A Mixed Methods Exploration Of Stigma, Discrimination, And Sleep Among Those On Medication For Opioid Use Disorder

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Abstract

A Mixed Methods Exploration of Stigma, Discrimination, and Sleep among those on Medication for Opioid Use Disorder

Uzoji Nwanaji-Enwerem

2023

Insomnia occurs in as many as 75% of people with Opioid Use Disorder (OUD). The prevalence of insomnia is attributable to concurrent factors such as mental health disorders, chronic pain, and medication use; however the contribution of social factors is not well understood. Persistent social factors and concerns within this population include stigma and discrimination. People who use prescribed medication for OUD (MOUD) report stigma and discrimination related to OUD, MOUD, and possibly other characteristics (e.g., race, gender, socioeconomic status, and incarceration history). However, the relationship between OUD-related stigma and discrimination with insomnia and between intersectional experiences, perceptions of stigma, and discrimination among patients on MOUD are not well understood. This dissertation research is nested within the NIH HEAL funded mechanistic study (CLOUDS STUDY: Collaboration Linking Opioid Use Disorder and Sleep) whose primary goal is understanding the contributions of sleep deficiency to relapse and retention in MOUD. The purpose of this dissertation is to examine the association between OUD-related stigma, and intersectional discrimination with insomnia among individuals on MOUD. Using a convergent mixed methods design, we addressed the following aims: **Aim 1:** Examine the associations between OUD-related stigma and intersectional discrimination with insomnia among individuals on MOUD [quantitative]. **Hypothesis:** OUD-related stigma and intersectional discrimination are positively correlated with insomnia severity among individuals on MOUD. **Aim 2:** Describe (1) how individuals perceive issues of stigma, discrimination, and
sleep; (2) the intersectional phenomena of stigma and discrimination; (3) how experiences and perceptions associate with sleep [qualitative]. **Aim 3**: Gain a comprehensive understanding of the relationship between stigma and discrimination with insomnia among individuals on MOUD through integration of quantitative and qualitative data from Aims 1 and 2 [mixed methods].

Informed by the Health Stigma and Discrimination Framework, manuscript #1 was a systematic review of original research describing associations between dimensions of stigma and sleep deficiency. There was consistent evidence that stigma, whether internalized, perceived, or anticipated, is associated with self-reported characteristics of sleep deficiency. This review highlighted important gaps in the literature which included, but were not limited to, the lack of exploration of this association among highly stigmatized populations, including those on MOUD. In manuscript #2, I report qualitative findings from 25 diverse participants on MOUD who described how they experienced intersectional stigma and discrimination and identified supports and resources that could be used to better understand and cope with the cumulative experiences of multiple forms of disadvantage. Five themes with supporting subthemes highlighted several identities that intersected with OUD. The intersection of multiple marginalized identities, which often led to discriminatory experiences, internalization of negative feelings, anticipated stigma, and shifts in self-perception. Participants also commented on recommendations for care to address the cumulative intersecting experiences of OUD. In manuscript #3, I explored (1) the relationships among OUD-related stigma, intersectional discrimination and insomnia among participants on MOUD, (2) how individuals perceived stigma, discrimination, and sleep, and (3) how individuals believed their experiences with discrimination and stigma were linked to sleep. The integration of quantitative and qualitative data led to a more comprehensive understanding of the relationship between stigma, discrimination, and sleep and the intersectional phenomena of stigma and discrimination experienced by this population. Analysis revealed moderate correlations between intersectional discrimination, physical symptoms and psychological distress with insomnia severity. Participants’ descriptions of their sleep illustrated how they connected
discriminatory and stigmatizing experiences to sleep. Overall, the findings of this dissertation underscore that OUD-related stigma is a complex and nuanced concept. Study findings add to the growing body of literature linking intersectional discrimination, physical symptoms, and psychological distress with insomnia in people on MOUD. These findings may help to inform future intervention development aimed at advancing anti-discrimination efforts to improve sleep outcomes among those with OUD.
A Mixed Methods Exploration of Stigma, Discrimination, and Sleep among Individuals on Medication for Opioid Use Disorder

A Dissertation
Presented to the Faculty of the Graduate School of Yale University
In Candidacy for the Degree of Doctor of Philosophy

By
Uzoji Nwanaji-Enwerem
Dissertation Chair: M. Tish Knobf, PhD, RN, FAAN
March 15, 2023
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CHAPTER 1:
Overview of the Dissertation
Introduction

Opioid use disorder (OUD), a type of substance use disorder affecting over 2.7 million individuals in the United States (US), is characterized as a problematic pattern of opioid use that causes significant impairment or distress.\(^1\) OUD is a chronic and relapsing disease that can impact anyone regardless of their demographic characteristics.\(^1\) OUD is a destabilizing health condition that can lead to multiple morbidities and mortality, including but not limited to overdose.\(^2\) Evidence-based treatment for OUD includes the use of federally approved medication for OUD (MOUD), namely methadone, buprenorphine, and naltrexone, coupled with counseling and other supports.\(^3\) However, only 20% of individuals with OUD receive appropriate recommended treatment each year.\(^4\)

Individuals with OUD often report multiple symptoms that are frequently overlooked and therefore undertreated,\(^4,5\) such as symptoms associated with poor sleep leading to insomnia. Insomnia is a sleep disorder that includes difficulty initiating sleep, staying asleep, waking up from sleep too early, and not being able to resume sleep after awakening.\(^6\) Insomnia occurs in as many as 75% of people with OUD\(^7\) and individuals on MOUD tend to report more severe insomnia symptoms.\(^8\) Opioid users report an increase in insomnia symptoms related to chronic drug use, pain, anxiety, depression, withdrawal symptoms, benzodiazepine (BZD) use, and cigarette smoking.\(^9\) Social factors may also contribute to insomnia among this population, however there is a dearth of research exploring such associations. The biological, psychosocial, and environmental mechanisms for the relationships between sleep disturbance and relapse and retention in MOUD are poorly understood and are the focus of an ongoing HEAL-funded study (U01HL150596, 9/27/2019-8/31/2023), the Collaboration Linking Opioid Use Disorder and Sleep (CLOUDS), which is the parent study for this dissertation.

Persons with OUD represent a population who are subject to negative stereotyping and stigma.\(^10,11\) OUD-related stigma can further disrupt one’s mental health, discourage help seeking, and restrict access to effective treatment, leading to harmful individual-level outcomes.\(^12\) Stigma is the negative stereotype and discrimination is the behavior that results from this negative stereotype.\(^13\) Persons with OUD may have multiple identities and together, may result in intersecting layers of discrimination,
known as intersectional discrimination.\textsuperscript{11,16} For example, an ex-offender with OUD may experience discrimination due to both their criminal history and their OUD, and a person of color may experience discrimination due to racism in addition to their OUD.\textsuperscript{14,15}

Stigma and discrimination contribute to poor sleep quality, insufficient sleep duration, greater use of sleep aids, and difficulty staying awake during the day.\textsuperscript{17-19} The emotional, psychological, and physiological alterations that come with experiencing stigma and discrimination can adversely affect sleep quality and duration.\textsuperscript{18} However, there is a significant gap in our understanding of the association between stigma and intersectional discrimination with insomnia among those on MOUD. This information is needed to guide specific sleep interventions to address insomnia in people on MOUD.

**Study Purpose**

Using a convergent mixed methods design, which simultaneously includes qualitative and quantitative data for a more complete understanding of a problem,\textsuperscript{20} the purpose of this doctoral dissertation was to examine the relationships between OUD-related stigma and intersectional discrimination with insomnia among those on MOUD.

**Specific Aims**

The primary aims of this doctoral dissertation were to:

**Aim 1:** Examine the associations between OUD-related stigma and intersectional discrimination with insomnia among individuals on MOUD [quantitative]. *Hypothesis:* OUD-related stigma and intersectional discrimination are positively correlated with insomnia severity among individuals on MOUD.

**Aim 2:** Describe (1) how individuals perceive issues of stigma, discrimination, and sleep; (2) the intersectional phenomena of stigma and discrimination; (3) how experiences and perceptions associate with sleep [qualitative].

**Aim 3:** Gain a comprehensive understanding of the relationship between stigma and discrimination with insomnia among individuals on MOUD through integration of quantitative and qualitative data from Aims 1 and 2 [mixed methods].
Overview of Dissertation

This dissertation consists of five chapters. Chapter 1 is the introduction. Chapters 2, 3 and 4 are manuscripts and Chapter 5 is the Discussion. The first manuscript (Chapter 2) was a systematic review, guided by the Health Stigma and Discrimination Framework. The purpose of the systematic review was to describe associations between dimensions of stigma and sleep deficiency and to identify future directions for research. We found consistent evidence that stigma, whether internalized, perceived, or anticipated, was associated with self-reported characteristics of sleep deficiency [sleep quality, duration, trouble sleeping, and insomnia symptoms]. Gaps within the research were identified, specifically limited information about how stigma affects sleep in specific subgroups, such as those with drug addiction. Our review also highlighted the lack of studies using an intersectional lens to understand the role of intersectionality with health inequalities. This manuscript has been published in *Sleep Health*.  

The purpose of the second manuscript (Chapter 3) addressed dissertation aim # 2 and explored (1) how individuals receiving medication for OUD (MOUD) experience intersectional stigma and discrimination and (2) resources helpful in addressing cumulative experiences of multiple forms of disadvantage. We identified five themes with supporting subthemes, which included descriptions of multiple identities (e.g., Black race, low socioeconomic background, ex-offender status) that intersected with OUD. These intersections led to internalization of negative feelings, anticipated stigma, and shifts in self-perspectives. Recommendations for care to address cumulative intersecting experiences of OUD were outlined. This manuscript was submitted to the *Journal of Health Care for the Poor and Underserved*.  

The third manuscript (Chapter 4) addressed Aims # 1 and 3. This phase of the work was designed to (1) examine the association between OUD-related stigma and intersectional discrimination with insomnia, and (2) describe perceptions of sleep (3) describe how experiences [with stigma and discrimination] influence sleep, and (4) integrate both quantitative and qualitative findings among individuals on MOUD. The hallmark of mixed methods research designs is to gain a comprehensive understanding through integration of quantitative and qualitative data (Aims 1 and 2). The hypothesis in Aim # 1 was partially supported as quantitative analysis revealed a weak positive correlation ($r_s = .17$, p
= .04) between intersectional discrimination and insomnia severity. Correlations between OUD-related stigma and insomnia severity were not statistically significant. Qualitative analysis described negative thinking and rumination as factors that participants felt their stigmatizing and discriminatory experiences affected their sleep. We highlighted areas of concordance and discordance where the quantitative and qualitative data were integrated. This third manuscript (Chapter 4) was submitted for publication to *Sleep Health*. 
References


CHAPTER 2

Adapting the Health Stigma & Discrimination Framework to Understand the Association between Stigma and Sleep Deficiency: A Systematic Review

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Abstract

Sleep deficiency and sleep disorders disproportionately affect socially disadvantaged and marginalized individuals and groups. Recent evidence suggests that stigma, a social process characterized by labeling, stereotyping, and prejudice, is associated with sleep characteristics. Guided by the Health Stigma and Discrimination Framework, the purpose of this systematic review is to describe associations between dimensions of stigma and sleep deficiency and to identify future directions for research. We searched the OVIDPsycINFO, OVIDEMASE, OVIDMEDLINE, and CINAHL databases for empirical research studies that reported relationships between the three dimensions of stigma—internalized, perceived, and anticipated—and characteristics of sleep deficiency—duration, continuity/efficiency, timing, alertness/sleepiness, quality, and disorders. Of 1,717 articles, 15 met our inclusion criteria. The most frequently assessed dimensions of stigma were internalized and perceived stigma. Characteristics of sleep deficiency were measured by self-report and included sleep quality, duration, trouble sleeping, and insomnia symptoms. We found consistent evidence that stigma, whether internalized, perceived, or anticipated, is associated with self-reported characteristics of sleep deficiency. This evidence base can be further strengthened with prospective studies that incorporate both multidimensional measures of stigma and objective measures of sleep characteristics. We outline research implications that can clarify underlying mechanisms and more precisely define the relationships between stigma and sleep and inform interventions to address stigma, improve sleep, and reduce the health inequities that disproportionately affect individuals from socially disadvantaged and marginalized groups.

Keywords: Systematic review, Stigma, Sleep, Health disparities
Introduction

Sleep health is characterized by satisfaction, appropriate timing, adequate duration, high efficiency, and sustained alertness during waking hours,\(^1\) and is essential for good health. Approximately 50 to 70 million Americans of different ages and socioeconomic classes experience sleep deficiency (i.e., insufficient sleep duration, fragmented sleep, frequent awakenings, irregular sleep timing, poor sleep quality), and sleep disorders (e.g., insomnia, sleep apnea),\(^1-3\) but individuals from socially disadvantaged backgrounds and marginalized groups are disproportionately affected.\(^2\) For example, people of color are less likely to get the recommended hours of sleep and more likely to experience variations in sleep timing, low sleep efficiency, less time in slow-wave sleep, and greater daytime sleepiness than their white counterparts.\(^4\) Individuals from racial/ethnic minority groups are also more likely to have persistent, severe, and undiagnosed sleep disorders, such as insomnia and sleep apnea relative to non-Hispanic white individuals.\(^5\) People in sexual minority groups disproportionately experience a number of sleep-related problems, such as poor sleep quality, relative to heterosexual individuals.\(^6\) Sleep deficiency and disorders contribute to health inequities among disadvantaged and marginalized groups, increasing the risk for adverse health outcomes such as hypertension, diabetes, obesity, myocardial infarction, stroke, poor immune functioning, poor mental health (e.g., depression), and substance-use disorders.\(^3,7\)

Although the mechanisms underlying sleep deficiency and disorders and their effects on overall health are not fully understood, recent studies suggest an association between sleep deficiency and social stress arising from socioeconomic status and social features of environments.\(^8\) Social features include, but are not limited to, family, social cohesion, safety, and neighborhood characteristics (e.g., light, green space, noise, traffic, pollution, walkability).\(^8\)

Stigma, characterized as a “mark of disgrace” associated with a particular identity or attribute,\(^9,10\) is a harmful social stressor that disproportionately influences health outcomes for individuals from disadvantaged and marginalized groups.\(^11-13\) It operates on the macro- (i.e., institutional), meso- (i.e., large social group), and micro- (i.e., individual) levels.\(^14\) Within these levels, stigma has many dimensions.
However, despite growing scholarly interest on the impact of stigma on health outcomes, there remains conceptual ambiguity and a lack of consensus regarding the type and number of dimensions that make up the stigma construct.\textsuperscript{15} We therefore focus on three dimensions of stigma or “stigma experiences” (i.e., lived realities), as described by Stangl et al. (2019) in the Health Stigma and Discrimination Framework. The three experiences include internalized, perceived, and anticipated stigma\textsuperscript{16} (see Table 1 for definitions).

Stigma is associated with poor emotional, physical, and mental health.\textsuperscript{17} In addition to feelings of shame, hopelessness, and isolation, stigma is linked to depressive symptoms, poor functioning, low educational attainment, poor self-esteem, low quality of life, poor social relationships, and low adherence to treatment regimens for medical conditions.\textsuperscript{18,19} Stigma can also reduce access to social and structural support, leading to increased morbidity and mortality.\textsuperscript{20} The US Centers for Disease Control and Prevention and the World Health Organization recognize stigma as a public health priority because of its adverse effects on disease prevention and treatment and potential to accelerate disease processes.\textsuperscript{21} However, despite strong evidence supporting the respective correlations between stigma and health and between sleep and health,\textsuperscript{22,23} the relationship between stigma and sleep deficiency remains poorly understood.

One concept closely related to stigma that has been linked to sleep is discrimination. While the terms \textit{discrimination} and \textit{stigma} are often used interchangeably, discrimination describes only one dimension of stigma—enacted stigma.\textsuperscript{24} Evidence suggests that discrimination is associated with poor sleep quality.\textsuperscript{3,25,26} In a systematic review of 17 studies, authors identified significant associations between discrimination, defined as differential or unfair treatment based on actual or perceived membership in a group, and sleep deficiency, including insomnia, poor sleep quality, inadequate sleep duration, and other sleep-related problems.\textsuperscript{3} Research attention to the relationship between sleep and discrimination increased, but associations with internalized, perceived, and anticipated stigma remain unclear. This systematic review offers new knowledge about the association between these core dimensions of stigma and sleep, building on past research focused primarily on discrimination.
Health Stigma and Discrimination Framework: The Conceptual Model

The guiding framework for this review is the Health Stigma and Discrimination Framework,\textsuperscript{16} a theory, research, and practice-based framework that outlines the stigmatization process across the socio-ecological spectrum in the context of health. This process incorporates stigma drivers, facilitators, markers (and their manifestations), and outcomes. The framework proposes that stigma experiences (i.e., internalized, perceived, anticipated and enacted) stem from drivers and facilitators. Drivers of stigma (e.g., fear of infection, blame, economic ramifications) negatively influence the stigmatization process. Facilitators (e.g., cultural norms, social support, health policy) can influence the stigmatization process either positively or negatively, leading to variation in outcomes for affected populations. This framework has shown promise for explaining the relationship between stigma and various outcomes, such as HIV testing practices.\textsuperscript{27} We adapted this framework (see Fig. 1) to examine the mechanisms leading from manifestations (i.e., stigma experiences- internalized, anticipated, and perceived stigma) to outcomes (sleep deficiency). Determining these relationships will inform interventions to improve sleep and reduce health inequities among individuals from socially disadvantaged and marginalized groups. The purpose of this systematic review is to describe associations among dimensions of stigma and sleep deficiency and to identify future directions to advance this field of study and, ultimately, public health.

Methods

Literature-search methods

We followed Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines (see Figure 2 for Flow Diagram) to identify and collate studies in the literature.\textsuperscript{28} Specifically, we searched records in the OVIDPsycINFO, OVIDEMBASE, OVIDMEDLINE, and CINAHL databases from their date of inception through March 26, 2020, and updated the search on November 1, 2020. The reference lists of relevant articles were hand-searched. Appendix 1 details our search strategy, including the full list of search terms.
The first and second authors independently reviewed the titles and abstracts of all citations identified using Covidence, a software program designed to manage the systematic review process. After this initial screening, the full texts of the remaining studies were reviewed against the inclusion and exclusion criteria. We included only empirical research studies that examined relationships between sleep and at least one of the three dimensions of stigma. Since the relationship between discrimination (or enacted stigma) and sleep has been recently reviewed, we excluded enacted stigma. We included studies that reported sleep characteristics related to deficiency—quality, duration, efficiency, timing, sleepiness—or disorders. We excluded secondary literature—systematic reviews, meta-analyses—as well as case studies, articles not published in peer-reviewed journals, and articles published in languages other than English.

