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Socioeconomic and Health Impact of Opioid Overuse on Working-Age Population in Minnesota

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This is to certify that the doctoral study by

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Abstract

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MPH, Walden University, 2012

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Doctoral Study Submitted in Partial Fulfillment

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Abstract

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The United States faces numerous challenges associated with the ongoing opioid crisis. Although the opioid epidemic is complex, opioid overuse affects users' health and has a far-reaching impact on socioeconomic well-being. This study employed a quantitative cross-sectional design using secondary data from a 2018 national survey of working-age individuals ages 18 to 45. Multivariate regression analysis was used to examine the associations between opioid overuse and socioeconomic status, health status, and perceived need for substance abuse treatment. The addiction career concept and chronic illness model theory were used to analyze these correlations. The findings indicated that people with higher incomes are less likely to report overusing opioids than people with lower incomes. There was no significant correlation between employment status and opioid overuse. Mental health was a strong predictor of opioid overuse, but there was no association between race and opioid overuse. These results provide knowledge on environmental and behavioral predictors of opioid overuse. If a community is cognizant of how addiction works, the risk factors of addiction, potential harm, and signs and symptoms, they can make informed decisions regarding opioids and create positive factors to counteract the risk factors of addiction. The findings have potential implications for positive social change by creating awareness in the community, allowing for the development of programs for early interventions, treatments, and prevention campaigns. These programs may reduce cases of opioid overuse and potentially lead to improved health and socioeconomic well-being.

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Dedication

This dissertation is dedicated to my parents, Mr. Ngwa Damasus and Mrs. Che Julia, who thought me the value of education, persistence, and perseverance. To my children, Miya, Adeh, Nji and Ndoh, who supported, inspired, encouraged, and stood with me as I moved through this process.

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Section 1: Foundation of the Study and Literature Review

Introduction

The United States continues to face numerous challenges associated with the ongoing opioid crisis. Since the announcement of the opioid epidemic as a national health emergency in October 2017, deaths from drug overdoses remain unabated (Wilson et al., 2020). Over 93,000 drug overdose-related deaths in the United States were reported in 2020; nearly 70,000 of these drug-related mortalities involved opioids (Centers for Disease Control and Prevention [CDC], 2021b). Opioid-related mortality accounts for more than 130 deaths daily (Health Resources and Services Administration [HRSA], 2020). Opioids significantly contribute to this alarming death rate from all drug-caused deaths across different age groups (Rudd et al., 2016).

From 1999 to 2019, more than half a million Americans died from opioid overdoses, including synthetic and prescription opioids and heroin (CDC, 2021a). Failure to mitigate the U.S. opioid crisis comes with a hefty price. Simmons-Duffin (2019) reported that the actual cost of this opioid epidemic in the United States had reached $179 billion in 2018, $72.6 billion for overdose death-related costs and $60.4 billion for healthcare costs; the rest was used for family and child assistance, education, and criminal justice. Understandably, assigning solid numbers or costs to the opioid epidemic's effect on the affected persons, families, and communities is difficult.

In the present study, I focus on the socioeconomic and health impact of opioid overuse in the working-age population, ages 18 to 45, in Minnesota and the perceived need for treatment. In this quantitative cross-sectional study using retrospective data, I

aimed to examine the association between opioid overuse and socioeconomic status, health status, and perceived need for substance abuse treatment in the working-age population in Minnesota. I used data from the 2018 National Survey on Drug Use and Health (NSDUH) for secondary data analysis.

In this section, I introduce the background, research problem, and purpose of the study. I identify research questions and hypotheses and specify theoretical frameworks and the nature of the study. I also examine the scholarship related to the significant theoretical propositions, constructs of interest, and chosen methodology for the study. Finally, I conclude the section by discussing the study's key definitions, assumptions, scope and delimitations, limitations, and significance.

Background

The effects of opioid overuse may be experienced differently based on a person's socioeconomic status. Between 2008 and 2014, Minnesota saw a tenfold rise in reported heroin overdose mortality across all demographic groups (Collins, 2016). In the past 15 years, mortality has increased with respect to all classes of opioids in the state (Minnesota Department of Health, 2021), along with a significant rise in treatment admissions for opioid use disorder (OUD; Minnesota Department of Human Services [MDHS], 2019). The prevalence of opioid overdose deaths is nearly 60% higher in men than in women (MDHS, 2019). Most importantly, according to MDH (2021), "while Minnesota has one of the lowest drug overdose mortality rates in the U.S., Minnesota has some of the worst race rate disparities in drug overdose mortality in the nation." In this state, between 2010 and 2019, there was a rise in mortality rate by 73% for African Americans and 178% for

American Indians, compared to a 71% increase for the White population (MDH, 2021). Moreover, the age groups who are at most risk for opioid-related death also differ in the mentioned racial populations. Namely, the most significant mortality has been reported for individuals ages 25–54 for Whites, ages 25–34 for American Indians, and ages 45–54 for African Americans (MDH, 2021).

In addition, there are differences in the mortality rate for different age groups within urban and rural settings, with adults

ages 45–54 reportedly having the highest mortality rate in urban Minnesota and adults ages 35–44 and 45–54 in rural areas (MDHS, 2019). Despite similar rates of opioid overuse for African American and Latinx people compared to the national average, preliminary research shows racial/ethnic and gender disparities in health-related outcomes. For example, in a study of mortality risk after inpatient drug detoxification treatment, Latinx American adults were at significantly higher risk for death within 4 years than Black adults were, but this was not the case for Whites (Saitz et al., 2007). In addition, although White individuals were continually at the highest risk for overdose between 1999 and 2018 in the United States, rates among Black and Hispanic adults sharply increased after 2017, while rates dropped among White adults (Mack et al., 2017). Specifically, regarding gender, data trends overall have indicated that a higher number of men die from opioid overdoses. However, opioid-dependent women were at a higher risk of mortality than the national average of the general population of men (Evans et al., 2015).

Moreover, there is a tremendous spatial inequality, especially across the rural–urban spectrum, in the current opioid crisis. In Minnesota, the highest opioid-related mortality rates are reported in rural areas, including suburbs and small towns, where there is less treatment availability and fewer emergency responders (Collins, 2016). Opioid overdose death has been called a "death of despair" because it happens mostly in places with remoteness, older populations, economic distress, and a lack of social support (Case & Deaton, 2020; Dasgupta et al., 2018). These disadvantaged peripheral areas are primarily rural and nonmetropolitan and are associated with lower socioeconomic status and higher poverty rates than urban or metropolitan populations (Monnat, 2019).

In addition, people from rural areas may experience less favorable health conditions and higher mortality rates mainly due to an uptick of younger and healthier people migrating out as well as the structural disadvantages (e.g., more economic distress and less availability of healthcare infrastructure) of living in rural neighborhoods and communities (Monnat & Rigg, 2016). Consequently, rural, and nonmetropolitan areas are more vulnerable to the opioid epidemic (Monnat, 2019). Finally, individuals' experiences in their interactions with OUD treatment systems (and other mental health services systems) have been notably different based on race/ethnicity and gender, contributing to health disparities (Pinedo et al., 2020). For example, traditional substance use disorder (SUD) treatment programs, often geared toward men's needs, may not be as beneficial for women, and Latinx individuals may benefit from more culturally appropriate services (Pinedo et al., 2020). Thus, it is vital to consider how the perceived need for treatment can vary across specific populations, such as working-age individuals. The inequities in

opioid overuse-related consequences also highlight the need for continued attention to socioeconomic differences in opioid overuse research.

Problem Statement

The issue that prompted this research was the rising prevalence of overuse of opioids in the United States and the lack of empirical evidence establishing an association between the overuse of opioids and socioeconomic status, health status, and perceived need for substance abuse treatment in the working-age population in Minnesota. Prior quantitative research has been focused on investigating the relationships between different socioeconomic categories and fatal opioid overdose or opioid mortality (Altekruse et al., 2020) rather than opioid overuse or misuse. The research problem addressed through this study is the rise in opioid overuse among the working-age population (18–45 years) in Minnesota and its association with their socioeconomic and health status and the perceived need for substance abuse treatment in the same population.

