

Sex, Race, and Ethnicity as Intersectional Predictors of Outpatient Substance Use Disorder Treatment Attrition

Nicholas L Bormann¹, Tyler S Oesterle¹, Mark A Lifson², Doo-Sup Choi^{1,3}, Stephan Arndt^{4,5}

¹Department of Psychiatry and Psychology, Mayo Clinic, Rochester, MN, USA; ²Center for Digital Health, Mayo Clinic, Rochester, MN, USA; ³Department of Molecular Pharmacology and Experimental Therapeutics, Mayo Clinic, Rochester, MN, USA; ⁴Department of Psychiatry, University of Iowa, Iowa City, IA, USA; ⁵Department of Biostatistics, University of Iowa, Iowa City, IA, USA

Correspondence: Nicholas L Bormann, Department of Psychiatry and Psychology, Mayo Clinic, 200 First Street SW, Rochester, MN, 55905, USA, Email bormann.nicholas@mayo.edu

Purpose: An intersectionally-informed approach considers how personal factors such as sex, race, and ethnicity may compound to impact individuals and their health outcomes. We examined how these factors interact to influence treatment attrition in an outpatient, treatment-seeking substance use disorder population.

Patients and Methods: The Treatment Episode Dataset-Discharges (2017–2021) provided de-identified data, with each outpatient treatment encounter assessed at admission and discharge, yielding a repeated cross-sectional design. The repeated admission bias was defined as the odds of total admissions relative to the odds of the first admission for each group. Discharge reasons of dropped out or terminated were coded as treatment attrition. Logistic regression assessed treatment attrition, with the interaction term assessing nonadditivity. The unadjusted model included sex, race and ethnicity, and their interaction term, and the adjusted model incorporated the state, primary substance, and age group.

Results: Of 3,934,962 admissions, 1,668,338 (42.4%) were first admissions. White males were over-represented in repeat admissions, and Latina females were 22% less likely to be readmitted. For first episode encounters, females had significantly greater treatment attrition across all groups. Sex, race, and ethnicity, and their interaction were significant in both unadjusted and adjusted models. In adjusted models, the sex difference in attrition was 1.3 percentage points for White individuals (95% CI: 1.2–1.5), but more than twice as large for Black (2.8; 95% CI: 2.5–3.2) and Latino individuals (2.8; 95% CI: 2.4–3.2).

Conclusion: Our findings show that intersecting identities of sex, race, and ethnicity shape disparities in treatment engagement. Black and Latina females face compounded barriers to retention and re-engagement. Incorporating an intersectional perspective into addiction treatment planning and policy may help reduce attrition and improve equity in care.

Keywords: addiction, bias, disparity, inequity, attrition, encounter, TEDS

Introduction

Substance use disorders (SUD) are chronic medical conditions characterized by continued use despite accumulating harms which significantly impact individuals and society, contributing to economic disadvantage and premature death.^{1,2} These outcomes disproportionately affect minoritized populations, exacerbating existing social and health inequities.^{3,4} Treatment attrition, or discharging prematurely before treatment completion, is experienced more frequently by individuals from minoritized groups.⁵ Understanding and addressing these challenges is crucial, as treatment attrition may diminish opportunities for recovery and perpetuate these disparities.

Multiple barriers contribute to treatment attrition, including structural barriers like financial and insurance constraints, attitudinal barriers such as stigma and a fear of potential consequences, and sociocultural barriers including gender and role expectations.^{6–8} Importantly, these barriers are not experienced equally across populations, and their compounded effects may lead to higher rates of attrition among minoritized groups. Intersectionality, a framework that examines the

interconnectedness of factors such as race, sex, and class, provides insights into how these overlapping identities uniquely shape treatment experiences and contribute to early disenfranchisement.⁹

Beyond individual and structural barriers, programmatic factors such as treatment setting, availability of culturally responsive care, and potential provider biases can also influence attrition.^{10,11} These factors highlight the complexity of treatment retention and attrition, emphasizing the need to consider both individual and systemic factors when addressing disenfranchisement from care. Historically, research on SUD treatment outcomes has primarily examined these factors independently, missing the compounded effects of intersecting identities on treatment attrition.^{12,13}

Understanding the role of various factors in attrition is crucial for improving treatment outcomes. While much of the research has focused on patient-level factors, such as younger age and low therapeutic alliance, less attention has been given to program-specific factors.^{14,15} Recent studies using an intersectional framework have revealed how racial discrimination in healthcare settings disproportionately affects minoritized groups in addiction treatment.¹⁶ For instance, research using the Substance Abuse and Mental Health Services Administration's (SAMHSA) 2017–2019 Treatment Episode Datasets-Discharges (TEDS-D) found that the largest disparities in non-intensive outpatient alcohol treatment completion, relative to White men, were observed among Black, Hispanic/Latina, and American Indian/Alaska Native women.¹⁷ These findings emphasize the need for further exploration of intersectionality in treatment attrition across diverse substances.