**Data extraction**

For each included study, the first author used structured tables to standardize data extraction. The second author independently reviewed the data extraction tables, and the two resolved discrepancies in discussions. The extraction of information was informed by previous structured tables that have explored similar associations and guided by criteria for including studies. This included study author(s) and year; study design; study population and sample size; sex/gender, mean age, and race/ethnicity of sample; stigma domain; type of stigma; stigma measure(s); sleep measure(s); and covariates.

**Study quality**

We used the Appraisal of Cross-sectional Studies (AXIS) tool to evaluate methodological quality and risk of bias in research methods, internal validity, reported outcomes, and generalizability. AXIS was developed for use in appraising observational cross-sectional studies and includes five categories: (1) introduction: clarity of aims/objectives; (2) methods: appropriateness of the study design, sample size, measures, and statistical approach; (3) results: data description, response rate, and internal consistency; (4) discussion: justification of conclusion and limitations; and (5) other, including conflicts of interest and ethics. Based on whether the article meets the stated criteria, items are scored as 1 for “yes,” 0 for “no,”
and missing for “I don’t know.” The maximum score is 20. The first author independently assessed and rated each article. The second author reviewed the ratings, and any discrepancies were discussed.

Results

A total of 1,717 citations were identified across all databases (see Figure 2 for Flow Diagram) and were imported into Covidence software. Duplicates were removed, leaving a total of 1,612 articles for title and abstract screening. A total of 1550 were excluded after screening. After reviewing the full text of 62 articles, 15 articles met our criteria for inclusion.

Study Characteristics

Table 2 summarizes the characteristics of included studies. All studies were published between 2017 and 2020, with frequency generally increasing over time: 2 studies were published in 2017; \(^3\) in 2018; \(^3\) in 2019; \(^6\) in 2019; \(^3\) in 2020. All studies were conducted in the United States (n=8), the United Kingdom (n=1), Hong Kong (n=1), Iran (n = 1), China (n=2), South Asia (n=1), and Canada (n=1). Most studies were cross-sectional (n = 14). Although two studies were longitudinal in design, all studies reported cross-sectional association between stigma and sleep. Sample sizes ranged from 64 to 3,444 participants, with a median of 220 participants. Mean age, gender, and racial/ethnic backgrounds differed across studies. Their AXIS scores averaged 17.5 out of 20, indicating overall high quality (see Table 2).

All studies used self-report measures to assess characteristics related to sleep deficiency, including quality, duration, and disorders, such as insomnia. Two studies assessed the association between stigma and components of the Pittsburgh Sleep Quality Index (PSQI), a global measure of sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. The rigor of the self-report measures varied, ranging from single-item measures of sleep problems to well-validated scales, such as the PSQI, the Bergen Insomnia Scale (BIS), the Insomnia Severity Index (ISI), and the Brief Symptom Inventory (BSI). Two studies used unvalidated self-report measurement tools.
In six studies, stigma was examined in relation to specific conditions, including mental illness (n=1), 39 substance use disorder (n=1), 31 acromegaly or nonfunctioning pituitary adenomas (n=1), 41 COVID-19 (n=1), 45 and human immunodeficiency virus (HIV; n=2). 33,35 Nine studies examined stigma in specific populations, including Chinese American breast cancer survivors (n=1), men (n=2), adolescents (n=2), youth stopped by police (n=1), commercial construction workers (n=1), Asian American college freshmen (n=1), and residents of low-income housing (n=1). 34 The most common dimensions of stigma measured were internalized (n=7) and perceived (n=7), followed by anticipated (n=2). The rigor of the self-report measures for stigma also varied (see Table 2), ranging from survey questions to well-validated scales, such as the Perceived Stigma of Substance Abuse Scale, 31 Internalized Stigma of Mental Illness Scale, 31,39 Self-Stigmatizing Thinking’s Automaticity and Repetition Scale, 39 HIV Stigma Scale, 33 Weight Bias Internalization Scale, 36,40 Determinants of Treatment Seeking Scale, 37 Treatment Seeking Attitudes in Military Personnel Scale, 37 Experiences with Discrimination and Fear of Discovery Scale, 35 The Perception of Teasing Scale, 44 Self-Stigma Scale, 38 and the Stigma Scale for Chronic Illness. 41 About half of the studies included mediation or moderation analyses to explain behavioral mechanisms that might link stigma to sleep. Table 3 presents a summary of significant and non-significant results pertaining to (1) each domain of stigma and its associations with sleep deficiency and sleep disorders and (2) mediation and moderation analyses.

**Internalized Stigma and Sleep**

**Self-reported sleep quality.** Three studies examined the association between internalized stigma and sleep quality. 33,38,39 In all three, greater self-reported internalized stigma was associated with poorer sleep quality. Two found indirect associations between internalized stigma and sleep quality through mediating variables, including loneliness, depressive symptoms, and ambivalence over emotional expression, which is defined as an inner conflict between the desire to express emotions and fear of negative consequences. 33,38 Chan et al. (2019) found that internalized stigma also played a mediating role between enacted stigma and sleep quality.
**Self-reported sleep duration.** Only McCreary et al. (2019) investigated the association between internalized stigma and sleep duration. They found that Canadian men who reported sleeping less than an average 7-8 hours per night had low scores on the Positive Health Focus subscale of the General Health-Related Self-Stigma scale, reflecting a diminished sense of their health status and the value of seeking treatment.

**Self-reported trouble sleeping.** Himmelstein et al. (2019) reported a significant association between internalized stigma and trouble sleeping among men. Similar to Chan et al. (2019), findings revealed that internalized stigma mediated the relationship between enacted stigma and trouble sleeping.

**Insomnia.** Two studies examined the association between internalized stigma and insomnia. Their authors reported statistically significant, positive, moderate correlations between internalized stigma and insomnia.

**Perceived Stigma and Sleep**

Seven studies addressed relationships between perceived stigma and sleep. Two examined the association between social stigma, a form of perceived stigma characterized as disapproval of a person or group of people based on perceivable social characteristics, and sleep. Three studies assessed the association between perceived condition or disease-specific stigma related to mental health, weight, and hormonal disorders and sleep.

**Self-reported sleep quality.** Five studies examined associations between perceived stigma and sleep quality. All five revealed that reports of perceived stigma were significantly associated with poorer sleep quality. Notably, one study found that this association was significantly mediated by stress and symptoms of depression.

**Self-reported sleep duration.** Two studies found a negative association between self-reported perceived stigma and sleep duration. Jackson et al. (2020) found that the combination of social stigma and post-traumatic stress mediated the relationship between perceived stigma and sleep quality and duration.
Insomnia. Two studies highlighted a significant association between perceived stigma and insomnia or insomnia symptoms.\textsuperscript{31,45} Particularly, Birtel et al. (2017) found that internalized stigma and internalized shame mediated the relationship between perceived stigma and insomnia symptoms.\textsuperscript{31}

Anticipated Stigma and Sleep

Self-reported sleep quality and duration. Findings from one study revealed associations between anticipated stigma and both sleep quality and duration.\textsuperscript{32} Ong et al. (2017) demonstrated that individuals who strongly anticipate stigma experience more racial microaggressions as well as diminished sleep quality and duration.

Insomnia. Travaglini et al. (2018) found a significant positive correlation between anticipated stigma and sleeplessness.\textsuperscript{35}

Discussion

This systematic review used the Health Stigma and Discrimination Framework as an organizing framework to understand the interconnection between stigma and sleep deficiency, as well as mechanisms underlying this relationship. Overall, we found consistent evidence that stigma is associated with self-reported characteristics of sleep deficiency, including poor quality, short duration, and insomnia symptoms. However, the relationships varied across studies. Below, we discuss the current evidence base and notable gaps in knowledge about the relationship between stigma and sleep deficiency.

Evidence suggests that the three dimensions of stigma highlighted by the Health Stigma and Discrimination Framework—internalized,\textsuperscript{31,36,37,39} perceived,\textsuperscript{31,34,42} and anticipated\textsuperscript{32,35} stigma—are directly associated with poorer sleep quality, shorter sleep duration, and insomnia symptoms. Psychological perceptions of safety and social belonging have been shown to optimize sleep.\textsuperscript{39} When people experience constant condemnation and begin to endorse, internalize, and anticipate further condemnation, their perceptions of self and others are altered, and they may feel threatened and withdraw
from social interaction. These observations may explain the direct relationships between stigma and sleep deficiency.

Consistent with the Health Stigma and Discrimination framework, our results suggest that stress, loneliness, depression, and ambivalence over emotional expression should be investigated as possible mediators that serve as drivers linking stigma to sleep deficiency. Stigma is a very powerful social stressor that can impair social interactions and psychological well-being. The body’s response to stress involves behavioral and physiological changes that activate the hypothalamic-pituitary-adrenal axis, leading to the release of hormones, such as cortisol, which increases blood sugar; suppresses the immune system; and ramps up fat, protein, and carbohydrate metabolism to fuel “fight or flight.” Hypothalamic-pituitary-adrenal hyperactivity can also lead to sleep deficiency. The shared neurobiological underpinnings of stigma-related stress and sleep deficiency provide directions for future studies on mediating mechanisms. Because stigma negatively affects psychological well-being, other potential drivers or mediators related to inner perceptions of self, such as low self-esteem and negative self-image, should be explored. Regarding other aspects of the Health Stigma and Discrimination Framework, future research should also consider potential mediators of the relationship between stigma and sleep deficiency, such as social support, which has been shown to minimize or buffer the effects of stigma on outcomes.

Stigma also serves as a mediator and moderator, linking other social stressors to poorer sleep quality. Link et al. (2001) describe stigmatization as a step-wise, sequential process that must take place before its consequences become manifest. For instance, people must first experience or perceive stigma before they internalize or anticipate the negative societal attitudes, stereotypes, and prejudices that lead to poor outcomes.

While experiencing stigma may impair sleep, sleep deficiency may also influence perceptions and experiences of stigma. Studies show that sleep deficiency can impair memory, judgment, and mood and alter emotional perception and recognition of prosocial emotional expressions that may, in turn, contribute to stigma. More recent studies show that sleep deficiency increases the likelihood of shunning
social contact and being intuitively avoided by others.\textsuperscript{59} Therefore, individuals suffering from sleep deficiency may perceive, internalize, and anticipate stigma more strongly than someone who is well-rested. Since most of the studies reviewed were cross-sectional in design, prospective studies are needed to understand the direction of relationships between stigma and sleep deficiency.

Across the 15 studies, a variety of measures were used to assess stigma and sleep deficiency. In total, 17 self-report measures were used to assess stigma, with multiple studies using more than one measure. Most studies used a unidimensional approach to assess stigma by only considering a single attribute or social identity in isolation. This unidimensional approach is problematic because individuals typically identify with more than one stigmatizing attribute and/or identity, or what is known as \textit{intersectional stigma}.\textsuperscript{60,61} The Health Stigma and Discrimination Framework also recognizes the importance of considering intersectional stigma to understand the full impact of stigma on outcomes, as intersectional stigma often results in greater inequities.\textsuperscript{16} Future studies should incorporate multidimensional instrumentation and semi-structured interviews to assess the range of experiences and perceptions that contribute to intersectional stigma. Broader approaches will enhance the validity of the data\textsuperscript{62} and provide a more holistic understanding of the concept.

All the studies reviewed assessed sleep deficiency using only self-reported sleep measures. Eight different self-report instruments were used. Many were global measures of sleep, which cannot be used to elucidate the association between stigma and such specific aspects of sleep, such as efficiency, fragmentation, or timing; further, they cannot guide interventions to improve sleep. In addition, the use of diverse measures hampers comparison and confirmation of results across studies. Future research is needed to examine the relationship between stigma and the various characteristics of sleep deficiency and sleep disorders, such as narcolepsy, parasomnias, and restless leg syndrome. Objective sleep measures, such as polysomnography (PSG) and actigraphy,\textsuperscript{63,64} are also needed, as subjective reports solely provide information on individual perceptions of sleep and not on sleep architecture. Such knowledge could be helpful in tailoring focused treatment for specific types (e.g., REM and non-REM sleep) and stages of sleep, which all serve particular and important purposes.
The relationship between stigma and sleep deficiency was examined in a wide array of populations and conditions, but evidence about how stigma affects sleep in specific subgroups is insufficient. Even commonly studied sources of stigma, such as mental illness stigma and HIV stigma, were examined in only three studies in this review. The association between stigma and sleep must be examined among more diverse stigmatized, socially disadvantaged and marginalized populations, such as individuals with minority sexual orientations, gender identities, a history of domestic violence, substance-use disorders, or other stigmatizing attributes, including disability, race, and occupation.

As demonstrated by the Health Stigma and Discrimination Framework, stigma operates across the socio-ecological spectrum. This creates a challenge for interventions. Approaches to reducing stigma include counseling/therapy, enhancement of positive social support, cognitive behavioral therapy (CBT) and motivational interviewing on a microlevel; education and awareness, and social marketing on a mesolevel; and anti-stigma/anti-discrimination legislation on a macrolevel. These interventions are effective in reducing stigma, but whether their effects are lasting is unclear due to a lack of long-term follow-up studies. Similar intervention strategies are used to improve sleep, including CBT, positive social support, enhanced education, and motivational interviewing. Moreover, legislation and health policies that address matters such as neighborhood cohesion and safety; access to care for sleep-related services, and segregation and redlining are beneficial in addressing sleep disparities on a macrolevel. Combined or multicomponent interventions, such as one involving both motivational interviewing to challenge stigma and CBT to facilitate healthier sleep-related behaviors may lead to more marked reductions in stigma-related sleep deficiencies. Moreover, because the neurotransmitters connected with sleep are the same as those that tell the body to stop the production of stress hormones, sleep interventions may help buffer the harmful effects of stress that stem from stigma on all levels.

Strengths and limitations

We adapted the Health Stigma and Discrimination Framework to guide our understanding of the interconnections between stigma and sleep deficiency. We rigorously adhered to contemporary PRISMA
standards, a comprehensive approach that allowed us to identify gaps in the current literature that can inform future research studies. We also identified studies that addressed prevalent types of stigmatized groups and attributes across the globe.

However, due to the lack of published studies, we were unable (1) to determine whether the dimensions of stigma are associated with specific characteristics of sleep deficiency, such as efficiency, timing, and alertness/sleepiness; or (2) to examine sleep in the context of other common stigmas, such as those related to disability, gender identity, and sexual orientation. We may have also missed relevant studies as we did not include grey literature, conference abstracts, and articles not published in the English language.

Most of the included studies were cross-sectional, so causal relationships between stigma and sleep deficiency could not be determined. Several studies examined bivariate associations but did not adjust for factors that might influence outcomes, such as sex/gender, socioeconomic status, education, and relationship and work status. Future longitudinal studies should include multivariate analyses to better understand the effects on sleep of acute and chronic exposures to stigma. Prospective studies are also needed to understand the direction of relationships between stigma and sleep. Moreover, given the heterogeneity of study measures, our ability to draw comparisons across them is limited. Despite these limitations, this review weighs current research in the emerging field of stigma and sleep and points to more focused directions for future research and interventions.

**Conclusion**

This systematic review indicates that stigma is associated with sleep deficiency, but further research is needed to improve our understanding of the mechanisms underlying this relationship. This evidence base will be strengthened by new research using prospective, longitudinal approaches that incorporate multidimensional measures of stigma and objectively measured aspects of sleep. Such studies will advance our capacity to develop interventions that focus on modifying stigma or perceptual responses to stigma and provide treatment for specific stigmatized populations who suffer from sleep deficiencies.
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References


Tables and Figures

Figure 1
Adapting the Health Stigma & Discrimination Framework to Understand the Association between Stigma and Sleep Deficiency.
Figure 2
Flow chart detailing the systematic search of potential reports and selection process of included studies ($n$).
### Table 1
Three dimensions of stigma ‘experiences’ described by the Health Stigma and Discrimination Framework

<table>
<thead>
<tr>
<th>Dimensions of Stigma</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internalized stigma (self-stigma)</td>
<td>A stigmatized group member’s own adoption of negative societal beliefs and feelings, as well as the social devaluation, associated with their stigmatized status</td>
</tr>
<tr>
<td>Perceived stigma</td>
<td>Perceptions of how the stigmatized group is treated by others.</td>
</tr>
<tr>
<td>Anticipated stigma (stigma consciousness)</td>
<td>The expectations of bias by others.</td>
</tr>
</tbody>
</table>

