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Substance Use Disorder Civil Commitment and Association With Post-Commitment Treatment Retention Among Adult Women

Lydie Ultimo
Walden University

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Walden University

College of Health Sciences and Public Policy

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Lydie Ultimo

has been found to be complete and satisfactory in all respects,
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the review committee have been made.

Review Committee

Dr. Patrick Dunn, Committee Chairperson, Public Health Faculty

Dr. Nancy Rea, Committee Member, Public Health Faculty

Chief Academic Officer and Provost

Sue Subocz, Ph.D.

Walden University

2024

Abstract

Substance Use Disorder Involuntary Civil Commitment and Association With Post-
Commitment Treatment Retention Among Adult Women

by

Lydie Ultimo

MSW, Boston College Graduate School of Social Work, 2000

BS, Bridgewater State University, 1998

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health, Community Health Education

Walden University

December 2024

Abstract

The effects of substance abuse are a public health challenge, as evidenced by the prevalence of drug-related overdoses since the year 2000. Involuntary civil commitment (ICC) denotes a legal basis to mandate treatment for people at imminent risk of harm due to substance use disorders (SUD). Grounded on the transtheoretical model stages of change, this quantitative retrospective cohort study analyzed the relationship between mental disorder history, medication for addiction treatment (MAT), and voluntary retention in SUD treatment post-ICC, controlling for age, race/ethnicity, drugs used, housing status, and Department of Children and Families services. Secondary data from the Massachusetts Department of Public Health yielded a random sample of 500 women aged 18 and older enrolled in ICC for SUD treatment between January 2017 and December 2019. The multiple regression results were significant for both predictors, $F(8, 485) = 9.398, p < .001, R^2 = .12$, with mental disorders ($B = .281, t = 6.468, p < .001$) providing a higher contribution to the model than MAT ($B = .149, t = 3.465, p < .001$). There was no statistically significant relationship with the covariates. The findings elucidate the need for co-occurring mental disorders and SUD treatment. Public health leaders can promote positive social change by expanding access to MAT and specialized treatment for women with SUD.

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Dedication

Five years ago, I decided to fulfill a lifelong goal to obtain my doctoral degree. Although initially daunting, I knew that this goal was possible, as it was rooted in my compass – faith, family, and friends. To my husband, Ralph, thank you for your unrelenting encouragement and support. I could not think of a better friend and cheerleader. I dedicate this work to you. You have earned it with me... To my children, Phae and Lily, you have longed for me to complete my studies. I am happy to share this milestone with you and confirm that I “finished the book.” I also dedicate this work to my extended family and dearest friends. As the saying goes, “It takes a village” – you have been my village and more.

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Secondly, I want to acknowledge the Massachusetts Department of Public Health Institutional Review Board and Data Access (MDPH IRB) office that provided access to the dataset for the study. This study would not have been possible without the data. Finally, I want to recognize the MDPH Bureau of Substance Addiction (MDPH BSAS) for collecting the data and leading the state's efforts to moderate the effects of substance addiction.

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Chapter 1: Introduction to the Study

Introduction

Substance use disorder (SUD) is a treatable disease. The growing trend in involuntary civil commitment (ICC) for individuals with SUD suggests a need for treatment. As a prominent public health concern, untreated SUD was associated with multidimensional consequences for physical, social, community, and economic health (Lo et al., 2020). Despite the negative impacts, few people with SUD are contemplating and seeking treatment (Substance Abuse and Mental Health Services Administration [SAMHSA], 2022). Research on the relationship between ICC and SUD treatment retention may contribute critical knowledge to advance treatment approaches.

Among the schools of thought on SUD treatment methods, therapeutic alliance denotes a patient and provider partnership through which treatment goals and strategies are established (Horvath & Luborsky, 1993). According to Forrest (2021), therapeutic alliance in SUD therapy is rooted in a human relationship. Such a relationship is essential in establishing trust and reciprocal accountability. While recognizing the dynamic nature of the therapeutic relationship, Forrest posits that the alliance between the patient and provider is a catalyst for growth, treatment engagement, retention, and healing. The construct of therapeutic alliance is a critical factor in the assumptions of this study. As ICC can provide an avenue to initiate SUD treatment, the nature of ICC evoked interest in examining the effects of a mandated patient-provider relationship. Inherently, committing people to SUD treatment against their will may be antithetical to the

therapeutic alliance and treatment engagement. The investigation of these assumptions can inform efforts addressing the SUD disease burden.

Over the last decade, the toll of the drug epidemic has been widespread in the United States. In 2021, the total drug-related overdose deaths in the country reached 106,699, from 52,404 in 2015 [National Institute on Drug Abuse (NIDA), 2023]. An estimated \$1 trillion was associated with the opioid epidemic in the country in 2017, with the highest per capita impact among states in the Northeast, such as Massachusetts (Kuehn, 2021). The prevalence of the drug epidemic engendered urgency for alternative solutions. Advocacy from individuals, family members, healthcare providers, and community leaders influenced diverse state legislations regarding ICC for SUD treatment. Consequently, states with ICC statutes related to SUD increased from 18 in 1991 to 35 at present, and rates of individuals in ICC also significantly increased (Christopher et al., 2015; Christopher et al., 2020; Prescription Drug Abuse Policy System, 2021).

Massachusetts is among the states that experienced the intensity of the drug epidemic in the country. The annual toll of opioid-related deaths in the state increased from 375 in 2000 to 2,301 in 2021 (Massachusetts Department of Public Health, 2022a). The significant shift in opioid-related deaths was between 2010 and 2014, when a 147.89% increase (from 547 to 1,356) prompted a public health emergency declaration by the state's governor (Massachusetts Department of Public Health, 2022). Concurrently, court-mandated ICCs increased from 4,103 in 2011 to 6,048 in 2018 (Commonwealth of Massachusetts, 2023a). Historically, the state's correctional

institutions served as overflow facilities for people in ICC. For women with SUD awaiting bail trial, the designated correctional facility did not provide SUD treatment (Kates, 2015), contrary to similar settings for men. After civil litigation in 2016, the state discontinued mandated civil commitment in a correctional facility for women with SUD.

According to the Massachusetts Department of Public Health (2016), individuals with ICC history were 2.2 times more likely to die of opioid-related overdose as compared to individuals with a history of voluntary treatment; women had greater odds of being prescribed and dying from prescription opioid use than men. In FY 2022, women comprised about 30% of SUD treatment enrollments and 28% of opioid-related deaths in the state (Commonwealth of Massachusetts, 2023b; Massachusetts Department of Public Health, 2022b). These indicators are critical to understanding the issue's scope and research interest regarding ICC for women with SUD.

Although SUD prevalence is greater among men, the trajectory between first substance use and dependence is more expeditious among women (Hernandez-Avila et al., 2004; Lewis et al., 2014). Women with SUD can face compounding effects of comorbid and co-occurring conditions and social challenges (McHugh et al., 2018). Gender differences in SUD displayed significant disparities for women, including exposure to adverse childhood experiences (ACES), intimate partner violence, delayed treatment seeking, and stigma based on perceived gender norms (Hecksher & Hesse, 2009; Medina-Perucha et al., 2019). Psychiatric disorders can be pronounced among women with SUD with noted conditions such as anxiety, depression, post-traumatic stress disorder, and suicidal behavior (Kalo, 2020). When seeking treatment, women with SUD also

encounter significant structural barriers related to the scarcity of specialized services, criminalization of drug use, and family and housing insecurity (Spector et al., 2021).

These challenges and related propensity for risk behavior and harm can be prevalent among women in ICC for SUD. Research on Massachusetts women in ICC for SUD found common traits of significant family history of SUD, criminal justice involvement, chronic somatic conditions, and financial challenges (Lex et al., 1990). Similarly, Opsal et al. (2013) found that women in ICC had a significantly greater prevalence of chronic substance use, overdose history, and frequent physician visits for co-morbid concerns. Women who abuse substances during pregnancy can pose significant health risks to their children. States have adopted various strategies to address fetal exposure to substances, including mandating ICC for women who use substances during pregnancy (Stone, 2015).

Effective treatment for women with SUD remains an ongoing need in Massachusetts. It is imperative to examine the effects of ICC, given the continued increase of ICCs in the state. Also, research on women in ICC is scant. This study examined the relationships between mental disorder history, MAT, and voluntary treatment continuation among women who were in ICC for SUD in Massachusetts. Women with SUD need specialized treatment that prioritizes the physical and social aspects of their lives. Individuals who remain in treatment have a greater likelihood of being well. Understanding factors associated with voluntary treatment retention post-ICC can inform further studies and best practices for treating women with SUD. This chapter

highlights the study with a synopsis of the theoretical framework and the impacts of SUD among women who are involuntarily committed to treatment.

Background

The state of Massachusetts has an expansive history of gender-based civil commitment for individuals with SUD. Since 1885, the state's statutes have allowed the confinement of women with SUD to mitigate personal and social harm due to behavioral health concerns (Chisholm, 2013). Despite centuries of ICC, Hall and Appelbaum (2003) asserted the need for research to discern the effectiveness of ICC in addressing the disease of SUD. Longer length of stay in treatment can increase the prospect of achieving recovery from SUD (Hubbard et al., 2003). This study assessed the relationship between mental disorders, MAT, and retention in voluntary treatment post-ICC among women with SUD.

Although part of the intent for ICC involves harm mitigation from chronic substance abuse, ICC has been a debated method of intervention for people with SUD. Civil commitment to SUD treatment can be regarded as coercion and an infringement on people's civil liberties (Parker et al., 2022; Wild et al., 1998). Factors such as the deprivation of individual autonomy and involvement of justice and penal systems for civilly committed individuals sparked ethical concerns about ICC as a public health approach (Csete & Wolfe, 2017). The evidence suggested that people voluntarily sought ICC due to limited treatment options (Chau et al., 2021). Certain studies showed that ICC was ineffective in preventing relapses and increased the likelihood of adverse outcomes, including drug overdose (Rafful et al., 2020). Research on people with SUD and their

perception of ICC found poor satisfaction and that ICC was a more appropriate approach for individuals with severe mental disorders (Christopher et al., 2020; Marshall & Hser, 2002). Also, in a national study of 739 American Psychiatric Association members, fewer participants indicated support for ICC relative to alcohol use (22.0%) and other drug-related disorders (22.9%; Brooks, 2007).

Conversely, Kelly, Finney, and Moos (2005) found that at 1-year and 5-year follow-up, ICC patients had equal or better treatment outcomes for abstinence, recidivism, and overall satisfaction. While some addiction medicine physicians acknowledged a limited understanding of ICC, many of those surveyed (60-70%) indicated support of ICC for SUD (Jain et al., 2021). Bourquin-Tieche and colleagues (2001) also learned that among civilly committed individuals with alcohol use disorder, receptivity, positive perception of ICC, and treatment outcomes were more pronounced among women. Openness to ICC among women was motivated by aspects such as imminent harm and parental responsibilities (Bourquin-Tieche et al., 2001).

These disparate findings from the literature may reflect noteworthy variables that can be associated with the results. For instance, ICC statutes relating to individuals with SUD are significantly diverse among states in the country (Christopher et al., 2015; Prescription Drug Abuse Policy System, 2021; Williams et al., 2014). Applying different laws may result in divergent ICC procedures and outcomes for individuals with SUD. Factors such as limited study samples, subjective measures, and interpretation can also limit generalizability (Jain et al., 2018). Although studies have examined various aspects related to ICC, few studies in the country solely focused on women with SUD.

Massachusetts is one of the states in the country with higher rates of drug-related overdose and ICCs (CDC, 2022c; Christopher et al., 2022). This study concentrated on a critical gap in the literature to examine the associations between mental disorder history, MAT, and continuation in voluntary SUD treatment among adult women who were in ICC for SUD in Massachusetts. As the drug epidemic remains a public health challenge, it is vital to understand the potential impacts of ICC.

Problem Statement

SUDs negatively affect people's physiological and social well-being (Lo et al., 2020). Women experience SUDs differently than men. Fonsceca et al. (2021) indicated that women had an accelerated trajectory from onset to problem substance use. This level of susceptibility was related to physiological and social influences (Towers et al., 2023). Women with SUD face a confluence of co-morbid and co-occurring conditions, including psychiatric disorders, exposure to infectious diseases, violence, and trauma (Meyer et al., 2019). Post-traumatic stress disorder and SUD severity were significantly associated in women with SUD (Peltier et al., 2022). Research on the impacts of the COVID-19 pandemic showed significantly higher substance use rates among women and a 41% increase between 2019 and 2020 (Pollard et al., 2020).

Women with SUD can face significant stigma and structural barriers when seeking treatment. These barriers were particularly pronounced among pregnant and parenting women (Smid & Terplan, 2022). In a study on women in treatment for SUD in Belgium, Schamp and colleagues (2021) learned that women with SUD feared losing child custody, withheld information about their substance use history, lacked awareness

of treatment options, and lost hope for their well-being. Lack of childcare in treatment facilities was also an indicated barrier for women entering SUD treatment (Schamp et al., 2021).

Considering these complex challenges, fewer women enter SUD treatment than men (Fonseca et al., 2021; Towers et al., 2023). Studies found that women with SUD defer entering and can have shorter lengths of stay in SUD treatment (Gilbert et al., 2019; McCrady et al., 2020). In 2020, SUD treatment admissions among women in Massachusetts was 28% (SAMHSA, 2022). Delayed and untreated substance use can intensify SUD acuity, the need for comprehensive support, and ICC involvement. In fiscal year 2018, 36.4% of ICCs in Massachusetts were women (Massachusetts Department of Public Health, 2019).

Coffey et al. (2021) found that ICC petitions by physicians and law enforcement significantly increased when the requirement for in-person court appearances was removed in studied communities in Massachusetts. This trend demonstrated the pervasiveness of the drug epidemic and the use of ICC in the state. Although ICC rates in Massachusetts ranked among the highest in the country, few studies have focused on women in ICC for SUD treatment. This study addressed a gap in the literature regarding women in ICC for SUD in Massachusetts. Examining the effects of ICC among women with SUD can inform clinical practices and public health interventions.

Purpose of Study

The purpose of this quantitative study was to conduct a retrospective cohort analysis on the ICC of adult women in Massachusetts to investigate the predictive

relationship between mental disorder history, MAT engagement, and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and Department of Children and Families (DCF) services. Where ICC was established as an intervention to mitigate the impacts of SUD, the literature indicates the need to analyze the critical aspects of this approach (Jain et al., 2018). Recognizing the benefits of continuous and effective treatment in terms of pharmacotherapy and counseling (Evans et al., 2020), this study assessed ICC encounter(s) and the long-term effects among women. The findings can enhance the understanding of SUD and the related effects of ICC on treatment retention.

Women who are involuntarily committed to SUD treatment can be at significant risk of harm (Christopher et al., 2022). While ICC for SUD treatment can help prevent imminent harm among women with SUDs (Huang et al., 2021), the trauma from the involuntary commitment process was associated with long-term risks, including relapse and overdose after civil commitment (Evans, et al., 2020; Rafful et al., 2018). Women with SUD need treatment and services that can address their physiological and social needs (SAMHSA, 2021). Factors such as trauma and psychiatric disorders are related to SUD among women and need to be examined. It is also essential to acknowledge that women with SUD are not monolithic. Recognizing the diverse representation and needs of women with SUD, this study focused on covariates such as age, race/ethnicity, housing status, drug use history, and involvement with DCF (Meyer et al., 2019). The effects of ICC on women with SUD remain to be understood from the literature and field practice. By assessing factors that may be related to long-term SUD treatment retention among

women in ICC for SUD, this study can bridge a gap in gender-based research and inform policy and treatment strategies.

Research Questions and Hypotheses

RQ1: What is the predictive relationship between mental disorder history and voluntary SUD treatment retention (in days) in women post-discharge from ICC for SUD, controlling for age, race/ethnicity, drugs used, housing status, and DCF services?

H₀1: There is no statistically significant predictive relationship between mental disorder history and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services.

H_a1: There is a statistically significant predictive relationship between mental disorder history and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services.

RQ2: What is the predictive relationship between MAT engagement and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services?

H₀2: There is no statistically significant predictive relationship between MAT engagement and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services.

H_{a2}: There is a statistically significant predictive relationship between MAT engagement and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services.

RQ3: What is the predictive relationship between mental disorder history, MAT engagement, and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services?

H₀₃: There is no statistically significant predictive relationship between mental disorder history, MAT engagement, and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services.

H_{a3}: There is a statistically significant predictive relationship between mental disorder history, MAT engagement, and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services.

Theoretical Framework

The adopted theoretical framework for this study was the transtheoretical model of change (TTM). Developed by psychologists James O. Prochaska and Carlo DiClemente, the TTM explains the evolution of human behavior change (Prochaska et al., 1992). Prochaska and DiClemente established the TTM through their seminal research to bridge the gap among key psychotherapy theories on human behavior

(Prochaska & Norcross, 2002). Since its inception in 1977, the TTM has been grounded in empirical work that continues to inform research and clinical practice related to the treatment of psychiatric disorders and health promotion (Prochaska et al., 1988; Prochaska, Norcross, & DiClemente, 1994; Prochaska & Velicer, 1997; Rosen, 2000).

The TTM explains the progression of behavior change according to a set of nonlinear stages that are depicted as (1) *pre-contemplation* (unmotivated to change), (2) *contemplation* (awareness of risk behavior and uncertain to change), (3) *preparation* (awareness of risk and willing to change), (4) *action* (motivated and active in behavior change), and (5) *maintenance* (sustaining abstinence from problem behaviors) (Hashemzadeh et al., 2019). Transition through the stages of change occurs by employing relevant processes of self and environmental reevaluation, counterconditioning, consciousness-raising, self-liberation, helping relationships, contingency management, stimulus control, and social liberation (Prochaska, Redding, & Evers, 2002). Each stage and process facilitates increased awareness and abilities for change through decision balance – a person’s belief in their prospect for change, and self-efficacy – the conviction in the ability to change (Yalcinkaya-Alkar & Karanci, 2016).

In the present study, the TTM provided a lens to examine the influence of ICC in effecting behavior change for women with SUD. Women who are involuntarily committed to SUD treatment are in the initial stages of changes, as evidenced by their compulsive substance use despite related risks. Researchers have found that people in involuntary treatment for SUDs were less motivated to change, and readiness for change was not a significant predictor of abstinence post-involuntary commitment (Opsal et al.,

2019). Among women studied based on risky behaviors related to binge drinking and sexual activity, levels of readiness for change were consistent with the TTM stages of change (Lowrey et al., 2019). Adopting the TTM can provide a basis to assert the need to mitigate harm from SUD while fostering therapeutic alliances. Research examining ICC from the TTM lens is sparse (Opsal et al., 2019). Given the complex trauma and psychiatric history of women with SUD, involuntary initiation in treatment may hinder the process of change toward retention in long-term treatment. This study assessed these assumptions to expand knowledge in providing affirmative treatment for women with SUD.

Nature of the Study

The nature of this study was quantitative. A retrospective cohort design was adopted to assess the relationship, if any, between the independent variables mental disorder history and MAT and the dependent variable voluntary SUD treatment retention (in days) in women who were civilly committed, controlling for age, race/ethnicity, drugs used, housing status, and DCF services. The retrospective cohort design was fitting for this study as it provided the means to analyze a group of women from their ICC to 12 months post-civil commitment (Wang & Kattan, 2020). The retrospective cohort design also facilitated using existing data to longitudinally examine the potential relationship between the variables (Euser et al., 2009).

The Massachusetts Department of Public Health Bureau of Substance Addiction Services (MDPH BSAS) collects and manages data on involuntary and voluntary SUD treatment episodes in the state. MDPH BSAS provided the data for this study. I used pre-

existing ICC and voluntary treatment data to capture treatment episodes between January 1, 2017, and December 31, 2019. I used a simple random sampling approach through retrospective chart review to obtain the desired sample (Gearing et al., 2006; Elfil & Negida, 2017). The study sample involved adult women aged 18 and older who were in ICC for SUD during the study timeframe.