To address these gaps, we build upon past work¹⁷ by examining outpatient treatment attrition, which more directly reflects perceived treatment acceptability. As individuals from minoritized populations have disproportionately higher rates of treatment attrition, this distinction from the study of treatment completion is important.⁵ Guided by intersectionality theory, we predicted that race and ethnicity would moderate the effect of sex on treatment attrition. Specifically, we hypothesized a sex-by-race-and-ethnicity interaction, where Black and Latina females would exhibit the highest rates of treatment attrition. This reflects the idea that the combined disadvantages of being both minoritized and female would be multiplicative rather than additive. In addition, we evaluated whether groups were more or less likely to return for future treatment, hypothesizing that Black and Latina females would be less likely to re-engage in care following discharge.

Material and Methods

Sample

SAMHSA's 2017–2021 TEDS-D files were used for the data analysis.¹⁸ TEDS-D contained discharge records from United States substance use treatment facilities receiving public funds, with individual states determining provider eligibility. States compile admission and discharge data from reporting treatment programs and forward standardized files to SAMHSA. Since these records were publicly available, the University of Iowa Internal Review Board waived human subject review and approved the study. All data were obtained from the publicly available SAMHSA TEDS-D files, and use of these data complied with relevant data protection and privacy regulations.

Combining five years of data created a large enough sample to examine race and ethnicity subgroups and repeated admissions. The data were de-identified by SAMHSA and states, so individuals could not be tracked across episodes. The only exception was a variable indicating whether this was a first or repeated admission. Discharges indicating outpatient treatment with valid entries for prior episodes (4.44% missing), a listed substance (either alcohol or another drug) (8.52% missing), race (4.15% missing), ethnicity (4.44% missing), and sex (0.04% missing) were included. This sample was used to assess repeated admission bias (RAB; defined below). All subsequent analyses were restricted to first admissions only.

Measures

Treatment attrition was based on the recorded discharge status for the treatment encounter. Treatment staff recorded the primary outcome variable as treatment completed, dropped out of treatment, terminated by facility (client non-compliance or rules violation), incarcerated, transferred, or other (defined by SAMHSA as an individual who “transferred or discontinued treatment because of change in life circumstances”).¹⁸ Conceptualizing treatment attrition as a measure of acceptability, we defined it as individuals who either dropped out or were terminated by the program. Incarceration often results from external legal factors, and transfers indicated continued care in another setting and have been excluded from prior discharge analyses.¹⁹

Race and ethnicity were self-reported. All individuals indicating Latino/Hispanic ethnicity were categorized as Latino regardless of race. Additional subgroups were those identifying as Black/African American (coded Black) and White. Individuals who could not be classified as Black, White, or Latino were excluded (6% of all episodes). Sex indicated biological sex.

RAB was quantified as an odds ratio (OR_{RAB}), defined as the odds of group membership in the total sample divided by the odds in the first admission sample.²⁰ Values greater than 1 indicate that a group is disproportionately represented in repeated admissions, while values less than 1 indicate underrepresentation. Therefore, RAB indexes whether certain groups are more or less likely to appear in repeat encounters, rather than predicting individual readmission. Bootstrap confidence intervals (95%) were generated from 5,000 iterations, consistent with prior work.²⁰

Additional covariates included the treatment state, which has been shown in prior work to significantly influence treatment completion rates and the types of services provided in encounter-based datasets.^{5,21} Age was included because prior TEDS-D analyses have shown sex-based differences in the progression of use and age at first treatment episode.²² TEDS-D categorizes age into twelve groups for confidentiality, treated here as categorical to account for nonlinear relationships. Primary problem substances reported at admission that were mentioned less than 2% of the time (eg, inhalants, barbiturates) were collapsed into “Other.”

Statistical Analysis

OR_{RAB} used all treatment encounters to assess the odds of returning to treatment. All later analysis used initial treatment encounters only, which minimizes biasing results toward individuals who seek treatment multiple times. This bias can be pronounced in encounter-based datasets like TEDS-D, where individuals with repeated admissions are overrepresented, shifting the primary unit of analysis toward repeatedly-treated cases.²⁰ Since treatment readmissions may reflect different underlying mechanisms, they introduce analytic complexity and may obscure disparities. This approach enables a more direct examination of intersectional disparities in treatment attrition without conflating them with patterns of repeated care.