*Note: Definitions adapted from The Health Stigma and Discrimination Framework.*
<table>
<thead>
<tr>
<th>Author (year)</th>
<th>Study Design</th>
<th>AXIS score (score out of 20)</th>
<th>Population/sample size</th>
<th>Sex/Gender</th>
<th>Mean Age years (SD)</th>
<th>Race/Ethnicity</th>
<th>Stigma Domain</th>
<th>Type of Stigma</th>
<th>Stigma Measure</th>
<th>Sleep Outcome</th>
<th>Sleep Measure</th>
<th>Covariates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birtel et al. (2017)</td>
<td>O, CS 18</td>
<td>Individuals with substance abuse disorder (N = 64)</td>
<td>42.1% female, 57.8% male</td>
<td>32.28y (10.34)</td>
<td>90.6% Caucasian, 4.7% mixed ethnic background, 3.1% Hispanic, 1.6% was Jewish</td>
<td>Perceived stigma, Internalized stigma</td>
<td>Substance use stigma</td>
<td>PSAS, ISMI</td>
<td>Insomnia symptoms</td>
<td>BIS</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Chan et al. (2019)</td>
<td>O, CS 18</td>
<td>Individuals with mental illness (N = 282)</td>
<td>48.6% female, 51.4% male</td>
<td>43.38y (11.10)</td>
<td>NR</td>
<td>Internalized stigma [self-stigma process and self-stigma content]</td>
<td>Mental illness stigma</td>
<td>ISMI, STARS</td>
<td>Sleep quality</td>
<td>PSQI</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Eyallon et al. (2020)</td>
<td>O, CS (mixed method) 17</td>
<td>Commercial Construction Workers (N = 219)</td>
<td>3% female, 97% male</td>
<td>40.12y (11.73)</td>
<td>14% Non-white, 86% white 40.9% white, 43.1% Black/African American, 1.1%</td>
<td>Perceived stigma</td>
<td>Occupation stigma</td>
<td>4-item scale</td>
<td>Sleep quality</td>
<td>PSQI</td>
<td>Race, gender, age, job position</td>
<td></td>
</tr>
<tr>
<td>Fekete et al. (2018)</td>
<td>O, CS 19</td>
<td>Individuals living with HIV (N = 181)</td>
<td>24.9% female, 71.8% male</td>
<td>42.81y (11.0)</td>
<td></td>
<td>Internalized stigma</td>
<td>HIV stigma</td>
<td>HSS</td>
<td>Sleep quality</td>
<td>PSQI</td>
<td>Income, self-rated health, years since HIV diagnosis, severity of HIV-related symptoms and age</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Gender</td>
<td>Race</td>
<td>Sample Size</td>
<td>Mean Age (SD)</td>
<td>Race Distribution</td>
<td>Weight and Lifestyle Inventory</td>
<td>Police encounter related stigma</td>
<td>Sleep quality, Sleep duration</td>
<td>Arrested/Taken into custody, convicted, sentenced to detention/probation, sex, age, BMI, SES, race</td>
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<tr>
<td>Himmelstein et al. (2019)</td>
<td>O, CS</td>
<td>17 Men (N = 1753)</td>
<td>100% males</td>
<td>sample 1: 45.45y (16.26)</td>
<td>Sample 1 - 52.7% white, 16.2% Black, 5.8% Asian, 23.1% Hispanic/Latino, 2.2% Other</td>
<td>Internalized stigma, Enacted stigma</td>
<td>WBIS-M, Three “yes” or “no” questions to indicate whether they had ever been teased, treated unfairly, or discriminated against because of their weight.</td>
<td>Sample 2: 32.3% white, 33.5% Black, 0% Asian, 34.1% Hispanic/Latino, 0% Other</td>
<td>Weight and Lifestyle Inventory</td>
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<tr>
<td>Jackson et al. (2020)</td>
<td>O, CS</td>
<td>18 Youth from the FFCWS (N = 3,444)</td>
<td>48.5% female, 51.51% male</td>
<td>15.59y (0.76)</td>
<td>Sample 1: 48.80% Black, 25.26% Hispanic, 35.94% Other</td>
<td>Perceived stigma</td>
<td>Police encounter related stigma</td>
<td>Sleep quality, Sleep duration</td>
<td>Survey on sleep duration (in hours) and sleep deprivation</td>
<td>Arrested/Taken into custody, convicted, sentenced to detention/probation, sex, age, BMI, SES, race</td>
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<tr>
<td>Khanal et al. (2020)</td>
<td>O, CS</td>
<td>17</td>
<td>Healthcare workers involved in COVID-19 response (N = 475)</td>
<td>52.6% female, 47.4% male</td>
<td>28.20 y (5.80)</td>
<td>65.9% Brahmin/Chhetri, 23.2% Janjati, 6.1% Madhesi, 1.5% Dalit, 3.4% Others</td>
<td>Perceived stigma</td>
<td>COVID-19 related stigma</td>
<td>Survey questions related to COVID-19</td>
<td>Insomnia</td>
<td>ISI</td>
<td>25.94% white</td>
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<tr>
<td>Lin et al. (2019)</td>
<td>L (does have CS data)</td>
<td>17</td>
<td>Overweight/obese adolescents (N = 934)</td>
<td>52.5% female, 47.5% male</td>
<td>15.7y (±1.2)</td>
<td>NR</td>
<td>Internalized stigma</td>
<td>Weight related stigma</td>
<td>WBIS</td>
<td>Insomnia</td>
<td>ISI</td>
<td>n (&lt;7 hours), along with survey on sleep quality (nights per week) and trouble sleeping (most nights), race/ethnicity, prior delinquency, delinquent peers, low self-control, parental education, married to biological father, household income, material hardship, neighborhood disorder, maternal low self-control, maternal depression, parenting stress, father incarceration, youth depression, youth anxiety</td>
</tr>
<tr>
<td>Ong et al. (2017)</td>
<td>O, CS</td>
<td>16</td>
<td>Asian American college freshmen (N = 152)</td>
<td>42.8% female, 57.2% male, 18.14y (.55)</td>
<td>58.5% Chinese Americans, 13.2% Asian Indian, 7.9% Taiwanese, 5.9% Korean, 5.3% Vietnamese, 3.9% Filipino, 3.3% Japanese, and 1.9% “other Asian”</td>
<td>Anticipated stigma</td>
<td>Racial/ethnic related stigma</td>
<td>Questionnaire for Race/Ethnicity</td>
<td>Sleep quality, Sleep duration</td>
<td>5-Item questionnaire, Sleep duration was calculated as the difference between self-reported bedtime and waking time.</td>
<td>Gender, age, nativity, education, income, stigma consciousness</td>
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<td>McCreary et al. (2019)</td>
<td>O, CS</td>
<td>18</td>
<td>Men (N = 2000)</td>
<td>100% Males</td>
<td>19% 19-29 years, 46.7% 30-54 years, 34.4% 55+ years</td>
<td>NR</td>
<td>Internalized stigma</td>
<td>Health related stigma</td>
<td>Determinants of Treatment Seeking Scale and Treatment Seeking Attitudes in Military Personnel Scale were used to create two subscales: Positive Health Focus subscale and Self-Reliance subscale.</td>
<td>Sleep duration</td>
<td>Single question taken from the Canadian Health Measures Survey</td>
<td>Smoking, alcohol use, diet, exercise, depression, overall health risk</td>
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<tr>
<td>Study</td>
<td>O, CS</td>
<td>N</td>
<td>Population Description</td>
<td>Gender Distribution</td>
<td>Age Distribution</td>
<td>Stigma Measures</td>
<td>Sleep Quality Measures</td>
<td>Covariates</td>
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<tr>
<td>Ruff et al. (2018)</td>
<td>O, CS</td>
<td>17</td>
<td>Low income housing residents (N = 120)</td>
<td>55% female, 45% male</td>
<td>25% were 18-24 years, 35% 25-44 years, 40% &gt;45 years</td>
<td>Perceived stigma, Housing related stigma</td>
<td>Sleep quality, Sleep duration</td>
<td>Age, gender, race/ethnicity, income, education, employment status, obesity, census block percent non-Hispanic black and census block median household income</td>
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<tr>
<td>Travaglini et al. (2018)</td>
<td>O, CS</td>
<td>18</td>
<td>Black women living with HIV (N = 220)</td>
<td>100% women</td>
<td>43.4y (8.9)</td>
<td>Anticipated stigma, HIV related stigma</td>
<td>Insomnia symptoms</td>
<td>Experience with Discrimination and Fear of Discovery scale</td>
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<tr>
<td>Wang et al. (2020)</td>
<td>O, CS</td>
<td>18</td>
<td>Chinese adolescents (N = 1626)</td>
<td>46.19% female, 53.81% male</td>
<td>16.81y (0.95)</td>
<td>Perceived stigma, Weight related stigma</td>
<td>Sleep quality</td>
<td>Gender, age, grade, BMI, self-perceived weight, class rank, household income, relationship between parents, relationship with father, relationship with mother, relationship with teachers, relationship with classmates</td>
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<tr>
<td>Study</td>
<td>Sample Type</td>
<td>N</td>
<td>Sample Description</td>
<td>Sex Distribution</td>
<td>Age (mean ± SD)</td>
<td>Measure(s)</td>
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<tr>
<td>Wu et al. (2019)</td>
<td>O, CS</td>
<td>16</td>
<td>Chinese American breast cancer survivors (N = 136)</td>
<td>100% women</td>
<td>57.75y (9.22)</td>
<td>Internalized stigma, Breast cancer related stigma, SSS, Sleep quality, PSQI, Time since diagnosis, age, family income, and marital status</td>
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<tr>
<td>Zhang et al. (2019)</td>
<td>L (does not have CS data)</td>
<td>18</td>
<td>Sample 1: Acromegaly patients (N = 39)</td>
<td>Sample 1: 51.3% female, 48.7% male</td>
<td>Sample 1: 39.6y (11.7)</td>
<td>Perceived stigma, Acromegaly/pituitary adenoma related stigma, SSCI, Sleep quality, PSQI, None</td>
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<td></td>
<td>Sample 2: Patients with nonfunctioning pituitary adenomas (N = 78)</td>
<td>Sample 2: 56.4% female, 43.6% male</td>
<td>Sample 2: 41.3y (10.1)</td>
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</table>

*Note: NR = Not reported; O = Observation; CS = Cross Sectional; L = Longitudinal; HIV = Human Immunodeficiency Virus; FFCWS = Fragile Families and Child Wellbeing Study; BMI = Body Mass Index; SES = Socioeconomic Status; PSQI = Pittsburgh Sleep Quality Index; BSI = Brief Symptom Inventory; ISI = Insomnia Severity Index; BIS = Bergen Insomnia Scale; PSAS = Perceived Stigma of Substance Abuse Scale; ISMI = Internalized Stigma of Mental Illness Scale; STARS = Self-stigmatizing Thinking’s Automaticity and Repetition Scale; HSS = HIV Stigma Scale; WBIS = Weight Bias Internalization Scale; WBIS-M = Modified WBIS; POTS = The Perception of Teasing Scale; SSS = Self Stigma Scale; SSCI = Stigma Scale for Chronic Illness. a Scores for each study in Appraisal tool for Cross-Sectional Studies (AXIS) tool.
## Table 3
Major study findings

<table>
<thead>
<tr>
<th>Author (year)</th>
<th>Results of Mediation/Moderation Analysis</th>
<th>Major Study Findings</th>
<th>Significant relationship between stigma and sleep (yes/no)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stigma tested as a mediator (yes/no)</td>
<td>Mediating or moderating variables tested</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stigma tested as a moderator (yes/no)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birtel et al. (2017)</td>
<td>Yes</td>
<td>Perceived and internalizing stigma correlated with poorer sleep. Internalized stigma</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>mediated the relationship between perceived stigma and poorer sleep.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>Self-stigma content, self-stigma process, and sleep disturbance were positively</td>
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<tr>
<td></td>
<td></td>
<td>correlated with one another. Self-stigma</td>
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<tr>
<td></td>
<td></td>
<td>mediated the relationship between experienced discrimination and sleep disturbance.</td>
<td></td>
</tr>
<tr>
<td>Chan et al. (2019)</td>
<td>Yes</td>
<td>Internalized stigma was indirectly related to global sleep quality and daytime sleep</td>
<td>Yes</td>
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<tr>
<td></td>
<td>No</td>
<td>dysfunction. Loneliness and depressive symptoms mediated the relationship between</td>
<td></td>
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<td></td>
<td></td>
<td>stigma and sleep. WBI mediated the</td>
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<tr>
<td>Fekete et al. (2018)</td>
<td>No</td>
<td>Weight stigma was associated with trouble sleeping in sample 2 and experienced weight</td>
<td>Yes</td>
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<tr>
<td></td>
<td>No</td>
<td>stigma was indirectly associated with trouble sleeping. WBI mediated the</td>
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</tr>
<tr>
<td></td>
<td>Loneliness, symptoms of depression</td>
<td></td>
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</tr>
<tr>
<td>Himmelstein et al. (2019)</td>
<td>Yes</td>
<td>Weight stigma was associated with trouble sleeping in sample 2 and experienced weight</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>stigma was indirectly associated with trouble sleeping. WBI mediated the</td>
<td></td>
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<tr>
<td></td>
<td>No</td>
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<tr>
<td>Study</td>
<td>Stigma</td>
<td>Weight</td>
<td>Stigma-Related Stigma</td>
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<tr>
<td>Lin et al. (2019)</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>McCreary et al. (2019)</td>
<td>No</td>
<td>No</td>
<td>No</td>
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<tr>
<td>Ong et al. (2017)</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Ruff et al. (2018)</td>
<td>No</td>
<td>No</td>
<td>No</td>
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Significant correlation found between insomnia and weight-related self-stigma. Those who reported sleeping less than 7–8 h per night on average had lower scores on the Positive Health Focus dimension of the GHRSS, which reflected less positive sense of health and the value of treatment seeking.

Higher levels of stigma consciousness predicted greater sleep difficulties. Stigma consciousness moderated the relationship between microaggression and sleep.

Overall neighborhood stigma, negative external perception and feelings of judgement from living in subsidized housing was not associated with sleep quality or duration. Those reporting a negative media image of their neighborhood had significantly less average sleep per night and were at increased risk of poor sleep quality.
<table>
<thead>
<tr>
<th>Study</th>
<th>Findings</th>
<th>Significance</th>
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<tbody>
<tr>
<td>Travaglini et al. (2018)</td>
<td>No significant correlation found between sleeplessness and stigma.</td>
<td>Yes</td>
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<tr>
<td>Wu et al. (2019)</td>
<td>Greater self-stigma was related to greater AEE, which was related to worse sleep quality, greater use of sleep aids, and greater difficulty staying awake during the day.</td>
<td>Yes</td>
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<tr>
<td>Eyllon et al. (2020)</td>
<td>Increases in stigma scores was associated with greater likelihood of having sleep deficiency.</td>
<td>Yes</td>
</tr>
<tr>
<td>Jackson et al. (2020)</td>
<td>Social stigma and post-traumatic stress connected to police stop experiences were associated with significant increases in trouble sleeping. Post-traumatic stress mediated the relationship between social stigma and trouble sleeping.</td>
<td>Yes</td>
</tr>
<tr>
<td>Zhang et al. (2019)</td>
<td>Patients with impaired sleep quality had higher scores for disease stigma those without impaired sleep quality.</td>
<td>Yes</td>
</tr>
<tr>
<td>Wang et al. (2020)</td>
<td>Students with weight stigma had poorer global sleep quality (PSQI scores). Students experiencing weight stigma had longer sleep latency, shorter sleep duration, more severe sleep disturbances, and daytime dysfunction. Stress and depression mediated the</td>
<td>Yes</td>
</tr>
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</table>
relationship between weight stigma and global sleep quality.

| Khanal et al. (2020) | No | No | No | Stigma experience among health workers was significantly associated with higher odds of insomnia. | Yes |

*Note: AEE - Ambivalence over Emotional Expression, WBI - Weight Bias Internalization*
CHAPTER 3

“The combination is catastrophic:” A qualitative study of intersectional stigma and discrimination among those on Medication for Opioid Use Disorder

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Abstract

Intersectional stigma and discrimination for those involved with opioid use disorder (OUD) potentially create many difficulties and barriers to care. Using data from a mixed methods study we report qualitative findings guided by two aims: to explore (1) how individuals receiving medication for OUD (MOUD) experience intersectional stigma and discrimination and (2) resources helpful in addressing cumulative experiences of multiple forms of disadvantage. Interviews were conducted with 25 diverse individuals on MOUD attending treatment clinics in the Northeast United States. Five themes with supporting subthemes identified multiple identities that intersected with OUD. These intersections led to internalization of negative feelings, anticipated stigma, and shifts in self-perspectives. Recommendations include multi-service models to address the cumulative intersecting experiences of OUD. Findings highlight the complexity of intersecting, marginalized social positions. Future work should look beyond ‘one size fits all’ approaches to care and recognize individual vulnerabilities, for improving outcomes among those experiencing OUD.

Keywords: Stigma, Discrimination, Intersectionality, Substance Use, Lived Experiences
**Introduction**

Opioid use disorder (OUD) is a chronic and relapsing disorder that involves the nonmedical use of prescribed opioid medications or the use of illicitly obtained heroin. OUD affects over 2.1 million adults in the United States and is estimated to have mortality rates as high as 1.5% to 2% per year. With the opioid epidemic worsening from year to year, there remains a critical need to connect the affected population to appropriate treatment and strategize ways to increase retention once treatment has been initiated. Although the combination of behavioral treatments along with Medication for OUD (MOUD), namely, methadone, buprenorphine, and extended-release naltrexone, serve as effective treatment methods for OUD, these combinations remain underutilized. Low retention and infrequent follow up after treatment initiation remains a challenge despite the proven treatment benefits of reduction in risk of overdose and death. There are demographic, clinical, and social determinants that affect initiation and retention in MOUD treatment. Stigma and discrimination are known barriers to accessing MOUD, implementing MOUD, and remaining engaged in treatment.

Stigma can be defined as an attribute or behavior that deviates from broad societal norms, and that results in reduced social acceptance, and adversely impacts physical health, mental health, and quality of life among individuals with OUD. Stigma is a multi-level phenomenon reflected in attitudes, often conceptualized as internalized, anticipated, or perceived stigmas, and in experiences including enacted or experienced stigmas (e.g., discriminatory acts or behaviors). Few researchers have included the perspective of intersectionality in the study of stigma and discrimination.

Intersectionality provides an understanding of how the intersection of different aspects of one’s identities, such as race, class, gender, and sexual orientation, creates lived experiences embedded in structural systems of opportunities and oppression. Applying an intersectionality lens to substance use disparities sheds light on the experiences of individuals with multiple and intersecting minority identities. This is critical as OUD often occurs in tandem with other stigmatized characteristics. For instance, an individual with OUD might be stigmatized for factors including, but not limited to, their drug
use/treatment status, socioeconomic status, employment status, criminal record, race, gender, sexual orientation, having comorbid physical/mental health conditions, or being a victim of abuse.\textsuperscript{13}

While the intersectionality literature on addiction stigma has predominately focused on intersectionality’s “big four” (race/ethnicity, gender, sexual orientation, and class) or has been confined to the intersection of two identities,\textsuperscript{11,13-15} more research is needed to better understand the nuances of multiple intersecting identities among those experiencing opioid use disorder. The aims of this study were to explore (1) how individuals receiving MOUD experience intersectional stigma and discrimination and (2) supports and resources that could be used to better understand, cope with and tackle the cumulative experiences of multiple forms of disadvantage.