Definition of Terms

The following key terms and definitions were relevant to this study:

Addiction recovery: An individualized process of achieving continual abstinence from substance misuse or abuse and engagement in promoting wellness, including positive social connections and financial and physical health (Witkiewitz et al., 2020).

Age: A temporal representation of human life based on the years from birth to a specified reporting period (e.g., from birth to the day of admission in treatment) (Sanghi, 2022).

Department of Children and Families (DCF) Involvement: Self-report indicating history of receiving child and family-related services from DCF, the Massachusetts child protective services agency (Commonwealth of Massachusetts, 2024).

Drug addiction: A chronic and remediable condition stemming from compulsive drug use and related genetic, neurological, environmental, and social influences. (Volkow & Boyle, 2018).

Drug use: The consumption of licit and/or illicit substances that can alter physiological functioning. Consumed substances can include prescription medications,

alcohol, cannabis, cocaine, opioids, and methamphetamine (National Institute of Health, 2019).

Ethnicity: Categorization of individuals based on social constructs related to shared nationality or culture (Flanagin et al., 2021).

Housing status: A state of residency that is represented as housed – having a fixed and consistent dwelling to live, or unhoused/homeless – lacking a place for habitation (SAMHSA, 2018)

Involuntary civil commitment: A court order to provide in-patient treatment to individuals with SUDs without their consent, based on potential harm to self and/or others (Jain et al., 2018).

Mental health: A dynamic state of psychological functioning influenced by internal and external stimuli. Balancing and expressing personal emotions and cognitive and social skills (Galderisi et al., 2017).

Mental disorder: A psychiatric disorder involving dysregulated mood, cognition, and behaviors with symptoms that include impaired physical wellness, individual, and social functioning (Manderscheid et al., 2010; Tse & Haslam, 2023; World Health Organization, 2022a).

Medication for addiction treatment (MAT): Refers to Federal Drug Administration (FDA) approved medications for SUD to help manage symptoms of SUD and promote recovery (Volkow, 2020).

Race: Categorization of individuals based on social constructs related to factors such as ancestry, origin, and physical features (Flanagin et al., 2021).

Recovery coaching: A supportive approach where individuals in active alcohol and drug addiction receive desired guidance and support from individuals/peers with lived experience with SUD and recovery to promote affirmative and recovery-oriented behavior change (Jason et al., 2021).

Section-35: Refers to Massachusetts General Laws Chapter 123 Section 35, which grants court authority to mandate civil commitment and involuntary treatment of up to 90 days for individuals who are deemed a threat of harm to themselves and/or others due to their SUD (General Court of the Commonwealth of Massachusetts, 2023c).

Substance use disorder: A clinical diagnosis based on the intensity of consumed substances and related patterns of symptoms and behaviors. As a brain disease, SUD can be managed through pharmacologic, cognitive, and behavioral therapies (American Psychiatric Association, 2013; Baconi et al., 2015).

Voluntary treatment retention: Continuous participation in treatment for SUD based on a treatment plan and/or recovery goal (Viera et al., 2020).

Assumptions

A principal assumption of this study was that women in ICC may be less motivated to remain in treatment post-ICC. This premise was based on the perspective that women in ICC are in the pre-contemplative and contemplative stages of change. Also, women in ICC may have negative perceptions of mandated treatment, which can evoke resentment and opposition to continuing treatment. ICC involves compulsory treatment to mitigate harm for individuals who lack awareness and/or motivation to seek treatment for SUD (Christopher et al., 2020). The ICC process in Massachusetts for

individuals with SUD involves a petition and appearance before the court, followed by detainment upon the court's approval for ICC (Walt et al., 2022). This process was described as coercive and potentially triggering for people with a traumatic history (Evans et al., 2020; Parker et al., 2022). For women with complex substance use and mental health needs, ICC may be a deterrent to remaining in treatment.

Another assumption of this study was that the study sample received SUD treatment during the ICC period. Literature has established the need and benefits of providing comprehensive treatment for people with SUD. Integrated SUD treatment reflects a range of harm reduction strategies, cognitive behavioral and pharmacotherapy, and recovery support (Krawczyk et al., 2022). Comprehensive SUD treatment can promote retention, which is related to decreased harm from compulsive drug use and risky behaviors (Bart et al., 2012). As the ICC mandate in Massachusetts is based on a specified date range of approximately 90 days (National Alliance for Model State Laws, 2016), this study assumed that the treatment provided during this period was responsive to the needs of the women.

Scope and Delimitations

This study concentrated on adult women who were in ICC for treatment of SUD. The drug epidemic in the United States has been an ongoing public health problem, as evidenced by the toll of drug-related deaths and decreased life expectancy (Gold, 2020). The literature indicated that the trajectory from onset to chronic substance use is faster among women than men. Also, the gaps in the rates of SUD and drug-related deaths were increasingly tapering between men and women (Cornish & Prasad, 2021; National

Institute on Alcohol Abuse and Alcoholism, 2020). SUD in women is associated with significant trauma and mental health challenges that can be belatedly diagnosed (Lotzin et al., 2019). The paucity of studies on ICC and SUD treatment for women validated this study as a unique inquiry on women in Massachusetts who were civilly committed to SUD treatment.

The inclusion criteria for this study involved women aged 18 and older who were involuntarily civilly committed to Massachusetts Section 35 programs for SUD treatment. Cases were selected from January 1, 2017, to December 31, 2019. The case selection also encompassed participants from Section 35 and non-Section 35 programs in the Massachusetts community-based continuum of care for SUD. Programs included inpatient acute treatment, post-acute residential, outpatient, and recovery support services. Section 35 ICC programs based in Massachusetts' correctional facilities were excluded from this study. ICCs in the Massachusetts penal system involved women who were held on bail for a criminal offense and committed to SUD treatment. The exclusion reflects the differences in the population.

This study adopted a retrospective cohort design to analyze the potential relationship between mental disorder history, MAT engagement, and retention in voluntary SUD treatment (in days) post-ICC among adult women with SUD. Data for this study originated from an agency that was principally responsible for ICC oversight and data management for people with SUD in the state. As retrospective cohort analyses are not generalizable, the data reflects the population of women in ICC for SUD treatment within the MDPH programs.

Limitations

This study contained certain fundamental limitations. As a retrospective cohort model, it was based on preexisting clinical data from databases managed by the Massachusetts Department of Public Health Bureau of Substance Addiction Services. The essence of the data involved case reports from community-based ICC and voluntary SUD treatment programs. Therefore, this study recognized potential biases inherent to retrospective analyses, including missing data, recall bias, confounding, and loss of follow-up (Talari & Goyal, 2020).

Significance

The findings from this study contributed to the knowledge about ICC as an intervention for people with SUD. The drug epidemic in Massachusetts remains a significant public health concern. While the rate of ICC increased over the past ten years, studies about the impacts of ICC on individuals in the state, particularly women, were sparse. SUD among women is associated with a range of negative consequences that include exposure to infectious diseases, physical ailments, generational exposure to drug use, family separation, involvement with the criminal justice system, poverty, homelessness, and death (Barati et al., 2021).

Whereas positive social change reflects actions and events that can enhance the well-being of people and communities, this research contributed meaningful information to determine how ICC has influenced the health of women with SUD in the state. The study can inform public health professionals and policymakers on how various aspects of ICC may be associated with the desired goal of retaining women with SUD in treatment

to promote their healthy and long-term recovery. The information from the research can also inform evidence-based practices and effective treatment alternatives.

Summary

SUD is associated with deleterious consequences. The repercussions of substance use can involve significant harm to self and others. Such effects have been prominent over the past ten years, as evidenced by the toll of the drug epidemic in the United States, with unprecedented rates of drug overdose and overdose-related deaths (Cartus et al., 2022). Women are differentially affected by SUD than men. The disparate impacts of substance use among women as compared to men have been demonstrated in terms of neurobiological and social influences.

Women with SUD can experience a faster trajectory from onset to chronic use. The pattern of compulsive substance abuse in women often coincides with histories of trauma in childhood and intimate partner relationships. Women may defer and seek treatment for varied reasons than men. When presenting for treatment, women were more likely to indicate co-occurring psychiatric disorders, co-morbid conditions, and financial stressors. Notwithstanding, few research and treatment approaches focus solely on women.

SUD can evolve through interrelated stages ranging from incessant drug use to self-directed efforts to maintain sobriety. Without proper treatment, women are more likely to experience relapse and greater potential for harm. As the prevalence of SUD remained a public health crisis, ICC was strongly promoted to initiate treatment (Coffey et al., 2021). Women who are referred for ICC are deemed a significant risk of harm and

often pre-contemplative of the need for treatment. Delivering specialized treatment and services responsive to women's needs can foster therapeutic alliances and interest in treatment engagement. Research is needed to examine the effectiveness of ICC in engaging women in treatment and maintenance of sobriety.

The next chapter includes a review of recent research on SUD and ICC. In the literature review, I focus on key factors that are related to SUDs and highlight the effects of substance use on women. The review also addresses ICC for SUD and explains the gap in the literature relative to the effectiveness of ICC for treatment engagement among women with SUD.

Chapter 2: Literature Review

Introduction

Compulsive substance abuse can negatively affect people's physiological and social well-being. State-enacted civil commitment statutes provide a legal basis to mandate treatment for SUD. While published research has studied aspects of civil commitment for SUD, less is known about the effects of civil commitment among women versus men with SUD (De Andrade et al., 2018; Grahn, 2022). Notably, the research is limited relative to factors that may be associated with SUD treatment retention among women who were in ICC for SUD.

Among the deleterious impacts of SUD is the inability to conduct daily living functions and maintain health, safety, and caring relationships (Lo et al., 2020). As ongoing SUD treatment and recovery support have been associated with abstinence, understanding the effects of ICC on women with SUD may inform clinical approaches for treatment initiation and engagement. Moreover, the study results may enlighten policy decisions related to the drug epidemic. The study intended to address a paucity of research on ICC relative to women with SUD. This chapter includes an overview of my literature search strategy and theoretical foundation.

This study investigated the relationship between mental disorder history, MAT, and retention in voluntary SUD treatment post-ICC. Recognizing the diverse pathways to SUD treatment and considering ICC as an intervention for treatment, I examined whether women's mental disorder history and engagement in MAT predicted their long-term SUD

treatment retention. This chapter includes an overview of the literature search strategy, theoretical foundation, and literature review on SUD civil commitment.

Literature Search Strategy

Databases Used

This literature review encompassed a broad search of various Walden University Library Portal databases. I searched for peer-reviewed journal articles, published articles, books, and related web-based information regarding SUD and ICC relative to women. The searched databases for this study include Academic Search Complete, Complementary Index, Education Source, CINAHL Plus, Google Scholar, PubMed, PsychInfo, SAGE Full-Text, Science Direct, and Social Science Citation.

Key Search Terms

My literature search started with an initial focus on four principal terms: substance abuse, substance use disorder, civil commitment, and involuntary civil commitment. These key terms provided a broad base of articles, including literature on definitions, effects, and related interventions for SUD. The term civil commitment also yielded a range of articles related to commitment for the treatment of individuals with psychiatric disorders versus SUD.

Based on these findings, I narrowed the search by combining the terms, including SUD and women, SUD and civil commitment, women and civil commitment, SUD treatment and women, and medication for addiction treatment, mental health, mental disorders, and women and mental disorders. The search timeline focused on current peer-reviewed articles published between 2018 to 2024. For the seminal literature search, I

included literature published since 1982. My seminal search included terms such as substance abuse, drug abuse, drug addiction, substance abuse treatment, substance abuse mandated treatment, women and substance abuse, mental health, mental illness, medication for addiction treatment, medication-assisted treatment, transtheoretical model stages of change, and involuntary civil commitment. Additionally, I searched websites of government entities such as the Substance Abuse and Mental Health Services Administration (SAMHSA), Centers for Disease Control and Prevention (CDC), and National Institute on Drug Abuse (NIDA) for statistics and information related to the study topic.

Theoretical Framework

ICC involves legally mandated treatment for acute psychiatric and substance-related disorders. While ICC laws and procedures vary, a key tenet of ICC is to mediate harm by providing a mechanism to involuntarily treat individuals who are deemed at risk of harming themselves or others due to their mental illness or SUD (Cohen et al., 2018; Zhong et al., 2023). SUD can evolve through various stages, including periods of persistent use and impaired discernment for safety and well-being. During this critical stage, ICC has been pursued as a solution to initiate SUD treatment. Through treatment, maladaptive behaviors related to acute substance use can transform into adaptive functioning (Reimann & Jain, 2021). The literature suggested that effective treatment for SUD involves ongoing and comprehensive cognitive, behavioral, and pharmacologic therapies (Proctor & Herschman, 2014; Volkow, 2020). Such a treatment approach integrates SUD's neurobiological, social, and behavioral aspects (Kelly & Daley, 2013;

Volkow, 2020). The focus of this study involved mandated treatment through ICC for women with SUD. The theoretical framework focused on the TTM stages of behavior change.

Among theories of human behavior change, researchers commonly applied TTM to explain addictive behaviors (Kebs et al., 2018; Prochaska et al., 1985). The model is based on integrated psychotherapy theories and related studies on behavior change. The foundational theorists of TTM, James O. Prochaska and Carlo C. DiClemente, posit that human behavior change occurs through a multidimensional process involving five distinct stages known as pre-contemplation, contemplation, preparation, preparation, action, and maintenance (Prochaska & DiClemente, 2005; Prochaska & Velicer, 1997). *At precontemplation*, an individual's awareness and interest in change are inattentive; *contemplation* consists of awareness and consideration without commitment to action; *preparation* involves intent and modest improvement of problem behavior; *action* reflects cessation of problem behaviors and demonstrated commitment to positive change; *maintenance* involves the void of problem behavior and adaptation to sustained new behaviors (Norcross et al., 2011; Prochaska & Velicer, 1997).

TTM demonstrates when and how individual behaviors change. While the stages of change denote the points when change occurs, the change process reflects how (activities and related experiences) changed behaviors evolve across the various stages non-linearly (Prochaska, DiClemente, & Norcross, 1992). Prochaska and DiClemente (2005) identified the 10 change processes as Consciousness Raising, Self-Liberation, Social Liberation, Counterconditioning, Stimulus Control, Self-Reevaluation,

Environmental Reevaluation, Contingency Management, Helping Relationships, and Dramatic Relief. Each stage coincides with a respective process and timeline, such as practical reasoning and consciousness arousal during the initial stages of precontemplation and contemplation; versus pragmatic, behavioral, and counterconditioning efforts in the later stages of action and maintenance (Norcross et al., 2011; Prochaska & DiClemente, 1983). Movement through the distinct stages of change is associated with individual beliefs in the prospects and ability to change (Prochaska & Velicer, 1997). Consequently, relapses are an expected aspect of the model for which stage-based interventions are indicated (Prochaska & Velicer, 1997). The relative psychotherapy approach for each stage was depicted as “nurturing parent” at precontemplation, “Socratic teacher” and encourager during contemplation, “experienced coach” and guide during preparation, and “consultant” during action and maintenance (Norcross et al., 2011).

TTM emerged through foundational assays on self-directed change processes for smoking cessation, which identified the contemplation stage as the initial point where change can begin (Prochaska & DiClemente, 1983). Subsequent studies have adopted TTM and indicated notable effect outcomes relative to smoking cessation behavior (Velicer et al., 2007). Prochaska and colleagues (2001) conducted a two-arm randomized control with up to 24 months follow-up study on a representative sample of 4,144 smokers. They found that initiative-taking stage-based intervention approaches showed statistically significantly higher recruitment, retention, and abstinence rates among the experimental group versus the controls. Patterns of behavior change and relapse in

addictive behaviors were found to be like other aspects, such as physical activity (Marcus & Simkin, 1994). Researchers used TTM to delineate the change process in weight loss management among obese participants with a history of stroke or transient ischemic attack (TIA). They showed that patients in the action stage were more likely to engage in weight management behavior change (Wilson et al., 2022).

Yet, the literature indicated significant gains in behavior change were more attainable with realistic goal setting based on individual readiness for change (Aparicio & Mendez, 2020). Stage-based education and follow-up for overweight women in an exercise experimental group indicated statistically significant changes in exercise behavior and body mass index at the pretest and posttest (Baysal & Hacialioglu, 2017). Similar outcomes were noticed when TTM-based interventions were adopted with a focus on stress management (Evers et al., 2006) and depression management (Levesque et al., 2011). These studies suggest that effective interventions for behavior change must align with the individual stage of readiness for change (Krebs et al., 2018).

Using TTM as a framework concerning ICC might inform clinical interventions for individuals with SUD. The TTM also recognizes that SUD behavior change may not often start at the action stage, and repeated deviations from the intent to change may serve as integral lessons in the dynamic recovery process (DiClemente & Crisafulli, 2022). Adopting the TTM to assess readiness for change can help predict retention in treatment. Among patients enrolled in a hospital emergency department-based medication for opioid use disorder (MOUD) program, Reuter and colleagues (2022) found a 54.1 and 43.0 percent post-enrollment retention rate at 30 and 90 days, respectively. In assessing

the stages of change at baseline, Reuters et al. (2022) found that patients in the preparation/action/maintenance stage showed greater odds of retention than patients in the early pre-contemplation/contemplation stage (60.0% vs 40.8%; odds ratio [OR] 2.18; 95% confidence interval [CI] 1.15 to 4.1; $p < 0.05$).

While Reuters et al. (2022) focused on the stages of change among an outpatient-based group, Opsal, Kristensen, and Clausen (2019) investigated the stages of change at baseline between individuals enrolled in a combined voluntary and involuntary inpatient treatment milieu for SUD. Opsal et al. (2019) found that readiness for change was significantly lower among involuntarily versus voluntarily admitted patients (39% vs 59%) at baseline, and more voluntarily admitted patients scored higher on the action stage ($p = 0.025$). Also, readiness for change at baseline was not a predictor of abstinence at follow-up, whereas SUD severity at baseline predicted risk for continued drug use (Opsal et al., 2019).

At 6-month follow-up, Pasareanu et al. (2016) found that despite a decrease in drug use overall, twice as many voluntarily admitted patients indicated abstinence from substance use versus involuntarily admitted patients (50% versus 24%; OR = 0.31, 95% CI = 0.14-0.68, $p = 0.013$). These studies suggest that people with SUD enter treatment at various stages of change. While overall goals for SUD treatment can include abstinence, individualized approaches can be adopted to achieve sustainable behavior change. In relating the TTM to this study, I sought to expand the understanding of the relationship between ICC and long-term retention in treatment for sustained recovery for women with SUD.

Literature Review Related to Key Concepts and Variables

Substance Use Disorder

SUD is a chronic condition with significant physical and social impacts.

According to the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-5), SUD diagnosis can be classified from a continuum of substances, including alcohol, cannabis, tobacco, hallucinogens, opioids, and stimulants, and related patterns of impaired cognition, emotions, physical functioning, and behaviors (American Psychiatric Association, 2013). Characterized as a psychiatric disorder, SUD involves cognitive, behavioral, and physiological symptoms from the persistent use of substances despite negative effects on physical wellness, agency, and social functioning (Centers for Disease Control and Prevention [CDC], 2022b).

The evolution of SUD involves a three-stage cycle of binge/intoxication, withdrawal/negative effect, and preoccupation/anticipation (Koob, 2013; Koob & Volkow, 2016). As people abuse substances at increased levels over extended periods, the loss of control can lead to physical harm from continuous intoxication, social harm through the neglect of individual responsibilities, safety, and duty to others, substance-related withdrawal symptoms from discontinued use, and neuroadaptation where tolerance compels increased substance use to sustain the effects (Koob et al., 2020). It was indicated that the determinants of SUD involve intrinsic and extrinsic factors modulated by addictive substances (Popescu et al., 2021). The phenomenon of SUD can be explained with a focus on the underlying causes.