To account for the impact of intersectionality on treatment attrition, an interaction term within regression models was employed similar to Pro et al.¹⁶ Specifically, this evaluates the multiplicative effects of sex-by-race-and-ethnicity. This advances past literature that used a rank-and-replace method,¹⁷ which may assume effects are additive and treat variables as independent. This approach can oversimplify relationships by reducing variability to ordinal scales, potentially obscuring the nature of complex multiplicative interactions, making it less suitable for intersectionality assessment. Interaction terms, however, capture the compounded effects of intersecting identities, consistent with the theory of intersectionality.⁹

Demographics for first episodes were compared using chi-square, Kruskal–Wallis, or Brunner–Munzel tests. Logistic regression assessed treatment attrition. An unadjusted model included sex, race, and ethnicity; an interaction term assessed nonadditivity. The adjusted model included treatment state, primary substance, and age group. Previous work indicated that the state greatly affected race and ethnicity differences.⁵ Previous research also demonstrated that referral source (eg, the person or agency referring the client to treatment) is significantly associated with both the utilization of specific addiction treatments and discharge status.^{21,23} Consequently, referral source was excluded from the analysis, as its inclusion may potentially obscure or mediate the effects of race, ethnicity, and sex. However, a sensitivity analysis that included additional covariates (years of education, referral source, and living arrangements) was conducted and is reported in the results. Marginal probabilities came from the adjusted model. As TEDS-D contains information at both admission and discharge, it represents repeated cross-sectional data; therefore, the STROBE guideline for cross-sectional studies was followed.²⁴ All analyses were conducted using R version 4.3.2.²⁵

Results

The $n=3,934,962$ for all records (including repeat admissions) and 1,668,338 for first episode records. RAB varied considerably between the sexes and race and ethnicity groups (see [Figure 1](#)). Males were more likely than females to have multiple treatment episodes in all groups. White individuals were overrepresented in multiple episodes compared to other groups. In contrast, Latino individuals were particularly underrepresented in episodes after their first. For example, Latina females had an $OR_{RAB}=0.78$ (95% CI: 0.78–0.78), indicating they were 22% less likely to have a returning