Although several researchers have investigated the problem of opioid overuse (Blanco et al., 2020; Cicero & Ellis, 2017; Painter, 2017; Salmond & Allread, 2019; Winstanley & Stover, 2019), the literature specifically addressing the association between the overuse of opioids and the socioeconomic status, health status, and perceived need for substance abuse treatment among the working-age population is limited. While some authors have explicitly connected low socioeconomic status and health status to worse opioid use outcomes, they have generally focused on socioeconomic and health effects on treatment outcomes (Dasgupta et al., 2018; Hudgins et al., 2019; Winstanley & Stover,

2019). Within such approaches, opioid overuse is primarily seen as a maladaptive coping behavior resulting from experiences of marginalization, trauma, or health problems rather than an independent health disorder with specific outcomes (McLellan et al., 2000). This points to a need for closer examination of the phenomenon of opioid overuse and socioeconomic status as major independent risk factors for a plethora of outcomes. Moreover, the literature indicates researchers have not examined the working-age population in terms of their perceptions of their opioid overuse and their thoughts on treatment. There are studies on help-seeking behavior and mental distress but few on opioid overuse as a determinant for seeking treatment (Dasgupta et al., 2018; Winstanley & Stover, 2019). Treatment-seeking behavior in the working-age population is scarce, so this study was conducted to attempt to bridge that gap.

Purpose of the Study

The purpose of this quantitative cross-sectional study using retrospective data was to examine the association between opioid overuse and socioeconomic status, health status, and perceived need for substance abuse treatment in the working-age population in Minnesota. Evidence indicates that younger individuals in general engage in riskier behavior than older individuals do, and thus, targeting opioid overuse among a younger population may add more value (Hudgins et al., 2019). Further examination of the opioid overuse etiology in this age group is required to design more effective prevention strategies. Conducting this study also can help determine if opioid overuse has a relationship with help-seeking behavior in the working-age population in Minnesota

because the increase in the number of these individuals creates a burden on society's economics.

Research Questions and Hypotheses

In this study, I addressed three research questions and associated hypotheses:

RQ1: Is there any association between opioid overuse and socioeconomic status (income, employment status, education level, and race) in the working-age population (18–45 years) in Minnesota?

$H_0$1: There is no association between opioid overuse and socioeconomic status (income, employment status, education level, and race) in the working-age population (18–45 years) in Minnesota.

H_a1: There is an association between opioid overuse and socioeconomic status (income, employment status, education level, and race) in the working-age population (18–45 years) in Minnesota.

RQ2: Is there any association between opioid overuse and health status (diagnosed opioid abuse or dependence, non-opioid abuse or dependence, and mental health disorders) in the working-age population (18–45 years) in Minnesota?

$H_0$2: There is no association between opioid overuse and health status (diagnosed opioid abuse or dependence, non-opioid abuse or dependence, and mental health disorders) in the working-age population (18–45 years) in Minnesota.

H_a2: There is an association between opioid overuse and health status (diagnosed opioid abuse or dependence, non-opioid abuse or dependence, and mental health disorders) in the working-age population (18–45 years) in Minnesota.

RQ3: Is there any association between opioid overuse and the perceived need for substance abuse treatment (the felt need for treatment for illicit drug or alcohol use) in the working-age population (18–45 years) in Minnesota?

$H_0$3: There is no association between opioid overuse and the perceived need for substance abuse treatment in the working-age population (18–45 years) in Minnesota.

H_a3: There is an association between opioid overuse and the perceived need for substance abuse treatment in the working-age population (18–45 years) in Minnesota.

The independent variable in RQ1 is opioid overuse, the dependent variable is socioeconomic status, and the control variable is the age category of 18–45 years. The independent variable in RQ2 is opioid overuse, the dependent variable is health status, and the control variable is the age category of 18–45 years. The independent variable in RQ3 is opioid overuse, the dependent variable is the perceived need for substance abuse treatment, and the control variable is the age category of 18–45 years.

Socioeconomic status was assessed using four categorical variables, including income, employment status, education level, and race. Health status variable included non-opioid abuse or dependence, mental health disorders, and the presence of high blood pressure. Perceived need for substance abuse treatment was defined as the dichotomous dependent variable (need for treatment yes or no; Substance Abuse and Mental Health Services Administration [SAMHSA], 2019a, 2019b).

Conceptual Frameworks

In the absence of a single universal conceptual framework incorporating all the concepts necessary to explain opioid overuse comprehensively, this study was broadly framed by the addiction career concept (Hser et al., 1993) and the chronic illness model of drug addiction (McLellan et al., 2000). The addiction career concept provides a valuable starting point for studies that seek to understand the health outcomes of drug users. The addiction career concept suggests that drug abusers are involved in various addiction and treatment stages. Hence there are essential factors to consider when attempting to understand how an opioid use career affects a user's health over time. These characteristics include drug use severity characterized by a history of previous treatment episodes, use duration and frequency, administration route, and polydrug use. Furthermore, the chronic illness model of drug addiction informs a conceptualization of opioid overuse as an independent health disorder with its outcomes. In many earlier studies, researchers have approached substance use as a health consequence, documenting the association between variables such as poverty, exposure to violence, and other socioeconomically derived mechanisms and illicit drug use. Conversely, the chronic illness model helps address disparities in drug addiction outcomes regarding socioeconomic status, health status, and the perceived need for substance abuse treatment.

Nature of the Study

To address the research questions, I used a quantitative methodology with a cross-sectional research design based on secondary data in the population of working-age

individuals, ages 18–45. This methodological approach enabled me to establish the association between the independent variable of opioid overuse and dependent variables of socioeconomic status, health status, and perceived need for substance abuse treatment in the target population (Nojima et al., 2018). However, because this study design is cross-sectional, it was impossible to make any statements about the causal direction of the findings.

Secondary data for the prospective research design were extracted from the second numerical data in the 2018 National Survey on Drug Use and Health. The NSDUH and the NSDUH codebook are available from the SAMHSA (2019a, 2019b) and can be obtained on their website. Certain data points were used in answering the research questions. First, opioid overuse was measured as a reported past-year opioid overuse and socioeconomic status was measured using income, employment status, education level, and race data. Second, health status was measured using such data as reported lifetime non-opioid abuse or dependence, mental health disorders, and high blood pressure. Finally, the perceived need for substance abuse treatment was established as the felt need for treatment for illicit drug or alcohol use in the past year.

Literature Search Strategy

To conduct the literature review for this study, I compiled information from multiple sources, including books, peer-reviewed journals, and internet sources. I primarily searched for relevant sources using PLOS Medicine, PMC, National Association of Orthopedic Nurses, Springer Nature, American Nurses Association, ACOG, PubMed, Scopus, and Google Scholar that were published from 2015 to 2021. I

also found additional references from publications that cited or were cited by identified sources. I further drew on information from textbooks used for doctoral coursework or recommended by doctoral committee members. Because the study's overarching goals were to understand the context of opioid overuse initiation and the socioeconomic status, health status, and perceived need for substance abuse treatment in the working-age population in Minnesota, including historical context, no specific time frame was used to search for literature to avoid the exclusion of relevant materials. The key search terms and combinations of search terms included: *opioids, addiction career concept, chronic illness model, opioid overuse, opioid misuse, opioid use disorder, working-age population, health status, socioeconomic status, gender, age, substance abuse treatment, substance use disorder treatment, help-seeking, the perceived need for substance abuse treatment,* and *social determinants of health*.

Theoretical Frameworks

Career dynamics theory asserts that people's behaviors, skills, and attitudes change in stages associated with complex developmental career patterns (Hser et al., 1997). A career approach to drug addiction draws upon areas of research that have applied the term *career* as a theoretical construct, including employment, criminology, and mental health (Hser et al., 1997). An addiction career is defined as drug use that progressively escalates into more problematic and severe use levels, followed by repeated stages of relapse, abstinence, and cessation occurring over a long period (Hser et al., 1997). However, this career phenomenon does not occur for all individuals who initiate drug use (Schaler, 2000). Schaler (2000), among others, argued that many drug users

appear to overcome addiction or successfully manage to control their drug use behaviors and avoid addiction altogether. For example, in empirically based studies, researchers looking at heroin addiction among American soldiers during the Vietnam War (Robins, 1973) found that addiction was not permanent but was contingent upon environmental circumstances.