Substance Use Disorder and the Brain

The etiology of SUD encompasses intersected biological and environmental factors (McLellan, 2017). People's experiences with SUD are relative to their physiological, genetic, social, and environmental conditions. One of the key drivers of SUD involves maladaptive neuroplasticity in the brain (O'Brien, 2009). As an intricate organ in the body, critical regions and networks of the brain have been associated with substance addiction (Zilverstand et al., 2018). Principally, four main brain regions related to SUD include the prefrontal cortex, ventral tegmental area, nucleus accumbens, and hippocampus (Nall et al., 2021). The prefrontal cortex area modulates executive functioning, self-control, and decision-making (Goldstein & Volkow, 2011). As a central cradle of dopamine, the ventral tegmental area is associated with reward processing, motivation, and signaling with the nucleus accumbens, which mediates the effects of reward, reinforcement, and motivation (Wall et al., 2021). The hippocampus region facilitates memory creation and storage (Avchalumov & Mandyam, 2021).

In networking with the nucleus accumbens and prefrontal cortex regions, other key brain parts, such as the amygdala, link emotion, memory, and decisions (Wassum, 2022). As a monoamine neurotransmitter, the critical role of dopamine in the brain for drug-seeking has been established (Al-Sabri et al., 2022; Foley, 2019; Solinas et al., 2019). Dopamine regulates the brain's reward learning functions, including the processing of moods, memory, and cognition (Foley, 2019). The dynamic exchange of signals between neurons in these critical parts of the brain is significantly connected to the formation and persistence of SUD (Koob & Volkow, 2016; Yager et al., 2015).

Biochemical analyses demonstrated how substance use can change the brain's cognitive and reward-processing abilities and highlight the potential for therapeutic interventions (Betz et al., 2000). Drug use alters neurotransmission in the brain as different substances modulate the neural circuits of the brain, resulting in varied effects (Badiani et al., 2011; Solinas et al., 2019). Certain substances, such as opioids, feign neurotransmitters by binding and transmitting anomalous signals to stimulate neurons in the brain (NIDA, 2022a). Substances, such as cocaine and amphetamines, dysregulate the natural molecular reprocessing of neurotransmitters and related interaction between neurons (Su et al., 2022). One of the aspects of SUD involves mediating positive and negative feelings, memories, and learned behaviors (Koob et al., 2020). Dopamine-stimulated effects of euphoria and reward from substance use can amplify urges for more substances, resulting in a cycle of compulsive use (Volkow, Michaelides, & Baler, 2019). Abi-Dargham et al. (2003) studied SUD risk potential among psychostimulant-naïve subjects and found that the reported sense of enjoyment and energy was significantly associated with dopamine release effects from amphetamine exposure. Recent studies have also investigated the effects of polysubstance use and dopamine release (Crummy et al., 2020).

Animal models and neuroimaging technology have demonstrated how substances affect biochemistry in the brain. While it was argued that the complex nature of SUD presents translational deficits in animal models (Field & Kersbergen, 2019), the evidence suggested that animal models can provide a range of opportunities to study drug-addiction pathology and related therapeutic interventions (Kuhn, Kalivas, & Bobadila,

2019). Models of condition place preference, self-administration, drug reinstatement, and incubation have provided valuable insight into how substance exposure affects the animal brain (Spanagel, 2017). Imaging methods such as magnetic resonance spectroscopy, positron emission tomography, and single photon emission computed tomography also provided multidimensional perspectives of the brain anatomy with drug use and behaviors (Fowler et al., 2007; Hayes, 2020).

For instance, in vivo studies in rats suggested that substance-seeking behavior and self-administration of cocaine, amphetamine, and opiates were significantly associated with concurring dopamine levels (Ranaldi et al., 1999; Suto et al., 2010; Wise & Jordan, 2021). Exposure to substances such as ethanol, cocaine, heroin, and methamphetamine showed significant differential effects on type I and type II pyramidal cells in the prefrontal neural cortex area, indicating potential for compulsiveness and blighted control (Leyer-Jackson et al., 2021). As the lateral habenula communicates negative reward effects to dopamine neurons in the brain (Baker et al., 2016), the suppression of neuron activity in the lateral habenula brain region significantly indicated impaired control for cocaine-seeking habits among rats (Wolfe et al., 2022). Changes in dopamine signaling in the nucleus accumbens (NAc) and related drug-seeking were provoked by conditioned exposure to heroin in rats (O'Neal et al., 2022).

Acute exposure to methamphetamine demonstrated considerable damage to the central nervous system, including irreversible weakening of dopamine nerve terminals and impaired cognitive functioning and decision-making (Groman et al., 2018; Rusyniak, 2013). Among patients with a history of stimulant abuse at 6 months follow-up post-

treatment, diffusion metrics on white matter trajectory from the prefrontal cortex to the nucleus accumbens, right anterior insula, and amygdala indicated a significant association with relapses (Tisdall et al., 2022). Drug-reinforcing effects were blunted when dopamine receptors were obstructed, indicating significant potential for the treatment of SUD (Solinas et al., 2019). These studies' findings demonstrated the brain's complex nature and how SUD is related to significant changes in the brain regions and dopamine neuroadaptation (Poisson et al., 2021; Sulzer, 2011; Volkow et al., 2019). These neurobiological factors are also critical in understanding how substance use divergently impacts people with SUD.

Substance Use Disorder and Heredity

SUD susceptibility is associated with heredity. Studies indicated that approximately 30 to 60% of SUD risk was heritable (Abdellaoui et al., 2021; Deak & Johnson, 2021). Through various twin and family studies and Genome-Wide Association technology, researchers investigated the individual genome to expand knowledge on genetic variants and risks for SUD (Gelernter & Renato, 2021; Uffelmann et al., 2021; Wetherill et al., 2019). Genetic influences on SUD were indicated in twin and family studies (Prom-Wormley et al., 2017), including a two-fold familial risk of alcohol dependence versus controls (Nurnberger et al., 2004). Gene-related significant associations with alcohol use disorder (AUD) were also found in transcriptome and gene expression analyses on prefrontal cortex tissue (Kapoor et al., 2019).

Similar studies on postmortem prefrontal cortex tissue of people with SUD found a significant decrease in calmodulin genes that are indicative of acute exposure to

substances such as cocaine and related impaired decision-making (Lehrmann et al., 2006). While a preponderance of genome-wide association studies has comprised participants of European descent (Peterson et al., 2019), newer studies investigate SUD heritability among different ancestries. Recent genome-wide association studies on cocaine use disorder discovered significant gene association across African American and European American ancestries (Huggett & Stallings, 2020).

Environmental Effects on Substance Use Disorder

In considering the genetic influences on SUD, Vink (2016) postulated the balance of genes and environment as moderating factors. Here, the perspectives of nature versus nurture, top-down and bottom-up, invoke a comprehensive approach to investigate the underpinnings of SUD (Bakhshipour-Rudsari & Karimpour-Vazifehkhori, 2021; Green, et al., 2021). An individual's environmental conditions can impact their emotional state, behavior, and potential for SUD, relapse, and recovery. Along these lines, the social determinants of health lens have been adopted to assess SUD risks, recognizing the impacts of protective factors versus stressors, trauma, racial inequities, and disparities in health, economics, and education (Amaro et al., 2021; Ewald et al., 2019). Moreover, key aspects such as parental involvement, peer associations, socio-economic status, place of residence, and trauma can significantly affect SUD behavior (Vink, 2016).

From a developmental perspective, the literature showed that childhood exposure to trauma, violence, and neglect was related to SUD. ACES induced significant biological and emotional deregulation (Deighton et al., 2018), including depression, which was associated with SUD (He et al., 2022). Substance use initiation in early life

stages can increase the potential for SUD as an adult. Among youth under 18 years old, compounded exposure to ≥ 3 environmental risks, such as sexual or physical abuse, migration, alcohol, and cannabis abuse, indicated >220 times greater likelihood of polysubstance use in adulthood (Steixner-Kumar et al., 2021).

Parental opioid use and misuse were studied about offspring substance use and showed significant association with offspring alcohol, tobacco, and cannabis use in early adolescent years (Kerr et al., 2020). Adults with SUD linked their conditions with environmental exposure to parental substance use and related neglect, loneliness, trauma, and social isolation during childhood (Meulewaeter et al., 2022). The environmental risks for SUD were also identified with place. Access and proximity to substances were associated with SUD risk based on the geographic density of outlet sales (Mennis et al., 2016) and peer consumption, such as campus environments (Welsh et al., 2019). Household access to licit substances was associated with prescription drug misuse and abuse (Worsham & Barnett, 2020). Counter to the environmental effects of heightened exposure to substances, the limited availability of community-based services can prevent access to therapeutic interventions for SUD (Mennis, 2016).

Conversely, the absence of emotional stressors and environmental stimuli can contribute to halting the impacts on SUD. A study of rats showed that stunted conditioned place preference for cocaine was associated with a change to supportive environments, though the potential for relapse was indicated after 30 days (Solinas et al., 2008). Similar effects of supportive environments were shown for conditioned place preference of other substances, including morphine (Xu et al., 2017). The literature

explained that while biological traits may influence predisposition for SUD, environmental impacts may also be critical contributors to SUD. The findings from these studies suggested that SUD recovery necessitates continuous cognitive and behavioral reinforcements (Solinas et al., 2008).

Women and Substance Use Disorder

Substance use can have disparate impacts on women than men. Numerous studies provided critical insight into the effects of physiological and social factors on women with SUD. For instance, neurobiological changes related to reward and stress processing differentially affected women with AUD (Verplaetse et al., 2021). Smaller brain volume was also indicated among women with AUD (Verplaetse et al., 2021). Similarly, methamphetamine use among females, as compared to males and controls, showed smaller frontal cortices, which was associated with acute neurotoxicity and impulsivity (Kogachi et al., 2017). These neurological deficits can manifest in maladaptive behaviors. Critical markers of SUD stages, such as cravings and relapse, were reported as more pronounced among women (National Institute on Drug Abuse, 2022). The trajectory from initial to chronic drug use was found to be faster among women than men for certain substances, including alcohol, marijuana, cocaine, and licit opioids (Goetz et al., 2021; McHugh et al., 2018). Referred to as “telescoping,” this phenomenon was suggested to be among women who were at greater risk of severe SUD and seeking treatment (McHugh et al., 2018). Still, animal models indicated similar patterns with cocaine, other stimulants, and opiates (Becker & Koob, 2016).

Women with SUD can face unique challenges related to their physical health. Compulsive substance use was associated with physical ailments such as breast cancer, liver, cardiovascular, and gastrointestinal diseases (McHugh et al., 2018). Erol and Karpyak (2015) reviewed studies on sex differences and alcohol use risks and found associations with breast cancer despite lower drinking rates, irregular menstrual cycles, and increased rate (2.59 times per drinking day per week) of spontaneous abortion at mid-pregnancy. Risky substance use also exposed women to infectious diseases, including hepatitis C and human immunodeficiency virus (HIV). Factors such as transactional sex and hypodermic needle sharing contributed to the health risks. This was demonstrated in the study by Guy et al. (2022), which highlighted disparities in HIV pre-exposure prophylaxis care for women who use injection drugs and related vulnerability to sexual violence, homelessness, and lack of access to healthcare.

Additionally, women with SUD can face co-occurring psychiatric conditions such as depression, anxiety, eating disorders, and posttraumatic stress. Whereas the onset of substance use among boys was impacted by peer influences, among girls, substance use initiation was related to coping with suppressed negative feelings (Fonseca et al., 2021). Physical and sexual trauma were common experiences for women with substance use and mental health disorders (Guy et al., 2022). ACES were prevalent in women with SUD and significantly intergenerational (Smith et al., 2021). Women were reported as more likely to mediate symptoms of mood dysregulation and anxiety by using substances (McHugh et al., 2018). This was shown in a recent study about the effects of the COVID-19 pandemic on substance use and mental health among women. Problem alcohol use

was significantly associated with heightened anxiety and depression from COVID-19 stressors, which included income insecurity and an increase in intimate partner violence (Devoto et al., 2020).

Furthermore, stigma and social policies can negatively affect women with SUD. Historically, policies on drug abuse focused on the criminal instead of therapeutic aspects. The demonstrated impacts of drug policies included delayed and neglected primary health care and SUD treatment seeking among women due to fear of prosecution and loss of child custody (Stone, 2015). These impacts were amplified among ethnic minority women (Simon et al., 2020; Farahmand et al., 2020). Stigma related to perceptions of traditional gender norms and drug use behaviors constituted barriers to treatment among women (McHugh et al., 2018).

Treatment for women with SUD can also reflect limitations in access to appropriate services. Despite the inherent individual and social challenges, systemic barriers were noted, including male-oriented services and gender marginalization. Gender-responsive treatment approaches integrate the intrinsic and extrinsic factors that influence SUD. Relative to interventions for women, gender-responsive approaches were recommended to comprehensively address aspects such as trauma, family history, physical and mental health, and social and community connections (SAMHSA, 2021). Gender-responsive treatment for women can foster group connection, self-image, sexuality, spirituality, and relationships (Covington, 2002).

Epidemiology of Substance Use Disorder

The deleterious effects of SUD can be widespread. The Substance Abuse and Mental Health Services Administration (2022) indicated that 40.7 million people aged 12 and older in 2021 reported having an alcohol or illicit drug use disorder in the past year, 96.8% (39.5 million people) did not see a need for treatment, and 1.1% (447,000 people) sought treatment. In 2021, over 106,000 individuals in the United States died of a drug-related overdose (National Institute on Drug Abuse, 2023a). Among women in the United States, 32.1 million had a mental health or SUD, and 20 percent of people in SUD treatment were women in 2020 (National Center for Drug Abuse Statistics, 2023). Women with co-occurring mental health and SUD were 20 times more likely to be arrested when compared with women without co-occurring disorders (The Pew Charitable Trust, 2023).

According to the Centers for Disease Control and Prevention (2022a), between 2010 and 2017, the rate of women with opioid-related diagnoses at delivery rose by 131 percent, and correspondingly, infants born with neonatal abstinence syndrome by 82 percent. In 2019, a total of 675,936 children were removed from home due to parental alcohol or drug abuse, of which 50.7% were under age one (National Center on Substance Abuse and Child Welfare, 2023). These key indicators illustrated the physical, social, and intergenerational impacts of substance use in women. As the drug epidemic persists, various alternatives have been proposed to mediate the outcomes. This study assessed the outcomes of ICC as a treatment initiation approach.

Involuntary Civil Commitment

Involuntary civil commitment involves court-mandated treatment to counter the detrimental outcomes of SUD. As impairments from chronic SUD may hinder people's ability to contemplate treatment, states have assumed the authority to mandate treatment based on the legal principles of "*parens patriae*" and "*police power*" (Walton & Hall, 2017). The notion of *parens patriae* (Latin for the parent of the country) empowers states to preserve people's health and best interests. At the same time, *police power* mandates states' protection of citizens (Walton & Hall, 2017). The practice of ICC encompassed an extensive history that began in the fourth century B.C. in Greece, where individuals with mental disorders were committed for care (Brakel, et al., 1985). Testa and West (2010) chronicled the history of ICC in the United States. They highlighted the introduction of state-operated mental asylums in the early 1800s when reforms were introduced due to advocacy against maltreatment of people with mental disorders in jail settings. From the 20th century to the present, various case laws contributed legal precedent for ICC relative to the balancing of protection from imminent risk and individual liberties (Testa & West, 2010).

ICC remains a commonly debated approach for treatment initiation. Udwardia and Illes (2020) examined the ethical aspects of ICC laws and practices by focusing on the Massachusetts General Laws (M.G.L Chapter 123, Section 35) that allow for the involuntary commitment of people with SUD and contended that ICC infringed on individual civil liberties by committing people against their will and providing inadequate treatment to people who are involuntarily committed. Similarly, Lines et al. (2022) examined the legal basis for assessing and granting ICC orders for people with SUD and

posited that the arbitrary allowance of ICC without appropriate assessment of medical necessity violated people's human rights. Choice theory (CT) was reviewed concerning mandated treatment for SUD and indicated that behavior is purposeful. Hence, mandated SUD treatment compels individuals to choose to forego risky behaviors that perpetuate substance use and adopt behaviors to promote recovery (Mottern, 2002).

Despite legal and ideological debates, the effects of the drug epidemic intensified support for ICC. Across the country, approximately 35 states have adopted ICC legislation (Christopher et al., 2020). The review of the various state ICC laws showed significant inconsistency in the interpretation and application of the laws (Christopher et al., 2015). Utilization of ICC also varied across states, with leading annual ICC averages in states such as Florida (>9,000) and Massachusetts (>4,500; Christopher et al., 2015).

Studies on ICC have found differing outcomes. For instance, an assessment of post-civil commitment outcomes among individuals with opioid use disorders showed that civil commitment was associated with fentanyl and injection drug use and overdose history. Also, relapse potential after civil commitment was significantly delayed for patients who were on MOUD, motivated to engage in treatment, and had a positive attitude toward treatment (Christopher, Anderson, and Stein, 2018). In exploring the perceptions of SUD patients, their family, friends, and treatment providers about ICC, Evans et al. (2020) found that while some patients identified ICC as a short-term benefit to prevent death and promote access to treatment, others indicated that trauma, family separation, and exposure to the justice system during ICC may have led to greater risks in

the long-term. This is important because ICC was mandated to engage people in SUD treatment for recovery.

These findings also expanded the understanding of potential challenges for long-term retention in treatment. Comparative analysis of ICC also demonstrated effectiveness in certain areas. A head-to-head quasi-experimental study on the effectiveness of SUD treatment in secured ICC settings versus voluntary treatment in the community showed that despite differences in the demographic composition of the population in ICC versus voluntary treatment, both approaches resulted in positive outcomes, including improved family relationships, employment, and relapse prevention (Huang et al., 2021).

Mental Health and Substance Use Disorder

The concept of mental health is shaped by diverse perspectives in literature (Vaillant, 2003). Such views were often theoretically, functionally, and/or culturally based (Galderisi et al., 2017; Hernandez-Torrano et al., 2020). Theories on mental health encompassed frameworks on psychodynamic, cognitive, biological, humanistic, social, and behavioral aspects that are fundamental in research and behavioral interventions (Merlo & Vela, 2022). Per the psychodynamic theoretical framework, mental health was conceptualized according to the effects of human development, relationships, and life experiences (Fulmer, 2018). The constructs of cognitive theory explicate how individual thoughts can mediate emotions and behaviors (DiGiuseppe et al, 2016). Research based on the biological framework elucidated the impacts of the physiological process on mental health and emphasized the connections between the brain, body, and environment (Cloninger et al., 2011; Syme & Hagen, 2019). Mental health frameworks explain how

behavior is learned through conditioning based on intent or stimuli (Podlesnik et al., 2017; Rehfeldt & Hayes, 1998). The tenets of the humanistic approach to mental health focused on the overall individual and emphasized people's inherent ability to affect their well-being (Barbato & D'Avanzo, 2016).

Considering the broad theoretical basis, the inconsistency in the definition of mental health was documented (Galderisi et al., 2015). Mental health was described as a lack of mental disease based on associations with mental dysfunction, related diagnoses, and interventions (Schwartz & Corcoran, 2009). Keyes et al. (2002) suggested that mental health can be conceptualized as a condition of subjective well-being, reflecting one's view of life and mental functioning. According to Manwell and colleagues (2015), in certain instances, mental health was referenced as an indirect term for mental illness.