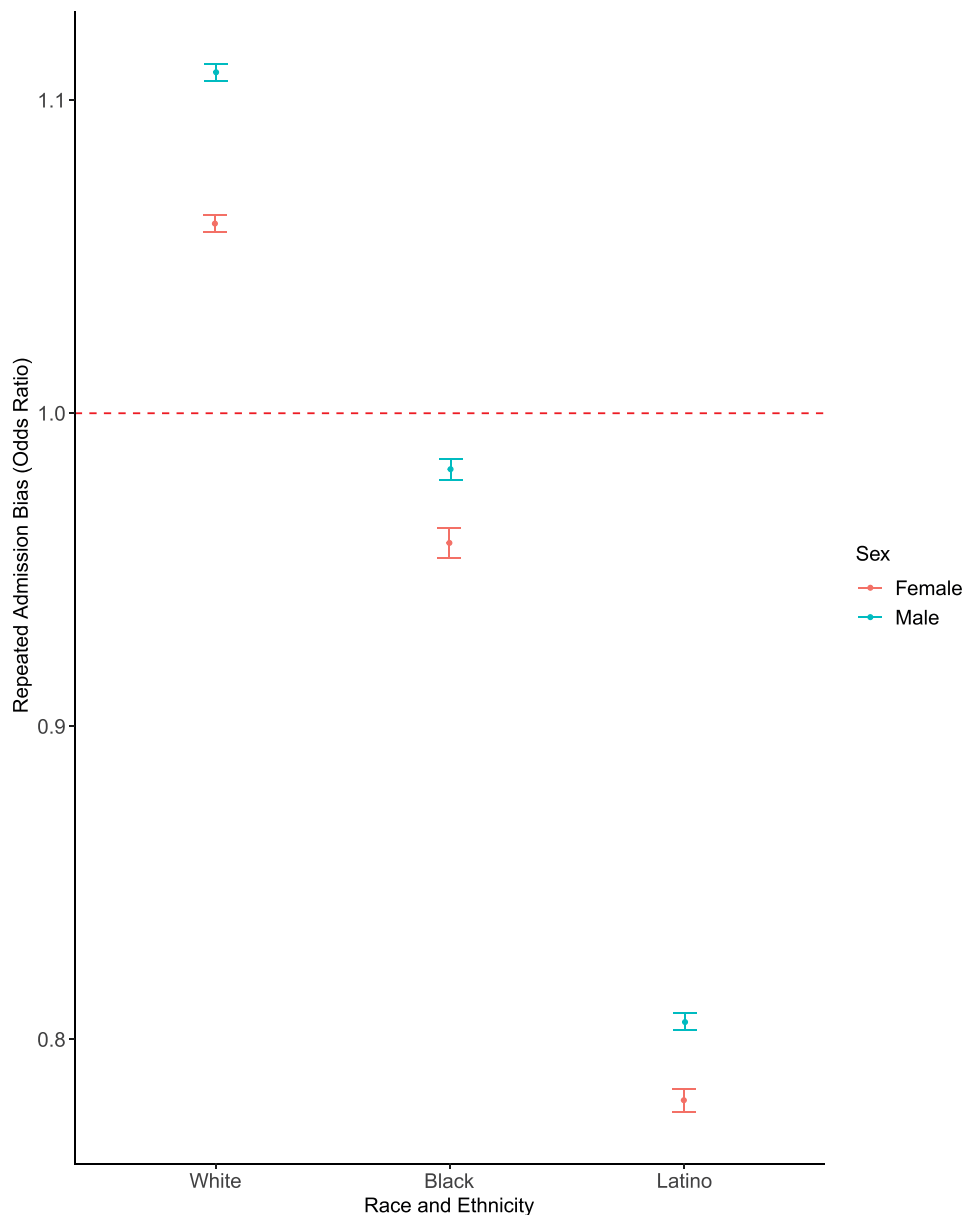


Figure 1 Repeated Admission Bias for Multiple Treatment Episodes.

Notes: Data is from the Substance Abuse and Mental Health Services Administration Treatment Episode Dataset-Discharge combined 2017–2021 datasets. When all outpatient treatment encounters are used, results become biased towards individuals who return to treatment multiple times. This Repeated Admission Bias (RAB) can be expressed as an odds ratio (OR_{RAB}). The horizontal dashed red line indicates equity, where there is no difference in repeated admission rates. However, males had consistently higher OR_{RAB} values than females within each race and ethnicity group, indicating greater representation in multiple treatment episodes. White individuals showed the highest OR_{RAB} values, suggesting overrepresentation in repeated episodes, while Latino individuals, particularly females, were underrepresented after their first episode. These results highlight disparities in repeated treatment episode patterns by sex, race, and ethnicity.

treatment episode. These results suggest that including all episodes may produce bias, particularly in analyses comparing sex with race and ethnicity. The following analyses only use first-episode cases.

Demographic information for the race and ethnicity first episode groups appears in Table 1. The groups significantly varied in sex, age, and primary substance. There were more males in the Black and Latino groups than in the White group. The Latino group was younger than the other groups. Among the Latino group, 29.9% were under 25 years old, compared to 17.7% and 21.2% of individuals in the White and Black groups. Black individuals were also slightly older than White individuals (Brunner-Munzel $t=3.97$, $df=466126$, $p<0.0001$). For example, 19.5% of the Black group were 50 or older compared to 14.6% of the White group.

Table 1 First Episode Demographics by Race and Ethnicity

	White	Black	Latino	$\chi^2/KW H, df, p$
N =	1,063,939	320,830	283,569	
%	63.8%	19.2%	17%	
Sex ^a				18,494.82, 2, <0.0001
Male	58.6%	69.9%	68.4%	
Female	41.4%	30.1%	31.6%	
Age ^b				21,253.43, 2, <0.0001
12–14	0.7%	1.0%	2.7%	
15–17	3.4%	5.0%	10.1%	
18–20	4.0%	4.6%	5.7%	
21–24	9.7%	10.6%	11.5%	
25–29	18.0%	17.4%	18.0%	
30–34	17.8%	14.6%	15.7%	
35–39	14.5%	11.1%	12.4%	
40–44	9.9%	8.6%	8.3%	
45–49	7.6%	7.7%	5.8%	
50–54	6.2%	8.1%	4.4%	
55–64	7.1%	9.9%	4.6%	
65+	1.2%	1.5%	0.8%	
Primary Substance ^a				158,595.35, 12, <0.0001
Alcohol	28.9%	29.0%	30.3%	
Cocaine	3.0%	10.4%	3.8%	
Marijuana	15.6%	37.2%	27.2%	
Heroin	18.8%	11.6%	14.0%	
Other Opiates	13.1%	4.6%	4.4%	
Methamphetamine	16.1%	3.8%	18.1%	
Other	4.4%	3.4%	2.2%	

Notes: Data is from the Substance Abuse and Mental Health Services Administration Treatment Episode Dataset-Discharge combined 2017–2021 datasets. ^a Pearson's χ^2 ; ^b Kruskal–Wallis H.

Abbreviation: KW, Kruskal–Wallis.

Table 2 indicates the discharge reasons. For individuals in the White and Black groups, Completed treatment had the highest percentage, followed by Transferred. However, for Latino individuals, the most frequent reason was Dropped Out. White individuals experienced the greatest amount of treatment program transfers, while Latino individuals transferred the least. Individuals in the Black and Latino groups dropped out of treatment more frequently than those in the White group. Programs terminated those in the Black group most often.