**Methods**

**Study design, population, and procedures.** A Convergent Mixed methods study was conducted in which quantitative and qualitative data were collected concurrently.\textsuperscript{21} The quantitative sample was drawn from the Collaboration Linking Opioid Use Disorder and Sleep (CLOUDS) study [an ongoing HEAL-funded (U01HL150596) study designed to examine the biological, behavioral, social, and environmental factors that explain the relationship between sleep deficiency and relapse and retention in MOUD]. In this paper we report qualitative findings following an interpretive descriptive approach in which we examined and holistically interpreted participants’ perspectives, leading to clinically relevant knowledge.\textsuperscript{16,17} Participants for the qualitative interviews were purposively sampled from the quantitative sample with respect to the diversity of gender, age, race, and ethnicity. Twenty-five adults were approached to participate in interviews, and no participant refused. Interviews (40-60 minutes) were face-to-face and were conducted in a private room at the community-based organization by the first author (U.N.). Participation was voluntary and participants received a $40 gift card for compensation for their participation.

We used a semi-structured interview guide with scripted prompts to encourage discussion (see Table 1) and conducted a pilot test of all interview questions. Participants were asked about their drug use journey, treatment experiences, their experiences with stigma, their experiences with intersectional
discrimination, and what resources they believed could be used to best support them. During the interviews, which were audio recorded after obtaining permission from participants, the interviewer documented field notes and memos.

**Ethical Considerations**

The Institutional Review Board (IRB) of Yale University reviewed and approved the study. Informed consent for the interview was obtained on the day of the interview. Refusal to participate did not interfere with the services being received at the treatment center. To protect the confidentiality of participants, all audio recordings were sent to HIPAA-certified transcriptionists who de-identified all data. Upon retrieval from the transcriptionist, transcripts were reviewed by two co-authors (U.N., L.S.) to check the de-identification and accuracy of transcripts. The de-identified transcripts and records were stored in encrypted files on a secure server.

**Analysis**

Qualitative data from interview transcripts, field notes, and memos were managed with Atlas.ti Version 8.4.4 (Berlin, Germany). Three co-authors (U.N., M.O., L.S.) reviewed all interviews and developed initial codes that were refined into a coding structure. We added and modified codes as additional interviews were conducted and reviewed. Two coauthors (U.N. and L.S.) met to compare coding approaches, clarify definitions, and refine the coding structure. The authors settled all coding disagreements by consensus. Once we established inter-coder agreement over 80% on all transcripts, U.N. coded the remaining transcripts. In preparation for thematic analysis, codes and quotations were examined for relationships, patterns, and central themes. Interviews were conducted and analyzed until no new codes or themes emerged from the interview transcripts.

Several steps were employed to maximize the rigor and validity of this study. U.N. worked closely with co-authors who were experienced in qualitative methods for consensus on coding and analysis. Authors practiced reflexivity to ensure awareness of potential biases. An audit trail with memoing was used during data collection and coding to enhance confirmability of study findings. U.N.
Results

The sample consisted of 11 men and 14 women who ranged in age, with an average age of 43.8 (standard deviation [sd] = 12.41). We included racially and ethnically diverse participants, 76% identified as White, 24% as Black, and 20% identified as Hispanic or Latino. Most participants lived in their own home/apartments with spouses/partners, had high school diplomas or GEDs, and were unemployed and looking for work. All participants were being treated for opioid addiction with methadone. Table 2 shows the demographic characteristics of the participants.

The thematic section headings below represent categories generated in the data analysis. Participants’ responses were categorized into themes and subthemes outlined in Table 3.

Living with Multiple Identities and Addiction

This theme highlighted the intersections of personal identities with OUD addiction and treatment stigma. The identities described were those established by participants’ unique characteristics, affiliations, and social roles. These included race, gender, age, comorbid conditions (i.e., mental illness, chronic pain, physical disability), physical appearance (i.e., teeth, hair color, tracks on arms due to drug use), single parenthood, low socioeconomic status (SES), work roles (i.e., sex work, adult dancing), and being an ex-offender.

Participants described the severe consequences and complexities of living with multiple socially marginalized identities. An often-recited consequence was experiencing oppressions from multiple sources. One participant, who self-identified as multiply-stigmatized based on his addiction, Puerto Rican decent, and criminal history stated, “That combined is catastrophic. It's like the trifecta of a person that is not gonna amount to anything or get any type of successful outcome. I'm definitely on the negative end of everything.”
**Being a person of color with OUD.** Several participants identified themselves as people of color, including six individuals who self-identified as Black. “Drug user” or “one on treatment for drug use” and “Black race” were noted as intersecting social identities that contributed to discriminatory events, as illustrated by

“I mean, honestly, it’s everything. It’s from my skin color. Bein’ a Black man in America, yeah, that’s really the toughest one. I get s*** just walking out my house every day. It’s somethin’, people just judging you thinkin’ that you the devil. It’s my skin tone.”

Participants of color also highlighted the lack of support and unfair treatment that they received from family, the judicial system, treatment centers, employers, etc. due to their addiction and race:

“Black people don’t have nobody to speak up for ’em. If they go to detox, you’re on detox on your own. Your family members ain’t comin’.”

“Being a female and being Black I know it's going to be a longer tougher fight than it would be for Caucasian female. I've been through the same type situation sometimes legally. I've caught my first DWI at age 20. Me and a Caucasian girl had the exact same case, hers was worse. I did jail time. She had a good lawyer and she did nothing. She did community service and a drug alcohol education class. I lost my license for two years, did two months in jail.”

**Low Socioeconomic status with OUD.** Low SES was characterized by participants as having less than a college education, being homeless or residing in low-income areas, having less access to day-to-day resources, and/or participating in sex work. The stigmatizing and discriminatory experiences related to the unique intersection of low SES and addiction often left participants feeling misunderstood, incapable, and disempowered. In describing being denied housing, one participant stated,

“She [landlord] wanted us to leave. She wanted to double the rent, and she knew we could not afford it. We had to leave. I felt discriminated. I was like, "Is she saying we're not good enough for a lease? Is that what she's saying? It’s not like we were there doing drugs all day and night.”

Having less formal education and battling addiction also limited opportunities and altered the way in which individuals felt society viewed them: “Even schooling, being looked at when you're trying
to get your education as if you're not smart enough or you can't complete the same type of task that the other person can."

**Ex-offender with OUD.** Those with past criminal histories highlighted stigmatizing and discriminatory experiences related to being ex-offenders and battling addiction. Individuals experienced discrimination from employers who denied them employment due to failed background checks. One individual expressed, "with everything I have going on, I look horrible on paper. Nobody wants me." Another individual described how having both identities caused society to label him as dangerous, immoral, and unproductive, "I have around 60 larceny charges in addition to my addiction. That's gonna be with me for the rest of my life now. People have the right to go look at that. Then, they see all that. They definitely change their view of you and give the job to someone they feel is better for the job."

**Loss.** Loss was a recurring theme in the lives of participants, particularly when losses led to drug use and negative consequences. Losses included (1) loved ones (e.g. parent, partner), (2) important relationships/social supports, (3) custody of children, (4) work opportunities, and (5) housing. In addition, there were losses of basic human rights, such as trust, respect, and equal treatment.

"...Drugs have caused me to lose everything. You know what I mean? I've lost everything, gained everything, lost everything, gained everything. I'm tired of losing."

While some losses were direct physical losses, "I lost custody of my child" or "I lost a really good job opportunity" the loss of relationships seemed to be more detrimental to individuals due to feelings of isolation and neglect:

"You can feel it. You can sense the attitudes. My family, my friends, some of 'em—everybody knows somebody with drug use problems and other issues, but they just treat you like they don’t want to be around you. You shunned out. You shunned out...and because of that, I’ve lost everything."

**“It’s Everywhere” Discrimination and Stigma**

The majority of participants reported family, friends, and community members as the most frequently perceived perpetrators of stigma and discrimination. Other identified perpetrators included co-workers
and employers, government services (i.e., child services, bus, banks, housing), drug treatment centers/detox clinics, the criminal justice system, and medical institutions. A few individuals described stigmatizing and discriminatory experiences as subtle microaggressions perceived from people’s “attitudes” or “energy.”

“It’s not like they [family] did anything bad, but you can just feel it. It’s the way they look at you...you can hear it in their voices.”

More blatant and traumatic experiences of discrimination often occurred with medical personnel:

“I remember going there [hospital], and they’d [medical staff] look at me, and normally for something you should stay overnight for—like one time I had a broken bone in half, and they got me in and out within 40 minutes. They threw a sling wrap and plaster on it real quick and got me out because they were like, “We can’t keep you overnight,” because they saw the tracks on my arms and knew I was homeless, and I think they felt like, “This b*tch just wants a bed for the night,” you know?

Internalizing negative experiences. The majority of participants discussed feelings of shame, guilt, embarrassment, and worthlessness or a combination of two or more of these feelings, due to discriminatory and stigmatizing experiences:

“You just want the feelings to go away. You just wanna feel normal.”

The internalization of stigmatizing and discriminatory events was a process that happened over time. Hearing stigmatizing and stereotypical remarks repeatedly served to catalyze the internalization process:

“The stereotypes match what it is that I feel about myself. Only because, after a while, you keep on hearing, "You're a loser," you keep on actin' like a loser, chances are that's who you become. That's how I feel. I feel like a frickin' loser. I feel like I keep on fallin' short. I keep on not being my full potential.”

Often the internalization of comments from others led individuals to question themselves, second guess, judge, criticize, and doubt their own contributions and capabilities:

“Sometimes I get into those thoughts where I start to believe what has been said to me through the years or the looks, and you know what those looks are. What they mean, and you start questioning
you yourself. “Am I an able-bodied person? Am I a good person? Do I do the best I can for the next person on a daily basis? Am I at least contributing to society trying to help out somebody every day?” I question myself sometimes, and sometimes it’s not—I’m not happy with the answer.”

**Anticipation** – “Don’t ask, don’t tell.” In discussing anticipated stigma (expectations that stigma or discriminatory experiences will happen in the future), many individuals had a ‘Don’t ask, don’t tell’ approach and valued their ability to keep certain parts of their life private, unless disclosure was warranted or forced. Concealing drug use, use of MOUD, and recovery status from family, friends, employers, and clinicians was related to fears of compromising valued relationships:

“... I don’t disclose any of that information no more. Because I’ve found that it ruins relationships. Unless they ask, I don’t tell.” In addition, participants feared being “judged” and viewed in a negative light: “They will look at you different. I feel they look at you, like you’ll be questionable, they’ll be wondering, "Oh my God, I never knew you were an addict and you did opiates, you smoked crack and oh, let me get my purse.” Participants also felt that disclosing such information could cause them to become victims of unfair/unequal treatment: “I feel as though that I won’t be treated equally. Once they [referring to the general public] know that you're an addict or you had that type of thing, you're always looked at as a liar, a thief.” In contrast, some participants denied anticipated stigma because they either (1) were unconcerned what people thought, (2) were not ashamed of who they were, or (3) felt being open and disclosing information was for their betterment. For instance, being open about drug use/treatment with clinicians helped to ensure they received appropriate and comprehensive care during medical visits: “I think it good to tell people, like your doctor, so they'll know how to treat you.”

**A “Damaged” Identity**

Living with multiple stigmatized social identities in addition to OUD resulted in feeling ostracized and having a low sense of self-worth. Many participants ascribed to the feelings of being treated as if they were “damaged,” “different,” “incapable” or that “something is wrong” with them. Having a damaged identity unjustly prevented individuals from occupying valuable social roles or entering desirable
relationships: “people treat me like a social scar.” The societal dismissiveness and exploitative understanding of intersecting identities left some feeling socially rejected: “It looks like, from my end, I feel like everybody's tryin' to avoid me, rather than to accept me and have pleasure in dealing with me. I feel like an outsider. I feel like a person that doesn't have any support system or person that can network with loved ones.”

**Facing Reality and Becoming Accountable**

Participants reflected on their overall experiences with intersecting identities, discrimination, stigma, and other barriers to social inclusion and had varied responses, some of which were more positive or affirming. While some felt such experiences reinforced their individuality, “I’m gonna continue to be me, flaws and all, and share who I am with the world,” others felt experiences empowered them, “I mean, it makes me feel like I’m Superman, like I been gone—I’ve been through hell and back honestly. It’s just been a lot, but I just keep goin’ because I know regardless even though I’m flawed, there is still people who depend on me and who look up to me. I got to do it for them. I got to do it for myself.”

In contrast with the many negative sequelae of stigma, some participants described stigmatizing and discriminatory interactions as catalysts to their personal accountability to not live up to negative stereotypes and expectations, “I’ve made mistakes in my past, but I’ve grown up to be so mature and be accountable.” Individuals described dealing with their own personal problems and learning to deal with issues themselves: “I deal with it myself. I try not to bring my problems on anybody else. I deal with my own problems my own self.”

An additional outcome of stigmatizing and discriminatory experiences included self-reflection regarding participants’ own character, intelligence, and decision making, and many other painful feelings. In some cases, this was a shift towards becoming less judgmental and more accepting of others, “I could never judge others because you can’t judge anybody. You don’t know what they’re going through. You don’t know their situation.”
Experiencing Treatment and Identifying Supportive Interventions

Participants highlighted various treatment experiences. The majority of participants attributed positive and successful treatment experiences to (1) being on the right dose of medication, specifically methadone, (2) having supportive counselors/positive counseling experience, and (3) being surrounded by those who support recovery efforts. In describing one treatment experience, a participant stated, “Yeah. I actually thought I was gonna come in for the few first times, and I was gonna just say, “Forget it. I’m not coming in no more,” but it’s actually helped me. Methadone is actually the one thing that I can say that it’s helped, in addition to having awesome counselors, so yeah.” On the contrary, negative treatment experiences were described by a few individuals as resulting from (1) racist medical/treatment staff, (2) unfair/unequal treatment, (3) not being ready to give up drugs, and (3) not meeting requirements to be admitted to or stay in treatment.

We asked participants about ideal treatment supports/resources that would be most helpful in (1) supporting recovery efforts and (2) better understanding and tackling the cumulative experiences of multiple forms of disadvantage. There were many suggestions for specific, flexible, and individualized programming, “I would need something that can hook me up. Hook me up with job referrals, housing, put in applications for work, you know? Things that I specifically need.”

Counseling and therapy. There was great value attributed to counseling and therapy to cope with discriminatory and stigmatizing experiences related to intersecting identities. Many individuals described the benefit of therapeutic communication where they could voice their opinions and really feel heard, “Just being able to speak with someone who can understand who you are as a person that can really give you good advice, I think, is always a good resource.” For some, the inaccessibility of counseling or therapy was due to lack of transportation to access services or the inability to pay. However, in some cases, the use of technology addressed this barrier, “I’ve started therapy. It’s on a free mobile app on my phone where I just set up times to speak with someone. It’s really helped me a lot just to I guess get a different perspective. People kind of help you, listen to your issues and I don’t know. I guess if maybe somethin’ like that to kind of help you deal with everything.” While many saw the benefits of individual
counseling and therapy, others felt support groups with multiple people would also be beneficial, “Yeah, or a group to talk about it with people that have similar experiences. Then, we can all get together and talk about it, people that understand what you’re going through. When you don’t feel like you’re alone, it helps.”

A one-stop-shop. Since there were often difficulties in accessing or utilizing the multiple resources needed to address the many complexities of their multiple identities, many individuals thought it would be helpful to be able to have a multi-service ‘a one stop shop’ for community building, treatment, social services, and support. For example, one participant stated, “I feel like there are many resources out there. It’s just not altogether. You know what I’m sayin’? it’s all separate. Something that’s altogether would be perfect for me.” There were many benefits seen for resources that addressed multiple needs and cultivated important life skills (e.g., self-care, job-readiness), “when I do those kinds of things, I feel productive. I feel like I’m doing something with myself. I feel better about myself.” In addition, many individuals thought that community support groups could help with education and bring about social change to support anti-stigma/discrimination work, “I feel like if there was enough people to come together and talk about these things, then maybe it could make a change, you know?”

Family and community support. The majority of the participants highlighted the importance of support provided by their families, friends, and community. This included positive support received from (1) spouse/significant others, (2) children, (3) friends, (4) treatment centers, (5) other individuals battling OUD, (6) church/religious institutions, and (7) community organized programs. Supports were seen as positive when there was unconditional love, less judgement and less need to conceal parts of their identities, “I don’t have to keep up appearances, you can be yourself here.” This was the same case when individuals found support from others who shared similar identities as they did:

“...nothing feels as good as being able to feel equal to somebody when you’re down there, so sitting on the curb by yourself while you see people walking, drive by, and you’re down on the curb, and everyone’s up higher than you, you know? There’s nuthin’ better than havin’ someone sit next to you on
the curb, just down low, you know? When I’m all f*** up and just—my people on the streets will just sit there with me side-by-side, equal, and we can just be like f*** this s***, you know?”

Discussion

Our study expands the growing stigma literature among those battling opioid use disorder with personal stories and vivid descriptions of their feelings about (1) intersecting factors and identities that contribute to experiences of discrimination and stigma, (2) physical, mental, and emotional responses to discrimination and stigma and (3) helpful strategies and supports that can be incorporated in treatment efforts and that also advance anti-stigma and discrimination work.

While many studies documented the existence of various forms of stigma relating to substance use and treatment status, our study uniquely highlights how people on MOUD often experience layers of stigma and discrimination in addition to substance use stigma. They reported a variety of experiences with intersectional stigma and discrimination in various environments. Most experiences resulted from the intersection between the experience of OUD and (1) race, (2) socioeconomic backgrounds, and/or (3) criminal histories. These findings are consistent with previous evidence for interdependent and intersectional relationships between different forms of stigma and social inequalities in addition to substance use stigma. For instance, often due to structural racism, Black people with substance use disorder report more oppression and have worse outcomes than their White counterparts. Racism and racism-related stress serve as important precipitants of substance use and barriers to recovery.

Our study builds on this work by emphasizing the severity and trauma of stigma and discrimination especially among Black individuals on MOUD versus members from other racial or ethnic groups. Our findings are also consistent with literature that outlines low socioeconomic status and incarceration as additional sources of marginalization adversely affecting outcomes for those with drug addiction.

Our findings suggest that internalized and anticipated stigma are highly prevalent among those on MOUD. These experiences often led to internalized shame, guilt, and unworthiness among participants and are commonly disclosed by those with drug addiction. For all participants in our study, anticipated stigma was influenced by an awareness that if aspects of one’s social identity were disclosed, it affected
how individuals treated and interacted with them. These findings are supported by many studies exploring anticipated stigma and substance use disorder. Earnshaw et al. (2013) conducted a qualitative study among individuals on treatment for OUD and found that participants felt ‘looked down’ or ‘thought less of’ when they disclosed their history of drug addiction. This highlights the manifestation of devaluation and discrediting characteristics of stigma that is often feared by individuals and thought of as avoidable if information is withheld.\textsuperscript{30} In our study, the ‘Don’t ask, don’t tell’ thought processes mirrored this phenomenon.