Several researchers, however, claim that the use of drugs and the related outcomes tend to evolve into destructive patterns of addiction best examined from the lens of the individual's life natural history, accounting for the contextual effects of meaningful events, social conditions, and transitional periods (Hser et al., 1993, 1995). Hence, the addiction career concept defines a longitudinal assessment of a person's drug use over a lifespan and the repeated stages of resumption and remission of use frequently occurring over an extended time (Hser et al., 1997). Several longitudinal studies within the drug abuse field and opioid overuse particularly lend support to the addiction career concept showing that treatment is linked to significant drug use reductions. However, relapsing, and eventual reentering into programs is relatively common for most users (Eastwood et al., 2017; Klein, 2020). Moreover, most drug-dependent persons engage in three to four treatment episodes over several years before accomplishing stable abstinence (Hser et al., 1993). Engagement in several treatment episodes is particularly the case when various other health and social problems are present with addiction (Martinelli et al., 2020).

In general, this career framework is best applied to longitudinal studies of drug abuse, as they can reveal long-term patterns and outcomes related to drug use. However, this framework can also provide a useful starting point for studies seeking to understand

drug users' health outcomes such as the present study. Furthermore, because an addiction career approach has been suggested by many to specify and understand immediate causal factors affecting drug addiction and its treatment (Hser et al., 2001), this framework guided the selection of socioeconomic factors that may influence an opioid users' addiction career.

Attention to patient perception measures of perceived need for treatment is an important research strategy that can enhance the clarity of drug treatment evaluations and contribute to the development of treatment interventions that target the relapsing and chronic nature of drug addiction. The shift in the focus of illness from acute and infectious disease to chronic disease has been paralleled by a similar shift in the drug abuse field, where drug dependence is characterized not as acute but as chronic, given the relapsing nature of the disorder (McLellan et al., 2000). Even though the field still holds uncertainties regarding the nature of addiction, there is an established consensus that addiction is not representative of an acute disorder for many dependent persons (McLellan et al., 2000). McLellan et al. (2000) empirically compared drug addiction to other chronic conditions, such as diabetes, asthma, and hypertension, using an innovative approach. Results from this study found many common elements between addiction and chronic illnesses.

Like chronic illnesses, there is a genetic predisposition and environmental influence associated with drug dependence. Evidence from twin studies showed the heritability nature of alcoholism and addiction, primarily shaped by the environment (Ducci, and Goldman, D., (2012). Researchers also pointed out that, like a patient with

heart disease who experiences changes in heart metabolism throughout the illness, neuroscience has established that metabolic and functional changes occur with prolonged drug use over time (SAMHSA,2016). McLellan (2002) contended that drug addiction should be treated and evaluated as a chronic condition based on this evidence. To date, there have been numerous treatment evaluations that have focused on drug abuse as a chronic health problem introducing a range of novel measurements, such as patient perceptions of quality of life or satisfaction with treatment, or perceived need for treatment (Muller et al., 2020). Thus, there has been a push toward moving beyond reducing the presence and severity of disease symptoms to enhancing the quality of life and patients' perspectives in terms of how satisfied they are with the services they received.

While the addiction career and chronic illness models both contextualize drug addiction as a chronic condition, there are conceptual differences between the two models. The addiction career model views drug abuse as a chronic and relapsing behavior; drug use is still viewed from a moral perspective in which drug use behavior is stigmatized as immoral and criminal. Similarly, treatment evaluations under an addiction career look at the more immediate causal factors that affect the use, such as socioeconomic factors investigated in RQ1. In contrast, viewing drug abuse as a chronic illness, like diabetes and hypertension, places drug use behavior within the medical domain as a health problem, thereby destigmatizing the behavior. From a treatment evaluation perspective, a chronic illness model looks at the cumulative effects of drug use on health over time and emphasizes patient perceptions of the need for treatment, as seen

in RQ2. This framework is different from an addiction career as it assesses functioning over time regarding physical and mental health outcomes, not simply adjustment regarding drug use, obtaining employment, and becoming a productive member of society.

Literature Review on Key Variables, Concepts, and Research Questions

The drivers for the opioid overuse crisis can be discussed from both the supply and the demand perspective. The increased opioid prescriptions since the 1990s are a supply factor and have led to the rise in overdose death rates from prescription opioids, which accounts for a dominant share of the overall opioid-related mortality. Empirical evidence also supports that opioid prescriptions and the availability of prescribers are highly related to opioid or drug-related mortality (Grigoras et al., 2018; Monnat, 2019). The explosive growth of heroin and synthetic opioids in the nonmedical drug market—due to their increased accessibility, reduced price, and high purity—is another essential supply factor that accounts for the increase in opioid-related deaths from all sources, even though the death rates involving prescription opioids have stabilized in recent years (Compton et al., 2016).

On the demand side, the rising need for opioids is the pulling force of the epidemic, which spurs the expansion of the nonmedical drug market. The need for opioids can be attributed to several sociopsychological factors. Macroeconomic slumps and increasing income inequality in the past few decades have caused people to suffer from personal economic hardship and family and social distress, which has inevitably contributed to a significant increase in "deaths of despair" (Case & Deaton, 2020, p.111).

The decline of communities (e.g., reducing social capital) and social isolation are also essential factors in the uncontrollable opioid overuse prevalence, aggravating people's depression and discouraging them from seeking appropriate drug addiction treatment (Blanco et al., 2020; Painter, 2017; Salmond & Allread, 2019). Therefore, researchers have stressed the importance of limiting the availability of opioids and reducing people's nonmedical misuse and promoting treatment for opioid addiction in depressed communities.

The opioid crisis hits different population groups differently, which is often related to specific drugs involved and the effects of socioeconomic factors. For opioid prescribing and overdose deaths involving prescription opioids, older people are especially vulnerable given their more significant level of exposure to chronic pain conditions (Jalal et al., 2018; Jalali et al., 2019). By contrast, younger people of working age tend to suffer deaths involving synthetic opioids and heroin, with the opioid-involved mortality rate for this group increasing rapidly in recent years (Cicero et al., 2017; Gladden et al., 2019; Gomes et al., 2018a; Jalal et al., 2018; Salmond & Allread, 2019). In addition, opioid overdose mortality rates are higher for men than for women, but the rates have increased significantly faster among women than men (Jalal et al., 2018; Singh et al., 2019). Different racial/ethnic groups face different challenges as well. Whites are exposed to broader opioid prescriptions due to their structural advantages over racial/ethnic minorities in terms of healthcare access, whereas racial/ethnic minorities suffer from increasing overuse of heroin and other illicit drugs.

Moreover, minority groups often have lower access to effective addiction treatments (Cicero et al., 2017; Dasgupta et al., 2018; Jalali et al., 2019). Thus, opioid overdose deaths predominantly affected White people at the beginning of the epidemic but have increased rapidly among other racial/ethnic groups since (Jalali et al., 2019.; Scholl et al., 2018). Nevertheless, Whites have also observed a significant increase in overdose mortality involving heroin and synthetic opioids (Jalal et al., 2018). Finally, as discussed previously, economic conditions are among the essential drivers of the crisis. People who navigate poverty, unemployment, and economic distress are affected more than people without such stressors (Dasgupta et al., 2018; Grigoras et al., 2018). Therefore, the extensive literature on the opioid crisis provides a clear general picture of its development and drivers over the past two decades and identifies the contributing socioeconomic factors and vulnerable populations in this epidemic.

The most unequivocally urgent and alarming issue about the current opioid epidemic is the exponential rise in deaths from overdose. Gladden et al. (2019) reported an overall decrease in opioid-related deaths by almost 5% in 2018; without co-involvement with illicit opioids, such as illicitly manufactured fentanyl (IMF), the opioid-related deaths decreased by 10.6% in 2018. However, IMF deaths saw an 11.1% increase overall in 2018, IMF and heroin co-involved deaths went up by 9.4%, fentanyl analogs by 11.4%, and fentanyl analogs and heroin by 33.0% (Gladden et al., 2019). Although this recent report by Gladden et al. (2019) covered 25 states, including Minnesota, and provided an overview of opioid-related mortality from July–December 2017 to January–June 2018, the report did not focus primarily on opioid-related deaths

among the working-age population. Gomes et al. (2018a) reported that opioid misuse was highest among people ages 24 to 35 and 15 to 24 years in 2016, with 20% and 12.4% of deaths in these age groups, respectively, attributable to opioids due to the persistent increase in opioid prescriptions.

In some studies, researchers have claimed that the transition from prescription opioids to heroin use is infrequent at the national level (out of around 10 million initiates to nonmedical use of painkillers, only 3.6% report transition to heroin; Compton et al., 2016). However, a recent report suggests new initiates to heroin are 19 times more likely to have overused opioid pain relievers than not, and 79.5% of recent heroin consumers previously utilized opioid painkillers, while only 1% of recent nonmedical prescription pain reliever initiates had previously used heroin. The underlying causes for the rise in heroin remain a topic of controversy (Cicero, & Ellis, 2017; Compton et al., 2016).