Across all groups, females were less likely to complete treatment and more likely to drop out compared to males. Figure 2 shows treatment attrition (Drop Out+Terminated) percentages stratified by sex and race and ethnicity. The sex

Table 2 Reasons for Leaving Treatment by Sex and Race and Ethnicity

Sex and Race and Ethnicity	Completed	Dropped out	Terminated	Transferred	Incarcerated	Death	Other
White							
Male	30.1%	25.2%	5.0%	33.2%	1.7%	0.3%	4.5%
Female	25.2%	26.3%	5.0%	37.4%	1.0%	0.2%	4.8%
Black							
Male	29.3%	31.6%	8.3%	23.6%	2.5%	0.3%	4.4%
Female	25.7%	36.6%	8.0%	23.4%	0.8%	0.3%	5.2%
Latino							
Male	35.7%	38.1%	4.9%	15.0%	2.3%	0.4%	3.6%
Female	30.6%	42.0%	4.6%	17.5%	1.0%	0.4%	4.0%

Notes: Data is from the Substance Abuse and Mental Health Services Administration Treatment Episode Dataset-Discharge combined 2017–2021 datasets. Only initial episode encounters for outpatient treatment were used.

difference within the White group was only 1.1 percentage points (95% CI: 0.9–1.3). Within the Black and Latino groups, the sex differences were 4.7 (95% CI: 4.3–5.1) and 3.5 percentage points (95% CI: 3.1–3.9).

As expected, the effects of sex, race and ethnicity, and their interaction were significant in an unadjusted logistic regression (Table 3). Even after adjusting for the age category (LR $\chi^2=1704.021$, $df=11$, $p<0.001$), treatment program state (LR $\chi^2=329,085.70$, $df=49$, $p<0.001$), and the primary substance (LR $\chi^2=10,705.569$, $df=6$, $p<0.001$), these findings remained significant. The only noticeable change in the ORs was an attenuation of the main effects for individuals in the Black and Latino groups.

Figure 3 shows the treatment attrition model-based estimated percentages broken down by sex and race and ethnicity groups while controlling for the covariates. Figure 3 also shows the attenuated race and ethnicity effect. However, the intersectionality is still apparent. Among White individuals, the sex difference was only 1.3 percentage points (95% CI: 1.2–1.5). For Black and Latino individuals, the sex difference was over twice as large at 2.8 (95% CI: 2.5–3.2) and 2.8 percentage points (95% CI: 2.4–3.2).

As a sensitivity analysis, we assessed whether adding the covariates years of education, referral source, and living arrangements impacted results. These variables had no appreciable effects and were omitted, as they may independently reflect intersectionality.

Discussion

The study findings supported our hypothesis that race and ethnicity moderate the effect of sex on treatment attrition. Specifically, the sex-by-race-and-ethnicity interaction showed that Black and Latina females had the highest rates of treatment attrition, with the sex difference in attrition being significantly larger for Black and Latina individuals than for White individuals. These results highlight the compounding effects of sex and race and ethnicity on treatment attrition.

The significant sex-by-race-and-ethnicity interaction aligns with an intersectionality-informed framework, which highlights how overlapping identities—such as race, ethnicity, and sex—may create unique privileges or disadvantages.⁹ Black and Latina females dealt with the greatest inequity, with the sex effect on treatment attrition being significantly moderated by race and ethnicity. Even after adjusting for age, state, and primary substance, individuals in these groups were more likely to drop out or be discharged from treatment compared to their male counterparts, with disparities twice as large as those observed among individuals identifying as White. Alarming, individuals identifying as Black or Latino were also underrepresented in future treatment admissions, compounding these inequities.

These results are consistent with prior research that has applied intersectionality to substance use treatment and related healthcare outcomes. For example, Pro et al used interaction terms, as we did, to examine how race and treatment