Although our study demonstrates the negative processes that arise from intersectional stigma and discrimination, our participants also described personal empowerment and accountability, less prevalent but positive processes. Several studies demonstrated that some people internalize stigmatizing and discriminatory events in a way that diminishes their self-esteem and self-efficacy, while others seem to be energized by the same experiences and become empowered in reaction to them.\textsuperscript{31} The extant literature includes studies that describe important mechanisms that facilitate positive processes that protect individuals from the deleterious effects of stigma and discrimination including resiliency,\textsuperscript{32} high self-esteem, and high self-efficacy.\textsuperscript{31} In a study conducted among young men who have sex with men, a positive moderating role of resilience was found in exploring the relationship between stigma and depressive symptoms.\textsuperscript{33} Similar to our findings, examples of ways individuals build resilience is highlighted in a qualitative study where participants drew upon existing support networks and expanded their own positive emotions and personal strengths in order to counteract their experienced stigma.\textsuperscript{34}

Finally, a range of interventions show promise for improving stigma and discrimination related to OUD: education through lectures and case scenarios, motivational interviewing and communicating, and other therapeutic interventions, such as group-based Acceptance and Commitment Therapy (ACT) and vocational counseling.\textsuperscript{35} However, to our knowledge -- no validated interventions exist that specifically target intersectional stigma and discrimination among those with OUD. Our study findings may inform future work with the use of motivational interviewing, therapy, counseling, and other therapeutic interventions that utilize an intersectional approach as potential effective strategies for specifically
addressing intersectional stigma and discrimination. Social supports (i.e., relationships with family and friends) and resources (i.e., a stable place to live) impact many outcomes among those with substance use disorder, including treatment retention and relapse. Findings from a study conducted by Dobkin and colleagues highlighted symptoms of depression, psychological distress, and greater drug abuse that were more prevalent among substance-using patients with low social support. Warren and colleagues found that among individuals with co-occurring substance use and psychiatric disorders, greater social support was associated with better mental health status, less drug use, and greater self-efficacy. Social support represents an important target domain for further research and intervention development, as our participants described how having positive social support helped them with feelings of belonging, acceptance, and perseverance.

**Limitations**

Our sample was limited to those individuals who were enrolled in MOUD with methadone in a not-for-profit community-based treatment center in the Northeastern region of the United States. Thus, the generalizability of our findings are likely limited regarding other more diverse communities of people who are addicted to opioids. We were challenged to recruit racially and ethnically diverse individuals for the parent quantitative study and the qualitative study sub-sample. This may be due to racial inequities in access and enrollment in treatment among people of color locally and nationally. It is possible that individuals from other groups and with unique intersecting identities may have had different experiences and perspectives that were not represented in these findings.

**Future research**

Research conducted in additional geographical locations will aid in understanding perspectives and outcomes for patients enrolled in OUD treatment centers in other regions, and those treating OUD with other MOUD medications (i.e., buprenorphine, naltrexone). Furthermore, potential determinants of stigma and discrimination, such as clinic location, length of time since initiating MOUD, and type of MOUD medication may uncover additional factors and social identities that place patients at greater risk for stigma and intersectional discrimination. Future research is needed to understand multi-level protective
factors essential for development of discrimination and stigma-reduction interventions centered around counseling and support to build resiliency and successful treatment outcomes.

**Conclusion**

In this qualitative study, we explored the experiences of intersectional stigma and discrimination among 25 individuals on MOUD. In giving voice to the participants, the study makes a unique contribution to the literature by providing insight into how various social identities, aside from the standard intersectionality characteristics (race/ethnicity, gender, sexual orientation, and class) intersect with addiction stigma. These intersections lead to various outcomes including internalization of negative feelings, anticipated stigma, and shifts in self perspectives. Recommendations for care include multi-service models to address the cumulative experiences of multiple forms of disadvantage and marginalization. Our findings highlight the need for future and directed research focused on several notable barriers to care and supports identified by study participants. There is a need to look beyond ‘one size fits all’ approaches to care and recognize individual vulnerabilities by examining organization, culture, policies, and procedures that help and/or hinder outcomes among those with OUD.

**Acknowledgment**

**Funding:** This work was supported by National Institute of Drug Abuse through the Ruth L. Kirschstein National Research Service Award to U.N. (F31DA054762).
References


Table 1 Interview Guide

<table>
<thead>
<tr>
<th>Semi-structured Interview Guide for Qualitative Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction:</strong></td>
</tr>
<tr>
<td>Thank you so much for agreeing to participate in this study, we truly appreciate your time. The purpose of this interview is better understand who you are as a person, and your experiences of stigma and discrimination (if any), and how these experiences have impacted you, and your health (including your sleep). For reference, we define stigma as <em>labeling, stereotyping, exclusion, rejection, blame or devaluation of an individual because of attributes viewed as different from societal norms</em> and discrimination as <em>differential or unfair treatment</em>. Also, as a reminder, the questions I will be asking you are personal and can be sensitive in nature, so if you are to ever feel uncomfortable with answering a question, or need to stop, or take a break, please feel free to let me know. Do you have any questions before we get started?</td>
</tr>
</tbody>
</table>

1. **Getting to know their story**
   **Prompt:**
   a. *Tell me about the first time you used drugs? for example: where were you? Were you with friends? What was going on for you at that time?*
   b. *How did you know your drug use was becoming a problem?*
   c. *What led you to want to get help?*
   d. *What things prevented you from getting help?*

2. **Perceived Stigma:**
   **Prompt:**
   a. *How do you think people view those with OUD/on treatment for OUD?*
   b. *Some people feel like other people look down on them – has that been something you’ve experienced – Yes/No – tell me more about that.*

3. **Experienced Stigma:**
   **Prompt:**
   a. *Have you had any direct experiences of stigma or discrimination? – Yes/No – tell me more about that.*
   b. *Have these experiences been related to OUD and/or being on treatment? Can you say more about that, or give me an example?*
   c. *What are other characteristics that you feel are an important part of you, but people treated you differently because of? For instance, this can be things such as your race, culture, religion, your job.-- Can you say more about that, or give me an example??*
   d. *What are your experiences with these combined identities? *Repeat participants response to previous question* Do you think it has an impact on how people treat you - yes/no- tell me more about that?*
   e. *Do you feel like one identity causes you to experience stigma or discrimination more than another identity…if so? Which one? Why?*

4. **Internalized Stigma:**
   **Prompt:**
   a. *The way that other people think of drug users….how does that make you feel about yourself?*
   b. *How do your experiences of stigma/discrimination make you feel about yourself? -- Has it changed the way you think or feel about yourself?*
   c. *How do your experiences with your combined identities make you feel about yourself?*
### 5. Anticipated Stigma:

**Prompt:**
- Do you tell people about your OUD and treatment status? How do the people you tell react?
- What do you think others’ attitudes are (or would be) toward you if they knew about your OUD or treatment status? – Do you think it would change how they treat you? In what ways?

### 6. Coping/Resilience:

**Prompt:**
- What are strategies you use to help you deal with experiences of stigma/discrimination?
- Do you find these strategies to be effective – Yes/No – tell me more about that.
- Who are the people in your life who have helped you to deal with any experiences of stigma/discrimination? Can you describe how they have been helpful to you?...if not people… resources?
- What do you think will be a good resource for dealing with issues with your combined identity?--for example *give participant example*

### 7. Is there anything I have missed or anything else you would like to tell me? Is there anything that you wished I would have asked that I did not?
### Table 2 Participant Demographics

<table>
<thead>
<tr>
<th>Baseline Characteristics</th>
<th>Enrolled Participant (N=25)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographics</td>
<td>Mean (SD) or N(%)</td>
</tr>
<tr>
<td>Age at Enrollment</td>
<td>43.8 (12.41)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>11 (44.0%)</td>
</tr>
<tr>
<td>Female</td>
<td>14 (56.0%)</td>
</tr>
<tr>
<td>Ethnicity</td>
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<tr>
<td>Hispanic or Latino</td>
<td>5 (20.0%)</td>
</tr>
<tr>
<td>Not Hispanic or Latino</td>
<td>20 (80.0%)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
</tr>
<tr>
<td>Black or African American</td>
<td>6 (24.0%)</td>
</tr>
<tr>
<td>White</td>
<td>19 (76.0%)</td>
</tr>
<tr>
<td>Where does the participant live?</td>
<td></td>
</tr>
<tr>
<td>Own home/apartment</td>
<td>19 (76.0%)</td>
</tr>
<tr>
<td>Assisted living</td>
<td>2 (8.0%)</td>
</tr>
<tr>
<td>Homeless</td>
<td>2 (8.0%)</td>
</tr>
<tr>
<td>Other</td>
<td>2 (8.0%)</td>
</tr>
<tr>
<td>With whom is the participant living?</td>
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</tr>
<tr>
<td>Alone</td>
<td>5 (20.0%)</td>
</tr>
<tr>
<td>With spouse or partner</td>
<td>10 (40.0%)</td>
</tr>
<tr>
<td>With family other than spouse</td>
<td>5 (20.0%)</td>
</tr>
<tr>
<td>With other</td>
<td>5 (20.0%)</td>
</tr>
<tr>
<td>Education Level</td>
<td></td>
</tr>
<tr>
<td>8th Grade or less</td>
<td>1 (4.0%)</td>
</tr>
<tr>
<td>9th to 11th Grade</td>
<td>4 (16.0%)</td>
</tr>
<tr>
<td>High School Diploma or GED</td>
<td>9 (36.0%)</td>
</tr>
<tr>
<td>Vocational Trade School Courses or Associates Degree courses after HS</td>
<td>2 (8.0%)</td>
</tr>
<tr>
<td>Courses towards a Bachelors Degree</td>
<td>7 (28.0%)</td>
</tr>
<tr>
<td>Bachelors Degree</td>
<td>1 (4.0%)</td>
</tr>
<tr>
<td>Masters Degree</td>
<td>1 (4.0%)</td>
</tr>
</tbody>
</table>
Table 2 Participant Demographics

<table>
<thead>
<tr>
<th>Baseline Characteristics</th>
<th>Enrolled Participant (N=25)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD) or N(%)</td>
</tr>
<tr>
<td>Employment status</td>
<td></td>
</tr>
<tr>
<td>Full-Time</td>
<td>5 (20.0%)</td>
</tr>
<tr>
<td>Part-Time</td>
<td>2 (8.0%)</td>
</tr>
<tr>
<td>Unemployed, looking for work</td>
<td>12 (48.0%)</td>
</tr>
<tr>
<td>Unemployed, not looking for work</td>
<td>4 (16.0%)</td>
</tr>
<tr>
<td>Retired</td>
<td>1 (4.0%)</td>
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<tr>
<td>Unable to work</td>
<td>1 (4.0%)</td>
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SD, Standard deviation
## Table 3 Summary of Qualitative Data in Major Themes and Subthemes

<table>
<thead>
<tr>
<th>Major Theme</th>
<th>Subtheme</th>
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<tbody>
<tr>
<td>Living with Multiple Identities and Addiction</td>
<td>- Being a person of color with OUD</td>
</tr>
<tr>
<td></td>
<td>- Low socioeconomic status with OUD</td>
</tr>
<tr>
<td></td>
<td>- Ex-Offender with OUD</td>
</tr>
<tr>
<td></td>
<td>- Loss</td>
</tr>
<tr>
<td>“It’s Everywhere” Discrimination and Stigma</td>
<td>- Internalizing negative experiences</td>
</tr>
<tr>
<td></td>
<td>- Anticipation – “Don’t ask, don’t tell”</td>
</tr>
<tr>
<td>A “Damaged” Identity</td>
<td></td>
</tr>
<tr>
<td>Facing Reality and Becoming Accountable</td>
<td></td>
</tr>
<tr>
<td>Experiencing Treatment and Identifying Supportive Interventions</td>
<td>- Counseling and therapy</td>
</tr>
<tr>
<td></td>
<td>- A one-stop-shop</td>
</tr>
<tr>
<td></td>
<td>- Family and community support</td>
</tr>
</tbody>
</table>
CHAPTER 4

“It’s All Connected:” A Mixed Methods Study of Insomnia, Stigma and Discrimination among Individuals on Medication for Opioid Use Disorder

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Note: This paper was submitted to Sleep Health

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Abstract

Objectives: Insomnia is one of the most common sleep disorders among those with opioid use disorder (OUD), including those on medication for OUD (MOUD). There is a dearth of literature exploring the role of social stressors on sleep outcomes among this group. The purpose of this study was to explore the association between OUD-related stigma and intersectional discrimination with insomnia among individuals on MOUD.

Methods: Participants were recruited from treatment clinics in the Northeast United States. Using a convergent mixed-methods research design, we explored associations with stigma [The Brief Opioid Stigma Scale], intersectional discrimination [Intersectional Discrimination Index], and insomnia [Insomnia Severity Index] through quantitative survey data and qualitative data from interviews for participant experiences. Data from the quantitative and qualitative components of the study were integrated for interpretation.

Results: Quantitative analysis indicated weak to moderate positive correlations between intersectional discrimination, and exploratory variables including pain, perceived stress, and psychological distress with insomnia severity. Qualitative analysis generated four main themes, which highlighted negative emotions and ruminations as factors that participants connected experiences with stigma and discrimination to poor sleep outcomes. Integration of data identified concordant and discordant findings.

Conclusions: Stigma, discrimination, physical symptoms and psychological distress appear to contribute to poor sleep outcomes among those with OUD. Future work should consider targeting maladaptive outcomes of rumination and negative emotions to improve sleep outcomes among those with OUD.

Keywords: Insomnia; Substance Use Disorders; Mixed Methods; Stigma; Discrimination; Intersectionality
Introduction
Opioid use disorder (OUD) is a chronic and relapsing brain disease defined as the persistent use of opioids despite adverse consequences.\(^1\) OUD affects over 2.7 million individuals in the United States (US), and its prevalence continues to rise annually.\(^1\) OUD often leads to deficits in cognitive function, mood, pain perception, autonomic activity,\(^1\) and death;\(^2\) causing at least one overdose death every 20 minutes.\(^3\) Although effective federally approved treatment, medication for opioid use disorder (MOUD), is available, only 20% of individuals with OUD receive the recommended treatment each year.\(^4\) Among those who seek treatment, relapse rates are high and are associated with lack of retention in treatment. This leads to poor physical, mental, emotional, and behavioral health.\(^3\)

A major health issue among those with OUD during both active disease and recovery is insomnia,\(^5\) defined as difficulty initiating sleep, maintaining sleep, or awakening too early in the morning.\(^6\) Insomnia occurs in as many as 75% of people with OUD\(^1\) and individuals on MOUD report more severe insomnia symptoms vs individuals with OUD who are untreated with MOUD.\(^7\) Factors that contribute to insomnia in this population include chronic drug use, pain, anxiety, depression, withdrawal symptoms, benzodiazepine (BZD) use, and cigarette smoking.\(^8\)

OUD is associated with stigma and discrimination. OUD-related stigma is a social process characterized by negative stereotyping, excluding, rejecting, blaming, or devaluing a person based on their opioid addiction. Discrimination is the is the act of making unjustified, prejudiced distinctions between people as a result of stigma.\(^9\) Both stigma and discrimination contribute to negative opioid-related outcomes.\(^9\) People on MOUD typically identify with more than one stigmatizing identity (e.g., a person of color, mentally ill, ex-offender) that intersect in an inseparable manner that causes “disadvantage by multiple sources of oppression”\(^10,11\) or intersectional discrimination.\(^12\) For example, an ex-offender, who is a person of color with OUD may experience discrimination due to their criminal history, race, as well as their OUD.

Stigma and discrimination contribute to poor sleep quality, insufficient sleep duration, greater use of sleep aids, and difficulty staying awake during the day.\(^13,14\) However, there is a gap in the literature
using an intersectional lens to explore stigma, discrimination, and insomnia among those on MOUD. The purpose of this mixed-methods study was to gain a comprehensive understanding of the relationship between stigma and discrimination and insomnia among individuals on MOUD through integration of quantitative and qualitative data. The aims were (1) to describe and explore the association among OUD-related stigma, intersectional discrimination, and exploratory variables [pain, perceived stress, psychological distress] with insomnia among those on MOUD; (2) Describe how individuals perceive stigma, discrimination, and sleep.

The conceptual underpinnings of this study were drawn from three overarching frameworks, namely, an adapted version of the Health Stigma and Discrimination Framework (see Figure 1), \(^\text{13,15}\) Intersectionality, \(^\text{12}\) and the Allostatic Model of Discrimination, Sleep, and Cardiometabolic Risk. \(^\text{16}\) The blending of these frameworks outline the intersecting, and multi-factorial drivers and facilitators of stigma and discrimination and the processes by which experiences may manifest and lead to poor sleep quality.

**Methods**

To gain a greater understanding of variable associations and participant experiences, we used a convergent parallel mixed methods design (see Figure 2) that integrates benefits of both quantitative and qualitative methods. \(^\text{17}\) This study was part of the larger study, Collaboration Linking Opioid Use Disorder and Sleep (CLOUDS) study [an ongoing HEAL-funded study (U01HL150596)] that was designed to examine the biological, behavioral, social, and environmental factors that explain the relationship between sleep disturbance and relapse and retention with MOUD. For our sub-study, we collected quantitative and qualitative data and analyzed them simultaneously. \(^\text{17}\) Individuals were enrolled in the CLOUDS study and recruited from low-barrier community treatment centers in Connecticut that provide MOUD. Research assistants recruited individuals via screening of medical records, word-of-mouth, recruitment flyers posted in the clinics. Individuals who attended the participating clinics completed computer-based surveys lasting approximately 60 minutes at the time of their clinic visits and received $30 for completion of baseline surveys.
We conducted interviews with individuals, after they completed the questionnaires, to elaborate on topics covered in the surveys, including information and their experiences with discrimination, stigma, and sleep. We approached twenty-five adults, purposively sampled with respect to diversity of insomnia severity scores, gender, age, race, and ethnicity, to participate in the interviews. All individuals whom we approached agreed to participate. The first author (U.N.) conducted semi-structured interviews face-to-face in a private room in the clinics. All interview questions were pilot tested prior to the interviews (see Table 1). An interpretive descriptive approach, which is a qualitative research methodology that emphasizes the generation of clinically relevant knowledge, was utilized to address the qualitative research aim. Participation was voluntary, and individuals received $40 as compensation.