Over prescription of opioids is undoubtedly considered a major driving factor in opioid-related problems (Barnett et al., 2017), but the concomitant spike compounds this in heroin and fentanyl supply, the low street cost and high potency of the opioids available, and the policies to reduce nonmedical use of prescription opioids themselves (Cicero & Ellis, 2017). While such shocking statistics have alarmed multiple sectors of U.S. society, the literature specifically investigating the association between the overuse of opioids and socioeconomic status and health status remains limited.

The evidence connecting opioid overuse to help-seeking behaviors is also scarce and inconclusive. The standard gold treatment for OUD is a combination of opioid pharmacological substitution and psychosocial therapy known as medication-assisted

treatment (MAT; Connery, 2015). With over five decades of evidence, MAT is superior to detoxification alone in significantly reducing the risk of comorbidities like infectious diseases, including Hepatitis C and human immunodeficiency virus, and the risk of death from overdose (Connery, 2015; DuPont et al., 2015). Previous federal and state administrations have expanded resources for treatment, as attested by both the Affordable Care Act's and the Mental Health Parity and Addiction Equity Act's push to make it mandatory for insurers to implement the same benefits level for substance abuse and mental health services as representative of general medical treatment. Currently, the continuity of these policies is not guaranteed; access to appropriate treatment for OUD remains limited, and the number of MAT facilities is not evenly distributed across the country (Jones et al., 2015). MAT retention rates are widely variable across studies, and relapse and treatment dropout are correlated and hover around 40% to 60% (Timko et al., 2016). Such shortness of treatment availability necessitates both an expansion in the number of facilities equipped to provide MAT and the development of tools and policies for improved use of treatment resources.

A key factor limiting SUD treatment access has long been the low self-perceived need for treatment, even among those meeting criteria for SUD. Andersen (1995) noted the salience of perceived need, explaining that it is highly predictive of whether individuals receive any services they would have an evaluated need. Evaluated need, meanwhile, tends to be more predictive of the number of services received among those receiving any treatment, with people with higher degrees of evaluation needing to receive more services. Across multiple decades of research, studies have consistently shown that

adults meeting the criteria for SUD are unlikely to report a self-perceived need for treatment at any given time. In three recent analyses, Ali et al. (2015, 2017, 2018) used data from the NSDUH to examine levels of perceived treatment and reasons for unmet treatment among adults with varying combinations of mental illness, SUD, and other predisposing characteristics and enabling resources. First, in an analysis of 2008–2012 NSDUH data, Ali et al. (2015) found that fewer than 3% of adult respondents who met the criteria for SUD but not mental illness reported they had felt a need for SUD treatment in the past year.

Limitations

A potential limitation of this prospective study is that findings were grounded in self-reported survey. Hence, it is impossible to identify the extent of overreporting or underreporting. Empirical investigations point to the validity of such data, but it may be subject to biases. Bias may vary by several factors, such as administration mode, target population, and setting under analysis (Harrell & U.S Department of Health, 1997; Hser et al, 1997; Luckett et al., 2020; Morral et al., 2000). Additionally, the NSDUH survey is not longitudinal but cross-sectional. As such, opioid overuse prevalence is reviewed at a specific time as opposed to changes over an extended period.

Significance

Providing treatment to individuals struggling with substance use and facing addiction and dependency can be challenging. Healthcare providers face various obstacles such as lack of engagement leading to relapse and noncompliance in following the treatment regimen, among other medical complications that may occur because of

opioid/substance use (Painter, 2017). Improving the knowledge of the associations between opioid overuse and the socio-economic status, health status, and perceived need for substance abuse treatment can affect the patient, community, and society by increasing awareness, educating, improving communication, and providing patient-centered quality care. This study is significant because it can help public health professionals understand the contributing factors to the increasing death rates among the working-age population in America. As a result, public health practitioners can develop strategies to decrease the exposure of the working-age population to opioid overuse. Additionally, this study can create positive social change by increasing awareness regarding the impact of opioid and drug overuse among the working-age population in Minnesota and other parts of the country.

Summary and Conclusions

Opioids can have addictive and deadly effects. The rising mortality rate from opioid overdoses is alarming. This deadly epidemic of opioid overdose continues to create havoc, not only in the economy in terms of socio-economic cost, but its adverse effects on individuals, families, and communities around the country and in other parts of the world are genuinely profound. Researchers have identified a variety of correlates for perceiving a need for opioid overuse. These include older age, poor overall health, comorbidities, mental health issues, legal issues associated with substance use, and prior substance use treatment utilization. However, despite the recent rise in mortality rates from opioid overuse in working-age individuals, the literature does not examine the working-age population from the perspective of their thoughts on treatment. In addition,

demographic correlates in the existing literature have been inconsistent, including those on race/ethnicity and gender. These variations may be due to the frequent combination of perceived need for mental health services with perceived need for SUD treatment in data collection procedures, as well as varied sample criteria dependent on SUD subtype (i.e., alcohol use disorder, drug use disorder). The findings of this study add evidence to the existing body of research on opioid overuse in the working-age population, particularly on the factors related to socio-economic status, health status, and perceived need for SUD treatment.

Section 2: Research Design and Data Collection

Introduction

The purpose of this quantitative cross-sectional study using retrospective data was to examine the association between opioid overuse and socioeconomic status, health status, and perceived need for substance abuse treatment in the working-age population in Minnesota. Further examination of the opioid overuse etiology in this age group can help in the design of more effective prevention strategies. Conducting this study also will help determine if opioid overuse has a relationship with help-seeking behavior in the working-age population in Minnesota, as the increase in the number of these individuals creates a burden on society's economics. In this section, I discuss in detail the research design and methodology of the study, including the target population, sampling approach, and operationalization of variables, as well as identify potential threats to the validity of the findings and appropriate ethical procedures.

Research Design and Rationale

This quantitative cross-sectional study using retrospective data involves one independent variable of opioid overuse, dependent variables of socioeconomic status, health status, and perceived need for substance abuse treatment, and the control variable of age category of 18-45 years. In this study, I specifically sought to clarify correlates associated with opioid overuse, including socioeconomic status, health status, and perception of a need for treatment. To accomplish the study aims and answer the three research questions, secondary data from a comprehensive national survey (N = 67,791) by SAMHSA (2019a) were used. The specified methodology was chosen because of the

potential causal relationship between opioid overuse and socioeconomic status, health status, and perceived need for substance abuse treatment. It is impractical to conduct the experimental research required to demonstrate causality.

Quantitative cross-sectional research methods are valuable for calculating the nature and strength of relationships among a set of variables. More specifically, collecting data with a survey instrument offers the ability to measure and describe the opinions, trends, characteristics, or attitudes of a population with numeric data (Creswell, 2009). Such numeric description is obtained by studying a sample from the selected population. Analysis of the sample results provides a researcher with the opportunity to make generalizations or claims about the overall population (Creswell, 2009). Survey design provides an economical way to research a population (Jones et al., 2013). Also, the short turnaround time for cross-sectional data collection process offers an advantage over other research approaches. For example, longitudinal experimental designs test the impact of an intervention or treatment by collecting data at multiple points in time (Creswell, 2009).

A limiting factor related to cross-sectional, descriptive designs is that the method is not intended to provide an understanding of the cause of trends, attitudes, or opinions of the research participants. Even a strong association between two factors does not necessarily imply causation (Creswell, 2009). Descriptive, quantitative methods are limited. This approach cannot provide a full picture of the complexities, individual circumstances, or experiences of participants (Creswell, 2009). However, this study can advance knowledge in the discipline by examining an extensive set of variables, whereas

existing research is more focused on fewer potential predictors of opioid overuse. These results, therefore, provide characteristics of the individuals overusing opioids, which can enable policymakers, physicians, and the community to better understand who is directly affected by the opioid crisis.