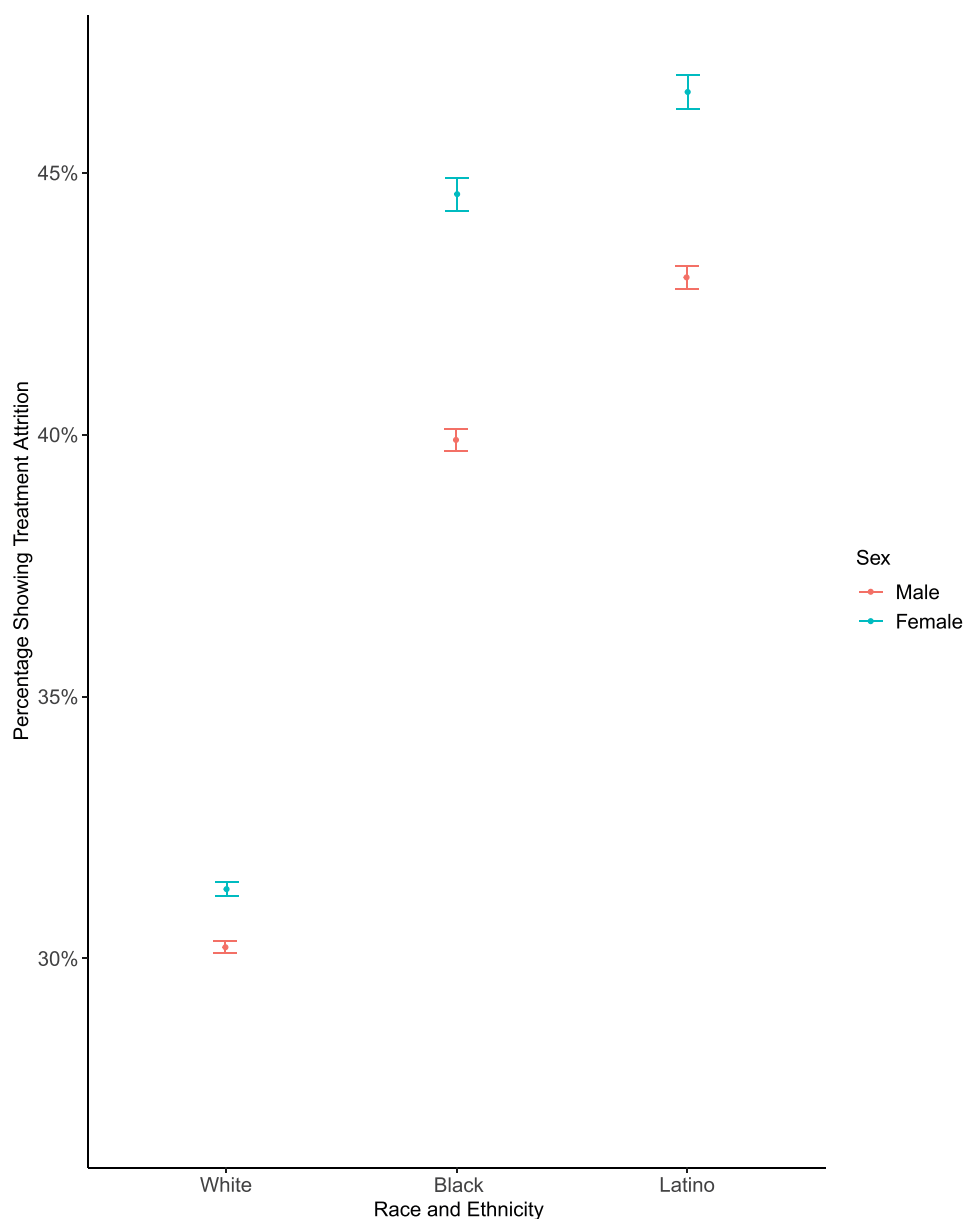


Figure 2 Race and Ethnicity Groups and Treatment Attrition.

Notes: Data is from the Substance Abuse and Mental Health Services Administration Treatment Episode Dataset-Discharge combined 2017–2021 datasets. Only initial episode encounters for outpatient treatment were used. Treatment attrition occurred when the reason for discharge was coded as either Drop Out or Terminated. Females consistently experienced higher attrition rates than males across all groups. The sex difference was smallest among individuals identifying as White and more pronounced among individuals identifying as Black and Latino. These disparities emphasize the interaction between sex and race and ethnicity for treatment attrition.

modality jointly influenced experiences of discrimination. They found that while discrimination was more prevalent for both minoritized populations and individuals in methadone maintenance programs, those exposed to both categories experienced the greatest effect. Most strikingly, American Indian/Alaska Native individuals receiving methadone had an OR of 32.78 (95% CI: 31.16–34.48) for perceived racial discrimination.¹⁶ Delk et al employed a rank-and-replace method across both initial and repeat admissions to outpatient alcohol treatment. They found that females from minoritized groups, compared to their male counterparts, had substantially larger disparities in treatment completion. This included five times higher for Hispanic/Latina females compared to Hispanic/Latino males (9.08 vs 1.77 percentage points), and more than twice as high for Black females compared to Black males (12.35 vs 5.89 percentage points).¹⁷ While our outcome focused on attrition rather than completion, the pattern we observed was consistent: in adjusted models, the sex difference in attrition was 1.3 percentage points for White individuals, compared to 2.8 points for both

Table 3 Crude and Adjusted Odds Ratios Predicting Treatment Attrition From Sex, Race and Ethnicity

	Crude (95% CI)	Adjusted (95% CI)	LR χ^2 ,df, p (Crude; Adjusted)
Sex	OR ^a	OR ^{a,b}	777.20, 1, <0.001; 687.30, 1, <0.001
Male (ref)	–	–	
Female	1.05 (1.04–1.06)	1.08 (1.07–1.09)	
Race and Ethnicity			25109.88, 2, <0.001; 2407.30, 1, <0.001
White (ref)	–	–	
Black	1.53 (1.52–1.55)	1.24 (1.22–1.25)	
Latino	1.74 (1.72–1.76)	1.12 (1.11–1.13)	
Interaction of Sex and Race and Ethnicity			293.76, 2, <0.001; 58.15, 2, <0.001
White: Female (ref)	–	–	
Black: Female	1.15 (1.13–1.17)	1.07 (1.05–1.09)	
Latino: Female	1.10 (1.08–1.12)	1.05 (1.03–1.07)	

Notes: Data is from the Substance Abuse and Mental Health Services Administration Treatment Episode Dataset-Discharge combined 2017–2021 datasets. Only initial episode encounters for outpatient treatment were used. ^a All odds ratios were significant at $p < 0.001$. ^b Covariates included age at admission, state of admitting facility, and primary substance.

