and digestive system (Offermanns & Rosenthal, 2008). Opioid use side effects include drowsiness, or "nodding out", relaxed muscles, and constipation. Opioids can be synthetic, semi-synthetic, or non-synthetic (naturally occurring). Opioid differs from the term opiate, which refers strictly to non-synthetic drugs derived from the opium plant. Examples of opiates include opium, heroin, and morphine which are also the oldest opiates (Offermanns & Rosenthal, 2008). The term opiates was historically used more often by professionals but is now typically replaced by the term opioids as it is the more inclusive term and because it also matches the appropriate DSM-V diagnosis, Opioid Use Disorder (APA, 2013; Offermanns & Rosenthal, 2008). Opioids will be the term utilized for the remainder of this study to identify both synthetic and non-synthetic substances acting on opioid

receptors (Offermanns & Rosenthal, 2008). Opioid use disorder is a pattern of problematic use of opioids that leads to clinically significant consequences that negatively impact the user's health (APA, 2013). Criteria include taking higher doses of opioids than intended over an increased period, experiencing cravings for opioids, failure to comply with obligations due to use, tolerance, and withdrawal. Withdrawal symptoms include body aches, nausea, gastrointestinal problems, difficulty sleeping, and a depressed mood (APA, 2013).

Prescribed opioids can be categorized as naturally occurring or non-synthetic (e.g. morphine), semi-synthetic (e.g. hydrocodone), or fully synthetic (e.g. fentanyl) (Holmquist, 2009). Naturally occurring opioids are developed solely via the opium poppy and include morphine and codeine. Semi-synthetic prescribed opioids are man-made from naturally occurring opioids, including oxycodone and hydrocodone. Fully synthetic prescribed opioids are completely manufactured and include fentanyl, methadone, and tramadol and are typically the most potent type of opioids (Holmquist, 2009).

In the United States, opioids are commercially available for oral (pill), transdermal (patch), nasal (spray), and intravenous use (injection) (Rosenblum, Marsch, Joseph, & Portenoy, 2008). Opioids can be administered illegally with a variety of methods (Butler, Black, Cassidy, Daily, & Budman, 2011). Pills can be swallowed, crushed smoked, snorted or injected (Butler et al., 2011). Snorting and injecting opioids are the preferred route for misuse, due to the rapid delivery of the drug to the brain, resulting in intense rewarding effects. Intravenous use results in a more immediate and rewarding high, due to the drug entering the bloodstream and quickly travelling to the brain. Alternatively, opioids such as heroin can be inhaled (smoked) as well as snorted (via the nose) or taken intravenously (Butler et al., 2011). Hydrocodone is most often misused orally, oxycodone is typically misused by snorting, morphine is typically misused by

injection, and fentanyl is commonly misused by snorting or injection (Armenian, Vo, Barr-Walker & Lynch, 2018; Ciccarone, Ondocsin, & Mars, 2017). Typically, users may begin with swallowing pills, then proceed to crushing and snorting or smoking and then to injecting opioids. This pathway occurs for two reasons, it is a more intensive high and because it is cheaper. Pills are more expensive than heroin and pills take longer for the high to be felt whereas the intravenous high occurs in seconds (Armenian et al, 2018; Ciccarone et al., 2017). Fentanyl and carfentanil are even stronger and less expensive than heroin (CDC, 2019; NIH, 2019). Fentanyl is 50 times more effective than heroin; carfentanil is 100 times more potent than fentanyl (CDC, 2019; NIH, 2019). This leads to a greater number of overdoses from these drugs than from other opioids (CDC, 2019).

Opioids create their analgesic effect by attaching to receptors found primarily brain regions (Feng et al., 2012; Rosenblum et al., 2008). When attached, they send signals to the brain to modulate pain, as well as other effects such as a slowing breathing. The human body naturally creates opioids known as endogenous opioids or endorphins (Rosenblum et al., 2008). Generally, the body is not capable of producing enough endogenous opioids to stop chronic pain or cause an opioid overdose (Papini, 2018). Opioids may also activate other neural pathways to produce mood effects such as euphoria or dysphoria (Papini, 2018). There are several categories of opioid receptors, with the brain being the primary location (Snyder, 2014). Receptors are also present in the spinal cord and digestive track, including mu, delta, kappa, and nociception receptors (Snyder, 2014). Delta receptors have antidepressant effects, the slow down respiration, and have some effect of pain relief in the spine (McDonald & Lambert, 2015). Kappa receptors are involved with stress reduction and sedation. Nociception receptors help modulate anxiety, depression, and appetite (McDonald & Lambert, 2015; Snyder, 2014; Waldhoer, Bartlett, &

Whistler, 2004). Analgesia, or the reduction of pain, is largely produced via mu opioid receptor activation (Rosenblum et al., 2008; Waldhoer et al., 2004). Opioids prescribed for pain are typically categorized as mu agonists (Feng et al., 2012).

Opioid classification includes partial and full opioid agonists (Rosenblum et al., 2008). Opioid antagonists, including non-opioid naloxone and naltrexone, are not opioids but can be used after an opioid overdose to immediately reverse the effects of mu agonists (Rosenblum et al., 2008). An opioid agonist is an opioid that activates particular opioid receptors which means that the person can feel the effects of the opioid (Helm, Trescot, Colson, Sehgal, & Silverman, 2008). Agonists can be either full or partial, with partial agonists have much less of an effect on their corresponding receptors than a full antagonist (Helm et al., 2008). Examples of full agonists are codeine, fentanyl, heroin, methadone, morphine, and oxycodone. Buprenorphine is the most commonly known partial agonist (CAMH, 2016; Helm et al., 2008). Naturally occurring opioids typically have short half-lives which has led to the creation of synthetic opioids with prolonged effects and longer dosing intervals, decreasing the risk of addiction (Rosenblum et al., 2008). An opioid half-life is the length of time necessary for the concentration of the opioid to be halved (Snyder, 2014). Understanding the half-life of a specific drug is an important factor for physicians when determining dosing intervals, or how often the patient should take the medication. Frequently prescribed opioids including oxycodone and morphine have considerably short half-lives consisting of two to four hours. Synthetic opioids such as the fentanyl patch are absorbed slowly, extending the half-life of the drug to approximately 17 hours and increasing the amount of time needed between doses (Snyder, 2014). Social workers should have a thorough understanding of dosing intervals when working with pain management clients in order to properly assess and educate clients about addiction risks.

History of Opioid Use

Opioids use for a variety of medical ailments has existed for millennia (Damania, 2011). Archeological records indicate that the Assyrians in Mesopotamia, located in modern day Iraq, harvested opium poppy for its euphoric properties as early as 3400 BCE, which is approximately five thousand years ago (Damania, 2011). Around this time, the poppy plant was referred to as the "joy plant" (Booth, 1996). Use spread to the Phoenicians (modern day Lebanon, Middle East), and Minoans (modern day Crete, Greece), and Egyptians in Africa, all of which are located around the Mediterranean Sea (Damania, 2011). Trade routes eventually took opium from the Mediterranean Sea to Europe. Hippocrates noted the medicinal uses for opium around 355 BCE included its ability to stop bleeding during treatment of internal diseases (Damania, 2011). By 1527 CE, approximately 500 years ago, a pill form of opium existed for medical use (Papini, 2018).

In 1803, a German doctor discovered the active ingredient in opium and successfully isolated it, discovering morphine. Morphine derived its name from Morpheus, the Greek god of dreams (Papini, 2018). Shortly thereafter, the hypodermic needle was invented and then morphine could be injected (Damania, 2011). Codeine synthesis first occurred in 1830. Codeine is less potent than morphine and had a primary use of relieving cough. Morphine use continued and quickly spread across the world, due to its reliability as a long-lasting painkiller. Cultivation of the opium poppy plant occurred in the American south, about 150 years ago during the Civil War (1861-1865). Union and Confederate soldiers used morphine to treat dysentery of soldiers and as an analgesic for battlefield surgeries. By the end of the war, many soldiers were suffering from “army disease,” an early term to describe opioid addiction (Damania, 2011). The first American opioid epidemic occurred before, during and after the Civil War from 1840 to 1890

(Kolodny et al., 2015). During that time, opioid consumption increased by over 500%. (Kolodny et al., 2015). During this opioid epidemic, Bayer Pharmaceuticals first synthesized heroin and introduced it to the commercial market as an analgesic in 1874, describing it as a less addictive form of opioid when compared to morphine (deShazo, Johnson, Eriator, & Rodenmeyer, 2018). This event is significant in that, a pharmaceutical company inaccurately reported that this new opioid (heroin) was a less addictive version of the older opioid (morphine) but in fact, this new opioid, may have made the epidemic worse (Damania, 2011). At this time, morphine was a common ingredient in over the counter medications, primarily to treat bronchitis, tuberculosis, and other cough inducing sicknesses (Damania, 2011).