Methodology

Population

Secondary data from the files of SAMSHA 2018 NSDUH were used in this study. SAMHSA's Center for Behavioral Health Statistics and Quality is responsible for managing the survey, data collection, and dissemination of the NSDUH public-use data files. Based on the inclusion criteria, the target population of these surveys is the general American civilian population ages 12 and older. According to the exclusion criteria, people who are homeless, military personnel on duty, or residents of institutions such as hospitals and jails are excluded from the survey (SAMHSA, 2019a, 2019b). Importantly, people in noninstitutional group settings, such as shelters, college dormitories, and halfway houses are included in the survey population. In addition to substance use, addiction, prescription drugs, mental health, physical health, social environment, and employment questions, "respondents are also asked about personal and family income, health care access and coverage, illegal activities and arrest records, problems resulting from the use of drugs, and perceptions of risks" (SAMHSA, 2021). The survey also collects such demographic data as "gender, race, age, ethnicity, educational level, employment status, income level, veteran status, household composition, and population density" (SAMHSA, 2021). Interviews are completed in all states and the District of

Columbia, but the public data set does not include the states or regions in which the respondents reside (SAMHSA, 2019a, 2019b).

Sampling

The NSDUH survey and the NSDUH codebook are available to the public from the SAMHSA (2019a, 2019b) and can be obtained on their website with no required permissions. The survey was the best source for the present study as it is designed to provide estimates representative of national- and state-level drug and alcohol use behaviors, lifetime and recent mental health status, receipt of drug, alcohol, and mental health treatment, and an array of demographic, socioeconomic status, and overall health status covariates. Each annual iteration of the NSDUH relies on a multistage, stratified sampling plan yielding independent, representative cross-sections that can be pooled across time to permit trend analysis and boost analytic sample sizes (SAMHSA, 2019b).

Using NSDUH survey data to study opioid overuse has several complementary advantages. First, NSDUH data, resulting from a complex, multistage survey design of all civilian, noninstitutionalized U.S. residents ages 12 or older, are nationally representative in a way that no other data can be and are one of the primary sources of statistical information on substance use and mental health trends in the United States (SAMHSA, 2019a, 2019b). Second, measures of SUD treatment needs (i.e., whether people meet the criteria for SUD) are independent of receiving treatment in the NSDUH (SAMHSA, 2019b). This is vital because more than half of people with SUD do not receive treatment in any given year, and an even smaller proportion receive treatment that private insurance pays for.

The 2018 NSDUH sample is allocated to the following age groups: “25 percent for adolescents aged 12 to 17, 25 percent for young adults aged 18 to 25, and 50 percent for adults aged 26 or older,” while “the sample of adults aged 26 or older is further divided into three subgroups: aged 26 to 34 (15 percent), aged 35 to 49 (20 percent), and aged 50 or older (15 percent)” (SAMHSA, 2019b, p. 5). To answer the two research questions about the working-age population in this study, the total sample of the data set comprised 67,791 general American civilians ages 12 and older; however, the sample of cases selected for analysis in this study was limited to 9,551 individuals ages 18 and older (SAMHSA, 2019a) who self-reported “past year opioid misuse, which is defined as the use of heroin or the misuse of prescription pain relievers in the past 12 months” (SAMHSA, 2019b, p. 97). The final number of respondents may be reduced because of missing data on key variables but no exclusion criteria were used.

I applied an a-priori sample size calculator for sequential multiple to establish a minimum sample size (Soper, 2021). A sequential multiple regression with eight predictors, an effect size of .15, desired statistical power level of 0.8, and a probability level of 0.05 requires a minimum of 108 respondents. Missing data in the regression analysis were addressed by pairwise deletion (available-case analysis). On an analysis-by-analysis basis, the latter resulted in a minimization of the loss occurring in likewise deletion, thus maximizing all available data.

Instrumentation

In 2006, the reliability of the NSDUH responses was assessed by applying the interview/reinterview technique. Respondents were asked the same questions at two

different time points. Cohen's kappa (κ) estimates ranging from −1.00 to 1.00 are applied to identify reliability (Cohen, 1960). The following interpretation of Cohen's kappa is relevant to this study instrumentation:

> (1) poor agreement for kappa's less than 0.00, (2) slight agreement for kappa's of 0.00 to 0.20, (3) fair agreement for kappas of 0.21 to 0.40, (4) moderate agreement for kappas of 0.41 to 0.60, (5) substantial agreement for kappas of 0.61 to 0.80, and (6) almost perfect agreement for kappas of 0.81 to 1.00. (Landis & Koch, 1977, p. 165)

Lifetime and past-year marijuana use had 0.93 and 0.82 kappa values, respectively. All the NSDUH measures utilized in this study are self-report. NSDUH assures that responses remained private and confidential. Furthermore, the use of ACASI reduces the potential for underreported and overreported responses (SAMSHA, 2019b, 2019c).

Operationalization

Opioid overuse was measured as a reported past-year opioid misuse: 1 = yes, 0 = did not use in the past year (SAMHSA, 2019c).

Socioeconomic status was measured using data values for gender, age, income, employment status, education level, and race.

Respondents' age was measured as their age at the time of the interview; "the interview program calculated the respondent's age from the interview date and the date of birth that was reported to the interviewer. The interview program prompts the interviewer to confirm the respondent's age after it has been calculated" (SAMHSA, 2019b, p. A-2).

Age values are as follows: 1 = 18–25 and 2 = 26–34, 3 = 35–49 (SAMHSA, 2019b, 2019c).

Respondents' gender was measured as male or female. Gender values are: male = 1, female = 0.

The income of respondents was measured as less than $20,000, $20,000–$49,999, $50,000–$74,999, and $75,000 or more (SAMHSA, 2019c).

The employment status of the respondent was measured as "full-time" "past-time,", "Unemployed," and "other" (SAMHSA, 2019c).

Respondents' education level was measured as less than high school, high school graduate, some college/associate degree, and college graduate (SAMHSA, 2019c).

Respondents' race was measured as not Hispanic or Latino and Hispanic or Latino (SAMHSA, 2019c).

Health status was measured using data values reported as lifetime nonopioid abuse or dependence (1 = yes, 2 = no), a past year serious mental illness (SMI; 1 = yes, 2 = no), and lifetime high blood pressure (1 = yes, 2 = no; SAMHSA, 2019c).

Finally, the *perceived need for substance abuse treatment* was established as a felt need for treatment for illicit drug or alcohol use in the past year (1 = yes, 2 = did not feel need in the past year; SAMHSA, 2019c).

Data Analysis Plan

All analyses were conducted using SPSS version 25 to answer the following research questions and test the study hypotheses.

RQ1: Is there any association between opioid overuse and socioeconomic status (income, employment status, education level, and race) in the working-age population (18–45 years) in Minnesota?

$H_0$1: There is no association between opioid overuse and socioeconomic status (income, employment status, education level, and race) in the working-age population (18–45 years) in Minnesota.

H_a1: There is an association between opioid overuse and socioeconomic status (income, employment status, education level, and race) in the working-age population (18–45 years) in Minnesota.

RQ2: Is there any association between opioid overuse and health status (diagnosed opioid abuse or dependence, non-opioid abuse or dependence, and mental health disorders) in the working-age population (18–45 years) in Minnesota?

$H_0$2: There is no association between opioid overuse and health status (diagnosed opioid abuse or dependence, non-opioid abuse or dependence, and mental health disorders) in the working-age population (18–45 years) in Minnesota.

H_a2: There is an association between opioid overuse and health status (diagnosed opioid abuse or dependence, non-opioid abuse or dependence, and mental health disorders) in the working-age population (18–45 years) in Minnesota.

RQ3: Is there any association between opioid overuse and the perceived need for substance abuse treatment (the felt need for treatment for illicit drug or alcohol use) in the working-age population (18–45 years) in Minnesota?

$H_0$3: There is no association between opioid overuse and the perceived need for substance abuse treatment in the working-age population (18–45 years) in Minnesota.

H_a3: There is an association between opioid overuse and the perceived need for substance abuse treatment in the working-age population (18–45 years) in Minnesota.

Sequential multiple linear regression analyses were employed to examine predictors of opioid overuse. Block 1 included age and gender. Dummy variables compared ages 18 to 26 and 26 to 36, respectively, to ages 35 to 49. In addition, dummy variables compared males to females, not Hispanic respondents to Hispanics, and people ages 18 to 49. The contribution of each block was assessed to prior blocks. For example, block 2 contained income, block 3, employment status, block four educational level, block five reported lifetime non-opioid abuse or dependence, block six the past year's severe mental illness, block seven lifetimes high blood pressure and block eight the felt need for treatment for illicit drug or alcohol use in the past year.