Abbreviations: CI, confidence interval; LR, likelihood ratio; OR, odds ratio.

Black and Latino individuals. Taken together, these findings across different datasets, outcomes, and analytic strategies support that intersectional disparities are larger for females from minoritized groups. Our study extends this work by restricting analyses to initial treatment episodes to reduce readmission bias and by examining both attrition and re-engagement across substances over a longer time period.

In our descriptive results (Table 2), Latino men and women had the highest rates of treatment completion across groups. However, these same groups also had some of the highest dropout rates and were less likely to be transferred compared to White or Black individuals. This demonstrates the importance of examining attrition alongside completion within an intersectional framework.

While it is not possible to ascertain causality from this data, several interrelated factors may contribute to these disparities. From an intersectionality perspective, sociocultural barriers such as stigma, parenting responsibilities, and cultural attitudes toward addiction treatment may converge to disproportionately discourage minoritized females from remaining in care. Specifically, women who use substances often face stigma that intertwines harmful perceptions of their sexuality and their perceived ability to parent.²⁶ Stigma as a barrier to care has been more extensively reported among Black and Latina women relative to White women, with Black and Latina women potentially experiencing a greater degree of stigma.⁷ Additionally, being a parent living with a child typically poses a greater treatment barrier for women than men,^{27,28} with Latina women reporting lower perceived family support than other groups.⁷ Women from minoritized groups are also more likely than men to report attitudinal barriers to seeking treatment, including concerns about treatment effectiveness and doubts about the seriousness of their issues. These barriers, such as embarrassment or fear of judgment, may exacerbate the challenges women face when deciding to seek out or remain in treatment.⁸

Economic inequities also intersect with race and gender to shape attrition. Financial instability, unemployment, and housing insecurity have been linked to lower treatment retention, particularly among Black, Hispanic, and Native American individuals.^{29,30} Economic barriers are especially relevant for women, who may experience disadvantage in employment opportunities.^{6,31} While economic hardship contributes to delays in treatment entry for Black individuals, racial disparities persist even when accounting for financial factors.³² Additionally, individuals residing in economically disadvantaged communities, particularly Black and American Indian populations, are less likely to initiate treatment, suggesting that structural economic inequities further limit access to care and increase the risk of early treatment dropout.³³ When combined with sociocultural barriers, these financial challenges create a complex set of obstacles that