**Ethical Considerations**

The Yale University IRB approved the study. All individuals provided written informed consent prior to engaging in any study procedures for both the quantitative and qualitative components of the study.

**Variables and Measures**

**Demographic and Clinical Characteristics**

Age, race, ethnicity, sex, income, education, health status, employment status, and housing status were collected via self-report. We considered psychological distress, perceived stress and pain as exploratory variables. All variable measures demonstrated good internal consistency in the present study ($\alpha$’s = 0.83-0.91).

**Psychological Distress**

The Brief Symptom Inventory-18 (BSI-18) constitutes three domains (i.e., anxiety, depression, and somatic symptoms), with six questions for each domain. The global severity index of distress indicates the sum of the three domains ranging from 0 to 72.

**Perceived Stress**
The Perceived Stress Scale (PSS) is a self-report questionnaire that consists of 10 items designed to indicate how unpredictable, uncontrollable, and overloaded respondents find their lives.\(^{21}\) Score = 0–13, no or mild stress; 14–26 = moderate stress, and 27–40 as severe perceived stress.\(^{22}\)

**Pain**

Pain was assessed with the Brief Pain Inventory (BPI).\(^{23}\) The BPI has 11 items, 4 for pain severity (at its worst, at its least, on average, and right now), each rated on a 0–10 scale ranging from no pain to pain as bad as you can imagine and pain interference (0–10 scale, does not interfere to completely interferes).\(^{23}\) Severity scores are the sum of the severity items divided by 4; interference scores are the sum of the interference items divided by 7.\(^{23}\)

**Stigma**

The Brief Opioid Stigma Scale (BOSS) was used to measure OUD-related stigma.\(^{24}\) The BOSS consists of 12-items assessing 4 opioid-related stereotypes across 3 Subscales. It assesses perceived stigma, or stereotype awareness (“aware”), internalized stigma, or stereotype agreement (“agree”), and self-esteem decrement (“harm”) related to opioid dependence. Each subscale score ranges from 4-20, the higher the score, the greater the stigma.

**Intersectional Discrimination**

The Intersectional discrimination Index (IDI) provides a measure of day-to-day intersectional discrimination that can be produced by different conditions: gender, ethnicity, mental health diagnosis, etc.\(^{25}\) The main scale is formed by 9 Likert-type with four response options (1 ‘never’ – 4 ‘many times’). The higher the score the more discrimination.\(^{25}\)

**Insomnia Symptoms**

Insomnia symptoms were measured using the Insomnia Severity Index (ISI).\(^{26}\) The ISI is a seven-item, self-report questionnaire used to assess insomnia symptoms. Scores range from 0 to 28, with higher scores indicating higher levels of insomnia. A score of 0–7 indicates no insomnia, 8–15 indicates subthreshold insomnia, 15–21 indicates moderate insomnia, 22–28 indicates severe insomnia.\(^{26}\) ISI cutoff score that was established to categorize individuals as having or not having insomnia was 15.
Data Management

Quantitative Data

Data were analyzed with R software. Descriptive information (i.e., mean, medians, standard deviations) was computed for all primary study variables to summarize individuals’ characteristics. The CLOUDS cohort of individuals consisted of 130 individuals at the time of data analysis, those with incomplete data for the primary variables [OUD-related stigma, intersectional discrimination, and insomnia] and exploratory variables [perceived stress, pain, and psychological distress] were excluded in the final analyses (n=10). The final sample size consisted of 120 individuals. Medians were used where the data were skewed for OUD-related stigma, intersectional discrimination, pain, stress, and psychological distress variables. These variables also did not satisfy assumptions of normality (as tested by the Shapiro–Wilk statistic). Spearman correlations were used to assess the associations between OUD-related stigma, intersectional discrimination, stress, pain, and psychological distress with insomnia. We compared the means of variables between people with and without insomnia based on their self-reports on the ISI using independent groups t-tests. We performed all tests at significance level of 0.05.

Qualitative Data

The first author conducted semi-structured interviews and audio recorded them. Each audio recording was sent to a transcriptionist who was HIPAA-certified. All transcribed interviews were read in entirety for accuracy. Qualitative data from interview transcripts, field notes and memos were managed with Atlas.ti Version 8.4.4 (Berlin, Germany). Data coding and analysis occurred simultaneously as interviews progressed until thematic informational redundancy was noted. Three co-authors (U.N., M.O., L.S.) developed a coding framework and refined it with a consensus approach. After 80% Inter-coder agreement was reached on jointly coded transcripts, U.N. coded the remaining transcripts. Thematic analysis, a method used to analyze qualitative data that emphasizes classifying and interpreting patterns of meaning, was used to identify key themes and sub-themes.

18,19,30
Quantitative and qualitative data were analyzed separately and then merged for data integration. A spreadsheet was kept displaying quantitative data along with qualitative themes for each participant. Data integration occurred through comparison of survey results with qualitative themes. We illustrated these comparisons in a joint display that presented quantitative and qualitative data concordance, discordance, and interpretations.

**Results**

**Quantitative Results**

The sample consisted of 71 men and 49 women, with a mean age of 41.58 years (SD = 11.64). The majority identified as White (79%) followed by Hispanic or Latino (17.5%), multi-racial (10.8%) and Black (8.3%). Most participants had high school diplomas, GEDs or post-high school education (75%) and were unemployed (69.2%). All individuals were being treated for opioid addiction with methadone.

Table 2 presents descriptive statistics on the demographic characteristics of the sample.

Using the insomnia severity instrument cut-off score of 15, 29% percent of the sample met criteria for clinical insomnia. Individuals were divided into two groups (no insomnia and insomnia). The descriptive characteristics of the two groups are displayed in Table 2. Individuals with higher insomnia scores were slightly older compared to those without insomnia (mean age 44.06 SD = 12.46 vs. 40.55 SD = 11.20). The majority of individuals with insomnia were White (74.3%), and slightly more than half were women (57.1%). The average pain, stress and psychological distress scores were higher among those with insomnia compared to those with no insomnia (Table 3).

There was a weak positive correlation ($r_s = .17$, $p = .04$) between intersectional discrimination and insomnia severity. There were no statistically significant correlations between stigma and insomnia severity, yet pain severity, pain interference, perceived stress, and psychological distress were all more moderately correlated with insomnia severity (Table 4).

**Qualitative Results**
The sample consisted of 25 individuals, of whom more than half were women (14 women, 11 men). The mean age was 43.8 (SD = 12.41). Similar to the quantitative sample, the majority identified as White (76%), 24% identified as Black, and 20% identified as Hispanic or Latino. Table 5 displays demographic characteristics of the qualitative sample.

The analysis resulted in four main themes, each with respective sub-themes. These include (1) Living with Multiple Identities and Addiction, (2) “It’s Everywhere” Discrimination and Stigma, (3) Perceptions about Sleep and (4) Connecting Discrimination and Stigma with Sleep. Themes 1 and 2 are briefly reported in this paper but have been fully described elsewhere (manuscript under review):31

**Living with Multiple Identities and Addiction**

Individuals described identities that intersected with OUD addiction and treatment stigma.31 All but one individual identified with one or more identities that intersected with addiction and treatment stigma. Identities were associated with characteristics, affiliations, and social roles, specifically race, gender, age, comorbid conditions (i.e., mental illness, chronic pain, physical disability), physical appearance (i.e., teeth, hair color, tracks on arms due to drug use), single parenthood, low socioeconomic status (SES), work roles (i.e., sex work, adult dancing), and being an ex-offender. The most common intersecting identities were (1) being a person of color with OUD, (2) coming from a low socioeconomic status background with OUD and (3) being an ex-offender with OUD. When reflecting on their multiple minoritized identities one individual stated:

…It’s unfortunate and just me, my disabilities and my skin tone and my drug use, I think those are the major things that I really feel like people have treated me badly because of includin’ the people that’s supposed to love you. It’s been tough.

**“It’s Everywhere” Discrimination and Stigma**

All individuals were aware and able to recall the negative biases and stereotypes against people with OUD: “They think the people that do drugs ain’t s***. They don’t want nothin’ in life. They’re bums, as far as they’re concerned…. ” Sources of stigma and discrimination included family, friends, community
members, co-workers and employers, government services (i.e., child services, bus, banks, housing), drug treatment centers/detox clinics, the criminal justice system, and medical institutions.  

**Internalizing negative experiences.** Discriminatory and stigmatizing experiences were often negatively internalized, resulting in feelings of shame, guilt, embarrassment, worthlessness, damaged, and/or incapable. Repetitive encounters of being stereotyped led some individuals to begin to believe the stereotypes as true: “I think, personally—through all the experiences that I’ve been through [with stigma and discrimination], I self-sabotage. Because I believe everything that’s being said about me, that I’m not good enough for anything.”  

In contrast, some individuals denied negative internalization of experiences because they were unconcerned what people thought or were not ashamed of who they were. For example, one individual stated: “Yeah, I know what they all think, but I’m confident in who I am. I don’t let what people say get to me…it doesn’t define me.”  

**Perceptions about Sleep**  
Individuals varied on how they perceived their sleep quality. Many described sleep as “erratic,” “very bad” and something one “could not get enough of.” Few individuals described their sleep more positively and as something they looked forward to doing: “I love my sleep, my sleep is my vacation.”  

Several factors that affected sleep were described by individuals. These included racing minds, sleep disorders (insomnia, sleep apnea), inactivity, sleeping too much, unstable living conditions, worrying, noise (neighborhood noise), drug use (caffeine, opioids), stress, waking up during the night, negative emotions (heartbreak, feeling like a disappointment), electronic use (lights, tv), discomfort in bed, having a ‘long day’, sleeping on a full stomach, and pain. The most cited factors included racing minds, stress, drug use, or a combination of two or more:  

*I sleep okay. It’s been a little bit hard recently because I just been going through so much with my family, just stress with COVID. I’ve lost some loved ones. Some financial issues. It has been tough, so I haven’t been sleeping that well. I think I only sleep about three hours a night because of everything that I*
got going on. I got to get work done. My mind is just wanderin,’ so stressed out about everything that’s goin’ on.

Factors that supported better sleep were over the counter sleep medications, illicit drugs (ex: marijuana, opioids), reading, listening to white noise, exercising, keeping busy during the day/exhausting oneself during the day, having a warm drink before bed, following a sleep/wake schedule, relaxing, having a stuffed animal in the bed, and having basic life necessities (food, shelter, clothing, money) and for a few, daylight due to neighborhood safety concerns,. Stable living conditions facilitated better sleep as described by one individual: “Just having a bed, a roof over my head, food, and yeah. Pretty steady cashflow of money coming in right now. That helps. That’s what helps me sleep well at night...it makes me feel at ease.”

Disrupted sleep patterns. Most individuals indicated either difficulty falling asleep (i.e., taking hours to fall asleep) or staying asleep after falling asleep. Some discussed nocturnal awakenings mainly due to feeling restless, needing to use the restroom, or because that was what their body was accustomed to: “I wake up every two hours on the dot...my body just wakes up every two hours.” Daytime sleepiness was identified as a consequence of disrupted sleep patterns, which often led to napping frequently as a compensatory strategy. While many used napping as way to “catch up” on their sleep time, a few participants described not sleeping for days at a time, which was due to various reasons, but more commonly related to stress and worrying: “I’ve been just so stressed out with life and everything going on. I don’t sleep at all. At this point I have to go days without sleeping to exhaust myself so I can at least sleep a little bit...it’s terrible.”

Connecting Discrimination and Stigma to Sleep

Individuals often expressed negative emotions such as shame, guilt, and feeling unworthy resulting from stigmatizing and discriminatory experiences. They perceived these emotions as contributing to sleep disruptions such as delayed sleep onset, waking periodically during the night, or not sleeping at all. In
some cases, people simply did not allow their sleep to be disrupted or used sleep to avoid the pain of stigma and discrimination. One individual who described being discriminated against often due to her multiple stigmatized identities (mentally challenged, ex-offender, recovering addict) stated:

> Sometimes I get into those thoughts where I start to believe what has been said to me through the years or the looks, and you know what those looks are. What they mean, and you start questioning yourself, “Am I an able-bodied person? Am I a good person? Am I the one to blame for everything happening to me?” I question myself sometimes, and sometimes it’s not—I’m not happy with the answer. It makes me sad. It kind of gives me the heebie-jeebies and causes me to keep myself up at night with my thoughts.

**Rumination.** Individuals described rumination or the act of continuously thinking about negative thoughts at night. Rumination connected their stigmatizing and discriminatory experiences to their experience of sleep. Many individuals described replaying their discriminatory experiences repeatedly in their head during the night. When one individual reflected on their ruminating thoughts, they stated:

> ...I feel like I can be quite sensitive regarding all of this [discrimination/stigma], it stresses me out. The judgment and the stress really gets me. It keeps me up at night because I keep thinking over and over and over again how unfairly people mistreat and judge me for who I am. My mind just doesn’t rest.

> “Sleep is my escape.” Some individuals made few or no overt connections between stigma, discrimination and sleep. The lack of connection was often a result of either having few or lack of experience with stigma and discrimination or used sleep to block out problems and negative thoughts related to stigma and discrimination. One individual stated, “I don’t let any of that stuff [discrimination/stigma] get to me. My sleep is important to me, so I don’t let anything affect it. Once I hit the pillow, I knock out completely.” Another individual even went on to describe how they felt sleep was their way to “escape” their reality and the hurt and pain that came with being stigmatized and discriminated against.
Integration

To gain a more comprehensive understanding of the association between stigma, discrimination, and insomnia in individuals on MOUD, we integrated both the quantitative and qualitative data analysis and findings, an essential strategy of mixed methods research.\textsuperscript{17} Integration occurred in two phases. The first phase included comparing the larger quantitative sample findings with the qualitative sub-sample findings. The second phase included merging the results of the quantitative and qualitative data to compare and contrast and identify data concordance and discordance. A color coded joint display of integrated data is represented in Table 6.

Sleep Characteristics. The scores on the Insomnia Severity Index indicated that most individuals had either mild or no insomnia. In contrast, qualitative findings demonstrated that most individuals perceived their sleep quality as very poor and many experienced several symptoms of insomnia (e.g., waking up during the night, difficulty falling asleep at night).

In the parent study, sleep data were collected with actigraphy, a validated method of objectively measuring sleep parameters and motor activity over days or weeks using a noninvasive accelerometer.\textsuperscript{32} Figures 3 and 4 used selected actigraph data from the parent study to illustrate examples of discordance of self-report and objectively measured sleep. Figure 3 illustrates an individual who reported greater insomnia severity, but whose actigraphy report demonstrated ‘healthy’ sleep through regular sleep and wake times, no major movements while sleeping, and regular activity during hours awake. Figure 4 depicts an individual who did not subjectively report insomnia but had actigraphy data consistent with insomnia symptoms such as irregular sleep and wake patterns.

OUD-related stigma. The average score for the stigma awareness was high. This was confirmed by the qualitative findings as many participants discussed their awareness of public stigma related to drug addiction and treatment. Although quantitative scores indicated that stigma agreement and self-esteem decrement were relatively low, qualitative data suggested that repetitive exposure to stereotypes
eventually led to stigma agreement and may have negatively affected overall self-esteem through reinforcing negative feelings and emotions.

**Intersectional discrimination.** Relatively low IDI scores indicated minimal intersectional discrimination. This finding was discordant with the qualitative data, as participants reported living with two or more stigmatizing identities resulting in discrimination. Discriminatory experiences were more harmful to overall wellbeing for individuals who held multiple minoritizing identities since they were more likely to experience recurring and chronic discrimination.

**Connecting discrimination, stigma and sleep.** The three subscales of OUD-related stigma were not significantly correlated with insomnia severity. However, qualitative data highlighted that the stigma of drug use fostered negative feelings among participants. This process often led to restlessness and rumination that affected their ability to fall and stay asleep at night. The weak but positive correlation between intersectional discrimination and insomnia was confirmed by the qualitative findings as more than half of participants reported a connection between their experiences with discrimination and troubled sleep.

**Connecting pain, stress, psychological factors and sleep.** Quantitative findings demonstrated significant moderate correlations between perceived stress, psychological distress, and pain with insomnia severity. The qualitative data supported these correlations since many psychological and physiological symptoms were described as barriers to the quality and quantity of participants’ sleep.

**Discussion**
To our knowledge, this is the first in-depth investigation of the association among OUD-related stigma, intersectional discrimination, and insomnia among individuals on MOUD. We found a weak positive correlation between intersectional discrimination and insomnia severity, while there were moderate
positive correlations for pain, stress, and psychological distress with insomnia severity. This was further supported by qualitative analysis of interview data that described how individuals perceived stigma, discrimination, and sleep and identified ways in which individuals felt that the experience of stigma and discrimination affected their sleep. The mixed-methods approach that combined survey data and qualitative data provided a broader understanding of stigmatizing, discriminatory, and sleep experiences of those individuals on MOUD, and strengthened validity of the findings.

Most individuals reported few to no symptoms of insomnia on the self-report questionnaire. Despite these reports, the interview data revealed poor sleep quality and many symptoms associated with insomnia. This discrepancy may be explained in several ways as outlined by Harvey and Tang (2012). Individuals with insomnia may misperceive their sleep by overestimating the time it takes to get to sleep and underestimating the time slept in total and/or experience psychological distress causing magnification of symptoms. Such discrepancies have been previously noted. For example, Hughes et al. (2018) found that underserved older adults had discordant findings for the results on self-report sleep [measured using the Pittsburgh Sleep Quality Index (PSQI) and ISI] and objective sleep [measured using actigraphy]. Discrepancies in sleep survey scores and interview data may also be due to the notable chronicity of sleep problems with this population; sleep problems may be dismissed or normalized and regarded as consequences that come with drug use and treatment. This can cause under reporting when being assessed with questionnaires versus interviews. Individuals may also not perceive poor sleep to be as bothersome when compared to other daily and life stressors, such as financial instability.