I took a three-level approach to data analysis. First, I examine all study variables by performing univariate analysis, such as checking the assumptions of normality, homoscedastic residuals, and removing outliers, followed by a bivariate analysis between all predictor and outcome variables to determine the association's existence and strength. Finally, I performed a multiple regression analysis to establish the impact on outcome variables (Coakes & Steed, 2009). Finally, the associations among study variables are

presented in tables to reveal patterns of association between the study variables and answer the two research questions.

Threats to Validity

This study builds on many strengths, from carefully chosen econometric methods to reliable, high-quality national survey data that focused on identifying people with SUD, OUD, opioid overuse, and their recent experiences seeking and receiving treatment. A wide range of mental health and substance use-related conditions are not easily captured in a survey questionnaire, even when it includes validated instruments. For example, the NSDUH survey includes mental health and substance use probes that could be used to generate a continuous measure of SUD treatment needs. Additionally, because this study used multiple models in a large regression equation, it may reduce the ability to detect significant relationships if they exist.

Ethical Procedures

The Institutional Review Board approved data collection for NSDUH at RTI International. NSDUH collects data through face-to-face interviews via computer assisting interviewing. In computer-assisted techniques, the interviewer and respondents use electronic devices to ask and answer interview questions (SAMSHA, 2019b). According to SAMHSA (2019b), the field interviewer (FI) uses a laptop computer to conduct the interview, which averages about an hour and includes a combination of computer-assisted personal interviewing (CAPI) and audio computer-assisted self-interviewing (ACASI). For the CAPI interview, FI reads the questions to the respondent

and enters the answers into the computer. In the ACASI interviewing, the respondent reads questions on the computer screen or listens to questions through headphones and then enters his or her answers directly into the computer without the FI knowing the response. (p. 7)

Participants were informed of the confidentiality of their responses and given a $30 incentive for participating in the study. The raw data was collected, edited, identifiers removed, imputed, and weighted (SAMSHA, 2019b).

Summary

This quantitative cross-sectional study using retrospective data examined the predictors of opioid overuse among a working-age subsample of respondents to the United States 2018 NSDUH. In addition, the outcomes for socioeconomic status, health status, and perceived need for SUD treatment were assessed in a multivariate regression framework.

Section 3: Presentation of the Results and Findings

Introduction

The purpose of this quantitative cross-sectional study using retrospective data was to examine the association between opioid overuse and socioeconomic status, health status, and perceived need for substance abuse treatment in the working-age population in Minnesota. All data analyses were conducted using SPSS Version 25 to test the study hypotheses.

To test the hypotheses, the NSDUH interactive website was used for analysis. Sequential multiple linear regression analyses were employed to examine predictors of opioid overuse. I applied a three-level approach to data analysis. First, all study variables were examined by performing univariate analysis, such as checking the assumptions of normality, homoscedastic residuals, and removing outliers. Second, a bivariate analysis between all predictor variables and outcome variables was performed to determine the existence and the strength of associations. Finally, multiple regression analysis was performed to establish the impact on outcome variables (Coakes & Steed, 2009). The associations among study variables are presented in the following tables and figures to reveal patterns of association between the study variables, test the hypotheses, and answer the two research questions.

Presentation of Results and Findings

Demographic Profile of Participants

Data were collected from 4,556,000 Minnesota participants. Table 1 details the demographic profile of the participants, which includes age, gender, race, and education level.

Table 1

Descriptive Analysis of Participants by Substance Use

Variable	Category	N (%)
Age	18 to 25	569,000 (29%)
	26 to 34	757,000 (38%)
	35 to 45	668,000 (34%)
Education level	Less than high school	266,000 (6%)
	High school graduate	925,000 (22%)
	Some college/associate degree	1,412,000 (33%)
	College graduate	1,664,000 (39%)
Income	Less than $20,000	1,644,000 (36%)
	$20,000 to $49,999	1,051,000 (23%)
	$50,000 to $74,999	1,085,000 (24%)
	$75,000 or more	776,000 (17%)
Employment status	Employed full time	131,000.0 (7%)
	Employed part time	573,000 (29%)
	Unemployed	100,000 (5%)
	Other	1,167,000 (59%)
Race	Not Hispanic or Latino	4,475,000 (99%)
	Hispanic or Latino	23,000 (1%)

Analyses of Research Questions and Null Hypotheses

Age

The test of association results indicate that age is not statistically associated with opioid overuse. The results show no statistically significant difference in nonopioid

overuse and opioid overuse in the past year. These results suggest that age has no strong effect on opioid overuse.

Table 2

Results of Chi-Square Test and Descriptive Statistics for Opioid Overuse by Age

Age	Did not overuse in the past year	Overused in the past year
18 to 25	532,000 (93%)	37.000(7%)
26 to 34	701,000 (93%)	56,000(7%)
35 to 45	654,000 (98%)	14,000(2%)

Note. X^2 = #, df = #. Numbers in parentheses indicate column percentages. *p < .05

Education

The test of association results indicates that education level is not statistically associated with opioid overuse. The results show no statistically significant difference in nonopioid overuse and opioid overuse in the past year. These results suggest that education level does not influence opioid overuse.

Table 3

Results of Chi-Square Test and Descriptive Statistics for Opioid Overuse by Education Level

Education level	Did not overuse in the past year	Overused in the past year
Less than high school	254,000 (95%)	13,000(5%)
High school graduate	897,000 (97%)	28,000(3%)
Some college/associate degree	1,355,000(96%)	58,000(4%)
College graduate	1,599,000 (96%)	66,000(4%)

Note. X^2 = 0.3710, df = #. Numbers in parentheses indicate column percentages. p > 0.05

Income

The test of association results indicate that income is statistically associated with opioid overuse. The results show statistically significant difference in nonopioid overuse

and opioid overuse in the past year. These results suggest that income can influence opioid overuse.

Table 4

Results of Chi-Square Test and Descriptive Statistics for Opioid Overuse by Income

Income	Did not overuse in the past year	Overused in the past year
Less than $20,000	1,575,000 (96%)	69,000(4%)
$20,000 to $49,999	996,000 (95%)	55,000(5%)
$50,000 to $74,999	1,045,000(96%)	39,000(4%)
$75,000 or more	767,000 (99%)	10,000(1%)

Note. X^2= 3.51, df = #. Numbers in parentheses indicate column percentages. p = < 0.01

Employment Status

The test of association results indicate that employment status is not statistically associated with opioid overuse. The results show no statistically significant difference in nonopioid overuse and opioid overuse in the past year. These results suggest that employment status does not influence opioid overuse.

Table 5

Results of Chi-Square Test and Descriptive Statistics for Opioid Overuse by Employment Status

Employment status	Did not overuse in the past year	Overused in the past year
Employed full time	128,000(96%)	17,000(4%)
Employed part-time	539,000 (94%)	34,000(6%)
Unemployed	96,000(96%)	3,000(3%)
Other	1,135,000 (97%)	32,000(3%)

Note. Numbers in parentheses indicate column percentages. p > 0.05

Race

The test of association results indicate that race is not statistically associated with opioid overuse. The results show a statistically insignificant difference in nonopioid

overuse and opioid overuse in the past year. These results suggest that race cannot influence opioid overuse.

Table 6

Results of Chi-Square Test and Descriptive Statistics for Opioid Overuse by Race

Race	Did not overuse in the past year	Overused in the past year
Not Hispanic or Latino	192,000(89%)	24,000(11%)
Hispanic or Latino	216,000 (94%)	14,000(7%)

Note. Numbers in parentheses indicate column percentages. $p > 0.05$

Mental Disorders

The test of association results indicate that mental disorders are statistically associated with opioid overuse. The results show a statistically significant difference in nonopioid overuse and opioid overuse in the past year as shown in Table 7. These results suggest that mental disorders influence opioid overuse.

Table 7

Results of Chi-Square Test and Descriptive Statistics for Opioid Overuse by Mental Disorders

Received mental health treatment in the past year	Did not overuse in the past year	Overused in the past year
Yes	783,000(92%)	72,000(8%)
No	3,303,000 (97%)	92,000(3%)

Note. Numbers in parentheses indicate column percentages. $p < 0.05$

Perceived Need for Substance Abuse Treatment

The test of association results indicates that the perception of a mental health problem or felt the need for treatment was positively associated with opioid overuse as shown in Table 8 ($X^2 = 13.09$, $p < 0.01$) providing support for the second hypothesis of the present study.