Concurrent works have endorsed a more comprehensive definition (Bertolote, 2008). A universally accepted view stems from the World Health Organization (WHO) (2004), which identified mental health as a state of well-being that consists of adapting to different circumstances and environments, reaching individual potential, and constructively contributing to one's community. Subsequent works influenced by the WHO definition recognized mental health as cognitive functioning in relation to physiological, social, and environmental contexts (Manwell et al., 2015). Consequently, comprehensive views posited that mental health is germane to overall health based on the ability to engage and appreciate life through thoughts, emotions, and actions despite changing circumstances and environments (Bhugra et al., 2013; Wren-Lewis & Alexandrova, 2021).

The distinction between the concepts of mental health and mental illness was captured by Manwell et al. (2015) through the perspective that customary practice focused on preventing mental illness while promoting mental health. New research endorsed a change in the terminology from mental illness to mental disorder, which recognizes the medical and societal influences and enables clarification of diagnoses (Radden, 2023; Telles-Correia et al., 2018; Tse & Haslam, 2023). The determinants of mental health encompass education, income, shelter, sense of safety, trauma experiences, social connections, and access to resources [Office of Disease Prevention and Health Promotion (ODPHP), n.d.]. Conversely, mental disorder was recognized as clinically significant psychological, biological, and developmental conditions that are related to dysfunctional thoughts, moods, and behaviors (American Psychiatric Association, 2013). Of note, mental disorder was not characterized according to cultural or social norms; it was instead based on clinical impairments related to distress and disability that hinder the fulfillment of social and functional responsibilities (American Psychiatric Association, 2013).

Examples of mental disorders included neurodevelopmental, schizophrenia, depression, anxiety, dissociative, personality, trauma/stressor-related, substance-related, and addictive disorders (American Psychiatric Association, 2013). Mental disorders can manifest diverse symptoms and intensity levels (Zimmerman et al., 2018). People can experience varied states of mental health and mental disorders (Mann et al., 2004; Mullins & White, 2019). As individuals with mental disorders can encounter periods of

positive mental health, episodes of deprived mental health may not engender severity for mental disorder diagnosis (Stein et al., 2021; Zimmerman et al., 2018).

Mental disorders affect people across all socio-demographic characteristics (Njoku, 2022). The National Association on Mental Illness (NAMI) (2023) indicated that in the United States in 2021, the onset of lifetime mental disorder was 50% for people aged 14 and 75 percent for people aged 24. Mental disorders affect one in five adults, and serious mental disorders affect one in 20 adults each year (NAMI, 2023). Among youth, one in six aged 6 to 17 had a mental disorder, and the second leading cause of death was suicide among youth aged 10 to 14 years (NAMI, 2023). Individuals with mental disorders experienced low positive mental health and poor health outcomes (Vaingankar et al., 2020). Serious mental disorders were associated with reduced life expectancy (Ilyas et al., 2017).

The spectrum of mental disorders involves high risks of comorbidity (Garcia-Gutierrez et al., 2020). Mental disorders, such as major depressive and suicidal behaviors (Veisani et al., 2017), anxiety, and hypertension (Qiu et al., 2023) were highly correlated. Chronic physical conditions such as cardiovascular disease, diabetes, cancer, and osteoporosis were found to be common comorbidities with mental disorders (Ma et al., 2021). Also, adult women with mental distress at >23 days/month showed greater risks of obesity, arthritis, asthma, diabetes, COPD, and coronary heart disease than men (Liao et al., 2022).

SUD can manifest concurrently with a range of other mental disorders, including depressive disorders, anxiety and mood disorders, schizophrenia, and post-traumatic

stress disorder (NIDA, 2022b; SAMHSA, 2023). In analyzing the effects of co-occurring SUD and mental disorders, it is critical to understand the interrelated factors of the condition. Co-occurring SUD and mental disorders involve the intersection of genetic predispositions and environmental stressors, compulsive substance use to moderate effects of other underlying mental disorders, and neurological changes in the brain from chronic substance use (National Institute on Mental Health, 2023). People may use substances to cope with symptoms of mental disorders such as depression, anxiety, and schizophrenia. Persistent use of mind-altering substances can adversely affect cognitive functioning (Mohamed et al., 2020). Co-occurring substance use and mental disorders also involve high risks for drug overdose, homelessness, involvement with criminal justice systems, poor physical health, and developing chronic conditions such as hepatitis, HIV, and AIDS (Keen et al., 2022; Peters et al., 2015; SAMHSA, 2023).

In the United States, co-occurring substance use and mental disorders affected approximately 9.5 million adult women, of which 94.1% had no treatment in the past year (SAMHSA, 2022). For this population, family responsibilities and perceived stigma can be critical barriers to seeking treatment (Agterberg et al., 2020). Also, perceived coercion into treatment may affect motivation for treatment engagement (Theodoridou et al., 2012). At 6-month follow-up, increased mental distress and substance use were found among patients in mandated treatment versus voluntary treatment (Pasareanu et al., 2017). Despite the complex needs of women with co-occurring SUD and mental disorders, positive reinforcement and increased access to treatment can contribute to decreased risks for relapse (Andersson et al., 2023).

Medication for Addiction Treatment

SUD encompasses a range of evidence-based interventions that aim to support heterogeneous populations with varied needs for sustained recovery (American Psychiatric Association, 2020; Center for Substance Abuse Treatment, 2004). Effective treatment assesses and responds to motivational, physiological, and social issues related to SUD, including the perception of risk, health condition, histories of substance use, trauma experience, past treatments, housing, legal matters, and social connections. Such assessment can inform treatment approaches and related dimensions of care (American Society of Addiction Medicine, n.d.).

The modalities of treatment for SUD can include pharmacotherapy to moderate brain dysregulation from certain substances such as alcohol and opioids (Douaihy et al., 2013). The pharmacological treatment of SUD encompassed three federally approved medications for opioid use disorder, which were indicated as *Methadone* – a synthetic opioid agonist that emulates similar brain effects as other opioids such as heroin, *Buprenorphine* – a partial opioid agonist that binds and partially simulates brain receptors, and *Naltrexone* – an opioid antagonist that fully blocks opioid receptors and euphoric effects (NIDA, 2021a). Other medications, such as Disulfiram and Acamprosate, have been employed to treat symptoms of AUD with varying effects (McGovern & Carroll, 2003). Often referred to as medication for addiction treatment (MAT) or medication for opioid use disorder (MOUD), the described pharmacological interventions were indicated as best practice when provided in conjunction with psychotherapy to promote recovery (United States Food and Drug Administration, 2023).

This therapeutic approach recognized that medication alone may not fully address the behavioral and social needs of people with SUD. Comprehensive MAT treatment can facilitate the pharmacological mitigation of neurological impairments, correction of maladaptive behaviors through cognitive and behavioral therapy, and social connectedness through sustained recovery support (Ray et al., 2020; van Reekum et al., 2020; Volkow, 2020).

Despite the ongoing drug epidemic and extensive evidence on the efficacy of MAT, gaps in pharmacotherapy remain. Volkow (2020) called attention to the issue that no specific medication was developed for substances such as cocaine and methamphetamine. In treating cocaine and methamphetamine addiction, clinical approaches adopted treatments formulated for other conditions, such as attention deficit hyperactivity disorder (ADHD), nicotine, and opioid-related disorder, with varied outcomes (Karila et al., 2010; Trivedi et al., 2021).

The National Institute on Drug Abuse (2023b) indicated that in 2021, of the 2.5 million adults aged 18 and older in the United States with opioid use disorder, one in five (22 percent) were engaged in pharmacotherapy. Within the same year, women with opioid use disorder showed lower adjusted odd ratios (AOR, 0.17; 95% CI, 0.04-0.71) for receiving MOUD than men (Jones et al., 2023). The lesser rate of MOUD engagement was notwithstanding other key underlying factors such as a higher rate of unemployment, incarceration, and less education among women with opioid use disorder than men (Longinaker & Terplan, 2014). SUD medications have facilitated evidence-based practice for withdrawal management, treatment induction, and relapse prevention (Douaihy et al.,

2013). Demonstrations of efficacy in pharmacologic treatment for SUD include decreased drug use, improved health, and retention in treatment (Amura et al., 2022; Fullerton et al., 2014; Mattick et al., 2014),

Yet, among women with SUD, engagement in MOUD may involve apprehension due to limited health literacy, perceived potential for stigma and retaliation, inability to disclose trauma history, and financial and geographic barriers (Boeri et al., 2021; Gallagher et al., 2022). Mandated MOUD treatment may motivate continuous engagement when the needs for specialty care are prioritized (Longinaker & Terplan, 2014; Lucabeche & Quinn, 2021). These aspects are critical when considering the potential association between MOUD and retention in SUD treatment among women after ICC.

Voluntary SUD Treatment Retention

The effectiveness of long-term engagement in SUD treatment has been documented (McKay, 2021). Despite the positive prospects of SUD treatment, there was contrasting evidence on mandated treatment (Huang et al., 2021; Werb et al., 2015). Endorsing mandated SUD treatment aims to prevent harm and promote sustained recovery (Slocum et al., 2023). For women who are deemed at risk of harm to themselves and others, involuntary treatment may present the opportunity to contemplate and seek continuous treatment and recovery. Hence, voluntary treatment retention after civil commitment entails willful engagement in SUD treatment and related services.

The SUD treatment continuum included various therapy options in facility-based (inpatient) and community (outpatient) settings and supportive services. Adherence to

appropriate treatment can promote successful transitions across levels of care (Mee-Lee & Shulman, 2003). As a chronic disease, continued SUD treatment and support can encourage abstinence and promote positive health outcomes, social relationships, and the ability to fulfill daily activities and responsibilities (McKay, 2021).

Studies on treatment retention among women indicated varied outcomes. When combined with primary care, ongoing substance use and psychiatric services were positively associated with long-term sobriety at up to nine years of follow-up (Chi et al., 2011). Rivera et al. (2021) compared retention among women who were referred to mandated and voluntary residential treatment and found greater retention in days among women in mandated treatment, and retention rates decreased as co-occurring mental disorders rates increased. Women who remained in residential treatment for six months or longer and achieved their treatment goals showed greater abstinence rates post-treatment (Greenfield et al., 2004).

Greenfield and colleagues (2004) emphasized that while retention in days was important, women's engagement in achieving their treatment goals was also critical to sustaining their recovery. Engaging in treatment involves collaboration in the therapeutic alliance between the individual and treatment provider and motivation for change (Forrest, 2021). These findings demonstrated the need for further examination of diverse factors that may be associated with retention in treatment.

Covariates Age, Race/Ethnicity, Housing, Drug Use, and DCF Services

Age

SUD can affect people across the lifespan. As the drug epidemic persists, in-utero exposure to substances remains a critical public health issue and research focus (Hudson et al., 2023; Ross et al., 2015). For every 1,000 newborns, about six were diagnosed with neonatal abstinence syndrome (NAS) based on symptoms related to fetal exposure from maternal substance use (CDC, 2022a). In utero and postnatal exposure to substances can be associated with health consequences such as low birth weight and neurological and developmental complications (Jansson & Patrick, 2019). Further exposure to violence, neglect, and trauma in childhood can present risks of mental distress and predisposition for SUD in adolescence and later years (Wisdom et al., 2022).

According to the National Center for Drug Abuse Statistics (2023), in the United States, the highest concentration of drug use was among people aged 18 to 25, followed by 26 to 29 at rates of 39 percent and 34 percent, respectively. Age of onset was also a critical factor and determinant of SUD. It was estimated that 70% of people under the age of 13 who use illicit substances developed SUD within the next seven years, versus 27 percent of people over age 17 (National Center for Drug Abuse Statistics, 2023). McCabe et al. (2022) studied the long-term potential for SUD in a cohort over 32 years and found that multiple substance use symptoms during adolescence predicted two or more SUD symptoms in adulthood. Current trends indicate an increase in SUD among people over 40 years. Among people aged 50 and older, drug-related deaths increased by 3% each year (National Center for Drug Abuse Statistics, 2023).

Across all ages, women experienced substance use differently than men. Studies on adolescent girls showed that substance use trends were commonly related to risk

factors such as low self-esteem, poor self-image, depression, and stressors (Schwinn et al., 2016; Stevens et al., 2009). Substance use among young adult women predicted negative sexual health outcomes, including sexually transmitted infections, unplanned pregnancies, and preterm births (Stidham et al., 2013). The combination of prescription drug use, comorbid conditions related to aging, and changes in family and social relationships may contribute to substance use among older adult women (Dowling et al., 2008). The constellation of the noted lifespan risk factors and impacts was indicated in women in ICC for SUD treatment.

Race/Ethnicity

The intersection of race/ethnicity and SUD represents another key component in understanding the factors that are related to ICC in women with SUD. Race and ethnicity refer to societal classifications of people based on origin, ancestry, physical traits, nationality, and culture (Flanagin et al., 2021). While recognizing the heterogeneity in racial and cultural identities among women with SUD (Burlew et al., 2021), in this study, race/ethnicity were reported based on the secondary dataset structure and definitions for American Indian/Alaskan Indian, Asian, Black/African American, Spanish /Hispanic/Latino, Native Hawaiian or Pacific Islander, White, Other.

Despite the pervasiveness of SUD, the evidence suggested that race and ethnicity were significantly related to people's disparate experiences with SUD and health outcomes (Hill et al., 2023). Among women with SUD, race and ethnicity can be associated with differences in drug use patterns, adverse outcomes, treatment-seeking behavior, and access to treatment and related services. National estimates on past year

illicit substance use in 2015-2019 showed higher rates for women aged 12 and older of two or more races (26.1%) and American Indian or Native women (23.9%) when compared with women of other racial/ethnic groups. Also, higher rates of past-year alcohol use were indicated for White women aged 12 and older than other racial/ethnic groups (Center for Behavioral Health Statistics and Quality, 2021). Wang et al. (2022) found increased patterns of SUD among Asian American and Pacific Highlander (AAPI) women, with more pronounced trends indicated within subgroups of AAPI women. In Massachusetts, the recent increase in opioid-related overdose deaths (2.5%) between 2021 and 2022 was significantly overrepresented by non-Hispanic Black residents, including a 47% increase among non-Hispanic Black women (Commonwealth of Massachusetts, 2023d; Massachusetts Department of Public Health. (2023).

Treatment-seeking behavior among women with SUD varied significantly based on race and ethnicity. Farahmand et al. (2020) emphasized the influence of systemic racism as a fundamental issue that perpetuates conditions for SUD among non-White women. Such conditions were evident in public policies and practices that disparately promoted punitive approaches for SUD treatment (Braveman et al., 2022; Lindsay & Vuolo, 2021). In a longitudinal study on prenatal substance use interventions between 1973 to 2005, Paltrow and Flavin (2013) found that African American women were disproportionately adjudicated (74%) versus White women. Structural barriers that affect income, education, housing, and healthcare can inhibit access to SUD treatment (Bailey et al., 2017). Persistent inequities may engender fear of punishment, perceived stigma, limited health literacy, and provider mistrust (Verissimo & Grella, 2017). The scarcity of

specialized treatment that fosters racially and ethnically appropriate services can also contribute to feelings of stunted social support (Pinedo, Zemore, & Mulia, 2022; SAMHSA, 2020). Notwithstanding SUD severity and the heightened awareness of the drug epidemic, non-White women indicated lower odds of SUD treatment initiation. Non-Hispanic Black and Hispanic women were significantly less likely to seek treatment for opioid use disorder during pregnancy and postpartum (Schiff et al., 2020; Suntai, 2021). Longer waiting times to receive urgent care and coordination for services can also delay treatment seeking (Goldfarb et al., 2023).

The literature highlighted the need for more representative samples in studies to examine the extent of inequities related to race and ethnicity in women with SUD and their connection with treatment engagement and retention (Guerrero et al., 2014; Wang et al., 2022). Culturally responsive treatment can contribute to overcoming systemic barriers and promote engagement (Jemal et al., 2020). Correspondently, focused studies on stratified groups may further elucidate the effects of SUD treatment (Parlier-Ahmad et al., 2022).

Housing Status

Housing and SUD are interrelated social and personal elements that need to be understood with the effectiveness of SUD treatment for women in ICC. Housing is a critical health determinant that can be affected by several factors, including mental disorders and SUD. Mental stressors from homelessness can provoke a propensity for substance use, and homelessness may also arise because of SUD (Johnson & Fendrich, 2007). Women with SUD can experience high risks for homelessness. SAMHSA (2018)

states that homelessness involves a lack of fixed, ongoing, and adequate tenure. This included living on the streets, in shelters, transitional housing, as well as situations of departure from domestic violence with no residence or resources (SAMHSA, 2018).

Women accounted for a sizable portion of the overall homeless population in the country based on 2022 estimates of 38% (222,970) [U.S Department of Housing and Urban Development (HUD), 2022]. The homeless estimates among women reflected a five percent increase from 2020 versus a 2% increase for men (HUD, 2022). Nationally, people experiencing homelessness had increased rates of methamphetamine use (Shearer et al., 2022). In Massachusetts, substance use among homeless populations was widespread. A cohort study on people experiencing homelessness in the state ($n = 60,092$) found that one in four deaths resulted from drug-related overdose, and 91 percent of the deaths involved opioids (Fine et al., 2022).

The combined effects of SUD and homelessness in women are multifaceted. For example, substance use among women who are homeless was significantly associated with cardiovascular risks and more prevalent for cocaine use (Suen et al., 2023). Chronic homelessness involving persistent lack of adequate rest, exposure to harsh weather conditions, and violence may predict a range of comorbid conditions such as liver disease, kidney disease, cancer, pneumonia, skin infection, tuberculosis, and HIV/AIDS (O'Connell, 2005). Unstable housing and opioid use disorder were associated with increased hospitalization (Milaney et al., 2021). The lack of health insurance, transportation, and primary care services may contribute to the heightened use of hospital emergency departments (Moore & Rosenheck, 2017). Comorbid conditions such as

tobacco use, depression, and hypertension were prominent in hospital admissions for homeless women with SUD (Subedi & Ghimire, 2022).

Women who are coping with SUD and homelessness can have significant exposure to traumatic experiences, including intimate partner violence, homicide, and suicide (Kleinman & Morris, 2023). Greene et al. (2023) studied a cohort of 851 women to understand their trauma experiences with their substance use and homeless status. Almost all (99.9 percent) participants indicated lifetime experience with traumatic grief and separation, and 75.3 percent reported having five to seven distinct trauma experiences (Greene et al., 2023). Substance use and homelessness in women can involve risky sexual behavior and a propensity for incarceration (Kim et al., 2011). These findings suggest a need for comprehensive interventions. The principles for trauma-responsive approaches involve the awareness of trauma, safety promotion, therapeutic collaboration, resilience, and cultural identity (Purkey et al., 2018). Interventions that align with trauma-responsive principles may enhance needed support to navigate the effects of trauma (Green & Korchmaros, 2023).

The experiences with SUD and homelessness also include challenges in navigating treatment. Women in unstable housing or homelessness can be limited by services that require fixed tenure as a condition for access to treatment (Rizzo et al., 2022). Contextually, services that mandate proof of address or cannot support individuals with unstable housing may restrict access. As studies investigated lessons learned from the COVID-19 pandemic, more interest ensued in the use of technology to mitigate barriers to services (DeLaCruz-Jiron et al., 2023). Despite the recognized potential

benefits of technology for telehealth, further research was also suggested to understand better the mixed outcomes (Toseef et al., 2022).

One of the salient approaches in responding to the needs of women who experience SUD and homelessness is to provide stable housing. Among women in ICC, housing security may be critical for sustained engagement in treatment and recovery. Permanent supportive housing and case management include advocacy, tenancy preservation, and housing security services (Rog et al., 2014). Supportive housing services can be beneficial when awareness and individualized needs are prioritized (Owczarzak et al., 2013). Komaromy et al., (2023) studied a cohort of individuals ($N = 100$) who were experiencing chronic homelessness and provided low-threshold housing with concurrent SUD services. After one year of follow-up, 25% of participants moved into permanent housing, and 49% were treated (Komaromy et al., 2023). A key aspect of the interventions in the study by Komaromy et al. (2023) was the recognized need for harm reduction in serving a population at the initial stages of change and motivation.