By the early 1900s, the federal government started to introduce legislation to curb opioid use (deShazo et al., 2018). In 1909, the Smoking Opium Exclusion Act made importing, possessing, or smoking opium a crime. The Harrison Narcotic Tax Act of 1914 created a registry of the production, manufacturing, and dispersing of any opium product. In 1924 the Anti-Heroin Act made it illegal to produce or possess heroin. Despite these attempts, by 1925, approximately 200,000 individuals were opioid addicts (deShazo et al., 2018). By 1935, Alcoholics Anonymous was created and Narcotics Anonymous followed in 1953 (Laudet, 2008).

U.S. President Nixon established methadone clinics in 1972, to combat the growing opioid addiction crisis (deShazo et al., 2018). Methadone was initially manufactured in 1937 by scientists at the IG Farben company in Germany (Payte 1991). The scientists were interested in finding a painkiller that was less addictive than morphine or heroin and could provide analgesia during surgery (Salmin, Giroux, Vachon, & Beaudry, 2016; Payte, 1991). The first use of methadone in the United States occurred in the 1940s. Methadone is currently a treatment for opioid use disorder treatment. Methadone mitigates symptoms of opioid withdrawal and is

effective in longer term maintenance therapy but many clinicians, clients, and those in sobriety report serious concerns with methadone and the potential for abuse. Maintenance therapy takes place in outpatient settings (Payte, 1991). The United States Congress passed The Narcotic Addict Treatment Act in 1974, allowing physicians to provide opioids to individuals with an addiction diagnosis for maintenance treatment (deShazo et al., 2018).

The New England Journal of Medicine published an article in 1980 that erroneously claimed less than one percent of hospital patients treated with opioids become addicted (Leung, Macdonald, Stanbrook, Dhalla, & Juurlink, 2017; McCarthy, 2017; Porter & Jick,1980; Rummans, Burton, & Dawson, 2018). The letter was eventually cited in 439 times in academic journals, leading many to underestimate the addictive potential of opioid prescriptions (deShazo et al., 2018; Leung, et al., 2017). Leung et al. (2017) observed that these journal articles often exaggerated the content of the editorial. Nevertheless, the statistic of the one percent addiction rate of opioids was subsequently utilized in the marketing of OxyContin (deShazo et al., 2018). OxyContin is a brand name for oxycodone and was the first sustained released version of that drug which enabled the drug to be released into the body in a slower and more controlled manner. Purdue Pharma is the company that released OxyContin (Skolnick, 2018). The first release of OxyContin occurred in 1996 and sales approached $48 million, reaching $1.1 billion by 2000. By 2010, OxyContin sales represented roughly 30% of the analgesic market, with $3.1 billion in sales (Skolnick, 2018). In 2007, Purdue settled with the Food & Drug Administration for $630 million dollars for false marketing claims of OxyContin (deShazo et al., 2018). OxyContin was often crushed for illegal use and was reformulated in 2010 to make misuse more complicated but not impossible. This led to many oxycodone addicts switching to black tar heroin, which is a less costly type of heroin that originates in Mexico (deShazo et al., 2018).

Opioids that are more potent than heroin have recently infiltrated the American illegal drug market (deShazo et al, 2018). One example is fentanyl, which is 80 times more powerful than heroin. In 2016, carfentanil became popular because compared to fentanyl it is 100 times more potent. It is also 1000 times stronger than heroin and was originally used as an elephant tranquilizer. These newer, more potent opioids are responsible for over fifty percent of the overdose fatalities in the United States and may be connected to abuse of prescription opioids (deShazo et al., 2018). In 2019 the Rochester Drug Cooperative was charged with conspiring to distribute drugs (Rashbaum, 2019). This marks the first instance of a pharmaceutical distributor facing federal charges like these. The charges allege that the Rochester Drug Cooperative was shipping oxycodone and fentanyl products to pharmacies, which subsequently illegally sold the drugs (Rashbaum, 2019). Most recently Purdue Pharma, the company that created and distributed the opioid pain reliever OxyContin, filed for bankruptcy (Mulvihill, 2019). The bankruptcy is a result of multiple lawsuits against Purdue Pharma from a variety of state and local government who sued the company for its role in the opioid epidemic (Mulvihill, 2019).

During most of the 20th century, medical professionals had an awareness of the addiction risks of prolonged opioid use and the diminishment of efficacy of opioids over time (Rosenblum et al., 2008). The contemporary opioid crisis in the United States most likely began with over-prescription of opioids for their analgesic effects in the 1990s. This contributed to them being the most frequently prescribed type of pharmaceuticals in the United States (Rosenblum et al., 2008). This coincided with the American Pain Society's push at the end of the decade to acknowledge the fifth vital sign as being pain (Skolnick, 2018). The first four vital signs have traditionally consisted of temperature, pulse, respiratory, rate and blood pressure (Lynch, 2001). This viewpoint has support by the Veterans Health Administration as well as the Joint

Commission on Accreditation of Healthcare Organizations (Skolnick, 2018). Patients were given more liberty in assessing their own pain and thus prescriptions of opioids for chronic pain increased leading to a greater degree of freedom and further misuse (Skolnick, 2018). The number of first-time prescription opioid abusers expanded from 628,000 in 1990 to 2.4 million in 2004 (Rosenblum et al., 2008). Subsequently the utilization of opioids to treat chronic pain began a substantial increase from year to year in the 1990s. The rise of medical use of opioids is related to an escalation in the misuse of opioid pain relievers (OPRs). The challenge remains to decrease the probability of misuse while not preventing legitimate use of opioids (Rosenblum et al., 2008). Social workers may mitigate this challenge by educating themselves on the most current research regarding pain management and addiction risk.

Theoretical Framework

Biopsychosocial Theory

Biopsychosocial theory describes the biological, psychological, and social mechanisms that interact to affect physical health and illness (Suls & Rothman, 2004). As a guiding framework, the biopsychosocial model has succeeded in enabling physical and behavioral health professionals to gain a multi systems viewpoint of human functioning (Suls & Rothman, 2004). The theory was formed during a shift away from the traditional biomedical disease perspective, which was beginning to be viewed as reductionist in the 1970s (Engel, 1978). Individual health and well-being are viewed through the interplay of three factors: biological, psychological, and social. Biological factors include genetic, biochemical, and physical health conditions. Psychological factors include emotions, personality, and mood. Social factors are those which encompass culture, language, family dynamics, and socioeconomic status (Engel, 1978). Many other theories of addiction were developed from a singular level of analysis, looking at

environmental, psychosocial, or biological factors alone (Peele, 1981). Biopsychosocial theory is an ideal lens through which to view addiction as incorporates many of the strengths of other theories of addiction while utilizing a multivariate approach (British Columbia Ministry for Children and Families, 1996). It unites many of the positive aspects of previous theories of addiction and allows focus to be put on all aspects influencing addiction. Individuals struggling with addiction are viewed heterogeneously with unique assessment and treatment needs.

Biopsychosocial theory can be empirically tested unlike other theories of addiction (Bolton & Gillet, 2019). As technology improves, medical imaging and genetic screening will prove to be helpful tools in testing hypotheses generated by this theory. A systems approach addresses the complex components of addiction includes individual free choice and moral responsibility within the biological, personal experience and socio-historical environment of the person (British Columbia Ministry for Children and Families, 1996). Social workers must not only integrate biopsychosocial research into their theory and practice but also begin to contribute to scientific advances to test and expand the biopsychosocial theory in order to better aid clients and stay pertinent among other fields of research (Brekke, 2012).

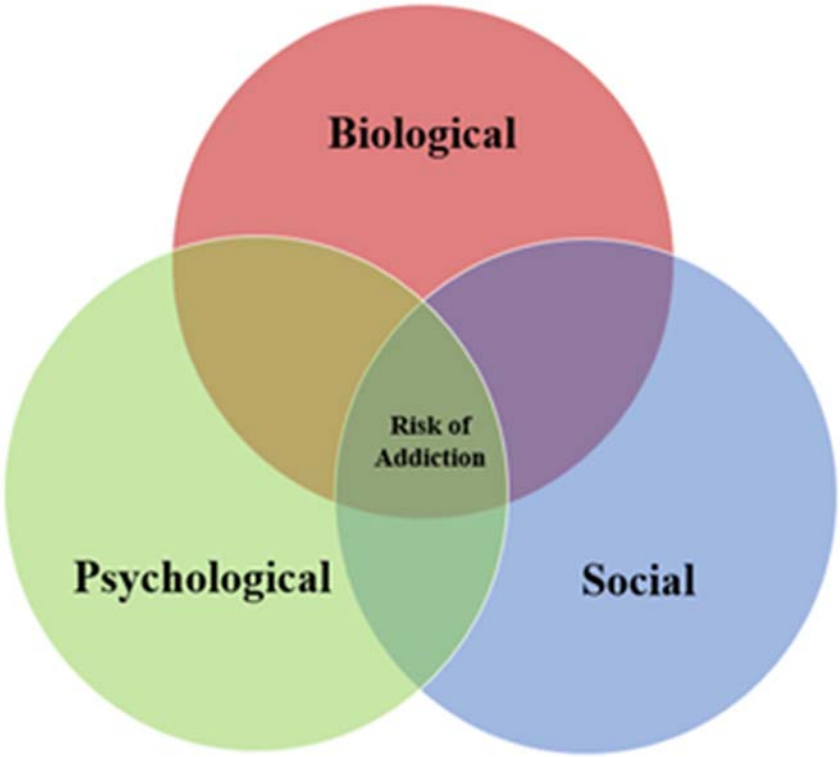

Figure 1. The Biopsychosocial Model

Strain Theory

Strain theory offers another salient lens through which to view opioid misuse. Strain theory focuses on strain, or stressors, affecting various groups of people (Merton, 1968). Agnew (2006) adapted strain theory to focus on strain as it affects individuals. Strain theory postulates that drug use is a reaction to exposure to differing types of stress (Agnew, 2006). Strains may frequently lead to negative emotional states. These states can include anger, frustration, and depression. These negative feelings drive the individual to mitigate them through corrective actions. Strain is a contributing factor in reducing social control and an individual's ability to cope in a healthy manner (Agnew, 2006). According to strain theory, many individuals who misuse drugs can describe a stressful situation which caused strain and contributed to them seeking out drugs for physical or emotional relief (Davis, Bahr, & Ward, 2013). Agnew (2006)