Table 8

Results of Chi-Square Test and Descriptive Statistics for Opioid Overuse by Mental Disorders

Perceived need for substance abuse treatment	Did not overuse in the past year	Overused in the past year
Yes	948,000(90%)	101,000(10%)
No	3,143,000 (98%)	59,000(2%)

Note. $X^2 = 13.09$; Numbers in parentheses indicate column percentages. $p < 0.01$

Multiple Regression Analyses Models

I ran a series of nine regression models using the variables described above. Table 9 shows the results of the final model.

Table 9

Regression Coefficients for Regression

Coefficients[a]

Model		Unstandardized coefficients		Standardized coefficients	t	Sig.
		B	Std. error	Beta		
9	(Constant)	.184	.014		13.106	.000
	Gender	-.013	.004	-.031	-3.641	.000
	Age category young	.005	.006	.009	.820	.412
	Age category old	-.021	.005	-.046	-4.098	.000
	RC-Race/Hispanic	.000	.005	-.001	-.069	.945
	RC-Total family income	-.006	.002	-.034	-3.536	.000
	Employment status	-.002	.001	-.011	-1.173	.241
	RC-Education Categories	-.012	.002	-.054	-5.738	.000
	Any pain reliever use in lifetime	-.066	.004	-.141	-16.219	.000
	RC-Categorical mi indicator revised	.065	.004	.135	15.516	.000
	Ever told had high blood pressure	.012	.004	.027	3.086	.002
	Think ever had problem with own mental health	4.944e-5	.000	.001	.177	.859

Note. a. Dependent Variable: RC – Opioids past year overuse; b. Predictors: (Constant), Think ever had problem with own mental health, RC – Race/Hispanic, Gender, Age

category young, ever told had high blood pressure, RC – Categorical mental health issues indicator, RC – Education categories, Any pain reliever use in lifetime, Employment status, RC – Total family income, Age category old

As Table 9 shows, respondents in the older age category 35–49 years, were more likely to show a statistically significant association with opioid misuse or abuse in the past year ($p = 0.00$) compared to 18–25 or 26–34. Therefore, a statistically significant association exists between opioid overuse and age. The association between race and opioid overuse was not strong, as the regression model shows the constant was not statistically significant for this variable in relation to the independent variable. Family income was significantly associated with opioid overuse in the past year. Employment status was not significantly associated with opioid use. Educational categories were significantly associated with the opioid overuse over the past year. Any nonopioid use in lifetime was significantly associated with opioid past year overuse. Mental health issues were significantly associated with opioid overuse. Blood pressure had significant association with opioid overuse. There was no significant association between perceived mental health problems and opioid overuse.

Conclusion

In conclusion, the study findings support the first and second hypotheses, suggesting an association between opioid overuse and educational levels, and income therefore the null hypothesis in this case was not validated and the alternate hypothesis hold true for educational level. However, employment levels and race were not statistically significant. Diagnosed opioid use or dependence, mental health disorders, or

non-opioid dependence were significantly associated with opioid overuse supporting the second alternate hypothesis in the second research question. The research findings did not support the third hypothesis regarding the association between opioid overuse and the perceived need for substance abuse treatment. In addition, multiple linear regression analysis using successive models showed the association of gender and older age categories of the working population between 35 and 49 years of age with opioid overuse. Predictor variables thus affected the outcome variable.

Section 4: Application to Professional Practice and Implications for Social Change

Interpretation and Implications of Findings

The study results provide quite interesting implications associated with opioid overuse in the working-age population in Minnesota. First, the comprehensive statistical analysis conducted in this study identified numerous factors associated with higher risks of opioid overuse. Identifying these factors may make it possible to develop effective interventions and preventive strategies focused on individuals belonging to risk groups, which could reduce opioid overuse and contribute to this population's general welfare.

First, it is necessary to mention the results of descriptive statistics and Chi-square tests, providing general information on opioid overuse differences across separate groups. Education level is not significantly related to opioid overuse, as the percentage of those who overuse opioids is almost the same across different education levels. A slightly higher percentage (5%) was observed among the respondents who had completed less than a high school diploma.

Income is directly associated with opioid overuse. People with higher incomes are less likely to overuse opioids than people with lower incomes. Only 1% of people in the $75,000 or more group overuse opioids in the past year, which aligns with previous findings (Fleming, 2018). People with lower income may be at risk of overusing opioids and other drugs due to various factors. Lower income has been associated with more everyday problems and lower quality of life, which may stimulate individuals to overuse drugs or alcohol.

There is no significant correlation between employment status and opioid overuse. Only 3% of the unemployed respondents reported overusing opioids in the past year. I also found no association between race and opioid overuse. There are several explanations for why no statistically significant associations were found. First, there were only two race groups: not Hispanic and Hispanic. If more race groups were included in the analysis, the findings may have been different. While income is associated with opioid overuse, there is no association between race and opioid overuse. This means that the income difference between not Hispanic and Hispanic in the population is not significant. Including other racial and ethnic minorities in the analysis may have led to more findings as to whether economic disparity associated with a minority status may lead to higher opioid overuse or not.

Mental health problems were a strong predictor of opioid overuse, which aligns with previous findings. People suffering from mental diseases and disorders are more likely to overuse alcohol and drugs due to higher exposure to stress and cognitive problems (Sumetsky et al., 2019). People suffering from mental disorders in Minnesota who do not have access to mental health services may use other methods to deal with adverse mental health symptoms, including drug overuse.

Multiple regression analysis models provide additional insights into the topic of interest. Family income, education, mental illness, and nonopioid use in a lifetime were associated with opioid overuse. The results also show that people belonging to the older age group 34–45 were more affected by opioid overuse compared to younger adults. One potential explanation for this is that the older individuals are more susceptible to opioid

overuse because they have higher chances of developing disorders associated with chronic pain. The prescription of opioids to help alleviate pain can lead to opioid overuse and addiction.

The findings indicate that sociodemographic factors and individual health-related factors, such as high blood pressure or mental disorders, are associated with opioid overuse. Using these findings makes it possible to identify risk groups and create public awareness campaigns targeted at specific audiences that may suffer from opioid overuse. In addition, the findings can inform the policy-making process and ensure that specific populations, such as people suffering from mental health disorders, are provided with a higher degree of access to practical psychological help and treatment.

The results of the study provide associations with opioid overuse in the working-age population in Minnesota. The comprehensive statistical analysis conducted in this study identified a range of factors associated with higher risks of opioid overuse. By identifying these factors, it is possible to develop effective interventions and preventive strategies focused on individuals belonging to risk groups, which in turn would reduce opioid overuse and contribute to the general welfare of this population.

Contribution to Discipline

This study's theoretical framework was grounded in the addiction career concept (Hser et al., 1993) and the chronic illness model of drug addiction (McLellan et al., 2000), which proved useful in explaining the variables used in each level of the multiple regression models. While any non-opioid use in a lifetime and high lifetime blood pressure were positively associated with opioid overuse, there were no significant

interactions among the predictor variables of income, employment status, race, diagnosed opioid use, or dependence, and mental health disorders or nonopioid dependence. Nevertheless, the addiction career concept and the chronic illness model of drug addiction elucidated the need for opioid harm reduction strategies specific to the working-age population, as education level emerged as a significant predictor of opioid overuse.

In addition, the findings establish a strong association between family income and opioid overuse, indicating that housing and economic security are critical to creating an environment that enables treatment entry for individuals overusing opioids. Although there is evidence that supportive housing can improve residential stability (Nojima et al., 2018), including child welfare system families (Glendening et al., 2020), there is limited evidence regarding its specific effect on SUD treatment entry, especially for women who overuse opioids. Retrospective and prospective studies that evaluate the effects of structural interventions such as supportive housing on enhancing SUD treatment access are warranted. As the present findings suggest that women are more affected by opioid overuse than men, research that elucidates the barriers to SUD treatment use for women who overuse opioids and are already in supportive housing programs is also recommended.

Recommendation

From this study's findings, I recommend studies on the specific opioid drug that causes more deaths in the working-age population and links with emerging substances such as cannabinoids and synthetic cannabinoids to determine the interactions of these

drugs or substances in opioid overuse. The results from this study have provided helpful insight into the need to create harm reduction initiatives geared towards reducing opioid overuse in the working-age population. For future research, I propose to create a project that targets educating working-age individuals and their families about the risks of using opioids. In addition, alternative pain management options to reduce reliance on opioid medications, particularly in patients with chronic conditions, should be provided. In the future, applying for grants to support the research projects geared toward reducing risks and creating opioid harm reduction education initiatives tailored for the working-age population. One recommendation is to evaluate existing programs on harm reduction in Minnesota by county and identify areas that work and potential areas for improvement that could benefit the working-age individuals.