Women in supportive housing and case management have indicated resilience, self-efficacy, and sobriety (Slesnick et al., 2023). Upshur et al. (2018) studied treatment motivation, use, and barriers among homeless women from 11 national Health Care for the Homeless clinics. Within the study population, women with SUD indicated significant polysubstance use, strong motivation, and a high rate of service engagement despite noted barriers such as experience with depression, high service costs, and coordination (Upshur, 2018). This approach also reflected the benefits of intensive specialized services such as homeless clinics.

Drug Use

As previously noted, women who use drugs can experience unique challenges than men. One of the key differences involves the expedited pace of consumption from first use among women (Fonseca et al., 2021). The rapid progression of drug use and dependence from onset was indicated in studies on women who use substances such as alcohol, cannabis, and opioids (Hernandez-Avila et al., 2004). Further risk patterns were noted for stimulant use (Mayo et al., 2019). Although the impacts of substance use were more pronounced among men, temporal trends indicated close to similar patterns in consumption and related effect rates among women. Between 2018 and 2020, age-adjusted mortality rates for alcohol increased by 14.7% per year among women versus 12.5 percent among men (Karaye et al., 2023). Drug-related overdose deaths significantly increased by 260 percent between 1999-2017 among women aged 30 to 64 (VanHouten et al., 2019). Trends of overdose-related deaths from fentanyl and methamphetamine use were similar between 2013-2016 and 2020 (D'Orsogna et al., 2023).

The effects of excessive alcohol abuse among women were associated with over 43,000 deaths, and approximately 18% of women aged 18 to 44 years endorsed binge drinking (CDC, 2022e). Physiologically, alcohol metabolized differently in women, and excessive drinking showed significant risks for comorbid conditions (Erol & Karpyak, 2015). Recognizing the increase in methamphetamine use, gender-based research also found greater psychiatric symptoms among women (Franke et al., 2022). These trends are relevant for research and may reflect the high-risk clinical profile of women who are in

ICC for SUD. This study included drug use as a variable to examine whether there is an association between types of substances used and retention in treatment.

Department of Children and Families (DCF) Involvement

Substance abuse among parenting women was associated with a range of negative effects on the physiological, cognitive, and social development of children (Chang, 2020; Cheng et al., 2022). The constellation of such risk factors for children and families may be consequential to the engagement of child protective services (CPS) agencies. As the CPS agency in Massachusetts, the DCF works to prevent child abuse and neglect by a parent or caregiver (Commonwealth of Massachusetts, 2024a). The conditions of child abuse and neglect include non-incidental harm, deprivation of basic needs for food, clothing, shelter, medical care, safety, education, and supervision (World Health Organization, 2022b). Parental substance abuse was corollary among children in protective services based on related harm potential (Ghertner et al., 2018; Palmer et al., 2022).

In fiscal year 2017, the total female admissions in MDPH BSAS licensed and funded programs was 35,491, of which about 63% had children ages 18 and under, and about 19% lived with their children (Commonwealth of Massachusetts, 2024b). Women with SUD often experience separation from their children due to circumstances related to their condition (Darlington et al., 2023; Lamonica & Boeri, 2020). The DCF mandates reporting prenatal substance exposure (Commonwealth of Massachusetts, 2024c). Prenatal exposure to substances such as alcohol and opioids presents significant risks for fetal alcohol spectrum disorders (FASD) and neonatal abstinence syndrome (NAS),

which are related to neurodevelopmental and physiological abnormalities at birth and adulthood (Dumbhare & Taksande, 2023; McHugh et al., 2018; Popova et al., 2023). Compulsive drug use can cause cognitive and physical impairment that limits the ability to fulfill parental responsibilities (Fox et al., 2013; Volkow & Blanco, 2023). Maternal SUD has been related to trauma, depression, anxiety, and mood disorders, which can hinder emotional connection and the ability to meet the physical and emotional needs of their children (Meulewaeter et al., 2019; Valeriote & Milligan, 2021).

Despite the harmful effects of substance abuse, women who engaged in SUD treatment indicated positive results, including voluntary retention and family reunification (Grub et al., 2021; Neo et al., 2021). Previous studies about the effects of CPS agency involvement on maternal SUD treatment engagement have reported different outcomes. While CPS may encourage women to engage in SUD treatment, fear of potential loss of child custody may also hinder treatment seeking (Fong, 2020; Mark et al., 2024; Rivera et al., 2021; Seay et al., 2017). Hence, in this study, it was imperative to analyze the relationship between the involvement of DCF and retention in SUD treatment.

Literature Gap Synopsis

The prevailing literature on ICC demonstrated diverse findings on potential risks, benefits, and perspectives. Still, fundamental differences between existing literature and this study are noteworthy. For instance, Rafful et al. (2018) used prospective cohort and targeted sampling methods to study the association between non-fatal overdose risks and involuntary drug treatment. The study population included Male and Female participants

(Rafful et al., 2018). Although Rafful and colleagues (2018) found associations between involuntary drug treatment and non-fatal overdose, the researchers also noted that SUD treatment options for participants were sparse. Limited treatment may have contributed to the heightened risks of overdose. Individuals in pre-contemplative and contemplative stages may be at greater risk for relapse and overdose. Hence, my study focused on women and considered the potential effects of pharmacotherapy and counseling on SUD behavior change as demonstrated through retention in treatment. Compared to the Rafful et al. (2018) study, Rivera et al. (2021) analyzed whether distinct types of referrals (i.e., mandated criminal justice, mandated child protective services, or voluntary) predicted retention in SUD treatment, with consideration of mental disorder diagnosis. Despite similarities with my study in terms of the population of women and inclusion of mental disorder diagnosis in the analysis, Rivera et al. studied women in a single SUD treatment program. The focus on one treatment entity may limit generalizability based on the inability to examine retention in different SUD treatment settings and modalities.

Given the scarce research on ICC for women with SUD in the United States, the literature search included studies from other countries. One of the studies was by Huang et al. (2021), which found comparably lowered relapse rates among individuals from ICC and voluntary SUD treatment. However, the study adopted a cross-sectional design, women were underrepresented, and drug use history among participants primarily involved methamphetamine (Huang, et al., 2021). As a key distinction, my study assessed whether different drug use patterns may moderate retention in treatment. Readiness for change can impact treatment-seeking behaviors, and longer monitoring periods may

facilitate deeper insight into the progression of change (Opsal et al., 2019). Whereas Opsal et al. (2019) analyzed motivation for change at a six-month follow-up, my study followed participants up to 12 months after discharge from ICC.

I also considered the literature on treatment adherence and drug use. In their studies on post-treatment injection drug use, Pasareanu et al. (2016) used a prospective cohort method to analyze drug use at a six-month follow-up. The study by Pasareanu et al. involved shared co-ed, co-located ICC, and voluntary treatment milieus. Also, few participants received post-treatment support. Among the same patient population, Pasareanu et al. (2017) analyzed levels of mental stress at baseline and six months post-treatment. Mental distress among ICC treatment participants remained high at follow-up and baseline levels compared to participants in voluntary treatment (Pasareanu et al., 2017). Recognizing the benefits of specialized treatment for women and continued support in the long-term recovery process, these key aspects informed the scope of my study.

Summary

The literature demonstrated the extent of the different effects of SUD on women in terms of the cognitive, biological, and social factors. It was indicated that women with SUD are exposed to significant vulnerabilities that can accelerate their substance use trajectory (Fonseca et al., 2021). SUD evolves through a series of stages. Effective treatment is necessary to align interventions with the stages of change (Messina et al., 2012). While ICC is employed as an alternative to mitigate risks and initiate SUD treatment, the knowledge of ICC effectiveness among women remains inconclusive. Few

studies have focused on women in ICC and factors that may be related to their treatment adherence. Hence, this study addressed a gap in the literature by focusing on the critical aspects of mental disorder diagnosis and MAT engagement to examine whether there might be an association with women's retention in treatment post-ICC. The next chapter includes an overview of the data analysis methods.

Chapter 3: Research Method

Introduction

The purpose of this quantitative retrospective cohort study was to analyze the relationship between mental disorder history, MAT engagement, and retention in voluntary treatment post-ICC for adult women in Massachusetts with SUD. This analysis used treatment episode data from the Massachusetts Department of Public Health Bureau of Substance Addiction Services (MDPH BSAS). The BSAS is the state's single licensing authority and a funder of SUD programs. In this capacity, licensed and funded SUD programs report treatment episode data to BSAS, which manages an expansive data repository on SUD treatment across the state.

Drug use has been an ongoing public health challenge in the state of Massachusetts. Although the state has an extensive history of compulsory treatment for mental disorders, ICC for SUD treatment was a recent strategy to address the public health crisis related to drug use. Research on the effects of ICC for women with SUD was limited. This study contributed to the research to inform policies and best practices on SUD treatment.

This chapter includes an overview of the rationale for the study's design. I provide an account of the literature that supported the appropriateness of the quantitative retrospective cohort model for this study. Next, I describe the study variables and present the methodology, including an explanation of the target population, sampling, data access, analysis, and interpretation approach. I also examine and provide a plan to

address threats to the validity of the design. Lastly, I present the study's procedures to address ethical concerns.

Research Design and Rationale

Chronic drug use poses significant threats to public health. Determining the factors that are associated with retention in voluntary SUD treatment among women after discharge from ICC may inform therapeutic approaches for people with SUD. This quantitative study adopted a retrospective cohort design and analyzed secondary data to determine the relationship between the variables of interest. In the first analysis, the independent variable was mental disorder history, and the dependent variable was voluntary SUD treatment retention (in days). For the second analysis, the independent variable was MAT, and the dependent variable was voluntary SUD treatment retention (in days). The third analysis combined the independent variables, mental disorders diagnosis and MAT, and the dependent variable, voluntary SUD treatment retention (in days). Across the three analyses, the covariates included age, race/ethnicity, drugs used, housing status, and DCF services.

Research questions are critical in defining a research agenda (Farrugia et al., 2010; Parathasarathy et al., 2023). In this longitudinal study, the quantitative retrospective cohort design aligns with the research questions, based on the intent to examine the potential relationships between mental disorder diagnosis, MAT engagement, and the dependent variable of voluntary treatment retention in days post-ICC. While qualitative research elucidates individual perspectives and experiences, quantitative research numerically examines phenomena (Creswell & Creswell, 2018).

Quantitative methods analyze relationships between variables to assess theories and assumptions (Creswell & Creswell, 2018). The quantitative approach also uses longitudinal data (Creswell & Creswell, 2018).

Researchers conduct cohort studies to examine the incidence, potential predictor, and cause of phenomena within a target group or sub-group of subjects over a specified period (Mann, 2003; Wang & Kattan, 2020). Cohort studies can involve observing secondary data (*retrospective*) or the natural evolution of an intended intervention (*prospective*; Andrade, 2022). While researchers gather data from current and future events in prospective studies, in retrospective studies, researchers analyze historical data collected for purposes unrelated to the study to infer outcomes (Song & Chung, 2010). Unlike experimental control studies that seek to identify cause and effect, the results of cohort studies are exclusively indicated as an association or relationship (Andrade, 2022). Cohort studies also differ from cross-sectional studies in which data is collected once to analyze the prevalence and potential relations between exposure and outcome (Mann, 2003). One benefit of cohort studies is the ability to analyze rare occurrences, though limitations can arise from insufficient cases (Mann, 2003). Cohort studies also facilitate examining diverse variables to reach conclusions on the relationships with the outcomes (Morrow, 2010).

The characteristics of the quantitative method were appropriate for this study, as the research questions involved variables most fittingly measured through statistical methods. In particular, the dependent variable (retention in treatment in days) numerically represents the subjects' continued engagement based on the number of days

they remain in voluntary SUD treatment after ICC. The retrospective cohort design aligned with this study, given the plan to longitudinally examine secondary data on SUD treatment episodes at ICC and voluntary treatment post-ICC.

Adopting a prospective cohort model was not feasible for this study based on the conditions for time and resources. The prospective design required the recruitment of subjects, baseline assessment, longitudinal, and post-follow-up monitoring (Wang & Kattan, 2020). Subject participation in prospective inquiries on civilly committed cohorts also included monetary incentives (Rafful et al., 2018). Lacking financial resources and time, these aspects presented significant challenges, among which include a potentially low recruitment rate due to the high-risk SUD population and loss to follow-up (Wang & Kattan, 2020).

Despite the paucity of research on ICC for SUD treatment, researchers have successfully used secondary data to advance knowledge on this topic and, more broadly, on SUD and related interventions. Considering my study's focus on Massachusetts, Maughan and Becker (2019) linked secondary data on treatment episodes from the Texas Department of State Health Services (DSHS) contracted SUD programs with DSHS vital records. It analyzed the relationship between drug-related death (in days) after SUD treatment and SUD treatment history, demographics, and drug use history. This retrospective model showed that among the studied cohort ($N = 178,749$), the highest odds of drug-related death were for individuals with opioid use disorder within 0 to 28 days after acute withdrawal management and residential treatment (Maughan & Becker, 2019).

In national-level studies, the Substance Abuse and Mental Health Services Administration (SAMHSA) Treatment Episodes Dataset (TEDS) was linked with state Medicaid data and vital statistics to assess MOUD outcomes for individuals in residential versus outpatient programs (Hartung et al., 2022). The potential for drop-out versus planned drug-free discharge from compulsory and voluntary SUD treatment was also studied (Beynon et al., 2006), as were the risks of mortality following compulsory treatment (Ledberg & Reitan, 2022).

This study was informed by the work of two recent retrospective cohort studies on compulsory treatment for SUD (Scarpa et al., 2023; Vuong et al., 2022). Scarpa et al. (2023) studied potential risks for ICC to SUD treatment and the association between ICC and substance use-related death from a cohort of 25,125 subjects. Focused on 20 years (1999 – 2019), Scarpa and colleagues linked the Swedish national addiction severity index (ASI) survey data from 144 municipalities with three other national datasets (Swedish National Board of Institutional Care, Swedish Causes of Death Register, and Swedish population registers) to obtain data on demographics, baseline addiction severity, ICC history, mortality, and related causes. The researchers conducted Cox regression analyses, discrete-time event-history effect logistic models, and propensity score matching to determine susceptibility for entering ICC and the association (in days) between ICC and mortality from alcohol and other drug use (Scarpa et al., 2023). Scarpa and colleagues found that women were more likely to be in ICC for SUD treatment, and ICC admission showed significantly greater odds for substance use-related mortality. As a notable difference between the work of Scarpa et al. (2023) and my study, the

secondary database from the state entities contained baseline addiction severity and demographic data, which may have required fewer steps in the statistical analysis.

Vuong et al. (2022) merged secondary data from the New South Wales Minimum Data Set for Drug and Alcohol Treatment Services (NSW MDS DATS) with NSW Emergency Department Data Collection (EDDC) and NSW Admitted Patient Data Collection (APCD) datasets to assess the relationship between hospital admissions and emergency department visits with ICC versus voluntary SUD treatment. Vuong et al. used data from a cohort of 231 subjects in ICC for SUD and 231 matched controls admitted in voluntary SUD treatment between May 1, 2011, and April 30, 2018, to assess hospital utilization within one year pre-and post-treatment. The researchers found that both (ICC vs. voluntary SUD treatment) groups had decreased hospital utilization post-treatment (Vuong et al., 2022). As my study aimed to assess the relationships between ICC and retention in voluntary treatment post-ICC, the study by Vuong et al. informed my research process. One distinction between the study by Vuong et al. and the current study involved using a Bayesian approach in the regression analysis, which allowed the inclusion of information from prior findings in the analysis (van de Schoot et al., 2014).

Methodology

The study's methodology is outlined herein. In the following section, I describe the target population, sample, and sampling procedure. This section also includes an overview of the data sources, collection, and access procedures. Lastly, I explain the data analysis plan, including statistical tests, and address internal and external validity threats.

Population

The target population comprised women aged 18 and older who were involuntarily civilly committed to SUD treatment in Massachusetts during the period of January 1, 2017, to December 31, 2019. Between 2017 and 2019 in Massachusetts, an estimated 516,000 (8.7% of the population) individuals aged 12 and older had SUD (Massachusetts Center for Health Information and Analysis, 2023). In 2017, female admissions to SUD treatment in the state were 35,491 (MA Department of Public Health Bureau of Substance Addiction, 2018). Of the 7,244 court clinic evaluations for ICC in FY2018, 36.4% were women (Massachusetts Department of Public Health, 2019).

Sampling and Sampling Procedures

As a retrospective cohort study, the sample was selected from secondary data on the Massachusetts ICC population of adult women civilly committed to SUD treatment. A simple random sampling strategy was adopted to select the sample. Sampling encompasses two distinct methods that involve the systematic selection of subjects (*non-probability or convenience sampling*) based on their convenience and accessibility and unsystematic assignment (probability or random sampling), where the odds of selection are equal for all subjects in the population (Creswell & Creswell, 2018). Random sampling limits the potential for systematic biases in the cohort selection process and underpins generalizing findings related to the population (Dziadkowiec et al., 2020; Elfil & Negida, 2017). As each subject's selection is by chance, one disadvantage involves the lack of assurance in obtaining a representative sample (Gravetter & Forzano, 2012). Using a secondary data set, the simple random sampling method provides the most suitable approach for the study.

The sample was randomly selected from the population of adult women in ICC for SUD treatment between January 1, 2017, and December 31, 2019. Sample selection was generated through Microsoft Excel using de-identified Client ID numbers. I used G*Power to calculate the sample size (Faul, et al., 2007). Using G*Power, multiple regression with an effect size (f_2) of 0.15, alpha level (α) of 0.05, power level ($1-\beta$) of 0.95, and 8 predictors generated a minimum sample size of 153. In examining the fundamentals of multiple regression and various rules-of-thumb that were adopted to determine minimum sample size, Green (1991) concluded that power analysis for a medium effect ($R^2 = .07$; $\beta = .20$) is based on the formula of $N \geq 104 + m$, where m = number of predictors. Based on the recommendations by Green (1991), a sample size of 110 ($N \geq 104 + 6$) was calculated for this study. This approach yielded a lower sample size than the calculation through G*Power.

Archival Data

ICC programs for women are licensed and funded by MDPH. As the licensing and funding agency, MDPH manages data related to ICC for women in the state. Data on intake, enrollment, and disenrollment from individual electronic medical records were reported to MDPH by SUD programs through a secure Enterprise Invoice/Service Management (EIM-ESM) system (Commonwealth of Massachusetts, 2023e). Service providers obtained consent from individuals receiving services during their enrollment to release client/confidential information to EIM/ESM. The data request for this study included:

- 1) Demographic information for women enrolled in ICC and/or voluntary SUD services from January 1, 2017, to December 31, 2019.
- 2) Enrollment in ICC and/or voluntary SUD services from January 1, 2017, to December 31, 2019.
- 3) Disenrollment in ICC and/or voluntary SUD services from January 1, 2017, to December 31, 2019.

The date range for the data request spans 2 years, allowing for 12 months (i.e., January 2017 – January 2018 or December 2018 – December 2019) of monitoring from ICC enrollment until the last date of the study’s period on December 31, 2019. This period aligned with the state’s statutory requirement for the maximum term of ICC orders of 90 days and allows for monitoring of subsequent voluntary SUD treatment (Commonwealth of Massachusetts, 2023f). In instances with more than one ICC enrollment, the analysis was based on the first episode within the study’s date range.