identifies three common types of strain. The first is goal blockage, which is when an individual is unable to achieve a goal that they desire. This type of strain may manifest as a failure within the educational system. A second form of strain results when something of value is lost, such as loss of physical or emotional functioning from a disability. Finally, strain may result from receiving a negative stimulus, such as losing a job or experiencing psychological distress (Agnew, 2006). Particular strains may be generalized into a belief that the environment is not support and may contribute to an individual being faced with more motivation to engage in substance misuse (Agnew, 2006). Strain theory traditionally utilizes the term deviant behaviors to describe the behaviors caused by negative states; however, due to the stigmatizing nature of that term, this study will call those behaviors unfavorable (Merton, 1968).

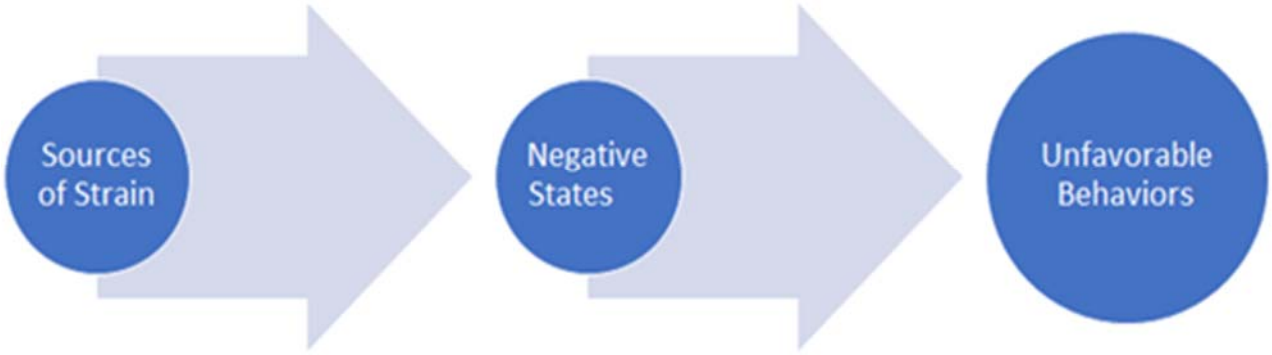

Figure 2. Strain Theory

Factors That Contribute to Opioid Misuse

Disability. Patients with a high-risk classification for opioid misuse report elevated levels of subjective pain (Sehgal, Manchikanti, & Smith, 2012). Individuals with a substance use disorder diagnosis report lower pain thresholds. It is not known if the lower threshold increases the addiction risk or if the effects of addiction lower pain thresholds (Sehgal, et al., 2012). Few medical schools offer courses in addiction or adequate pain management training (Moen,

Drageset, Eide, & Gjesdal, 2018; Volkow & McLellan, 2016). Physicians may have the misconception that taking pain medications as prescribed can protect their patients from addiction. This may lead clinicians to over prescribe and fail to recognize early signs of addictive behavior. The National Institute of Health recommended that research is needed for improving clinical practice to assist physicians in differentiating between acute and chronic pain, including a better understanding of how acute pain progresses to chronic pain, particularly how this transition could affect addiction risk for opioid pain killers (Volkow & McLellan, 2016). Treatment with opioids has been the mainstay approach for treating chronic pain, however, remains controversial due to the potential for misuse and addiction (Savage, 2003). There are also concerns about the long term implications of opioid induced hyperalgesia, an increased perception of pain, which also increases the risk of addiction (Rosenblum et al., 2008).

Disability is a complex phenomenon, encompassing impairments, activity limitations, and participation restriction and often accompanied with pain (Kumar, Singh, Sakar, & Singh, 2018; Moen, Drageset, Eide, & Gjesdal, 2018). Disability results from the interaction of an individual's impairments and environmental hurdles that collectively impede the individual's potential positive contributions to society (Kumar, et al., 2018; Moen, Drageset, Eide, & Gjesdal, 2018). The literature suggests that disability for individuals with substance abuse correlates with poor psychological and physical health, interpersonal and family conflicts, lack of education, duration and severity of substance use, and degree of stigma and discrimination experienced in the society (Kumar et al., 2018; Moen, Drageset, Eide, & Gjesdal, 2018). Evidence suggests that individuals with disabilities have increased incidences of opioid misuse in comparison to the general population, however they have less likelihood of receiving appropriate treatment (Chan & Trant, 2018). Disabled individuals are also more likely to misuse prescription pain medication

or heroin, in part due to the high occurrence of chronic pain that is associated with disability (ACL, 2019; Kennedy, Roll, Schraudner, Murphy, & McPherson, 2014). The existing research provides evidence that psychological distress is associated with disability. (Chan & Trant, 2018). Adults with disabilities had a higher rate of mild to moderate and severe psychological distress compared to adults without disabilities (Okoro & Dhingra, 2014). Severe psychological distress, serious mental illness, and the co-morbidity of chronic medical conditions were found to be related, although no clear causal pathway was identified (Swartz & Jantz, 2014).

Psychological Distress. Data gathered from the United States routinely show that psychological factors and mental health disorders can reliably predict opioid misuse (Darnell, 2014). The data suggest that physicians may be unwittingly prescribing opioids in an attempt to treat the factors that contribute to their patients' perception of pain. Psychological factors are among the primary contributing factors that opioids treat. (Darnall, 2014). Depression has a bidirectional relationship with opioid use, depressed individuals are often prescribed opioids and individuals who are prescribed opioids frequently have and accompanying depression diagnoses (Sehgal et al., 2012). Among individuals who are taking opioid analgesics, depression accounts for higher rates of reported abuse of prescribed medications (Sehgal et al., 2012). Mood disorders, including depression, are among the most frequent psychological comorbidities with opioid addiction (Berrettini, 2017). Sullivan (2018) found that individuals with a depression diagnosis had increased likelihood to begin treatment with opioids than were patients without a depression diagnosis. They were also progressed to long term opioid treatment twice as often. Depressed patients also continue to require opioid treatment for pain at much lower intensity levels as well. Depression also elevates the risk of prescription opioid misuse for adults and adolescents (Sullivan, 2018).

Similar to depression, anxiety disorders are very common psychiatric comorbidities with opioid misuse (Arteta, Cobos, Hu, Jordan, & Howard, 2016; Berrentinni, 2017). Anxiety in the form of panic, social phobia, and agoraphobia accounts for higher rates of abuse of prescribed opioids when compared to individuals not diagnosed with an anxiety disorder (Sehgal et al., 2012). Several researchers have mentioned that anxiety disorders lead to substance abuse for patients who have been prescribed opioids more often than just the presence of prescription opioids by themselves, creating substance abuse iatrogenically by the prescribing physician (Sehgal et al., 2012). Martins et al. (2012) concluded that individuals with anxiety disorders are at elevated risk of abuse of opioids.