The current study highlights a critical need for research on effective stigma reduction interventions, mainly social and structural stigma, which is a critical barrier to substance abuse treatment-seeking among individuals who overuse opioids (Hser et al., 1993). Intervention research should engage multiple stakeholders to develop and evaluate interventions incorporating the perspectives of females who use drugs. In addition, future research should examine how stigma reduction interventions at one level influence others and identify the extent to which multilevel interventions are needed and the specific context in which single-level versus multilevel interventions should be employed (Rao et al., 2019).

Contribution to the Profession

Opioid overuse remains a significant and urgent public health issue plaguing American society, counties, and communities. There were several studies on opioid-related mortality. However, these studies did not focus on opioid-related deaths and overuse in the working-age population (18-45 years), nor did they address the social determinants of opioid-related deaths in the working-age group (Grigoras et al., 2018; Monnat, 2019; Monnat et al., 2019). Prior research focused on the relationship between opioid mortality or overdose and socioeconomic categories (Altekruse et al., 2020) and not on opioid overuse or misuse. Opioid overuse among the working-age population has received little attention (Blanco et al., 2020; Cicero & Ellis, 2017; Dasgupta et al., 2018; Hudgins et al., 2019; Luckett et al., 2020; Mascola et al., 2017; Painter, 2017; Salmond & Allread, 2019; Winstanley & Stover, 2019). This study addressed that gap in research by examining the social determinants of opioid overuse in the working-age population. I examined the social determinants of health, including age, gender, race, employment status, income, education level, health status, and perceived need for substance abuse treatment that could predict opioid overuse rates in Minnesota. Although past research revealed connections between adverse health status, socioeconomic status, and worse opioid use outcomes, it emphasized treatment outcomes (Dasgupta et al., 2018; Hudgins et al., 2019; Winstanley & Stover, 2019) rather than opioid overuse. In addition, previous research paid little attention to treatment-seeking behaviors concerning opioid overuse (Dasgupta et al., 2018; Winstanley & Stover, 2019). Therefore, the present study attempted to fill a gap in research on the sociodemographic factors of opioid overuse,

health status, and the perceived need for substance abuse treatment, specifically in the working-age population.

This secondary data analysis of the NSDUH 2018 data achieved a three-fold purpose:

1. Determined the association between gender, race, health status, and opioid overuse.

2. Examined which sociodemographic characteristics such as income, education level, and employment status could predict opioid overuse rate; and

3. Analyzed trends of opioid overuse in Minnesota through 2018.

The results of this study added evidence to the current state of opioid research in the working-age population. Older adults (35–49-year-olds) were more affected than those in the lower age categories of 18-25 years and 26-34 years, while women were more affected than men, which was statistically significant ($p < .001$). However, race indicated no significant association with opioid overuse. At the same time, education level was significantly associated with opioid overuse over the past year, with people holding some college or associate degree less affected.

Additionally, the health status variables of non-opioid use in lifetime and high lifetime blood pressure were significantly associated with past year opioid misuse. While the employment status was not significantly associated with opioid overuse, there was a strong association between family income and opioid overuse in the past year, with those individuals with lower income (less than $20,000) affected the most. Finally, the perception of a mental health problem or felt need for treatment and the perceived need

for substance abuse treatment were both positively associated with opioid overuse. Overall, while this study's results conformed to previous research findings, i.e., social demographics, more research is needed to elucidate the role of specific opioids in increasing opioid overuse in the working-age population.

In the context of the Mental Health Parity and Addiction Equity Act and more recent health reforms like the Affordable Care Act, there are opportunities to go beyond insurance coverage mandates to facilitate greater treatment access on the patient, provider, and payer sides of the health care system. For example, more resources aimed at public education in the population of working-age individuals could be carefully targeted to enhance patient education and improve individuals' understanding of the need for treatment when it exists, where and from whom to seek it, and the extent to which their health insurance covers the treatment they need. In addition, insurers could make this information more readily accessible if well-calibrated incentives and regulations are implemented. Moreover, efforts to improve the public's basic understanding of opioid overuse remain needed to help reduce stigma, which persists as a prominent barrier to treatment.

There are limitations to this study's methodology—first, the NSDUH measures from the SAMHSA (2019a, 2019b) on survey respondents are self-reports. As a result, problems with knowledge, recall, and social desirability bias may have introduced measurement errors. These potential factors could pose downwardly biased estimates of treatment need and utilization (Morral et al., 2000). In addition, the social stigma related to the overuse of opioids may have adversely affected the truthfulness of the survey

reports (Hser et al., 1997). A second significant limitation is a cross-sectional design. Longitudinal cohort designs that follow drug users over time are rare and expensive, particularly given the frequency with which study participants transition in and out of drug use (Eastwood et al., 2017; Hser et al., 1997; Klein, 2020; Marel et al., 2019). However, because the instruments and data collection procedures used in this study were standardized and commonly used in the substance abuse treatment field, they may have reduced the impact of self-report bias.

Additionally, the NSDUH does not sample individuals without an address, which includes many homeless individuals and deployed members of the military (SAMHSA, 2019b). The survey also does not include residents of institutions like prisons, nursing homes, long-term care facilities, and mental institutions (SAMHSA, 2019b). Future studies should examine these populations' unique issues and needs, given the risk of opioid overuse, physical health, and mental health concerns (Galea & Vlahov, 2002). Notably, the current study did not specifically account for the severity of opioid overuse, nor did it examine specific types of substances. However, the included mental health and health status measures address the severity issue. Still, given that some have argued that specialty SUD treatment may not be necessary for individuals with less severe SUDs (Johnson et al., 2020), future studies examining substances in specified groups such as opioids should include specific severity measures in analyses.

Sharing this study with healthcare providers in Minnesota and other regions is recommended with emphasis on health education, highlighting opioid risks and ways of reducing the harm associated with opioid use in the working-age individual. For nursing

education, incorporating the results of this study in substance abuse literature, identifying the high-risk working-age individuals for opioid misuse could help promote patient-centered care and safety. Finally, for future direction, a collaborative study involving opioid harm reduction initiatives for the working-age person at the community or county level is recommended.

Contribution to Social Change

There are many stakeholders involved in this current opioid overuse crisis. Sharing this study results with medical professional groups, nursing professional groups, and legislative representatives in Minnesota are the next steps for this project. Letting the professional groups know where there are gaps in education and practices may guide them to make some recommendations or changes to their members. It may also help guide educational institutions as they prepare curriculums for future practitioners. Sharing the results with local legislative leaders may help support future legislation to reduce barriers to accessing care that is affecting working-age individuals overusing opioids and in need of treatment for their opioid dependence.

Combining addiction career and chronic illness theoretical frameworks allows for a better examination of opioid overuse from the potential treatment perspective. There is a need to expand the extant limited scientific evidence of long-term treatment effects and patterns of drug abuse and further study the association between utilization of service systems and patterns of drug abuse (Hser et al., 1993; McLellan et al., 2000). Conceptualizing opioid dependence and overuse as a chronic illness can significantly impact the treatment services concerning reimbursement and delivery (McLellan, 2002).

One such consequence of using a chronic illness view of drug addiction is the need for persistent treatment arrangements offered continuously, continuing care, or aftercare. Unfortunately, the current economic concerns and funding constraints of most drug abuse programs are not likely to promote the integration of drug addiction such as that based on overuse of opioids as a health problem. However, conducting more empirical-based longitudinal studies under this framework could help understand opioid overuse as health behavior and serve as a catalyst for change in social policy and practice surrounding how treatment services are delivered and outcome expectations.

Conclusion

It is worth investing and allocating resources to increasing public awareness about the harms and dangers of opioid overuse, particularly in the working-age population. Policymakers, government agencies such as the Drug Enforcement Administration, Food Drug Administration, state or local government, and other stakeholders could leverage the results of this study and develop actionable plans to protect the working-age individuals in Minnesota from opioid overuse and reduce the opioid death rates in the American society. For nursing practice, nurses administer pain analgesia, including opioids. Nurses act as patient advocates and conduct health teaching, including medication's adverse effects. Nurses could leverage this study's results in discussing with providers and patients which opioid drugs could cause more overuse in this age group.

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