The MDPH required their Institutional Review Board (IRB) approval for data access. The documentation of data request approvals was included as an appendix in this manuscript. The MDPH IRB process also required prior approval by the Walden University IRB with documentation of the Walden IRB approval in applications for data access (See Appendix B). The MDPH requirement for data access requests included registering as an MDPH affiliate in IRBNet, through which data request applications were submitted, including project narrative, rationale for the request, and data storage plan (Commonwealth of Massachusetts, 2023g).

Variable Operationalization

The MDPH documentation of individuals served includes date of birth, client identification numbers, and dates of enrollment and disenrollment. Records that had missing enrollment and disenrollment dates were excluded.

Independent Variable

The independent variables were (a) mental disorder history and (b) MAT. The mental disorders history variable was based on two treatment enrollment indicators: 1) history of past mental disorder treatment, and 2) prescription of medication for mental or emotional conditions within the past 12 months. The variable MAT engagement was based on enrollment and disenrollment assessment indicators: 1) receipt of MAT before enrollment in the ICC program, 2) initiation of MAT during the ICC program, and 3) receiving MAT post-ICC.

Table 1*Independent Variable Operationalization*

Variable	Definition	Scale of measure	Method of data analysis
Prior mental health (MH) treatment	Self-reports on prior types of MH treatment received (if any)	Nominal	Reports of MH treatment history were re-coded into nominal variables: 0 = no; 1 = yes to history of MH treatment
Prescribed MH medications in the past 12 months	Self-reports of history of prescribed MH medications in the past year	Nominal	Reports of prescribed MH medications were grouped into nominal variables: 0 = yes; 1 = no; 2 = refused/unknown
MAT engagement	Self-reports on receiving MAT before ICC enrollment	Nominal	Reports on MAT engagement were grouped into the variables: 0 = receiving MAT before ICC enrollment; 1 = Continue to receive MAT during ICC; 2 = Started receiving MAT during ICC; 3 = Continue with MAT after ICC
MAT engagement	Self-reports on the type of MAT being received	Nominal	Reports on types of MAT received were recoded as 0 = methadone; 1 = suboxone/buprenorphine; 2 = vivitrol/injectable naltrexone

Dependent Variable

The dependent variable, voluntary SUD treatment retention (in days), denotes continuous enrollment in SUD treatment after discharge from ICC. Records of enrollment in voluntary SUD treatment from the original dataset were converted as new binomial

variables for the analysis. The MDPH enrollment form indicated the dates of enrollment in treatment, which were measured as absolute days enrolled in voluntary SUD treatment.

Table 2

Dependent Variable Operationalization

Variable	Definition	Scale of measure	Method of data analysis
Voluntary SUD treatment enrollment	Absolute date of enrollment in voluntary SUD treatment after ICC	Continuous	Reported as the absolute sum of days enrolled in voluntary SUD treatment

Covariates

The covariates included age, race/ethnicity, drugs used, housing status, and DCF services. The variable age was measured on a continuous scale and reflected as a whole number based on the indicated date of birth at enrollment in ICC. Race/ethnicity was categorized as American Indian/Alaskan Indian, Asian, Black/African American, Spanish/Hispanic/Latino, Native Hawaiian or Pacific Islander, White, or Other, and refused to answer. Housing status was reported as “house/living at home,” “near homeless,” and “homeless.” Drugs used reflect discrete self-reports of drugs used. The DCF services covariate was measured on a nominal scale as “Yes/No.” Outcomes for the covariates were determined using frequency distributions.

Table 3*Covariates and Operationalization*

Variable	Definition	Scale of measure	Method of data analysis
Age	Self-reports of date of birth at intake	Continuous	Reported as whole numbers calculated from date of birth at enrollment
Drugs used	Self-reports on types of drugs used	Nominal	Reports of drugs used were coded as: 0 = Alcohol; 1 = Cocaine; 2 = Crack; 3 = Heroin; 4 = Fentanyl; 5 = Marijuana; 6 = Methamphetamine; 7 = Prescribed opiates; 8 = Other
DCF services	Self-reports on services received through DCF	Nominal	Reports of DCF services were grouped into nominal variables: 0 = yes; 1 = no; 2 = refused/unknown
Housing status/address type	Self-reports of address types	Nominal	Reports of address type were coded as: 0 = home; 1 = near homeless; 3 = homeless
Race/ethnicity	Self-reports of race	Nominal	Reports of race/ethnicity were coded as: 0 = American Indian/Alaskan Indian; 1 = Asian; 2 = Black / African American; 3 = Native Hawaiian or Pacific Islander; 4 = Spanish /Hispanic/Latino; 5 = White; 6 = Other; 7 = Unknown /Refused

Data Analysis Plan

The data management and analysis for this study was conducted using Microsoft Excel and SPSS Statistics for Windows, Student Edition, Version 28.

Data Cleaning

As noted above, various ICC programs report into the principal data warehouses from which the data for the analysis originated. Recognizing the potential for inherent flaws in the data, pre-processing measures, through frequency analysis, were adopted to address critical factors such as missing data, duplicate records, data noise, and outliers. The SPSS-29 software and Microsoft Excel were utilized to identify inconsistencies, code missing values, and address outliers (IBM, 2021; SUNY Empire State University, 2023).

Research Questions and Hypotheses

The analysis was based on the following research questions and hypotheses:

RQ1: What is the predictive relationship between mental disorder history and voluntary SUD treatment retention (in days) in women post-discharge from ICC for SUD, controlling for age, race/ethnicity, drugs used, housing status, and DCF services?

H_01 : There is no statistically significant predictive relationship between mental disorder history and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services.

H_a1 : There is a statistically significant predictive relationship between mental disorder history and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services.

RQ2: What is the predictive relationship between MAT engagement and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services?

H₀2: There is no statistically significant predictive relationship between MAT engagement and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services.

H_a2: There is a statistically significant predictive relationship between MAT engagement and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services.

RQ3: What is the predictive relationship between mental disorder history, MAT engagement, and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services?

H₀3: There is no statistically significant predictive relationship between mental disorder history, MAT engagement, and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services.

H_a3: There is a statistically significant predictive relationship between mental disorder history, MAT engagement, and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services.

Statistical Tests

Multiple regression modeling estimated the degree of the predictive relationship between the variables (Laerd Statistics, 2018; Slinker & Glantz, 2008; Uyanik & Guler, 2013). The first assumptions for conducting a multiple regression analysis include having a continuous scale dependent variable and two or more continuous or categorical scale independent variables (Laerd Statistics, 2018). These assumptions aligned with the study's variables as indicated. Further tests of multiple regression assumptions include assessments of independence of observation, linearity, homoscedasticity, multicollinearity, observation of outliers, and normal distribution of the residuals (Alexopoulos, 2010; Laerd Statistics, 2018). Verifications for each assumption were demonstrated through statistical assessments that include the Durbin-Watson statistic, Predicted Probability (P-P) plot for normality, scatterplot for homoscedasticity and linearity, and multicollinearity (Ernst & Albers, 2017).

Univariate descriptive statistics were utilized to describe the study sample. Frequency analysis examined data distribution (Kotronoulas et al., 2023). The hypotheses were assessed through bivariate analyses of the predictive relationship between the independent variables (mental disorder history and MAT engagement, respectively) and the dependent variable, voluntary SUD treatment retention in days (Kalan et al., 2021). The overall significance of the coefficients was assessed through *F*-test statistics (Sureiman & Mangera, 2023).

Interpretation of Results

The study results were interpreted using a *p*-value >0.05 as the benchmark for statistical significance with a 95% confidence interval (CI; Aguinis et al., 2021; Akoglu,

2018). Relative to the effect size, as the correlation coefficient demonstrates the intensity of a linear relationship from a range of -1 to 1, a correlation coefficient of 0.8 was considered (Kotronoulas et al., 2023).

Threats to Validity

This study was based on secondary data from MDPH (MDPH enrollment and disenrollment in ICC and voluntary SUD treatment). A potential threat to validity includes inaccuracies in the data, related transfer, and coding process. The original data stems from electronic health records (EHR) not collected for this study. This may affect the suitability of the data elements (Goldstein, 2020). Also, data from the EHRs include self-reported information that may introduce biases (Rosenman et al., 2011). Plans to address these threats included adherence to the data use instructions from MDPH, the data cleaning process, and sample sizing.

Ethical Procedures

A principal ethical consideration for this study involves the study's population of women with SUD. Drug addiction and mental disorders are highly stigmatized conditions. Stigma reflects negative attitudes and behaviors toward a personal characteristic (Yang et al., 2017). The stigma of SUD and mental disorders is associated with discriminatory policies, norms, and practices that lead to harmful impacts, including the fear of disclosing and seeking treatment (Yang et al., 2017). Careful consideration of factors such as terms, concepts, and data are necessary to prevent the potential for stigma from this study.

The Health Insurance Portability and Accountability Act of 1996 (HIPAA) ensures the privacy and confidentiality of protected health information (CDC, 2022d). United States Code of Federal Regulations Title 42 Chapter 1 Part 2 imposes further restrictions on disclosing information on individuals with SUD (National Archives, 2023). Adherence to privacy and confidentiality policies includes the assurance of informed consent. The data source (MDPH) ensures individuals' consent (i.e., during program enrollment) for data collection and confidential publication. In addition to the Walden IRB approval, MDPH requires prior approval of data requests. The IRB vetting process ensures ethical standards for secure data storage, management, and publication. This study adhered to the conditions for data access by ensuring appropriate data security, encryption, and de-identified release. After the completion of the analysis, the dataset for the study was destroyed per the MDPH IRB data disposal agreements (See Appendix D).

Summary

The increasing rates of substance use and related adverse impacts have engendered interest in alternative solutions, including compulsory treatment for SUD. Few studies in the United States have examined the relationship between ICC and post-commitment SUD treatment retention in women. This retrospective cohort study aimed to expand the literature by focusing on this research gap. This chapter provided an overview of the methodology, including the data collection, analysis, and interpretation plans. Chapter 4 will include a synopsis of the results.

Chapter 4: Results

Introduction

In this quantitative retrospective cohort study, I analyzed the association between mental disorder history, MAT, and voluntary treatment engagement in days among adult women who were in ICC for SUD. This study addressed a critical gap in the literature by focusing on factors that may be related to SUD treatment engagement. Long-term engagement in treatment can be a desired clinical outcome for sustained recovery in women with SUD. The study's results can inform the best practices for initiation and retention in SUD treatment. This chapter includes an overview of the data collection and analysis process and findings from descriptive statistics and multi-linear regression analyses. The study addressed the following research questions and hypotheses:

RQ1: What is the predictive relationship between mental disorder history and voluntary SUD treatment retention (in days) in women post-discharge from ICC for SUD, controlling for age, race/ethnicity, drugs used, housing status, and DCF services?

H₀: There is no statistically significant predictive relationship between mental disorder history and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services.

H_a: There is a statistically significant predictive relationship between mental disorder history and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services.

RQ2: What is the predictive relationship between MAT engagement and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services?

H₀2: There is no statistically significant predictive relationship between MAT engagement and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services.

H_a2: There is a statistically significant predictive relationship between MAT engagement and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services.

RQ3: What is the predictive relationship between mental disorder history, MAT engagement, and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services?

H₀3: There is no statistically significant predictive relationship between mental disorder history, MAT engagement, and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services.

H_a3: There is a statistically significant predictive relationship between mental disorder history, MAT engagement, and voluntary SUD treatment retention (in

days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services.

Data Collection and Analysis

The secondary data for this study was collected from MDPH after my data request through IRB Net and IRB approval by Walden University (See Appendix B and C). The data was transmitted as an Excel file through the Commonwealth of Massachusetts Managed File Transfer platform. The extracted dataset encompassed the study's period from January 1, 2017, to December 31, 2019. The raw data set contained 2,691 unduplicated cases, distinguished by client ID numbers. From the original dataset, 172 cases were excluded due to missing treatment episode dates. Of the remaining 2,519 eligible cases, a random sample of 500 cases was generated for analysis.

Data Coding and Risk Adjustment

The study sample was inspected to identify and code missing data. Based on the MDPH data dictionary, code "997" was entered for all missing data fields. Coding was conducted in Excel to create the independent variables (IV) (mental disorder history and MAT engagement) and the dependent variable (DV) [voluntary SUD treatment retention (in days)].

Coding of the Dependent Variable

The treatment enrollment and disenrollment dates in the original sample dataset were converted from eight-digit serial numbers to a date format. Total days in treatment were calculated for 12 months from the first ICC enrollment date. New variables were created to report total ICC episodes ("Total Sec35"), the DV of voluntary SUD treatment

in days (“TotalVolTx Days”), and overall total treatment days (“TotalTxDays”) within 12 months.

Coding of the Independent Variables

The variable for mental disorders history (“Mental Disorder Hx”) was created from data on mental health treatment (counseling and psychiatric hospitalization) and prescription histories. Mental disorder history was coded “0” for no history and “1” for history indicated. In the original sample dataset, MAT history was reported based on the type(s) of medication (Methadone, Buprenorphine, Naltrexone), whether received or not. A new variable (“MAT Engagement”) was created and coded as “0” for no MAT engagement and “1” for MAT engagement as indicated.

Coding of the Controlling Variables

The controlling variables include age, race/ethnicity, primary drugs used, housing status, and DCF services. The variable age was coded as age bands in SPSS: 19-30, 31-41, 42-52, 53-63, and 64-72. The remaining variables retained the codes from the original dataset and were labeled in SPSS accordingly.

Descriptive Statistics

To adhere to the MDPH confidentiality rules and procedures for data reporting, I suppressed cells of zero to five cases within the “Other” category in the demographic frequency distribution tables (Massachusetts Executive Office of Health and Human Services, 2012). The sample’s ages ranged from 19 to 72 ($M = 35.77$, $SD = 11.94$) (Table 4). As shown in Table 5, the largest concentration (72%) was between the 19 to 41 age group.

Table 4*Descriptive Statistics for Quantitative Variables (N=500)*

Variable	Mean	Std. deviation
Age (N=500)	35.77	11.938

Table 5*Frequency Distribution of Controlling Variables (N=500)*

Variable	Frequency	%
Age (N=500)		
19-30	210	42.0%
31-41	150	30.0%
42-52	76	15.2%
53-63	55	11.0%
64-72	9	1.8%

The demographic characteristics of race and ethnicity showed that 421 (84.2%) cases were White and 391 (78.2%) were North American. This was the largest group represented in the sample. Black and African American cases comprised 5.6% of the sample, the second largest group, followed by Other Asian, Native Hawaiian, Other Pacific Islander, and American Indian/Alaskan Native, which consisted of 4.8% of the group (Table 6, Table 7).

Table 6*Frequency Distribution of Controlling Variables (N=500)*

Variable	Frequency	%
Race (N=500)		
White	421	84.2%
Black or African American	28	5.6%
Multiracial	19	3.8%
Other, Asian, Native Hawaiian/Other Pacific Islander, American Indian/Alaskan Native	24	4.8%
Unknown	8	1.6%

Relative to ethnicity, 391 (78.2%) cases identified as North American. Also, 27 (5.4%) identified as Puerto Rican, and 20 (4.0%) indicated their race as European.

Table 7

Frequency Distribution of Controlling Variables (N=500)

Variable	Frequency	%
Ethnicity (N=500)		
African	14	2.8%
European	20	4.0%
North American	391	78.2%
Other, Dominican, Mexican, Central American, Brazilian, Cape Verdean, Other Portuguese, Other Asian, Salvadoran	32	6.4%
Puerto Rican	27	5.4%
Unknown	16	3.2%

Among the study subjects, heroin (41.2%) was the most used primary drug, followed by alcohol (39.6%) (Table 8). Most of the subjects, 427 (85.4%), endorsed living in a house or apartment, and 54 (10.8%) were unhoused and living on the streets (Table 9). Although 61.6% of the sample were parents, 16.8% had children under 18 and lived with their children (Table 10). Also, 40 (8.0%) subjects received DCF services (Table 10).

Table 8

Frequency Distribution of Controlling Variables (N=500)

Variable	Frequency	%
Primary drug use Hx (N=500)		
Alcohol	198	39.6%
Benzodiazepines	18	3.6%
Cocaine	25	5.0%
Crack	28	5.6%
Heroin	206	41.2%
Marijuana, PCP, methamphetamine, Rx opiates	11	2.2%
Non-Rx opiates	14	2.8%

Table 9*Frequency Distribution of Controlling Variables (N=500)*

Variable	Frequency	%
<i>Housing at enrollment (N=500)</i>		
House/apartment	427	85.4%
Room/boarded house, group home, shelter, refused	19	3.8%
Streets	54	10.8%

Table 10*Frequency Distribution of Controlling Variables (N=500)*

Variable	Frequency	%
<i>Parent (N=500)</i>		
Does not have children	190	38.0%
Has children	308	61.6%
Refused	2	0.4%
<i>Parenting status 1 (N=500)</i>		
Does not live with child <6yrs	462	92.4%
Lives with child <6yrs	38	7.6%
<i>Parenting status 2 (N=500)</i>		
Does not live with child 6-18yrs	454	90.8%
Lives with child 6-18yrs	46	9.2%
<i>DCF services (N=500)</i>		
No DCF services	457	91.4%
DCF services	40	8.0%
Missing	3	0.6%

Cases of mental disorders were prevalent in the study sample, as 379 (75.8%) were indicated with prior mental health counseling, prescription, or hospitalization history (Table 11). Most of the subjects, 362 (72.4%), received MAT. The types of medication received were primarily indicated as unspecified. Among the cases that reported MAT types, 76 (15.2%) were Buprenorphine, 67 (13.4%) were Methadone, and 33 (6.6%) were Naltrexone (Table 11).

Table 11

Frequency Distribution of Independent Variables (N=500)

Variable	Frequency	%
Mental disorder: Mental disorder Hx (N=500)		
Mental disorder Hx	379	75.8%
MAT engagement: MAT engagement Hx (N=500)		
MAT Hx	362	72.4%
MAT Type (N=500)		
Buprenorphine Tx	76	15.2%
Methadone Tx	67	13.4%
Naltrexone Tx	33	6.6%

The overall length of treatment was assessed across the sample to compare the mean and standard deviation for total treatment days ($M = 83.19$, $SD = 91.946$), number of ICC episodes ($M = 1.40$, $SD = 3.032$), and total voluntary treatment days ($M = 55.55$, $SD = 89.686$; Table 12).

Table 12

Descriptive Statistics for Quantitative Variable – Length of Treatment (N=500)

Variable	Mean	Std. deviation
Total Tx days	83.19	91.946
Total civil commitment episodes	1.40	3.032
Total voluntary Tx days	55.55	89.686

Results

Multiple Regression

Using the entry method, I analyzed the predictive relationship between the variables by concurrently entering the predictors (mental disorder history and MAT engagement) and outcome [voluntary treatment retention (in days)]. The Durbin-Watson statistics were 1.939 and confirmed the independence of residuals (Table 13). The scatter

plots showed collective and separate linear relationships between the dependent and independent variables. Homoscedasticity was indicated based on visual inspection of the spread of studentized residuals versus unstandardized predicted values.

Multicollinearity was not indicated, as all tolerance values were greater than 0.1. The studentized deleted residuals were inspected, and six cases with residuals greater than ± 3 SDs were found and filtered out. The leverage point values showed six cases with values in the 0.3 risky range that were also filtered. There was no Cook's distance value above 1. The assumptions of normality were violated based on the P-P Plot distribution of residuals that showed a moderately positive skewed distribution with a value range between -1 and -0.5. The model fit was not strong, R^2 12.0%, representing a small effect. The overall model was statistically significant $F(8, 491) = 9.524, p < .05$ (Leard Statistics, 2018; Table 14).