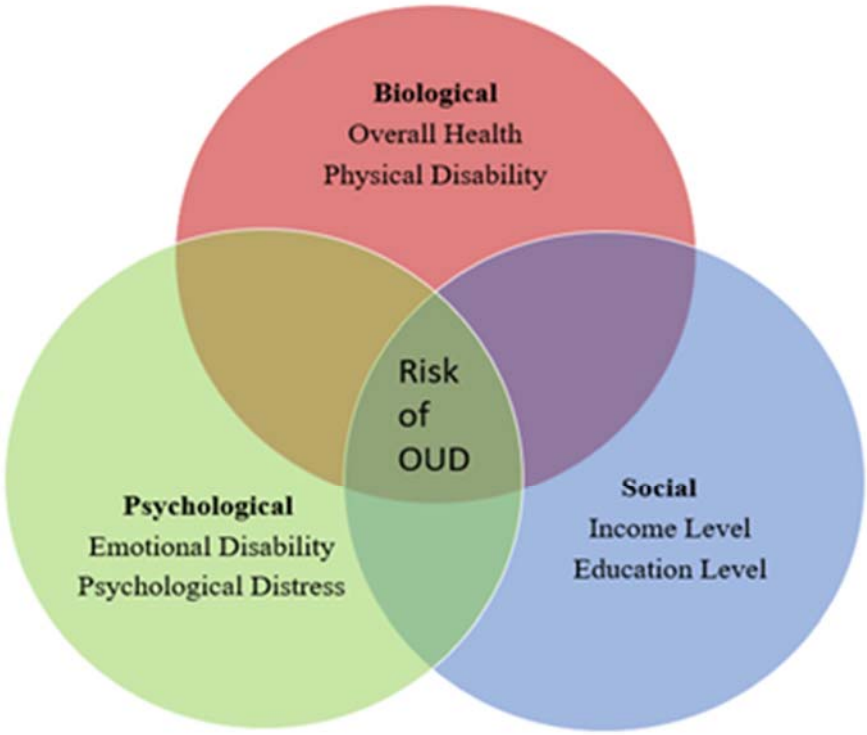

Figure 3. The Biopsychosocial Model of Variables Contributing to Opioid Use Disorder

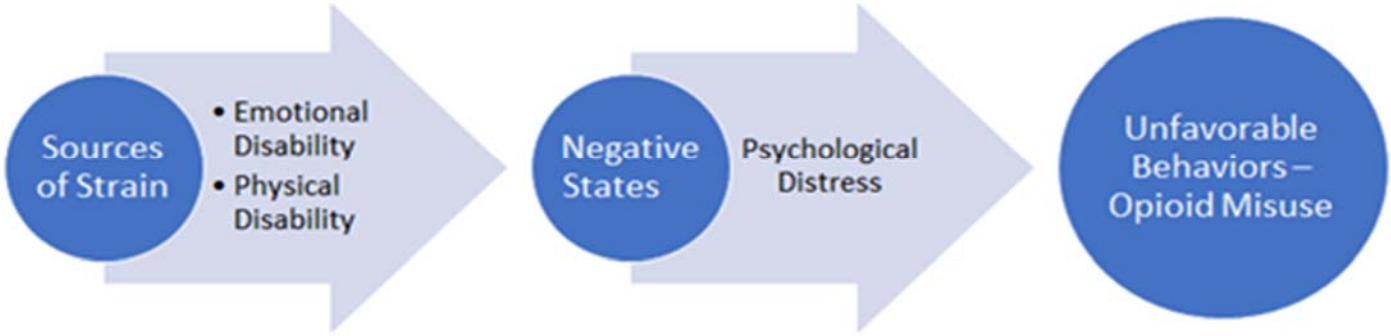

Figure 4. The Strain Theory of Variables Contributing to Opioid Use Disorder

CHAPTER 2: Methods

Data Sources

This study utilized secondary survey data from the 2017 National Survey on Drug Use and Health (NSDUH) (SAMHSA, 2018). The NSDUH is a survey that has been organized annually by the federal government through the U.S. Department of Health and Human Services, the Substance Abuse and Mental Health Services Administration (SAMHSA), and the Center for Behavioral Health Statistics and Quality (CBHSQ) since 1971 to determine the prevalence and correlations of drug use in the United States. It is the primary source of statistical information on the use of tobacco, alcohol, prescription psychotherapeutic drugs, and other substances by residents of the United States. The survey also includes several series of questions focusing on mental health issues (SAMHSA, 2018).

The criteria for the NSDUH is any civilian, non-institutionalized resident of the United States who is over the age of 12. In the original 2017 sample, there was a sample size of 68,032 individuals but for the measures utilized in this study, the sample size was 56,276 (SAMHSA, 2018). Excluded from participation were individuals with no permanent address, active-duty military personnel, and residents of institutional facilities, such as correctional facilities, nursing homes, mental institutions, and long-term care hospitals (SAMHSA, 2018).

Trained SAMHSA employees conducted the interviews in-person. They interviewed sampled individuals regarding delicate issues such as illegal or illicit drug use and presenting psychological concerns (CBHSQ, 2018b). Interviewers completed training to educate them how to communicate the importance of confidentiality with all potential respondents. Interviewers utilized computer-assisted interviewing (CAI) methods to enhance privacy and confidentiality for respondents while they partook in the interview. Introduction letters were mailed to sampled

residences, with field interviewers conducting follow up home visits. Eligibility to be the screening participant included any adult resident of the household. Interviewers used a tablet computer to conduct a five-minute screening with the potential respondent. Basic demographic data was gathered at this time on all household members. Subsequent to the screening, field interviewers made attempts to conduct interviews with each potential respondent in the home. The completion of the interviews took place in a separate area of the home, to maintain privacy from other members of the residence (CBHSQ, 2018b).

The interviews consisted of a blend of computer-assisted personal interviewing (CAPI) as well as audio computer-assisted self-interviewing (ACASI) (CBHSQ, 2018b). During the CAPI segment, interviewers read questions to the respondent and the interviewer inputted the responses into the computer. During the ACASI segment of the interview, participants read the questions themselves or listen to them through headphones and then input their responses into the tablet without the interviewer being aware of their response. Participants received a $30 incentive for participating in the interview (CBHSQ, 2018b).

Institutional Review Board (IRB)

The Millersville University IRB has approved this study as an expedited review due to the use of de-identified secondary data. The secondary data analysis poses less than minimal risk to the participants. The research does not contain any identifying information for the participants; therefore, the results of this study cannot be connected to individual participants of the 2017 NSDUH.

Sampling

The sampling methodology utilized for the 2017 NSDUH was a multistage probability sampling throughout the 50 states and the District of Columbia (CBHSQ, 2018b). Every state

and the District of Columbia was divided into sampling strata defined as state sampling regions (SSRs). There was a total of 750 SSRs generated, dividing each state into equally sized regions. The number of SSRs varied by state, the number being related to the state's sample size. SSRs were adjoining geographic regions designed to produce approximately the same number of interviews within a given state. SAMHSA researchers selected census tracts from each SSR, census block groups from within each of the census tracts, and area segments from within each of the census block groups. Furthermore, the researchers selected dwelling units (DUs) among segments, and a maximum of two residents who fit the inclusion criteria were asked to participate with the interview (CBHSQ, 2018b).

Measures

Physical disability (continuous). A six-item questionnaire will measure physical disability. The American Community Survey (ACS) created the questionnaire to determine the minimum standard for physical disability (CDC, 2018b). The questions define functional aspects of physical disability, including disability in hearing, vision, mobility, self-care, and independent living (CDC, 2018b). Example questions include “Are you deaf or having serious difficulty hearing?”, “Are you blind or having serious difficulty seeing, even when wearing glasses?”, “Do you have serious difficulty walking or climbing stairs?”, “Because of a physical, mental, or emotional problem, are you having difficulty remembering, concentrating, or making decisions?”, “Do you have difficulty dressing or bathing?”, and “Because of a physical, mental, or emotional condition, do you have difficulty doing errands alone such as visiting a doctor’s office or shopping?” (SAMHSA, 2018). Responses in the original survey were scored as 0 = “no”, 1 = “yes” (SAMHSA, 2018). For the purpose of this study, a composite continuous variable was created to sum the total score of the six-item set of questions. Scores for the

composite variable range from 0 to 6, with higher scores indicating greater physical disability.

Emotional disability (continuous). The validated World Health Organization Disability Assessment Schedule (WHODAS) will measure emotional disability (Meesters, Verhoef, Liem, Putter, & Vliet, 2009; SAMHSA, 2018). A reduced set of WHODAS items were included in the 2017 NSDUH. The variable WHODASC2 assesses disturbances in social adjustment and behavior. Participants were asked how much their emotions, nerves, or mental health caused them to have difficulties in daily activities and were asked to reflect on one month within the past 12 months when their emotions, nerves, or mental health interfered most with their daily activities. Example items include: "How much difficulty did you have remembering to do things you needed to do?", “How much difficulty did you have concentrating on doing something important when other things were going on around you?”, “How much difficulty did you have getting out of the house and getting around on your own?", “How much difficulty did you have dealing with people you did not know well?”, "How much difficulty did you have in participating in social activities, like visiting friends or going to parties", “How much difficulty did you have taking care of household responsibilities?”, and "How much difficulty did you have taking care of your daily responsibilities at work or school?". Likert scale responses are scored 0 = "no difficulty", 1 = "mild difficulty", 2 = "moderate difficulty", and 3 = "severe difficulty". The scale is continuous with values were summed across the eight variables created from WHODAS items to create a score ranging from 0 to 24, with a higher score indicating higher level of difficulty with functioning (SAMHSA, 2018).

Psychological distress (continuous). The validated Kessler-6 (K6) distress scale will measure psychological distress (Kessler et al., 2002; SAMHSA, 2018). Participants were asked to reflect about the worst month of psychological distress over the last year. For example, if a

participant indicated that the month of March was the worst month of psychological distress, then they were asked to reflect on approximately 30 days of March. Example items include: "How often did you feel nervous?", "How often did you feel hopeless?", "How often did you feel restless or fidgety?", "How often did you feel so sad or depressed that nothing could cheer you up?", "How often did you feel that everything was an effort?", and "How often did you feel down on yourself, no good, or worthless?". The original K6 scale scored responses as 1 = "all of the time", 2 = "most of the time", 3 = "some of the time", 4 = "a little of the time", 5 = "none of the time". The revised responses for the NSDUH are scored 0 = "none of the time", 1 = "a little of the time", 2 = "some of the time", 3 = "most of the time", 4 = "all of the time". The scale values were summed across the six items to create a score ranging from 0-24, with a higher score indicating higher level of psychological distress (SAMHSA, 2018).