Scores on the three stigma subscales provided insight on the level of stigma awareness, stigma agreement, and self-esteem decrement among participants. Although scores were lower than anticipated, stigma awareness scores were highest of the three subscales, a finding supported by the qualitative data. Individuals were aware of societal biases against drug users but felt that they were often misunderstood and prejudged. Woo and colleagues (2017) found similar results in their qualitative study where they sought to expand their understanding of methadone maintenance therapy (MMT) patients’ experiences of stigma. Half of the study individuals agreed with at least some of the negative stereotypes associated
with MMT, and this contributed to decreased self-esteem and guilt. Individuals in our study repeatedly reported internalization of negative experiences with stigma and discrimination and agreed that there were many stereotypes and prejudices aimed at them.

Although many studies have documented various forms of stigma relating to substance use and treatment status, our study identified various identities that intersected with substance use associated stigma beyond the most commonly studied intersectional factors of race/ethnicity, gender, sexual orientation, and class. Most stigmatizing experiences described by participants in our study resulted from the intersection among the experiences of OUD, race/ethnicity, socioeconomic background, and/or criminal histories. From the qualitative data, many individuals identified more than one identity that intersected with their OUD and recalled many hurtful discriminatory and stigmatizing experiences based on their combined identities. Inconsistencies between survey data and qualitative findings have often been found in studies of minoritized or underserved populations. This may be due to sensitivity of the measure that is used in measuring discrimination, or participants intentionally underreporting experiences with discrimination as a way of coping with feelings of rejection or managing pain associated with recollecting discriminatory memories.

Our finding that OUD-related stigma was not significantly correlated with insomnia severity contrasts with previous research that found positive correlations between stigma and sleep. It is possible that individuals on MOUD felt more discrimination or were stigmatized for other identities, such as ex-offender status or poorer socioeconomic background more so than their addiction and treatment status. Individuals with OUD often conceal their disorder by maintaining a positive appearance and concealing their engagement with treatment programs by not disclosing their status to others. This aids in avoiding stigmatizing and discriminatory encounters based on OUD. This was described by many individuals with comments on the importance of keeping up ‘clean and neat’ appearance to avoid negative labeling and stereotyping.

Finally, evidence from the quantitative data demonstrate that intersectional discrimination, pain, perceived stress, and psychological distress were positively and significantly correlated with insomnia.
severity. These findings were supported by our qualitative data. Overall, our findings are aligned with prior research suggesting that stigma and discrimination affect various health outcomes, including sleep, and are often associated with physical symptoms (i.e. pain), and psychological symptoms (e.g. anxiety, depression, and stress).  

Rumination and negative emotions were described as factors by which discriminatory and stigmatizing experiences may have affected sleep. Evidence suggest that rumination plays an important role in insomnia as repetitive thoughts purportedly fuel physiological, cognitive, and emotional arousal, which in turn disrupt sleep. A cross-sectional study among a sample of 68 African Americans had similar findings as researchers found a significant indirect effect of racial discrimination on participants’ sleep quality through rumination. Another study investigated the association between psychosocial factors and self-reported sleep duration and quality in a racially and ethnically diverse sample of 1,326 adults. The investigators found that the act of rumination served as a moderator between race and ethnicity related discrimination and subjective sleep quality and duration. However, contrary to our findings, anxiety and depression symptoms were not consistently associated with these sleep outcomes.

**Strengths and Limitations**

The strengths of the study include a mixed methods design which yields a more robust and comprehensive description of this complex clinical problem. Also, many steps were taken to maximize rigor and trustworthiness for this study, which included the use of valid and reliable instruments for the quantitative data collection and engaging in reflexivity as well as coding and analytic processes with multiple research team members for the qualitative analysis.

There are also limitations that should be considered when interpreting our results. The cross-sectional nature of this study precludes the ability to examine causal relationships among study variables and the quantitative sample lacked diversity in terms of type of treatment medication, geographical location, and race and ethnicity. Even though the quantitative sample met adequate statistical power, the sample size was small which limited our analysis approach to correlational analysis, a technique that
produces less conclusive results compared with other more robust techniques. The small sample may have also contributed to the decreased statistical power and effect size of the correlations. Although survey measures used to assess OUD-related stigma, intersectional discrimination and insomnia were psychometrically sound, reporting periods were limited to specific time frames (e.g., past 2 weeks), and survey instructions and language were complex, insensitive, and lacked description. This consequently may have left participants needing further clarification. However, the qualitative interview in our study succeeded in eliciting a range of experiences of sleep and intersectional discrimination through fostering a safe and comfortable environment for individuals to discuss sensitive matters, defining and giving examples of poor sleep outcomes and intersectional discrimination to provide clarity on the concept, and sensitive and responsive probing and prompting to encourage conversation.

**Study Implications**

Future prospective studies with larger, and more diverse samples are needed for more sophisticated analyses to examine the impact of stigma and discrimination on sleep outcomes among those with addiction. Studies investigating the association between stigma and discrimination on objective sleep characteristics are needed to understand this impact on different stages of sleep [awake, light, deep, and rapid eye movement (REM) sleep], each of which play a unique role in maintaining mental and physical health. Future research in developing scales for discrimination, stigma, and sleep should include input both from experts and the target population, those with OUD, to aid in the creation of more understandable and psychometrically sound instruments. Future research should aim to identify intervention approaches that target rumination and other psychological processes to help mitigate effects of discrimination and stigma on self-perception to improve sleep outcomes for with OUD.

Our findings have important implications for clinicians and other health providers working with individuals with OUD. It is important for providers to be educated about ways in which stigma and discrimination disrupt sleep so that they may address experiences with sleep-enhancing alternatives, such as behavioral and psychosocial interventions to promote sleep health and overall wellbeing.
Conclusion

In this convergent mixed methods study, we explored the relationships between OUD-related stigma, intersectional discrimination, and insomnia among patients on MOUD, how individuals perceive stigma, discrimination, and sleep, and how individuals believe their experiences with discrimination and stigma are linked to sleep. Our integrated quantitative and qualitative findings contribute to the body of evidence linking intersectional discrimination with physical symptoms, psychological symptom distress and insomnia within this highly stigmatized population. Individuals in our study identified that rumination and negative emotions contribute to insomnia. These findings suggest that interventions aimed at advancing anti-discrimination efforts should consider targeting maladaptive outcomes of rumination and negative emotions to improve sleep outcomes among those with OUD.

Declaration of conflict of interest

The authors have no conflicts of interest to disclose.

Acknowledgment

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References


Table 1: Interview Guide

Semi-structured Interview Guide for Qualitative Phase

Introduction:
Thank you so much for agreeing to participate in this study, we truly appreciate your time. The purpose of this interview is better understand who you are as a person, and your experiences of stigma and discrimination (if any), and how these experiences have impacted you, and your health (including your sleep). For reference, we define stigma as labeling, stereotyping, exclusion, rejection, blame or devaluation of an individual because of attributes viewed as different from societal norms and discrimination as differential or unfair treatment. Also, as a reminder, the questions I will be asking you are personal and can be sensitive in nature, so if you are to ever feel uncomfortable with answering a question, or need to stop, or take a break, please feel free to let me know. Do you have any questions before we get started?

8. Perceived Stigma:
   Prompt:
   a. How do you think people view those with OUD/on treatment for OUD?
   b. Some people feel like other people look down on them – has that been something you’ve experienced – Yes/No – tell me more about that.

9. Experienced Stigma:
   Prompt:
   f. Have you had any direct experiences of stigma or discrimination? – Yes/No – tell me more about that.
   g. Have these experiences been related to OUD and/or being on treatment? Can you say more about that, or give me an example?
   h. What are other characteristics that you feel are an important part of you, but people treated you differently because of? For instance, this can be things such as your race, culture, religion, your job.— Can you say more about that, or give me an example??
   i. What are your experiences with these combined identities? *Repeat participants response to previous question* Do you think it has an impact on how people treat you - yes/no- tell me more about that?
   j. Do you feel like one identity causes you to experience stigma or discrimination more than another identity…if so? Which one? Why?

10. Internalized Stigma:
   Prompt:
   a. The way that other people think of drug users….how does that make you feel about yourself?
   b. How do your experiences of stigma/discrimination make you feel about yourself? – Has it changed the way you think or feel about yourself?
   c. How do your experiences with your combined identities make you feel about yourself?

11. Anticipated Stigma:
   Prompt:
   c. Do you tell people about your OUD and treatment status? How do the people you tell react?
   d. What do you think others’ attitudes are (or would be) toward you if they knew about your OUD or treatment status? – Do you think it would change how they treat you? In what ways?

12. Sleep:
   Prompt: Thank you for sharing and talking about your experiences with stigma and discrimination. I want to shift gears a bit here and talk about your sleep.
   a. How would you describe your sleep?
   b. What makes you sleep well?
   c. what makes you not sleep well?
   d. Do you feel your experiences with discrimination have contributed to poor night’s sleep? In what ways?

13. Is there anything I have missed or anything else you would like to tell me? Is there anything that you wished I would have asked that I did not?
<table>
<thead>
<tr>
<th></th>
<th>Overall Sample (N=120)</th>
<th>No Insomnia (N=85)</th>
<th>Insomnia (N=35)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD) or N(%)</td>
<td>Mean (SD) or N(%)</td>
<td>Mean (SD) or N(%)</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>41.58 (11.64)</td>
<td>40.55 (11.20)</td>
<td>44.06 (12.46)</td>
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<td>Female sex</td>
<td>49 ( 40.8%)</td>
<td>29 ( 34.1%)</td>
<td>20 ( 57.1%)</td>
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<tr>
<td>Race</td>
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<td></td>
<td></td>
<td>0.5738</td>
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<tr>
<td>Black or African American</td>
<td>10 ( 8.3%)</td>
<td>6 ( 7.1%)</td>
<td>4 ( 11.4%)</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>95 ( 79.2%)</td>
<td>69 ( 81.2%)</td>
<td>26 ( 74.3%)</td>
<td></td>
</tr>
<tr>
<td>More than one race</td>
<td>13 ( 10.8%)</td>
<td>8 ( 9.4%)</td>
<td>5 ( 14.3%)</td>
<td></td>
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<tr>
<td>Unknown</td>
<td>2 ( 1.7%)</td>
<td>2 ( 2.4%)</td>
<td>0</td>
<td></td>
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<tr>
<td>Hispanic</td>
<td>21 ( 17.5%)</td>
<td>14 ( 16.5%)</td>
<td>7 ( 20.0%)</td>
<td>0.7919</td>
</tr>
<tr>
<td>Education*</td>
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<td></td>
<td></td>
<td>0.7808</td>
</tr>
<tr>
<td>Eighth grade or less</td>
<td>2 ( 1.7%)</td>
<td>1 ( 1.2%)</td>
<td>1 ( 2.9%)</td>
<td></td>
</tr>
<tr>
<td>Some high school</td>
<td>22 ( 18.3%)</td>
<td>14 ( 16.5%)</td>
<td>8 ( 22.9%)</td>
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</tr>
<tr>
<td>High school graduate/GED</td>
<td>48 (40.0%)</td>
<td>34 (40.0%)</td>
<td>14 (40.0%)</td>
<td></td>
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<tr>
<td>Post-high school</td>
<td>42 ( 35.0%)</td>
<td>30 ( 35.3%)</td>
<td>12 ( 34.3%)</td>
<td></td>
</tr>
<tr>
<td>Any employment</td>
<td>37 ( 30.8%)</td>
<td>27 ( 31.8%)</td>
<td>10 ( 28.6%)</td>
<td>0.8294</td>
</tr>
</tbody>
</table>

* = has missing data
### Table 3 Descriptive statistics: Pain, Stress, Intersectional Discrimination, OUD-related Stigma, Psychological Distress

<table>
<thead>
<tr>
<th>Variable/Measure</th>
<th>Overall Sample (N = 120)</th>
<th>No Insomnia (N = 85)</th>
<th>Insomnia (N = 35)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Median (Mean (SD))</td>
<td>Median (Mean (SD))</td>
<td>Median (Mean (SD))</td>
<td></td>
</tr>
<tr>
<td>Pain Severity (BPI)</td>
<td>2.5 (2.89 (2.70))</td>
<td>1.75 (2.36 (2.58))</td>
<td>4.5 (4.19 (2.60))</td>
<td>0.0008</td>
</tr>
<tr>
<td>Pain Interference (BPI)</td>
<td>1.93 (3.05)</td>
<td>1 (2.30 (2.85))</td>
<td>4.86 (4.51 (3.00))</td>
<td>0.0010</td>
</tr>
<tr>
<td>Perceived Stress (PSS)</td>
<td>21 (21.11 (4.54))</td>
<td>20 (20.47 (4.48))</td>
<td>22 (22.66 (4.36))</td>
<td>0.0121</td>
</tr>
<tr>
<td>Intersectional Discrimination (IDI)</td>
<td>3 (4.91 (5.33))</td>
<td>2 (4.27 (4.75))</td>
<td>4 (6.46 (6.34))</td>
<td>0.0753</td>
</tr>
<tr>
<td>Stigma Awareness (BOSS_Aware)</td>
<td>17.5 (16.51 (3.93))</td>
<td>17 (16.07 (4.15))</td>
<td>19 (17.57 (3.16))</td>
<td>0.0654</td>
</tr>
<tr>
<td>Stigma Agreement (BOSS_Agree)</td>
<td>9 (10.03 (4.38))</td>
<td>10 (10.13 (4.63))</td>
<td>8 (9.80 (3.76))</td>
<td>0.8732</td>
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<td>Self-esteem decrement (BOSS_Harm)</td>
<td>7 (7.54 (4.20))</td>
<td>6 (7.32 (4.16))</td>
<td>7 (8.09 (4.29))</td>
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<tr>
<td>Somatization (BSI)</td>
<td>50 (53.43 (9.23))</td>
<td>50 (51.15 (7.90))</td>
<td>58.5 (59.13 (9.95))</td>
<td>0.0002</td>
</tr>
<tr>
<td>Depression (BSI)</td>
<td>50 (53.76 (10.48))</td>
<td>48 (51.19 (9.51))</td>
<td>61 (60.19 (10.17))</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Anxiety (BSI)</td>
<td>49 (52.57 (10.30))</td>
<td>48 (50.14 (8.94))</td>
<td>58 (58.66 (11.06))</td>
<td>0.0002</td>
</tr>
<tr>
<td>Global Severity (BSI)</td>
<td>53.5 (54.18 (10.30))</td>
<td>49.5 (51.29 (9.31))</td>
<td>61 (61.41 (9.14))</td>
<td>&lt;0.0001</td>
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Table 4: Bivariate spearman correlations with study variables and insomnia severity

<table>
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<tr>
<th>Variable /Measure</th>
<th>Correlation</th>
<th>P value</th>
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<tr>
<td>Stigma Awareness (BOSS_Aware)</td>
<td>0.18</td>
<td>0.09</td>
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<tr>
<td>Stigma Agreement (BOSS_Agree)</td>
<td>0.05</td>
<td>0.58</td>
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<tr>
<td>Self Esteem Decrement (BOSS_Harm)</td>
<td>0.09</td>
<td>0.33</td>
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<tr>
<td>Intersectional Discrimination (IDI)</td>
<td>0.18</td>
<td><strong>0.04</strong></td>
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<tr>
<td>Pain Severity (BPI)</td>
<td>0.42</td>
<td>&lt;.0001</td>
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<tr>
<td>Pain Interference (BPI)</td>
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<td>Somatization (BSI)</td>
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<tr>
<td>Depression (BSI)</td>
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<tr>
<td>Global_Severity (BSI)</td>
<td>0.46</td>
<td>&lt;.0001</td>
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<tr>
<td>Perceived Stress (PSS)</td>
<td>0.21</td>
<td><strong>0.01</strong></td>
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p = significance level.
Table 5: Demographic and clinical characteristics of participants (N = 25)

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<th>Demographic and Clinical Characteristics</th>
<th>Enrolled Participant (N=25)</th>
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<tr>
<td><strong>Baseline Characteristics</strong></td>
<td><strong>Mean (SD) or N(%)</strong></td>
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<td>Demographics</td>
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<tr>
<td>Age at Enrollment</td>
<td>43.8 (12.41)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>11 (44.0%)</td>
</tr>
<tr>
<td>Female</td>
<td>14 (56.0%)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>5 (20.0%)</td>
</tr>
<tr>
<td>Not Hispanic or Latino</td>
<td>20 (80.0%)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
</tr>
<tr>
<td>Black or African American</td>
<td>6 (24.0%)</td>
</tr>
<tr>
<td>White</td>
<td>19 (76.0%)</td>
</tr>
<tr>
<td>Where does the participant live?</td>
<td></td>
</tr>
<tr>
<td>Own home/apartment</td>
<td>19 (76.0%)</td>
</tr>
<tr>
<td>Assisted living</td>
<td>2 (8.0%)</td>
</tr>
<tr>
<td>Homeless</td>
<td>2 (8.0%)</td>
</tr>
<tr>
<td>Other</td>
<td>2 (8.0%)</td>
</tr>
<tr>
<td>With whom is the subject living</td>
<td></td>
</tr>
<tr>
<td>Alone</td>
<td>5 (20.0%)</td>
</tr>
<tr>
<td>With spouse or partner</td>
<td>10 (40.0%)</td>
</tr>
<tr>
<td>With family other than spouse</td>
<td>5 (20.0%)</td>
</tr>
<tr>
<td>With other</td>
<td>5 (20.0%)</td>
</tr>
<tr>
<td>Education Level</td>
<td></td>
</tr>
<tr>
<td>8th Grade or less</td>
<td>1 (4.0%)</td>
</tr>
<tr>
<td>9th to 11th Grade</td>
<td>4 (16.0%)</td>
</tr>
<tr>
<td>High School Diploma or GED</td>
<td>9 (36.0%)</td>
</tr>
<tr>
<td>Vocational Trade School Courses or Associates Degree courses after HS</td>
<td>2 (8.0%)</td>
</tr>
<tr>
<td>Courses towards a Bachelors Degree</td>
<td>7 (28.0%)</td>
</tr>
<tr>
<td>Bachelors Degree</td>
<td>1 (4.0%)</td>
</tr>
<tr>
<td>Masters Degree</td>
<td>1 (4.0%)</td>
</tr>
<tr>
<td>Employment status</td>
<td></td>
</tr>
<tr>
<td>Full-Time</td>
<td>5 (20.0%)</td>
</tr>
<tr>
<td>Part-Time</td>
<td>2 (8.0%)</td>
</tr>
<tr>
<td>Unemployed, looking for work</td>
<td>12 (48.0%)</td>
</tr>
<tr>
<td>Unemployed, not looking for work</td>
<td>4 (16.0%)</td>
</tr>
<tr>
<td>Retired</td>
<td>1 (4.0%)</td>
</tr>
</tbody>
</table>
Table 5: Demographic and clinical characteristics of participants (N = 25)