Table 13

Model Summary

Model	R	R square	Adjusted R square	Std. error of the estimate	Durbin-Watson
1	.367 ^a	.134	.120	84.122	1.939

Table 14

Mode Fit Summary

Model	Sum of squares	Df	Mean square	F	Sig.
1 Regression	539164.425	8	67395.553	9.524	<.001 ^b
Residual	3474537.325	491	7076.451		
Total	4013701.750	499			

Research Question 1: What is the predictive relationship between mental disorder history and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services? The null hypothesis indicated no statistically significant predictive relationship between mental disorder history and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services. The alternative hypothesis indicated that there is a statistically significant predictive relationship between mental disorder history and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services.

After removing the outliers, I re-ran the multiple regression analysis by entering each independent variable separately, starting with the mental disorder history variable and the covariates. The Durbin-Watson statistics showed independence of residuals (1.888), and the partial regression plot for the model showed a linear relationship. There was homoscedasticity from the visual inspection of the studentized residuals versus unstandardized predicted values. There was no indication of multicollinearity based on tolerance values greater than 0.1. The assessment of outliers showed no studentized deleted residuals greater than ± 3 SDs; leverage values were less than 0.2, and no Cook's Distance values above 1. The residuals from the histogram and P-P Plot indicated moderately positive skewness.

The model was a poor fit with an adjusted R^2 of 10.0%, representing a small effect (Leard Statistics, 2018). The coefficient for mental disorder history was 59.294. The

range of plausible values indicated that the 95% confidence interval (CI) was between a low bound of 41.302 and a high bound of 77.286, $p < .05$. Mental disorder history statistically significantly predicted voluntary SUD treatment retention (in days) $F(7, 486) = 8.826, p < .05$. Therefore, the null hypothesis was rejected. However, when controlling for age ($p = .186$), race ($p = .179$), ethnicity ($p = .822$), drugs used ($p = .098$), housing status ($p = .069$), and DCF services ($p = .679$), no statistically significant association was found, therefore failing to reject the null (Table 15).

Table 15

Multiple Regression for Mental Disorder History and Voluntary Treatment Engagement

	Unstandardized B	Coefficients std. error	Standardized coefficients beta	t	Sig.	95.0% Confidence interval for B	
						Lower bound	Upper bound
(Constant)	14.709	16.532		.890	.374	-17.773	47.192
Mental disorder Hx	59.294	9.157	.284	6.475	<.001	41.302	77.286
Age ranges	-.443	.334	-.059	-1.324	.186	-1.099	.214
Race	-.023	.017	-.059	-1.347	.179	-.056	.011
Ethnicity	.004	.018	.010	.225	.822	-.031	.040
Primary drug use Hx	1.461	.882	.073	1.656	.098	-.272	3.195
Housing at enrollment	4.320	2.372	.079	1.821	.069	-.342	8.982
DCF services	-5.930	14.334	-.018	-.414	.679	-34.095	22.235

Research Question 2: What is the predictive relationship between MAT engagement and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services? The null hypothesis indicated no statistically significant predictive relationship between MAT engagement and voluntary SUD treatment retention (in days) in women

post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services. The alternative hypothesis indicated that there is a statistically significant predictive relationship between MAT engagement and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services.

I followed a similar process and entered the MAT engagement variable and the covariates for the second regression model. The Durbin-Watson statistics of 1.880 indicated independence of residuals. The partial regression plots test for linearity showed a linear relationship between the dependent and independent variables. Homoscedasticity was indicated from the plot of studentized residuals versus unstandardized predicted values. The test for multicollinearity showed all tolerance values as greater than 0.1. There were no outliers greater than ± 3 SDs. Leverage values were less than 0.2, and no Cook's Distance values were above 1. The histogram and P-P Plot distribution of the residuals displayed moderately positive skewness.

Although the model was a poor fit, $R^2 = 4.6\%$ (Leard Statistics, 2018), the relationship between MAT engagement and voluntary SUD treatment (in days) was statistically significant $F(7, 486) = 4.396, p < .05$. The null hypothesis was rejected. The coefficient for MAT engagement was 31.137. The range of plausible values indicated that the 95% confidence interval (CI) was between a low bound of 13.509 and a high bound of 48.765. There was no statistically significant association with the controlling variables, age ($p = .158$), race ($p = .199$), ethnicity ($p = .675$), drugs used ($p = .193$), housing status (p

=.018), and DCF services ($p = .658$), and therefore failing to reject the null hypothesis (Table 16).

Table 16

Multiple Regression for MAT Engagement History and Voluntary Treatment Engagement

	Unstandardized B	Coefficients std. error	Standardized coefficients beta	t	Sig.	95.0% Confidence interval for B	
						Lower bound	Upper bound
(Constant)	37.321	16.964		2.200	.028	3.990	70.652
MAT engagement Hx	31.137	8.972	.156	3.471	<.001	13.509	48.765
Age ranges	-.489	.346	-.065	-1.414	.158	-1.169	.191
Race	-.023	.018	-.058	-1.287	.199	-.057	.012
Ethnicity	-.008	.019	-.019	-.420	.675	-.044	.029
Primary drug use Hx	1.186	.911	.060	1.303	.193	-.603	2.975
Housing at enrollment	5.755	2.428	.105	2.371	.018	.985	10.524
DCF services	6.459	14.602	.020	.442	.658	-22.232	35.150

Research Question 3: What is the predictive relationship between mental disorder history, MAT engagement, and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services? The null hypothesis indicated no statistically significant predictive relationship between mental disorder history, MAT engagement, and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services. The alternative hypothesis indicated that there is a statistically significant predictive relationship between mental disorder history, MAT engagement, and voluntary SUD treatment retention (in days) in

women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services.

I ran the third regression model with both independent variables and the covariates. The tests of the assumptions indicated no multicollinearity. The Durbin-Watson statistic was 1.916. There were no outliers greater than ± 3 SDs. The leverage point values were less than 0.2, and no Cook's Distance values were above 1. The histogram and P-P Plot distribution of residuals indicated moderately positive skewness. Although the model was a poor fit, the results of the multiple regression were significant, $F(8, 485) = 9.398, p < .05, R^2 = .12$ (Tables 17 and 18). Both predictors were significant, with mental disorders ($B = .281, t = 6.468, p < .001$) providing a higher contribution to the model than MAT engagement ($B = .149, t = 3.465, p < .001$).

Table 17

Model Summary

Model	R	R square	Adjusted R square	Std. error of the estimate	Durbin-Watson
1	.366 ^a	.134	.120	84.004	1.916

Table 18

ANOVA

Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	530574.026	8	66321.753	9.398	<.001 ^b
	Residual	3422482.980	485	7056.666		
	Total	3953057.006	493			

Table 19 depicts the regression summary. The regression formula is $Y = -10.480$ (mental disorder) $+ 58.579$ (MAT engagement) $+ 29.867$. Mental disorder history and MAT

engagement statistically significantly predict voluntary treatment engagement (in days). The null hypothesis was rejected. However, the p values for the controlling variables were greater than .05, age ($p = .402$), race ($p = .225$), ethnicity ($p = .887$), drug used ($p = .156$), housing status ($p = .099$), and DCF services ($p = .622$). Therefore, failing to reject the null hypothesis (Table 19).

Table 19

Multiple Regression for Mental Disorder History and MAT Engagement

	Unstandardized B	Coefficients std. error	Standardized coefficients beta	t	Sig.	95.0% Confidence interval for B	
						Lower bound	Upper bound
(Constant)	-10.480	17.891		-.586	.558	-45.633	24.673
Mental disorder Hx	58.579	9.057	.281	6.468	<.001	40.783	76.375
MAT engagement Hx	29.867	8.619	.149	3.465	<.001	12.932	46.803
Age	-.280	.334	-.037	-.839	.402	-.936	.376
Race	-.021	.017	-.053	-	.225	-.054	.013
Ethnicity	.003	.018	.006	1.216	.887	-.033	.038
Primary drug use Hx	1.243	.875	.062	1.421	.156	-.476	2.961
Housing at enrollment	3.888	2.349	.071	1.655	.099	-.729	8.504
DCF services	-6.986	14.178	-.021	-4.93	.622	-34.844	20.872

Post Hoc Analysis

Voluntary SUD treatment engagement can be related to mental disorders and MAT history. After removing the outliers and running the multiple regression analyses, I used the compare means procedure to assess the averages across the total voluntary treatment days with mental disorders and MAT engagement history. As shown in Table 20, the total number of cases with no mental disorder history was about three times less

than cases with mental disorder history. The MAT history was three times greater between cases with mental disorders than no mental disorders. Among cases with a mental disorder history, the difference in average voluntary treatment days between those with MAT history and no MAT history was 44.85 days. Within the total sample, the difference in the average voluntary treatment days between MAT and no MAT history was 36.51.

Table 20

Descriptive Statistics (Compare Means) for Voluntary Treatment Days by Mental Disorders and MAT History

Total voluntary Tx days						
Mental disorder Hx	MAT engagement Hx	Mean	N	Std. deviation	Minimum	Maximum
No mental disorder Hx	No MAT Hx	6.32	38	29.597	0	179
	MAT Hx	8.33	82	39.142	0	296
	Total	7.69	120	36.278	0	296
Mental disorder Hx	No MAT Hx	37.70	99	74.304	0	340
	MAT Hx	82.55	275	100.135	0	344
	Total	70.68	374	95.963	0	344
Total	No MAT Hx	28.99	137	66.450	0	340
	MAT Hx	65.50	357	95.097	0	344
	Total	55.38	494	89.533	0	344

Summary

The above multiple regression analyses examined the predictive relationship between mental disorder history, MAT engagement, and voluntary SUD treatment retention (in days), controlling for age, race/ethnicity, drug use, housing status, and DCF services. The initial model with all variables revealed outliers greater than ± 3 SDs. After excluding the outliers, I reran the model for each independent variable with the covariates based on the research questions.

For the first research question (RQ 1), the model was a poor fit and explained 10.0% of the variance in voluntary treatment days. The model showed a statistically significant relationship between mental disorder history and voluntary treatment (in days) ($p < .05$). Therefore, the null hypothesis was rejected. However, the results failed to reject the null hypothesis when controlling for the variables age ($p = .186$), race ($p = .179$), ethnicity ($p = .822$), drugs used ($p = .098$), housing status ($p = .069$), and DCF services ($p = .679$).

Research question two (RQ 2) found a statistically significant relationship between MAT engagement and voluntary treatment in days ($p < .05$). The null was rejected. The model was a poor fit and only explained 4.6% of the variance in the voluntary treatment days. Given the small-scale R^2 value, the model's predictability was less precise. When controlling for the covariates, no statistically significant relationship was found for age ($p = .158$), race ($p = .199$), ethnicity ($p = .675$), drugs used ($p = .193$), housing status ($p = .018$), and DCF services ($p = .658$). Therefore, the results failed to reject the null.

The regression model for research question three (RQ 3) assessed the predictive relationship between both independent variables (mental disorder history and MAT) and the dependent variable (voluntary treatment in days) while controlling for age, race/ethnicity, drug use, housing status, and DCF services. There was a statistically significant relationship between mental disorder history, MAT engagement, and voluntary treatment in days ($p < .05$). The null hypothesis was rejected. Mental disorder history and MAT accounted for 12% of the variance in voluntary SUD treatment in days.

When controlling for the covariates age ($p = .402$), race ($p = .225$), ethnicity ($p = .887$), drugs used ($p = .156$), housing status ($p = .099$), and DCF services ($p = .622$), no statistically significant relationship was found.

Mental disorders history and MAT engagement can affect SUD treatment outcomes. In Chapter 5, I explain the results and explore connections and variations in literature. I also describe the study's limitations. Finally, I provide recommendations for future studies and implications for social change.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

This study employed a quantitative retrospective cohort design to analyze the relationship (if any) between mental disorders, MAT engagement, and voluntary retention in treatment for women after ICC for SUD. The research questions enquired whether there was a predictive relationship between the independent variables, mental disorder history and MAT engagement, and the dependent variable voluntary treatment (in days), controlling for age, race/ethnicity, drug use, housing status, and DCF services. This chapter highlights the key findings, limitations, and implications for research and social change.

Using Excel software, a sample of 500 was randomly selected out of 2,519 eligible cases. The data analysis encompassed multiple regression, descriptive statistics, and descriptives by comparing means. The sample was predominantly White (84%) with a mean age of 36. Heroin and alcohol were the primary drugs used. Also, most of the sample had housing, did not have children under 18, and did not receive DCF services. The sample had a mean of 1.4 ICC episodes and 55.55 voluntary treatment days post-civil commitment within the one-year study period.

In the initial test of the assumptions of multiple regression, unusual points greater than ± 3 were identified, and assumptions for normality were violated as the P-P Plot and histogram distributions showed moderately positive skewness between the -1 and -0.5 range. After removing the outliers, the model for each research question was analyzed again. The multiple regression models indicated a statistically significant ($p < .05$)

relationship between the independent variables (individually and combined) and the dependent variable. However, I did not find a statistically significant relationship when the covariates were included in the model.

Research question one (RQ1) focused on mental disorders and treatment retention: What is the predictive relationship between mental disorder history and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services? The assumptions of multiple regression, including independence of observations, homoscedasticity of residuals, multicollinearity, and outliers, were not violated. While observing for normality, the histogram distribution and P-P Plots showed moderately positive skewness. The model was a poor fit with modest R^2 values that accounted for 10% of the variance in voluntary treatment (in days). Mental disorders statistically significantly predicted voluntary treatment (in days) ($p < .05$). The null hypothesis was rejected. There was no statistically significant relationship with the covariates of age, race/ethnicity, drugs used, housing status, and DCF services, and therefore, failing to reject the null.

The second research question (RQ2) considered the effect of MAT engagement: What is the predictive relationship between MAT engagement and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services? Although the tests of the assumptions for the independence of observations, homoscedasticity, and multicollinearity did not depict any violation, the histogram and P-P Plot

distributions indicated moderate positive skewness. The model showed a poor fit, with a small effect size, $R^2 = 4.6$. The results revealed a statistically significant relationship between MAT engagement and voluntary SUD treatment (in days). The null hypothesis was rejected. However, there was no statistically significant association with the controlling variables of age, race/ethnicity, drugs used, housing status, and DCF services, and therefore, failing to reject the null hypothesis.

Research question 3 (RQ3) examined the relationship between both independent variables (mental disorders and MAT engagement) and voluntary treatment retention: What is the predictive relationship between mental disorder history, MAT engagement, and voluntary SUD treatment retention (in days) in women post-discharge from ICC, controlling for age, race/ethnicity, drugs used, housing status, and DCF services? As noted above, the multiple regression assumptions for the independence of observations, homoscedasticity, and multicollinearity were not violated, and the inspection for normality showed a moderately positively skewed distribution. The overall model was a poor fit, with 12% of the variance in voluntary treatment (in days) explained. Both independent variables (mental disorders and MAT engagement) indicated a statistically significant relationship with the dependent variable (voluntary treatment in days), and the null was rejected. The covariates did not depict a statistically significant relationship, and the null was not rejected.

Interpretation of Findings

The results showed a preponderance of cases with mental disorder history. This observation is consistent with the national trends on women with SUD as a growing

health concern. For instance, in assessing the prevalence of mental illness, Terlizzi and Norris (2021) found that in 2020, more women endorsed having a history of mental health treatment than men (25.6% and 14.6% respectively). The National Survey on Drug Use and Health indicated that in 2022, 11.1 million (8.5%) adult women surveyed had co-occurring substance use and mental disorders (SAMHSA, 2024). This was an increase of 17% from the 2020 total of 9.5 million (SAMHSA, 2022b).

Psychiatric comorbidities in women with SUD have been studied. The literature suggested that women were more likely to use substances to cope with symptoms of mental health conditions such as anxiety, depression, interpersonal conflicts, trauma, and ACES (Kalo, 2020). Research also showed that women with SUD can experience stigma and discrimination that provoke and exacerbate mental illness. In a study by Matsumoto et al. (2021), women indicated that persistent exposure to marginalization, and attitudes of being untrustworthy, and lesser than others significantly affected their emotional health, including depression and post-traumatic stress disorder.

Untreated mental health may influence the propensity for substance use. Mental illness severity was associated with polysubstance use among women during pregnancy (Li et al., 2024) and post-partum (Stewart et al., 2023). Stewart and colleagues (2023) studied seven states with the prevalence of drug-related deaths. The researchers found that substance use was greater among pregnant women with six or more stressful life events in the year before giving birth (67.1%) and four ACES (57.9%; Stewart et al., 2023). Substance use and mental illness during pregnancy can present multi-generational health and social challenges (Cook et al., 2017; Racine et al., 2020). Despite the known

risk factors and growing adverse effects, gaps in access to co-occurring substance use and mental disorder treatment for women persist (SAMHSA, 2024).

Engagement in MAT Services

In this study, mental disorder history and MAT engagement significantly predicted variance in voluntary treatment in days ($p < .05$). More cases with mental disorder history received MAT. The cases that received MAT were not readmitted to ICC and stayed approximately 45 days longer in voluntary treatment than those that did not receive MAT. In the overall sample, cases that received MAT had an average of 37 more voluntary treatment days post-ICC. The voluntary treatment received within the studied period may have consisted of continuous services in residential settings or outpatient counseling and pharmacotherapy (Chou et al., 2023; Newberger et al., 2024; Winders Davis et al., 2024). These observations from the study are critical when considering the persistent barriers and need for specialized treatment for women (Agterberg et al., 2020). Similar outcomes were indicated regarding the association between MAT and treatment retention (Justesen et al., 2020; Mattick et al., 2009; Wilder et al., 2017).

Continued treatment adherence can improve the likelihood of abstinence and long-term recovery. Research on MAT showed effectiveness in reducing cravings, withdrawal symptoms, and illicit drug use (Amura et al., 2022; Spayde-Baker & Patek, 2023). MAT services were associated with decreased viral infection rates among incarcerated individuals (Springer et al., 2018). MOUD was also linked with decreased opioid-related deaths (Wakeman et al., 2020). The results of this study suggest that MAT

engagement for women in ICC can be beneficial in improving their length of stay in treatment.

Theoretical Assessment

The theoretical framework for this study was the TTM stages of change. The TTM conceives that human behavior change occurs through a sequence of stages over time that begin with an individual's unwillingness to change in the next six months (*pre-contemplation*), progress to the awareness and hope for change in six months (*contemplation*), followed by willingness to act in one month (*preparation*), engagement in behavior change for six months (*action*), and end with the complete endorsement and ongoing adoption of behavior change (*maintenance*; Hunter, 2024). This theoretical framework informed the study's conceptualization of the dependent variable, voluntary treatment in days. Specifically, the study assumed that length of stay in voluntary treatment after ICC could indicate willful adherence and progress toward the desired behavior change to recover from SUD.

ICC has been adopted as a last resort for individuals deemed harmful to themselves and others due to their unwillingness or unawareness of the need for behavior change (Silcox et al., 2024). This study regarded women in ICC at the pre-contemplation stage as a baseline assessment (Reuter, 2022). As previously noted, ICC was deemed necessary for women who were pre-contemplative due to mental disorders, fear, stigma, psychological stressors, and the lack of awareness and access. This study analyzed the potential effects of mental disorder history and MAT engagement in women's behavior change progression while controlling other related covariates. The findings suggested that

despite the prevalence of co-occurring mental disorders history, MAT engagement was associated with continuance in treatment.

Limitations of the Study

As a retrospective cohort study, the inherent limitations of the model are noteworthy (Wang & Kattan, 2020). The study assessed voluntary continuation in treatment after ICC. One of the principal limitations involves the data source. The study was based on secondary data from MDPH BSAS that was not originally collected for this analysis. The administrative data originated from SUD treatment programs licensed and funded by MDPH BSAS. Data from certain programs, such as outpatient and opioid treatment programs, were underreported due to limited data submission.

Also, the dataset did not represent all SUD treatment programs in the state. In particular, the dataset did not include cases from ICC programs operated by the Massachusetts Department of Mental Health (DMH) and the Department of Corrections (DOC). Cases from the DOC were intentionally excluded as they involved other legal aspects, such as women with criminal charges, on bail, and pending trial. Furthermore, MDPH BSAS did not collect data from non-contracted MAT prescribers.