Opioid misuse (dichotomous). Opioid misuse in the past year will be measured by asking participants whether or not they abused or were dependent upon heroin or pain relievers in the past year (SAMHSA, 2018). Responses are scored as 0 = “no abuse or dependence” and 1 = “abuse or dependence of heroin and/or pain relievers” (SAMHSA, 2018).

Opioid misuse (categorical). Opioid misuse in the past year will be measured by asking participants whether or not they abused or were dependent upon heroin or pain relievers in the past year (SAMHSA, 2018). Responses are scored as 1 = “heroin only”, 2 = “pain relievers only”, 3 = “heroin and pain reliever”, and 4 = “neither” (SAMHSA, 2018).

Health Status (categorical). Health status will be measured by asking about participants “Would you say your overall health in general is excellent, very good, good, fair, or poor?” (SAMHSA, 2018). Likert scale responses are scored 1 = “excellent”, 2 = “very good”, 3 = “good”, 4 = “fair”, 5 = “poor” (SAMHSA, 2018).

Education level (categorical). Education level will be measured by asking participants what the highest level of education was that they completed (SAMHSA, 2018). Likert scale responses are scored 1 = “less high school”, 2 = “high school grad”, 3 = some college/Associate’s degree”, 4 = “college graduate”, 5 = “12 to 17-year olds” (SAMHSA, 2018).

Income level (categorical). Income level will be measured by asking participants what their total family income is (SAMHSA, 2018). Likert scale responses are scored 1 = “less than “$20,000”, 2 = “$20,000 - $49,000”, 3 = “$50,000 - $74,999”, and 4 = “$75,000 or more” (SAMHSA, 2018).

Research Questions & Hypotheses

RQ1: What is the impact of physical disability on psychological distress?

H1: Physical disability predicts psychological distress.

RQ2: What is the impact of emotional disability, physical disability, and psychological distress on opioid misuse?

H2: Emotional disability, physical disability, and psychological distress increase opioid misuse.

RQ3: Do overall health status, education level, income level, and opioid misuse affect emotional disability?

H3: Poor health status, lower education level, lower income level, and higher rate of opioid misuse increases emotional disability.

RQ4: Do overall health status, education level, income level, and opioid misuse affect psychological distress?

H4: Poor health status, lower education level, lower income level, and higher rate of opioid misuse increase psychological distress.

Data Analysis

Linear regression will be used to assess the impact of the continuous independent variable (physical disability) on the continuous dependent variable (psychological distress). Linear regression will answer the first research question, "what is the impact of physical disability on psychological distress?". Logistic regression will be used to assess the impact of the continuous independent variables (emotional disability, physical disability, and psychological distress) on the dichotomous dependent variable (opioid misuse). Logistic regression will answer the second research question, "what is the impact of emotional disability, physical disability, and psychological distress on opioid misuse?".

Analysis of Variance (ANOVA) will be used to examine the impact of four categorical independent variables (overall health, education level, income, and opioid misuse) on the continuous dependent variables (emotional disability and psychological distress). ANOVA will answer the third research question, "do overall health status, education level, income level, and opioid misuse affect emotional disability?". ANOVA will also answer the fourth research question, "do overall health status, education level, income level, and opioid misuse affect psychological distress?". Post hoc testing will be used to further explore if any significant differences exist between the means of the independent variables for research questions three and four.

CHAPTER 3: Results

Participants

The total study sample included 56,276 participants with the majority being female (52%, n=29,239). Further, 58.8% (n=33,117) of the survey respondents were white, 18.2% (n=10,216) were Hispanic, 12.5% (n=7,047) were black, 4.7% (n=2,631) were Asian, 3.8% (n=2,159) reported being more than one race, 1.5% (n=846) were Native American/Alaskan Native, and 0.5% (n=260) were Native Hawaiian/Pacific Islander.

Additionally, 24.4% (n=13,722) were 12-17 years old, 24.6% (n=13,840) were 18-25 years old, 15.6% (n=8,786) were 26-34, 19.9% were 35-49 (n=11,214), and 15.5% (n=8,714) were over 50. The majority of respondents (46.9%, n=26,370) reported never being married. Marital status for the remaining respondents included 31.4% (n=17,655) married, 7.9% (n=4,467) divorced or separated, and 2.1% (n=1,199) widowed. Respondents under the age of 14 (11.7%, n= 6,585) were excluded from answering the marital status question.

Respondents reported their health as being excellent (25.6%, n=14,406), very good, (38.8%, n=21,813), good (25.9%, n=14,571), and fair/poor (9.7%, n=5,467). Educational levels (n=56,276) were reported as 9.6% (n=5,395) of individuals having less than a high school education, 20.0% (n=11,269) having graduated high school, 25.4% (n=14,288) with some college, 20.6% (n= 11,602) having graduated college, and 24.4% (n=13,722) being between the ages of 12-17 and not yet having had the opportunity to complete high school. Respondents reported their annual family income as less than $20,000 (18.8%, n=10,576), $20,000-$49,999 (30.6%, n=17,221), $50,000-$74,999 (15.5%, n=8,747), and $75,000 or more (35.1%, n=19,732).