<table>
<thead>
<tr>
<th>Baseline Characteristics</th>
<th>Enrolled Participant (N=25)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unable to work</td>
<td>1 (4.0%)</td>
</tr>
</tbody>
</table>

SD, Standard deviation
# Table 6: Joint Display of Quant and Qual data

<table>
<thead>
<tr>
<th>Quantitative Scores</th>
<th>Qualitative Themes and Subthemes</th>
<th>Exemplar Quotations</th>
<th>Interpretations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insomnia severity category</td>
<td>Theme: Perceptions about Sleep</td>
<td>Discordant. The survey results indicated that majority of individuals had minimal to no symptoms of insomnia. However, during interviews, majority individuals in the qualitative phase, regardless of insomnia category, described insomnia symptoms and poor sleep quality.</td>
<td></td>
</tr>
<tr>
<td>ISI score ≤14: n = 85</td>
<td>Sleep facilitators: Drugs, reading, listening to white noise, exercising, keeping busy during the day/exhausting oneself during the day, having a warm drink before bed, following a sleep/wake schedule, relaxing, having a stuffed animal in the bed, and having basic life necessities.</td>
<td>“Just having a bed, a roof over my head, food, and yeah. Pretty steady cashflow of money coming in right now. That helps. That’s what helps me sleep well at night.”</td>
<td></td>
</tr>
<tr>
<td>ISI score &gt;14: n = 35</td>
<td>Sleep barriers: Most common barriers included mind racing, stress, and drug use, or a combination two or more.</td>
<td>“I sleep okay. It’s been a little bit hard recently, because I just been going through so much with my family, just stress with COVID. I’ve lost some loved ones. Some financial issues. It has been tough, so I haven’t been sleeping that well. I think I only sleep about three hours a night because of everything that I got going on. I got to get work done. My mind is just wanderin’, so stressed out about everything that’s goin’ on.”</td>
<td></td>
</tr>
<tr>
<td>Range of Scores and Interpretation: absence of insomnia (0–7); sub-threshold insomnia (8–14); moderate insomnia (15–21); and severe insomnia (22–28).</td>
<td>Disrupted sleep patterns: Difficulty falling asleep (i.e., taking hours to fall asleep) or staying asleep once being able to fall asleep.</td>
<td>Concordant: Majority of individuals were aware of stereotypes about people battling OUD. This is both reflected in quant and qual results.</td>
<td></td>
</tr>
<tr>
<td>OUD-Related Stigma</td>
<td>Theme: “It’s Everywhere”</td>
<td>Discordant: Quant scores indicated OUD stereotype agreement and self-esteem decrement were low. However, qual interviews suggest repetitive expos to stereotypes can lead to agreement and can affect overall self-esteem.</td>
<td></td>
</tr>
<tr>
<td>Discrimination and Stigma</td>
<td>Internalizing negative experiences</td>
<td>“They think the people that do drugs ain’t s***. They don’t want nothin’ in life. They’re bums, as far as they’re concerned....”</td>
<td></td>
</tr>
<tr>
<td>Average OUD_Stigma</td>
<td></td>
<td>“The stereotypes match what it is that I feel about myself. Only because, after a while, you keep on hearing, &quot;You’re a loser,&quot; you keep on actin’ like a loser, chances are that’s who you become.”</td>
<td></td>
</tr>
<tr>
<td>Range of Scores and Interpretation:</td>
<td>Assess stereotype awareness (&quot;aware&quot;), stereotype agreement (&quot;agree&quot;), and self-esteem decrement (&quot;harm&quot;) surrounding opioid dependence. Each subscale score ranges from 4-20, the higher the score, the greater the stigma (greater awareness, greater agreeance, and greater harm).</td>
<td></td>
<td></td>
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<tr>
<td>------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>That's how I feel. I feel like a frickin' loser. I feel like I keep on fallin' short. I keep on not being my full potential.”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intersectional Discrimination</td>
<td>Theme: Living with Multiple Identities and Addiction</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Majority of individuals reported at least 2 or more identities that intersect with OUD.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boxplot for Intersectional Discrimination</td>
<td>It's unfortunate and just me, my disabilities and my skin tone and my drug use, I think those are the major things that I really feel like people have treated me badly because of includin' the people that's supposed to love you. It's been tough.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range of Scores and Interpretation:</td>
<td>Final scores between 0 and 34, the higher the score, the more intersectional discrimination suffered/experienced</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Discordant. Average scores on the intersectional discrimination index were low. However, qualitative interviews demonstrated majority of individuals experience intersectional discrimination and find experiences to be chronic and detrimental to overall wellbeing.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spearman Correlations</td>
<td>Theme: Connecting Discrimination and Stigma to Sleep</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OUD Stigma (3 subscales) and Insomnia</td>
<td>“Sleep is my escape:” For less than half of individuals, sleep was their way to “escape” their reality and the hurt and pain that came with being stigmatized and discriminated against. They described experiences as having no impact on their sleep.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OUD_Aware: $r_s = .18$, $p = 0.09$</td>
<td>“I don’t let any of that stuff get to me. My sleep is important to me, so I don’t let anything affect it. Once I hit the pillow, I knock out completely.”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OUD_Agree: $r_s = .05$, $p = 0.58$</td>
<td>Discordant. OUD stigma was not significantly correlated with insomnia severity. However, interviews highlighted being stigmatized for drug use fostered negative feelings among individuals which often lead to restlessness and mind wondering that affected their ability to sleep at night.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OUD_Harm: $r_s = .09$, $p = 0.33$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intersectional Discrimination and Insomnia: $r_s = .18$, $p = .04$</td>
<td>Rumination and negative emotions: The act of replaying discriminatory experiences repeatedly in one’s head affected sleep quality for individuals. Negative emotions such as shame, guilt, unworthiness and feeling “like a loser” were common emotions expressed by individuals that caused sleep disruptions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concordant. Intersectional discrimination could be considered relevant to insomnia severity. Over half of individuals in the qualitative phase of the study reported a connection between their experiences and sleep.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correlation</td>
<td>p-value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>---------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived stress and Insomnia: r_s = 0.21</td>
<td>p = 0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain and Insomnia: r_s = 0.31</td>
<td>p &lt; 0.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mental Health and Insomnia:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BSI_Somatization and Insomnia: r_s = 0.45</td>
<td>p = &lt;0.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BSI_Depression and Insomnia: r_s = 0.49</td>
<td>p = &lt;0.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BSI_Anxiety and Insomnia: r_s = 0.41</td>
<td>p = &lt;0.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BSI_Global_Severity and Insomnia: r_s = 0.46</td>
<td>p = &lt;0.05</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Barriers to sleep included stress, anxiety, and other mental health symptoms.

“...because of my pain, I feel so uncomfortable laying down at night sometimes. It keeps me up and stresses me out.”

Concordant. The qualitative results indicated underlying psychological pathways by which stigmatizing and discriminatory experiences hindered sleep. Results supported the quantitative results which highlighted more moderate correlations between stress, mental health symptoms, and pain with insomnia.
Figure 1: The adapted Health Stigma & Discrimination Framework
Figure 2: A convergent parallel mixed methods design

Quantitative [Specific Aim 1]

- Quant Data Collection
- Quant Data Analysis
- Quant Findings

Qualitative [Specific Aim 2]

- Qual Data Collection
- Qual Data Analysis
- Qual Findings

Mixed [Specific Aim 3]

Integration through merging Quant and Qual Findings

Integrated Interpretation
Figure 3: Actigraphy report of participant exemplar case -- self-report insomnia w/ healthy actigraphy sleep

Note. This is an actigraphy report for a 39-year-old Puerto Rican female, with self-reported insomnia. Notably, she described her sleep quality as poor in the qualitative component of the study.

Features of this actigraphy data report include an 8-day period starting from 12 PM and ending at 11:59AM, the activity level indicated by the black and red line under each day, the yellow line which indicates light (natural or artificial), light blue shaded intervals which indicate intervals of rest, and dark blue shades intervals which indicate intervals of sleep.
Figure 4: Actigraphy report of participant exemplar case -- self-report no insomnia w/ poor actigraphy sleep

Note. This is an actigraphy report for a 35-year-old Black male, with no self-reported insomnia, that described their sleep quality as poor in the qualitative component of the study.

Features of this actigraphy data report include an 8-day period starting from 12 PM and ending at 11:59AM, the activity level indicated by the black and red line under each day, the yellow line which indicates light (natural or artificial), light blue shaded intervals which indicate intervals of rest, and dark blue shades intervals which indicate intervals of sleep.
CHAPTER 5
Discussion
The purpose of this doctoral dissertation was to explore the association between OUD-related stigma and intersectional discrimination with insomnia among those on MOUD. In manuscript #1, which was a Systematic Review, we described the association between dimensions of stigma and sleep deficiency. In synthesis of the evidence, I used an intersectional lens to identify a gap in knowledge about the association between stigma and sleep among highly stigmatized populations, such as those on MOUD. The conclusions of the review informed the dissertation aims (manuscript #2 and #3). In manuscript #2, I explored (1) how individuals receiving MOUD experienced intersectional stigma and discrimination and (2) supports and resources that could be used to better understand the cumulative experiences of multiple forms of disadvantage among those receiving MOUD. In manuscript #3, I examined the association between OUD-related stigma and intersectional discrimination with insomnia, described perceptions of sleep, described how experiences [with stigma and discrimination] influence sleep, and integrated both quantitative and qualitative findings among a sample of participants attending two substance use treatment centers.

The skills gained from this research provided a solid foundation for my future program of research, which will focus on clarifying underlying mechanisms between stigma, discrimination, and sleep and inform interventions to address stigma, improve sleep, and reduce the health inequities that disproportionately affect individuals from socially disadvantaged and marginalized groups. In this chapter, I will present a summary of key findings from the three manuscripts and their implications to research, policy, and clinical practice.

**Summary of Key Findings**

In chapter 2 (manuscript #1), we conducted a systematic review of the literature using the Health Stigma and Discrimination Framework as an organizing framework to understand the interconnection between stigma and sleep deficiency, as well as mechanisms underlying this relationship. We reviewed and analyzed 15 relevant articles and found consistent evidence that all dimensions of stigma [internalized, anticipated, and perceived] were associated with self-reported characteristics of sleep deficiency, including poor quality, short duration, and insomnia symptoms. Research supported that
stress, loneliness, depression, and ambivalence over emotional expression were mediators that linked stigma to sleep deficiency. Stigma also served as a mediator and moderator, linking other social stressors to poorer sleep quality.

In chapter 3 (manuscript #2), we explored how individuals receiving MOUD experienced intersectional stigma and discrimination and what supports and resources could be used to better understand the cumulative experiences of multiple forms of disadvantage. Interviews were conducted with 25 individuals on MOUD. The analysis generated five themes: Living with Multiple Identities and Addiction, “It’s Everywhere” Discrimination and Stigma, A “Damaged” Identity, Facing Reality and Becoming Accountable, and Experiencing Treatment and Identifying Supportive Interventions. Across all themes, multiple identities were described that intersected with OUD. The most common identities were being a person of color, an ex-offender, and coming from a low socioeconomic background. These intersections led to internalization of negative feelings, such as shame, guilt, and embarrassment, but also led to anticipated stigma and shifts in self-perspectives. Participants described comprehensive and individually tailored counseling and therapy as recommendations for care to address the cumulative experiences of multiple forms of disadvantage.

In chapter 4 (manuscript #3), we utilized a mixed methods design to describe and integrate quantitative and qualitative data related to OUD-related stigma, intersectional discrimination, stress, pain, psychological distress and insomnia among individuals on MOUD. The quantitative survey data were collected from 120 participants. No correlation was found between OUD-related stigma and insomnia severity, but positive weak to moderate correlations were found between intersectional discrimination, pain, stress, psychological distress and insomnia severity.

These findings were further supported by qualitative analysis of interview data, guided by interpretive description. Participant responses highlighted perceived issues with stigma, discrimination, sleep and ways in which participants felt that their stigmatizing and discriminatory experiences affected their sleep. From our thematic analysis of coded data, we generated four main themes. The first two themes, Living with Multiple Identities and Addiction, and “It’s Everywhere” Discrimination and Stigma
were briefly reported in this manuscript but were fully described in manuscript 2 (under review). The other themes included Perceptions about Sleep and Connecting Discrimination and Stigma to Sleep. Participants identified common factors that supported better sleep and negative factors that disrupted sleep. In addition, rumination and negative emotions were described as factors by which participants’ discriminatory and stigmatizing experiences may have affected their sleep.

The integrated data from both the quantitative and qualitative components of the study demonstrated discordance between the low quantitative scores of the ISI, the 3 subscales of the BOSS, and the IDI contrasted with the qualitative findings, which demonstrated greater severity of insomnia, and greater experiences with stigma and intersectional discrimination. Quantitative findings also demonstrated significant moderate correlations between perceived stress, psychological distress, and pain with insomnia severity which was concordant with quantitative findings that identified many psychological and physiological factors that participants described as barriers to their sleep.

**Research Implications**

In this research, I aimed to address a knowledge gap related to the unclear relationship among stigma, discrimination, and insomnia among those on MOUD. This study provides foundational knowledge to direct future research aimed at addressing disparities among those with OUD. Research conducted in other geographical locations will aid in understanding perspectives and outcomes for patients enrolled in OUD treatment centers in other regions, and those treating OUD with other MOUD medications (i.e., buprenorphine, naltrexone) who often experience different stigmas and barriers to care. Future studies should further examine these associations utilizing larger and more diverse sample that include more Non-Hispanic Black individuals who are more disproportionately and negatively affected by OUD. Studies investigating the association between stigma and discrimination on objective sleep characteristics are needed to understand this impact different categories of sleep [awake, light, deep, and REM sleep], which each play a unique role in maintaining mental and physical health. Examination of these associations should also consider accounting for other important factors such as illness duration, duration of treatment, and life quality that could confound associations between stigma, discrimination, and
insomnia severity. Identifying mediators and moderators of the association between stigma, intersectional discrimination and insomnia with prospective and longitudinal data is critical to add to our understanding of underlying mechanisms and temporal patterns to inform future targeted interventions. Future research testing interventions centered around counseling and therapy, community building, and social networking offer the potential to reduce discrimination and stigma effects and target factors related to sleep disturbance. Our work demonstrated prejudice among health care providers, as well as structural aspects of the medical institution, which compromises the quality of care that those on MOUD receive. Additional qualitative studies that examine types and influence of provider attitudes, both implicit and explicit, on health outcomes among those on MOUD represents another important research avenue.

**Policy Implications**

With global attention to the opioid epidemic, it is critical to understand complex interactions of factors influencing drug use trajectories: (1) to better tailor programs for improving treatment outcomes, (2) improve MOUD treatment retention rates, (2) inform national opioid policies, and (3) develop evidence to support funding of more comprehensive and integrative programs that target stigma and related sleep concerns. Ongoing public OUD stereotypes and stigma are dangerous and destructive. These stereotypes have continued over the decades through “War on Drugs” policies via dramatically divergent control regimes and presentation of those who are addicted to drugs as “threats” to society. Findings from our research may help to inform policymakers on the multitude of contexts, populations, and stigma types that exist under the umbrella of opioid-related stigma and its detrimental effects on health. This understanding supports the creation of polices that identify and dismantle environments that uphold stigma-based care and discrimination, expand access and improve delivery methods of treatment for OUD, and promote health, safety, and well-being of persons with OUD.

Our research informs and supports policies that will aid in improving the sleep health of persons with OUD. Such policies include (1) educational campaigns targeting sleep improvement regarding the impact of common sleep barriers [e.g., electronic media and a sedentary lifestyle] and sleep promotion techniques such as cognitive behavioral therapy for insomnia, that specifically target rumination; (2)
improving access to treatment for sleep disorders though increased governmental funding for ambulatory in-home diagnostic testing for sleep disorders; and (3) funding for sleep wellness programs that will aid individuals to cope and deal more effectively with societal stressors that come from poverty, racism, sexism, disablism, and others.

**Practice Implications**

Through the integration of both quantitative and qualitative data, we were able to more fully describe the perspectives and experiences of stigma, intersectional discrimination, and sleep among those on treatment for OUD. Our findings provide clarity on the nuances of opioid-related stigma, sources of opioid stigma, and how it manifests in various contexts for persons with OUD. Our findings demonstrated how stigma and discrimination exist not only within the health care system, but also in other systems that patients rely on, including pharmacies, insurance, housing, transportation, and others. These findings are important to clinical programs, substance use disorder treatment programs, and community stakeholders in identifying people at risk for stigma, discrimination, and sleep disturbance. Clinical approaches such as increased mental health focused care, holistic assessments, and screening for comorbid conditions are needed.

Continual provider education regarding MOUD among underserved populations that acknowledges both provider and systemic bias and structural barriers in this population can aid in addressing intersectional stigma and discrimination. Finally, implementation of intersectionality and anti-discrimination frameworks in healthcare and community settings could help to address stigma-based care and destigmatize addiction and improve clinician and patient interactions through greater understanding and management of complex needs of those with OUD.

**Conclusion**

In this dissertation, we explored (1) the association between OUD-related stigma, intersectional discrimination, and insomnia (2) how individuals perceive issues of stigma, discrimination, and sleep, and (3) how experiences and perceptions associate with sleep. Our quantitative findings add to the growing body of evidence linking intersectional discrimination and other physiological [e.g., pain] and
psychological [e.g., anxiety, stress, depression] factors to insomnia in highly stigmatized populations. The qualitative findings provided more nuanced understanding of the quantitative findings and gave voice to the participants to describe their unique identities and views towards discriminatory and stigmatizing experiences, and sleep. Scientific evidence for this association can be strengthened with additional prospective studies with diverse samples that incorporate objectively measured aspects of sleep. Further investigation on potential modifiers of the relationship between stigma, discrimination and insomnia is warranted to advance our ability to develop targeted interventions to address stigma and discrimination to improve sleep-related outcomes among those who suffer from OUD.