Another limitation involves missing data. The data fields included client demographics, enrollment, and disenrollment data. The dataset required extensive cleaning and re-coding of missing data, which may have introduced biases in the analysis. Moreover, the underreporting of MAT data limited the ability to analyze and report the specific types of MAT used. Lastly, the dataset included self-reported information by program participants. Data entry was conducted across multiple programs

by various data collectors. These aspects warrant consideration for potential confounders in the reporting (Fumo-Dos-Santos & Ferreira, 2023; Schuster et al., 2023).

Recommendations

This study was based solely on data from MDPH BSAS contracted programs. During the study period, ICC programs for women in the state were operated under MDPH BSAS and DMH. Most of the ICC and voluntary SUD programs were overseen by MDPH BSAS. The DMH operated one ICC program for women that opened in 2016. Data from the DMH ICC program was not yet available at the time of the data request for this study. Future studies can include the DMH-operated ICC program to obtain a more generalizable sample (Degtiar & Rose, 2023).

During the COVID-19 pandemic, census at SUD programs in the state were significantly affected as few individuals sought treatment in congregated facilities. This study excluded the COVID-19 period to avoid data noise related to the pandemic (Andrade, 2023). Studies on the effects of untreated SUD during the COVID-19 pandemic can bridge the gaps in the literature. Also, it is critical to examine the pandemic-related outcomes among high-risk groups with SUD, including women, Black, Indigenous, and People of Color (BIPOC) that have experienced high rates of overdose, co-occurring conditions, and limited treatment access in the state (Friedmann et al., 2023).

Additionally, this study focused on voluntary retention in SUD treatment among women with a history of ICC. A range of personal and social factors can challenge retention in SUD treatment. Apsley and colleagues (2024) explored the barriers that

women experience in their treatment journey and found that women were challenged by the lack of adequate insurance coverage, knowledge of complex treatment systems, and childcare to engage in treatment. Women were also concerned about losing their parental rights and accessing providers that were willing to prescribe MAT (Apsley et al., 2024). Similar research can be expanded to compare the retention in treatment between women with a history of ICC versus voluntary treatment.

Although the results found statistically significant relationships between the independent and dependent variables (IVs: mental disorders, MAT engagement, DV: voluntary treatment in days), I did not find a statistically significant relationship with the controlling variables of age, race/ethnicity, drugs used, housing status, and DCF services. Retention and completion of SUD treatment have been studied concerning the social determinants of health (Baird et al., 2023), demographic and socioeconomic factors (Lucabeche & Haney, 2018), co-occurring and co-morbid conditions (Jones et al., 2023). For instance, Lucabeche and Haney (2018) found that treatment retention was significantly greater among White participants versus Black, Hispanic, and other race/ethnicity counterparts. Also, among the cases studied, the older age of first use was significantly associated with greater odds of treatment completion (Lucabeche & Haney, 2018). Researchers can follow similar methods to continue highlighting the effects of demographic and socioeconomic disparities in SUD treatment retention.

Implications for Positive Social Change

While the prevalence of drug use has historically been concentrated among men, recent reports indicate that rates of substance use and related fatalities are increasingly

leveling among men and women (CDC, 2021). The current trends emphasize the need to examine the underlying conditions further to inform strategies for positive social change. As previously noted, women are uniquely affected by substance use than men. On an individual level, women experience onset and metabolize substances differently (Zakinaeiz & Potenza, 2018). Women also have a greater predisposition to the negative physiological consequences of substance abuse (Cornish & Prasad, 2021; NIDA, 2020).

Active substance use in women of childbearing age can pose significant generational risks. Maternal drug use is associated with long-lasting health and social consequences, including premature birth, low birth weight, developmental challenges, and ACES (Chang, 2020; Koponen et al., 2020). The impairment from substance use may hinder women's ability to emotionally connect and fulfill parenting responsibilities and lead to child neglect and maltreatment (Powell et al., 2024). Older adult women have shown significant disparities in treatment retention when compared across race and ethnicity (Suntai et al., 2020). Despite these consequences, studies indicated that women with SUD were less likely to seek treatment due to a low perception of risk, stigma, financial stressors, fear of adjudication, and the loss of custody of their child (Darlington et al., 2023; Nichols et al., 2020; Pinedo et al., 2020).

Women with SUD need specialized treatment to address their unique challenges. Various evidence-based models have been established to inform the assessment, initiation, and treatment retention for women with SUD. Effective treatment approaches for women align the severity of SUD with compatible therapeutic and supportive services (Flannigan et al., 2023; Hunter, 2023). Comprehensive interventions must recognize the

diversity among women in terms of their sociodemographic background, types of substances used, and related co-occurring conditions (SAMHSA, 2021). Treatment programs that uphold women's racial/ethnic identities and linguistic abilities can foster participation, a sense of belonging, and retention (Bui et al., 2022; Suntai et al., 2020). SUD can be associated with trauma across the lifespan. Trauma-informed interventions provide the opportunity to mitigate the effects of exposure to violence and traumatic experiences.

In responding to the needs of women with SUD, it is also important that interventions are tailored to the stages of change and motivation. For instance, women in the pre-contemplative stage of change can benefit from peer recovery coaching and support. Studies have shown that as part of the support network for individuals with SUD, peers with lived experience can provide first-hand knowledge and guidance to access treatment and resources (Stanojlovic & Davidson, 2021). Women with SUD also need targeted education about the disease of substance addiction and related services. Lack of information may delay the initiation of treatment. Community health workers can provide education and support women in navigating complex healthcare and SUD treatment systems.

SUD is a chronic disease. Evidence-based treatment of women with SUD requires the incorporation of counseling and pharmacotherapy. Existing research suggests that treatment with pharmacotherapy demonstrated a significant reduction in drug use, relapse, and mortality (NIDA, 2021b). Among women, retention in MAT was also associated with improved maternal and fetal health outcomes (Wilder et al., 2017). Such

findings need to be replicated to expand knowledge on the options for recovery from SUD.

As previously noted, the heterogeneity of women with SUD needs to be recognized in research. There remains a substantial need for studies that reflect and increase understanding of the diverse groups of women with SUD, treatment access challenges, and opportunities to achieve better health outcomes (Burlew et al., 2021; Webb et al., 2022). Lastly, further research can elucidate the effects of stigma. As societal norms and beliefs about women with SUD continue to perpetuate stigma, studies are needed to demonstrate the efficacy of treatment and enlighten the field on effective approaches to eradicate stigma.

Conclusion

The purpose of this study was to examine the relationship between mental disorder history, MAT, and voluntary treatment retention in women with a history of ICC. I selected this topic to address a gap in the literature. Few studies have focused solely on the population of women with a history of ICC. As a high-risk group, it is imperative to understand the factors that are associated with treatment retention and recovery. The findings indicated a statistically significant relationship between the variables. I included the controlling variables of age, race/ethnicity, drug use, housing status, and DCF services to understand the effects of sociodemographic influences further. Although the findings did not indicate a statistically significant relationship between the controlling variables, future studies may explore different approaches to understand the effects better.

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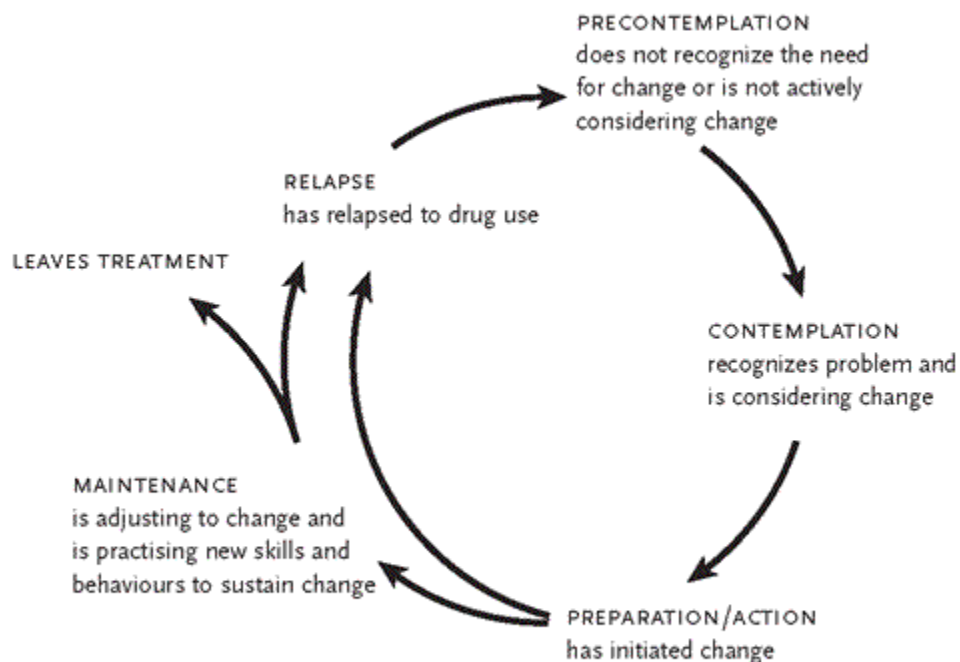
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Appendix A: Transtheoretical Model Stages of Change

Stages of change



Source: Prochaska, J., Norcross, J. & DiClemente, C. (1995). *Changing for Good: A Revolutionary Six-Stage Program for Overcoming Bad Habits and Moving Your Life Positively Forward*. New York: Avon Books.

Appendix B: Walden University IRB Approval



100 Washington Avenue South, Suite 1210
Minneapolis, MN 55401 Phone 612-312-1210

March 7, 2024

Dear Lydie Ultimo,

This email is to notify you that the Institutional Review Board (IRB) confirms that your study entitled, "Substance Use Disorder Involuntary Civil Commitment and Association with Post-Commitment Treatment Retention Among Adult Women," meets Walden University's ethical standards. Our records indicate that you will be analyzing data provided to you by the Massachusetts Department of Public Health as collected under its oversight. Since this study will serve as a Walden doctoral capstone, the Walden IRB will oversee your capstone data analysis and results reporting. The IRB approval number for this study is 12-20-23-1021419 which expires when your student status ends.

This confirmation is contingent upon your adherence to the exact procedures described in the final version of the documents that have been submitted to IRB@mail.waldenu.edu as of this date. This includes maintaining your current status with the university and the oversight relationship is only valid while you are an actively enrolled student at Walden University. If you need to take a leave of absence or are otherwise unable to remain actively enrolled, this is suspended.

If you need to make any changes to your research staff or procedures, you must obtain IRB approval by submitting the IRB Request for Change in Procedures Form. You will receive confirmation with a status update of the request within 1 week of submitting the change request form and are not permitted to implement changes prior to receiving approval. Please note that Walden University does not accept responsibility or liability for research activities conducted without the IRB's approval, and the University will not accept or grant credit for student work that fails to comply with the policies and procedures related to ethical standards in research.

When you submitted your IRB materials, you made a commitment to communicate both discrete adverse events and general problems to the IRB within 1 week of their occurrence/realization. Failure to do so may result in invalidation of data, loss of academic credit, and/or loss of legal protections otherwise available to the researcher.

Both the Adverse Event Reporting form and Request for Change in Procedures form can be obtained on the Tools and Guides page of the Walden website: <https://academicguides.waldenu.edu/research-center/research-ethics/tools-guides>

Doctoral researchers are required to fulfill all of the Student Handbook's [Doctoral Student Responsibilities Regarding Research Data](#) regarding raw data retention and dataset confidentiality, as well as logging of all recruitment, data collection, and data management steps. If, in the future, you require copies of the originally submitted IRB materials, you may request them from Institutional Review Board.

Both students and faculty are invited to provide feedback on this IRB experience at the link below:

<https://www.surveymonkey.com/r/B6FDTJT>

Sincerely,

A handwritten signature in blue ink that reads "Caroline Wright".

Caroline Wright
Research Ethics Support Specialist
Research Ethics, Compliance, and Partnerships
Walden University
100 Washington Avenue South, Suite 1210
Minneapolis, MN 55401
Email: irb@mail.waldenu.edu
Phone: (612) 257-6505

Information about the Walden University Institutional Review Board, including instructions for application, may be found at this link: <http://academicguides.waldenu.edu/researchcenter/orec>

Appendix C: Massachusetts Department of Public Health IRB Approval



The Commonwealth of Massachusetts
 Executive Office of Health and Human Services
 Department of Public Health
 250 Washington Street, Boston, Massachusetts 02108-4619
 Institutional Review Board and Data Access

FWA
 00000786
 MDPH IRB
 00000701

DATE: April 24, 2024
 TO: Lydie Ultimo
 Walden University
 FROM: Massachusetts Department of Public Health
 PROJECT TITLE: [2140145-5] Substance Use Disorder Involuntary Civil Commitment and Post-Civil Commitment Treatment Retention Among Adult Women
 SUBMISSION TYPE: Amendment/Modification
 ACTION: APPROVED
 APPROVAL DATE: April 24, 2024
 EXPIRATION DATE: October 23, 2024
 REVIEW TYPE: M.G.L. c.111 §24A

The Commissioner of the Massachusetts Department of Public Health (MDPH) has approved your request to conduct your study, [2140145-5] Substance Use Disorder Involuntary Civil Commitment and Post-Civil Commitment Treatment Retention Among Adult Women using confidential MDPH data in accordance with M.G.L. c. 111, §24A.

You are responsible for ensuring continued compliance with your sponsoring institution's requirements for IRB oversight.

Authorization to conduct this study pursuant to M.G.L. c.111, §24A, provides you access to the confidential MDPH data described in your final application, subject to the general conditions specified below and any project-specific conditions listed in your final application. You are responsible for ensuring the confidentiality and security of these data and must abide by the terms and conditions of this approval. If these conditions are not met, the Department may rescind this authorization and deny you further access to confidential records.

1. Limitations on the Use of Data. Data access is granted for the years and variables listed in your final application. The data provided shall be used only for the purposes set forth in your application and any approved amendments. Any other uses of the data or changes to the protocol will require an approved amendment or a new 24A application prior to implementation.

This approval may not be transferred to another investigator without first submitting an amendment request for review and approval.

No database linkages may occur unless specified in your final application. When data are combined from multiple sources, the resulting combined dataset is subject to all conditions in this approval.

2. Confidentiality. Confidentiality of the data shall be strictly maintained, as specified in your application and any approved amendments. No person participating in this study shall disclose, in any manner, the data so obtained except in strict conformity with such study and the conditions specified in this authorization, unless otherwise authorized by MDPH.

No person participating in this study shall in any way attempt to determine, or allow anyone else to attempt to determine, the identity of any data subject unless authorized to contact data subjects as specified in your final application.

Confidential study data may not be transmitted via facsimile or electronically without specific authorization from MDPH.

3. Access to the Data. This authorization provides access to confidential data for the purposes of this approved study only; it does not convey ownership of the data. Access to the data shall be limited to you and the additional individuals named in your final application or an approved amendment.

The data provided for this study may not be shared with anyone else without prior approval from MDPH.

It is your obligation to ensure that all study personnel, including any approved contractors or subcontractors, understand and comply with required conditions for accessing Department data, including secure handling and management of files or paper records. A Researcher Pledge of Confidentiality must be signed by all persons who will have access to the data, and submitted with this letter to MDPH by email to DPH.IRB@state.ma.us to complete your project approval prior to release of the requested information. Access to the data shall be limited to those who have signed the pledge.

Written notification to MDPH, in the form of an amendment submitted through IRBNet, is required prior to any changes in personnel who will access these data. The enclosed Researcher Pledge of confidentiality pledge must be submitted prior to allowing new staff to access study data.

4. Security/Unauthorized Access. You must report to MDPH at DPH.IRB@state.ma.us any unauthorized access by, or disclosure of data to, persons not authorized by this approval. Failure to report violations of confidentiality or security may result in penalties and termination of your access to confidential Department data.
5. Compulsory Legal Process. In the event you are requested or compelled, through a subpoena, discovery request, court order or any other form of compulsory legal process, to provide any information or copies of any documents, records or other materials obtained by you pursuant to the provisions of M.G.L. c.111, §24A in connection with your study, you must contact MDPH at DPH.IRB@state.ma.us immediately and comply with the Department's requirements related to compulsory legal process..
6. Publications. All publications or reports of analyses shall involve only aggregate data and no personally identifying information or other information that could lead to the identification of any data subject shall ever be published or publicly disclosed in any manner.

No report of these data containing statistical cells with one through four (<5) subjects shall be released, except with prior written approval from MDPH. When small cells are suppressed, additional cells that would allow the computation of the suppressed cells' values must also be suppressed.

No maps that could lead to the identification of a study subject shall be published or released.


If you believe that your publication or presentation may include small numbers without compromising confidentiality of the data, you must submit your draft to MDPH at DPH.IRB@state.ma.us prior to submittal for publication to ensure that MDPH confidentiality requirements are met. It may be publicly released or submitted for publication only after written approval of MDPH is received.

7. Reporting Requirements. All unanticipated problems or adverse events must be reported promptly to this office by calling (617) 624-5621 or (617) 624-5647. In addition, all complaints regarding this project from study subjects or issues of non-compliance with MDPH Research Policies must be immediately reported by phone or secure email. Use the appropriate reporting forms for this procedure when documenting through IRBNet. All FDA, sponsor, or other IRBs' reporting requirements must also be followed.

8. Renewal. A request for renewal must be submitted at least 30 days but no more than 60 days prior to the expiration date of this approval if you wish to continue your study beyond the expiration date. At that time, all study personnel must be reminded of their obligation to protect and securely manage the data provided and created during the course of the study. As long as you continue to hold study data, you must comply with requirements for annual renewal of this approval.
9. Completion and Data Destruction. You must notify MDPH at DPH.IRB@state.ma.us upon completion of your study and must destroy all data provided by the Department and may not retain any copies of the data provided, unless otherwise authorized by MDPH. You must submit an Affidavit of Data Destruction at the completion of the study. The statutory protections remain in effect so long as you retain any confidential data pursuant to this authorization.
10. Agreement to Comply with Conditions of Approval. You must sign this letter and return it with all pledges of confidentiality to MDPH at DPH.IRB@state.ma.us.

Principal Investigator(s) or Applicant(s):

I understand the restrictions placed upon use of Department confidential data and agree to abide by the terms and conditions specified in this letter and attachments.

(Signature):  Date: 4/25/24
Lydie Ultimo

24A - d 812

Appendix D: Massachusetts Department of Public Health IRB Approval



The Commonwealth of Massachusetts
 Executive Office of Health and Human Services
 Department of Public Health
 250 Washington Street, Boston, Massachusetts 02108-4619
 Institutional Review Board and Data Access

FWA
 00000786
 MDPH IRB
 00000701

DATE: October 2, 2024
 TO: Lydie Ultimo
 FROM: Massachusetts Department of Public Health
 PROJECT TITLE: [2140145-7] Substance Use Disorder Involuntary Civil Commitment and Post-Civil Commitment Treatment Retention Among Adult Women
 REFERENCE #:
 SUBMISSION TYPE: Closure/Final Report
 ACTION: ACKNOWLEDGED
 EFFECTIVE DATE: October 2, 2024
 EXPIRATION DATE:

Thank you for submitting the Closure/Final Report materials for this project. The Massachusetts Department of Public Health has ACKNOWLEDGED receipt of your submission. No further action on submission 2140145-7 is required at this time. You will be contacted by a review committee member if clarifications are needed.

The following items are acknowledged in this submission:

- Closure/Final Report - Closure Form - Project 2140145.doc (UPDATED: 10/2/2024)

If you have any questions, please contact the office at DPH.IRB@state.ma.us. Please include your project title and reference number in all correspondence with this office.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within the Massachusetts Department of Public Health's records.