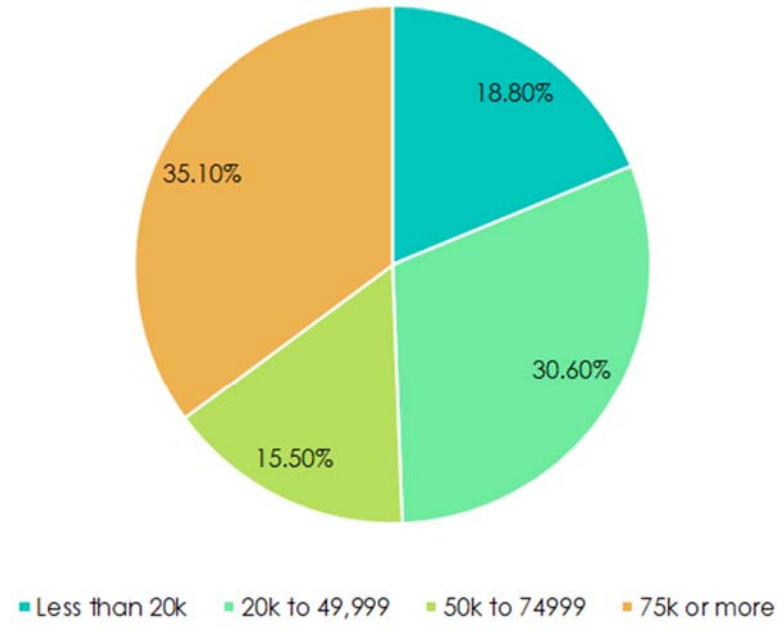

Figure 5. Participant Income Level

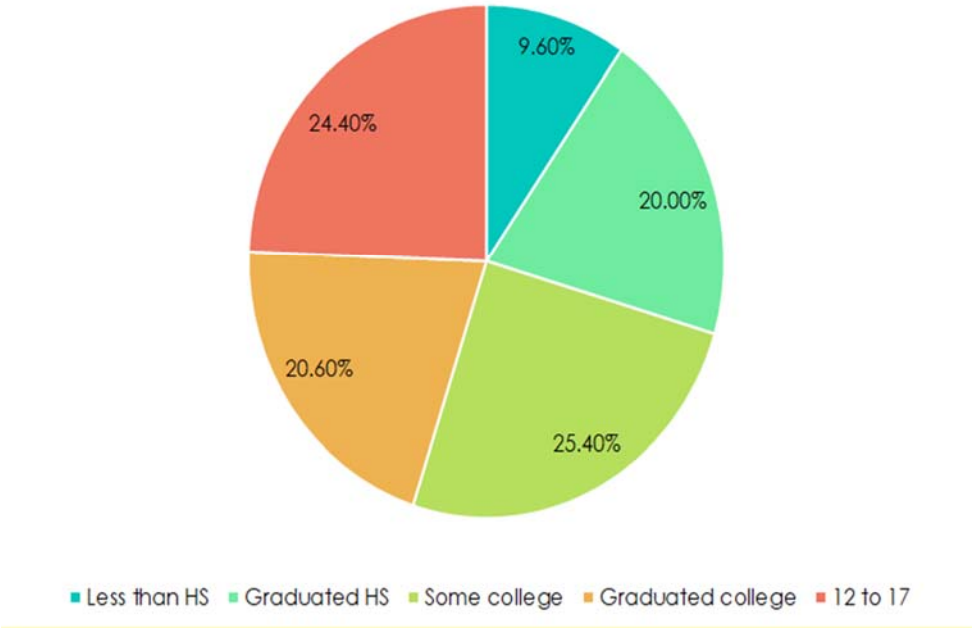

Figure 6. Participant Education Level

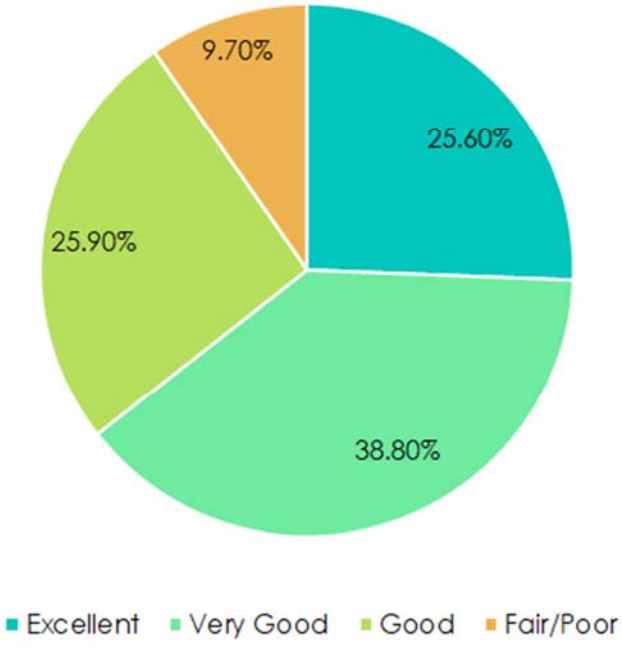

Figure 7. Participant Health Status

The vast majority of respondents (99.0%, n=55,731) reported that they did not have a heroin and/or pain reliever dependence in the past year. The majority of individuals with a dependence in the past year reported having a dependence on pain relievers only (0.7%, n=377), with the remaining having dependence on heroin only (0.2%, n=106) and having a dependence on both heroin and pain relievers (0.1%, n=62).

Emotional disability scores were measured by the WHODAS. WHODAS scores ranged from 0-24, with a score of 0 representing “no difficulty”, a score of 1-8 representing “mild difficulty”, a score of 9-16 representing “moderate difficulty”, and a score of 17-24 representing “severe difficulty.” The average emotional disability score as measured by the WHODAS was 4.25, SD= 5.78. These results indicate that the average participant in the sample reported mild difficulty with emotional problems interfering with their daily functioning.

Psychological distress scores were measured by the K-6 scale. K-6 scores ranged from 0-24, with scores above 13 representing severe distress. The average psychological distress score as measured by the Kessler K-6 was 11.10, SD = 6.41. These results indicate that the average person of the sample scored below the cut-off for severe distress.

Physical disability scores were measured from 0-6, with 0 representing no difficulty and an increased score representing an increase in difficulty performing tasks due to a physical disability. A score of 6 would indicate the highest level of self-rated physical disability. The mean physical disability score was 0.28, SD= 0.71. The score of the average person in the sample indicates low levels of physical disability.

Psychological Distress and Physical Disability

Simple linear regression was conducted to test if physical disability scores (as measured by a six-item set of questions that are utilized by the American Community Survey to determine the minimum standard for physical disability) significantly predicted psychological distress scores (as measured by K6). Physical disability score accounted for 6.6% of the variance in psychological distress score and was a significant predictor of psychological distress, $F(1, 13{,}557) = 963.841$, $p < .001$. Physical disability score was positively associated with psychological distress score ($\beta = 0.26$). These findings follow the expectation of the first hypothesis. Individuals who experience difficulty in completing daily physical tasks are inclined to suffer from increased levels of psychological distress. Physical disability can result in social isolation and physical pain, both of which have been shown by previous research to correlate with symptoms of psychological distress (Darnell, 2014; Sehgal et al., 2012).

Opioid Misuse

Logistic regression was utilized to ascertain the effects of emotional disability, physical disability, and psychological distress on the likelihood that individuals misused opioids. The logistic regression model was statistically significant, $\chi^2(3) = 198.527$, $p < .001$. The model explained 8.3% (Nagelkerke R^2) of the variance opioid misuse and correctly classified 98.0% of cases. For each unit increase in emotional disability score (WHODAS), an individual was 1.025 times more likely to have misused opioids in the past year. For each unit increase in psychological distress (K6) score, an individual was 1.106 times more likely to have misused opioids in the past year. For each unit increase in physical difficulty score, an individual was 1.238 times more likely to have misused opioids in the past year. These findings highlight the impact that physical disability has on opioid misuse. Although mean physical disability scores for the sample were low, any increase in physical disability resulted in exponentially higher risks of opioid misuse.

Emotional Disability

An ANOVA with post hoc tests were conducted that examined the effect of health status (IV), education level (IV), income level (IV), and opioid misuse (IV) on emotional disability (DV), as measured by the WHODAS. Disability is associated with decreased functioning from a disease, disorder, or injury which impairs an individual's ability to interact with their environment (Leonardi, Bickenbach, Ustun, Kostanjsek, & Chatterji, 2006). Emotional disability occurs when an individual's emotional state or mental health causes them to have difficulties or impairments performing daily activities (SAMHSA, 2018). The model was statistically significant $F(194, 42{,}346) = 15.755$, $p < .001$. The model revealed that participant perception of good health, higher education level, higher income, and sobriety from heroin and painkillers

predicted lower levels of emotional disability. Post hoc testing in the form of Tukey's Honest Significance Test (HSD) revealed a significant difference in psychological distress scores by health status, education level, income, and opioid misuse. Tukey's HSD allows for the comparison of several means (Field, 2018). The results indicate that the risk of opioid misuse seems to be mitigated by an individual's perception of having good health, as well as having a high school or lower education, and higher reported income.

Emotional Disability, Education, and Income

The education and income levels of participants also had a relationship to their levels of emotional disability. Emotional disability scores were significantly lower for individuals who had an education level of high school or less (less than high school [3.60] and high school graduates [3.80]), compared to college graduates (4.22), and individuals with some college (4.85). These results are not congruent with the expectation that an increase education will result in a decrease of emotional disability.

Participants' income levels had an association with their emotional disability scores. Individuals that reported their annual income as $75,000 or more (3.74), $20,000- $74,999 ($50,000-$74,999 [4.14], $20,000-$49,999 [4.30]), and less than $20,000 (5.10) had significantly different emotional disability scores from each other. Similarly, higher income levels appear to lower an individual's perception of emotional disability. It is reasonable to conclude that individuals with higher income would have access to sufficient healthcare and mental health services to treat any symptoms of emotional disability.

Emotional Disability and Health

Individuals that reported their health as excellent (2.92), very good (4.12), good (4.69), and fair/poor (6.28) had significantly different emotional disability scores from each other. These

results are a reasonable conclusion. Perceptions of better health correlate with lower levels of emotional disability.

Emotional Disability and Opioid Use

Opioid use was shown to have an impact on an individual's level of emotional disability. Emotional disability scores were significantly lower for individuals that haven't used heroin and/or pain relievers in the past year (4.18), compared to those who only used heroin (9.01), and those who use only pain relievers or pain relievers and heroin (pain relievers only [10.86], heroin and pain relievers [11.06]). Sobriety from opioid use also appears to mitigate higher perceptions of emotional disability. The use of pain relievers seems to impact emotional disability scores more than heroin.

Psychological Distress

An ANOVA with post hoc tests was conducted that examined the effect of health status (IV), education level (IV), income level (IV), and opioid misuse (IV) on psychological distress (DV), as measured by the K6. Psychological distress is considered a condition of emotional strain often accompanied by symptoms of low mood and anxiety (Mirowsky & Ross, 2003). The model was statistically significant $F(166,13,387)=7.175$, $p<.001$, which revealed that participant perception of good health, higher education level, higher income, and sobriety from heroin and painkillers predicted lower levels of psychological distress. Post hoc testing in the form of Tukey's Honest Significance Test (HSD) revealed a significant difference in psychological distress scores by health status, education level, income, and opioid misuse. Tukey's HSD allows for the comparison of several means (Field, 2018).

The results indicate that individual's psychological distress score seems to be mitigated by an individual's perception of having good health, as well as having a college education, higher reported income, and abstinence from opioid use.

Psychological Distress, Education, and Income

The education and income level of participants also had a relationship to their levels of psychological distress. Psychological distress scores were significantly lower for college graduates (9.60) compared to non-college graduates (some college [11.65], high school graduates [11.82], and some high school [12.05]). College graduates reported the lowest level of psychological distress so this may indicate that increased education may have a positive impact on psychological distress.

There were significantly different psychological distress scores between individuals that reported different levels of income. Individuals that reported their annual family income as $75,000 or more (9.87), $50,000-$74,999 (10.64), $20,000-$49,000 (11.55), and less than $20,000 (12.68) had significantly different psychological distress scores from each other. The highest income reported had the lowest level of psychological distress while the lowest reported income had the highest psychological distress. Higher income categories may be a protective factor against psychological distress.

Psychological Distress and Health

There were significantly different psychological distress scores between individuals that reported their health as excellent (9.45), very good (10.62), good (11.85), and fair/poor (13.31). This indicates that individuals who report a more positive perception of their health also reported lower levels of psychological distress. These results are aligned with the conclusions of past research on the relationship between these variables (Seghal, 2012).

Psychological Distress and Opioid Use

Opioid use had an impact on an individual's level of psychological distress. There were significantly different psychological distress scores between individuals that reported different opioid use. Psychological distress scores were significantly lower for individuals that have not been dependent on heroin and/or pain relievers in the past year (11.00), compared to those who have been dependent on heroin only (15.02), opioid pain relievers only (16.64), or both heroin and opioid pain relievers (16.80). Individuals who reported total sobriety from opioids also reported the lowest levels of psychological distress while individuals who reported use of both heroin and opioid pain relievers reported the highest levels of psychological distress. Sobriety from all opioids may be associated with lower levels of psychological distress.

CHAPTER 4: Discussion and Conclusion

Discussion

This study explored the relationship between disability, psychological distress, and opioid use through the perspectives of biopsychosocial theory and strain theory. Previous studies exploring the relationship of psychological distress and the misuse of illicit substances exist, as well as studies investing the relationship between substance abuse and disability. This dissertation is innovative because it fills a gap in the literature by studying factors associated with the combination of disability (physical and emotional), and psychological distress on opioid use experienced by a national sample of individuals. The following research questions were utilized to explore the correlations of the variables:

RQ 1: What is the impact of physical disability on psychological distress?

H1: Physical disability predicts psychological distress.

RQ 2: What is the impact of emotional disability, physical disability, and psychological distress on opioid misuse?

H2: Emotional disability, physical disability, and psychological distress increase opioid misuse.

RQ 3: Do overall health status, education level, income level, and opioid misuse affect emotional disability?

H3: Poor health status, lower education level, lower income level, and higher rate of opioid misuse increases emotional disability.

RQ 4: Do overall health status, education level, income level, and opioid misuse affect psychological distress?

H4: Poor health status, lower education level, lower income level, and higher rate of opioid misuse increases psychological distress.

Individuals who experience difficulty in completing daily physical tasks are inclined to suffer from increased levels of psychological distress. Limitations with physical functioning may result in individuals isolating themselves, thus reducing their social support which may otherwise mediate levels of psychological distress. Physical disabilities may also affect an individual's feelings of confidence and self-worth, leading to the symptoms associated with psychological distress. The findings of this study support the need for professionals working with individuals with disabilities to be aware of the risk of associated psychological distress and have the capacity to provide or refer to the appropriate services to treat any mental health concerns.

Pain is a factor that is often comorbid with limitations in physical functioning. Pain often accompanies psychological distress, including depression and anxiety (Bair, Robinson, Katon, & Kroenkem, 2003). The combination of pain and psychological distress, partially understood through the lens of biopsychosocial theory, may result in increased disability (Bair, Robinson, Katon, & Kroenkem, 2003). When individuals suffer with physical disabilities it is conceivable that the related functional limitations may lead to a reduced sense of independence that may contribute to higher levels of psychological distress. Pain associated with physical disability is one of the leading causes of receiving an opioid prescription and prescription opioid misuse is one of the most common paths to OUD (Agarwal, Udoji, & Trescot, 2017). For each unit increase in physical difficulty score, an individual was 1.24 times more likely to have misused opioids in the past year, which supports past research on the topic (Agarwal, Udoji, & Trescot, 2017).

Positive perception of health is associated with lower levels of psychological distress and emotional disability. It is reasonable to believe that negative health (or a perception of negative health) would lead to an individual experiencing more of the symptoms of depression and

anxiety which are hallmarks of psychological distress and emotional disability. Likewise, perceptions of positive health may be a protective factor against these symptoms by increasing an individual's sense of resiliency and confidence in their ability to effectively cope with distress or disability. Perception of good health may also indicate that an individual has access to healthcare, enabling them to properly address any physical or mental health issues that might occur.

College graduates reported the lowest level of psychological distress so this may indicate that increased education may have a positive impact on psychological distress. College graduates are more likely to have higher income which also correlates with lower psychological distress. This may be explained by overall less worry and fear that these individuals face regarding financial concerns. College graduates are also more likely to have access to employment that provides adequate health insurance so they may ensure their medical and mental health needs are met. Individuals with higher levels of education are also more likely to be aware of community resources that exist to support them in times of need. College graduates may have more disposable income and therefore more access to healthy ways to cope with symptoms of psychological distress in order to mitigate negative effects of the distress.

Interestingly, the results are somewhat reversed concerning the relationship between education and emotional disability. Individuals with a high school education or less had the lowest WHODAS scores and were significantly different than individuals who completed some college and those who graduated college. On average, those who complete some college had the highest WHODAS scores. These results contradict previous research (Huang et al., 2017; Krieg, 2013). Although psychological distress and emotional disability are similar concepts, the difference lies in the limitations that an emotional disability places on an individual. Perhaps the

unique academic and social stressors of college aggravate existing aspects of emotional disability in some individuals, causing higher scores. Individuals not attending any form of college would be immune from those particular stressors.

Individuals who reported total sobriety from opioids also reported the lowest levels of psychological distress and emotional disability while individuals who reported use of both heroin and opioid pain relievers reported the highest levels of these variables. Substance abuse highly correlates with mental illness diagnosis (Sehgal et al., 2012; Arteta, Cobos, Hu, Jordan, & Howard, 2016; Berrentinni, 2017). It is expected that sobriety from all opioids would be associated with lower levels of psychological distress and emotional disability.

In regard to emotional disability scores, the addition of opioid pain reliever use (either alone or in tandem with heroin use) causes WHODAS scores to be significantly higher than for individuals using only heroin or who were abstinent for heroin or opioid pain reliever use. Opioid pain relievers are typically prescribed for pain which has been linked to higher levels of emotional disability (Arteta, Cobos, Hu, Jordan, & Howard, 2016; Berrentinni, 2017; Sehgal et al., 2012).

Conversely, for each unit increase in psychological distress (K6) score, an individual was 1.11 times more likely to have misused opioids in the past year. For each unit increase in emotional disability score (WHODAS), an individual was 1.03 times more likely to have misused opioids in the past year. These findings also supports past research about the relationship between substance abuse and mental illness, that is a history of mental illness increases an individual's chances of acquiring a substance abuse disorder and also increases the likelihood that they will relapse (Arteta, et al., 2016; Berrentinni, 2017; Sehgal et al., 2012).

The results of this study can be summarized by four major points. First that increased physical disability has an effect of increased psychological distress (Chan & Trant, 2018). Second, better perceptions of health, increased income, and increased level of education have an inverse relationship with psychological distress. That is, when these factors are present levels of psychological distress decrease (Patel et al., 2018). Third, better perception of health and increased income are also correlated to lower levels of emotional distress. Unexpectedly, an increase in education is correlated with an increase in emotional disability. These findings are inconsistent with previous research on the topic which indicate that emotional distress is mitigated by higher educational levels (Huang et al., 2017; Krieg, 2013). The findings of this study may indicate that some aspect of the social or educational stressors of college may aggravate symptoms of emotional disability. More research needs to be conducted on the association between these variables to better understand the relationship. Finally, this research study indicates that increased levels of psychological distress and emotional disability are driving factors for an increase use of opioids. Previous research supports this conclusion (Seghal et al, 2012). Physical disability, health, income, and education all affect levels of psychological distress and emotional disability, which in turn correlate with opioid use.

Implications

Gaining a better understanding of the multifaceted causes of addiction may guide policy to reflect an updated, less punitive model of addiction prevention and treatment. The application of biopsychosocial theory and strain theory highlight the fact that addiction is not a moral failure or due to a lack of will power but rather is the result of a combination of many factors that are outside of the control of the addicted individual. Policy recommendations also include creating and supporting an infrastructure to help clients cope with disability, psychological distress, and

substance abuse issues. Fawcett and Goodwin (2015) describe social work's dual task of advocating for policy change and concurrently providing services. Without policy development, social work practice will likely not make the necessary changes, emphasizing the need for social workers to support legislation that will benefit their clients (Fawcett & Goodwin, 2015). Social work practice may improve by updating the field with the most salient research on addiction risk.

Clinical social workers are well suited to address the areas of deficit by working with physicians and patients to enhance education, treatment, and communication. Social workers play a critical role in aiding individuals in understanding their risk factors for addiction. They should receive training in educating and supporting patients about the precursors of opioid misuse. Social work excels at working across disciplines and is able to advance the synthesis of social, biological, and behavioral research and integrate the findings into direct practice that may translate into educational gains.

best mitigated by universities providing comprehensive screening and counseling services.

The findings of this study highlight the importance of treating physical disability without opioids. Opioids are not indicated for chronic use, and this research adds support to the fact that physical disability can lead to increased risk for opioid use. There is a need for improving access to high-quality psychosocial services. Psychological distress and emotional disability are shown to have an impact on opioid use, and both can be mitigated with effective and timely mental health services.

There is a vital need for social workers and their clients to be educated on the risk factors of opioid use that were explored by this study. This knowledge is a crucial first step in ensuring necessary prevention services are provided to those at risk. Social workers can utilize this research to update their biopsychosocial assessments of clients, ensuring that they are aware of

all risk factors of opioid use.

Finally, social work education benefits from any new research, especially on a topic as salient as opioid addiction. This research will be disseminated through submission to academic journals and presentations at professional conferences to educate researchers, policymakers, clinicians and students. The results of this study have particular significance for social work leadership and education. College education appears to have a relationship with opioid use; therefore, universities have a unique ability to provide outreach and education to students. The emotional disabilities and psychological distress experienced by many college students may lead to opioid use and can be effectively mitigated by universities providing comprehensive screening and counseling services for all students, especially those who display some of the risk factors associated with current or future opioid use. Social work departments are tasked with ensuring faculty and students are exposed to the most current research on this topic, allowing for future social work professionals to be best prepared to meet the challenges of the opioid epidemic.

Limitations

The findings of this study come with some limitations. The sample is limited to non-institutionalized populations, leaving out individuals in settings such as hospitals, residential placements, and prisons that might have a substantial number of individuals with disabilities, distress, and problems with opioid use. This study examines data from the 2017 NSDUH, which is cross-sectional. It does not consider any change in the disability, distress, or opioid use status over time among the study participants or the directionality of the relationships between the variables. The NSDUH is a vast source of quantitative data, however, does not incorporate any qualitative approaches into its methodology.

Additionally, the study was limited to the instruments utilized by the NSDUH. Although these instruments provided useful data on the study variables, they limited the extent to which relationships between the variables may be understood. For example, more comprehensive measures of potential sources of distress and disability would allow for a better understanding of how disability is related to different kinds of stress. Examples of potential sources of distress and disability includes difficulties in relationships and life changes such as job loss. The data was anonymous and de-identified, which do not allow for additional information gathering from participants. Responses were also self-reported by participants and therefore subjective, as opposed to an official clinical diagnosis from an objective health care professional.

Future Research

The findings of this study can be further explored upon in several important ways. A mixed-methods study, incorporating qualitative research methods, would provide an in-depth understanding of individual perspectives of the relationship between disability, distress, and opioid use. Future research would benefit from including populations excluded from this study, particularly incarcerated individuals and those serving in the military. Following a cohort over a period of time via a longitudinal study would provide more substantial data on the directionality of the relationships examined in this study.

Future research on this topic may benefit from reviewing trends in the NSDUH data over time with a multi-year study of past NSDUH data. Prospective studies may also be conducted, following a cohort of participants with specific diagnoses related to emotional disability, physical disability, and psychological distress and tracking their opioid use over a period of time. A study such as this one may incorporate survey questions created to help the researcher gain a more nuanced understanding of the relationship of the variables. Mixed-methods research, which

incorporate qualitative research methods, such as a phenomenological study, may be utilized to gain a better understanding of participants' perception of how these variables interact within their own lives and discover shared themes experienced by the participants.

Conclusion

The opioid epidemic continues to devastate American society, harming individuals, destroying families, and burdening healthcare and economic infrastructures (Kolodny et al., 2015). While effective treatment methods are necessary, history shows that treatment alone will not solve the problem and individuals will continue to die as a result of this epidemic (McCarty, Priest, & Korthuis, 2018). More research contributing to the understanding of causes and effects of OUD, as well as the relationships between these factors, is needed to identify individuals at risk for opioid misuse and prevent them from becoming addicted (CDC, 2018a). The results of this study imply that recognizing risk factors for opioid misuse may aid in identifying at-risk individuals and in prevention efforts. These findings have wide reaching impact for medical professionals, public health officials, and social workers. The research conducted for this study should be expanded upon by social workers so that the profession may maintain a current and relevant research agenda, influence policy and leadership, provide cutting edge education to social work students and, improve best practices for treating addiction.

Appendix A

Functional Impairment Scale (SAMHSA, 2018): WHODAS The World Health Organization Disability Assessment Schedule (WHODAS) is a scale used to measure functional impairment that consists of a series of items that are used for assessing disturbances in social adjustment and behavior (i.e., functional impairment). The questions comprising the abbreviated WHODAS are provided below, with their associated edited variable names from the mental health module as well as the response categories for each question: The next questions are about how much your emotions, nerves, or mental health caused you to have difficulties in daily activities. (SAMHSA, 2018)

In answering, think of the one month in the past 12 months when your emotions, nerves, or mental health interfered most with your daily activities.

IMPREMEM During that one month when your emotions, nerves or mental health interfered most with your daily activities how much difficulty did you have remembering to do things you needed to do?

1 No difficulty
2 Mild difficulty
3 Moderate difficulty
4 Severe difficulty

IMPCONCN how much difficulty did you have concentrating on doing something important when other things were going on around you?

1 No difficulty
2 Mild difficulty
3 Moderate difficulty
4 Severe difficulty

IMPGOUT how much difficulty did you have going out of the house and getting around on your own?

1 No difficulty
2 Mild difficulty
3 Moderate difficulty
4 Severe difficulty
5 You didn't leave the house on your own

IMPGOUTM [IF IMPGOUT = 5] Did problems with your emotions, nerves, or mental health keep you from leaving the house on your own?

1 Yes
2 No

IMPPEOP how much difficulty did you have dealing with people you did not know well?

1 No difficulty
2 Mild difficulty
3 Moderate difficulty
4 Severe difficulty
5 You didn't deal with people you did not know well

IMPPEOPM [IF IMPPEOP = 5] Did problems with your emotions, nerves, or mental health keep you from dealing with people you did not know well?

1 Yes
2 No

IMPSOC how much difficulty did you have participating in social activities, like visiting friends or going to parties?

1 No difficulty
2 Mild difficulty
3 Moderate difficulty
4 Severe difficulty
5 You didn't participate in social activities

IMPSOCM [IF IMPSOC=5] Did problems with your emotions, nerves, or mental health keep you from participating in social activities?

1 Yes
2 No

IMPHHLD how much difficulty did you have taking care of household responsibilities?

1 No difficulty
2 Mild difficulty
3 Moderate difficulty
4 Severe difficulty
5 You didn't take care of household responsibilities

IMPHHLDM [IF IMPHHLD=5] Did problems with your emotions, nerves, or mental health keep you from taking care of household responsibilities?

1 Yes
2 No

IMPRESP how much difficulty did you have taking care of your daily responsibilities at work or school?

1 No difficulty
2 Mild difficulty
3 Moderate difficulty
4 Severe difficulty
5 You didn't work or go to school

IMPRESPM [IF IMPRESP=5] Did problems with your emotions, nerves, or mental health keep you from working or going to school?

1 Yes
2 No

IMPWORK [IF IMPRESP NE 5] During that one month when your emotions, nerves or mental health interfered most with your daily activities how much difficulty did you have getting your daily work done as quickly as needed?

1 No difficulty
2 Mild difficulty
3 Moderate difficulty
4 Severe difficulty

Appendix B

Psychological Distress Scale (SAMHSA, 2018): The two six-item K6 scales gather information regarding how frequently a respondent experienced symptoms of psychological distress during the past 30 days and during a month in the past 12 months when he or she felt more depressed, anxious, or emotionally stressed than in the past 30 days, respectively. Only respondents who indicated that there was a worse month than the past 30 days (DSTWORST=1) were asked about the worst month in the past year other than the past 30 days. The questions comprising the two K6 scales and the screener question for the worst month scale are provided below with their associated edited variable names from the mental health module as well as the response categories for each question:

DSTNRV30 During the past 30 days, how often did you feel nervous?

1 All of the time
2 Most of the time
3 Some of the time
4 A little of the time
5 None of the time

Response categories are the same for the remaining past month K6 questions:

DSTHOP30 During the past 30 days, how often did you feel hopeless?

DSTRST30 During the past 30 days, how often did you feel restless or fidgety?

DSTCHR30 During the past 30 days, how often did you feel so sad or depressed that nothing could cheer you up?

DSTEFF30 During the past 30 days, how often did you feel that everything was an effort?

DSTNGD30 During the past 30 days, how often did you feel down on yourself, no good, or worthless?

DSTWORST The last questions asked about how you have been feeling during the past 30 days. Now think about the past 12 months. Was there a month in the past 12 months when you felt more depressed, anxious, or emotionally stressed than you felt during the past 30 days?

1 Yes
2 No

DSTNRV12 Think of one month in the past 12 months when you were the most depressed, anxious, or emotionally stressed.

During that month, how often did you feel nervous?

1 All of the time
2 Most of the time
3 Some of the time
4 A little of the time
5 None of the time

Response categories are the same for the remaining worst month K6 questions:

DSTHOP12 During that same month when you were at your worst emotionally . . . how often did you feel hopeless?

DSTRST12 During that same month when you were at your worst emotionally . . . how often did you feel restless or fidgety?

DSTCHR12 During that same month when you were at your worst emotionally . . . how often did you feel so sad or depressed that nothing could cheer you up?

STEFF12 During that same month when you were at your worst emotionally . . . how often did you feel that everything was an effort?

DSTNGD12 During that same month when you were at your worst emotionally . . . how often did you feel down on yourself, no good, or worthless?

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