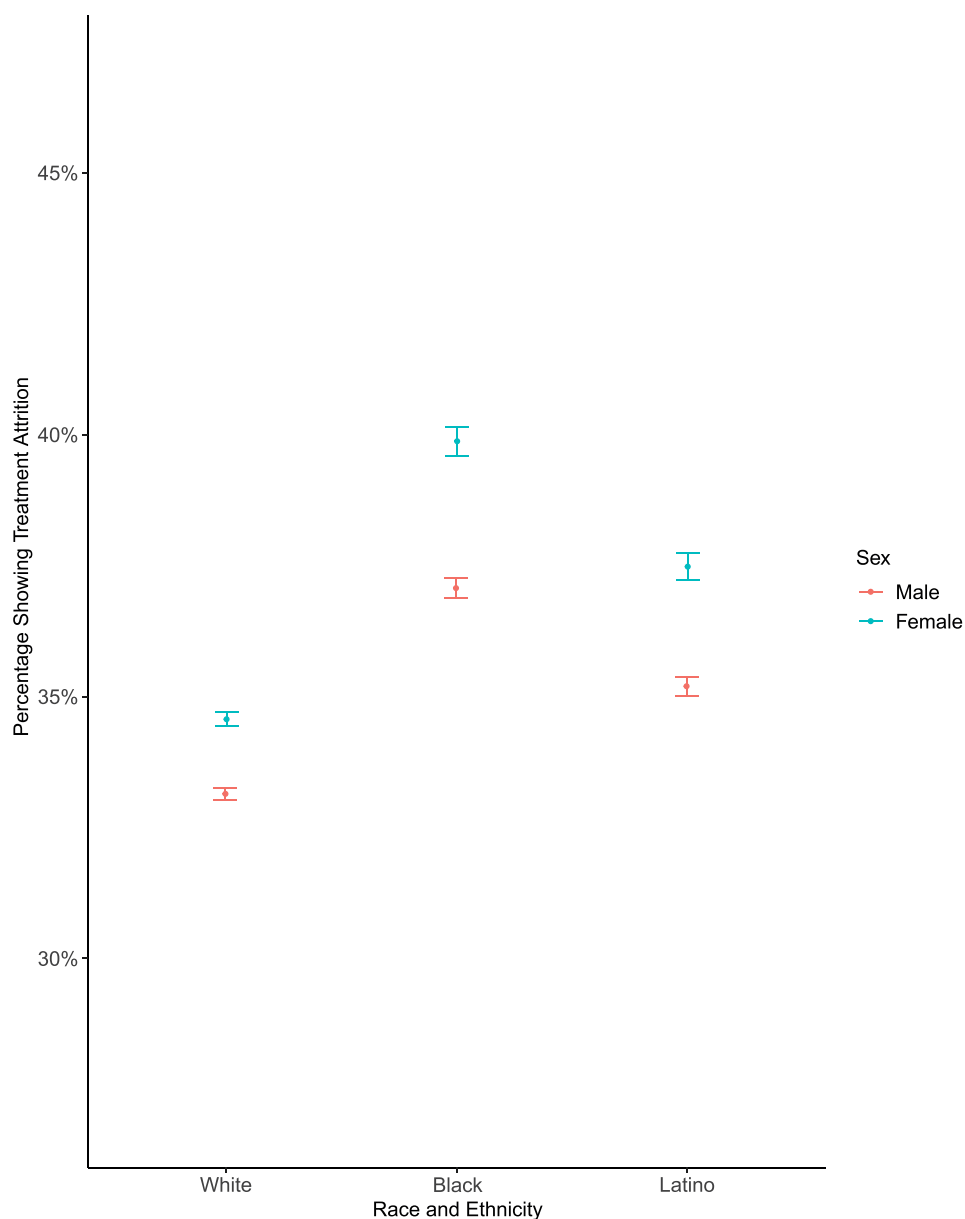


Figure 3 Adjusted Model-based Race and Ethnicity Groups and Rates of Treatment Attrition.

Notes: Data is from the Substance Abuse and Mental Health Services Administration Treatment Episode Dataset-Discharge combined 2017–2021 datasets. Only initial episode encounters for outpatient treatment were used. Treatment attrition occurred when the reason for discharge was coded as either Drop Out or Terminated. Model controlled for encounter age category, state the treatment centered was located, and the primary substance listed. This figure presents the estimated probabilities of treatment attrition for males and females within each race and ethnicity group, accounting for covariates. Race and ethnicity moderated the effect of sex on treatment attrition, with the sex difference in attrition being twice as large for Black and Latino individuals compared to White individuals.

make it particularly difficult for minoritized women to engage and remain in substance use treatment. These findings extend previous research indicating that females are less likely to seek specialty addiction treatment, showing that treatment-seeking females from minority groups are also less likely to return after treatment attrition.³¹ As completion of specialty treatment is associated with improved outcomes, this disparity is particularly concerning.¹

These patterns mirror broader intersectional inequities in healthcare, where the convergence of race, gender, and structural barriers results in systematically different access and quality of care. For example, Black and Latino individuals are less likely than White individuals to access alcohol treatment, with disparities more pronounced among women.³⁴ Similarly, in residential addiction treatment, Black and Latino individuals are less likely to be initiated on medications for opioid use disorder treatment than their White peers.³⁵ Beyond addiction treatment, inequities are also present.

Individuals who are Black are less likely than individuals who are White to receive depression treatment³⁶ and Black females are less likely to be referred for cardiac catheterization than White males.³⁷ Stigma related to treatment may contribute to these differences,³⁸ but their overall causes are likely multifactorial in nature.^{39,40}

Possible Solutions and Areas of Future Research

Solutions must also be intersectionally-informed. Culturally tailored interventions can support patients from diverse backgrounds by enhancing the relevance and accessibility of treatments, ultimately improving patient engagement, retention, and outcomes. Evidence suggests that culturally tailored approaches can make evidence-based treatments more effective for minoritized populations by addressing unique cultural values, preferences, and barriers to care.⁴¹ For providers, these strategies can improve therapeutic rapport and the ability to address treatment disparities, fostering a more inclusive care environment. The education of treatment staff on intersectionality is an essential component of this approach. By enhancing providers' knowledge of historical barriers faced by individuals from minority groups within the healthcare system, steps can be taken to rebuild patient trust and willingness to remain in or return to care if needed.⁴² Additionally, having diversity in clinic leadership has been identified as a driver to implement culturally-responsive and intersectionality-aware treatment.¹¹ It is important to note, however, that these interventions are meant to augment and not replace gold standard treatments.⁴¹

Addressing systemic barriers that disproportionately affect females, particularly those from minoritized racial and ethnic groups, is critical to reducing disparities in treatment attrition. For instance, childcare support, transportation assistance, and flexible scheduling could help mitigate logistical barriers that contribute to preventing females from remaining in treatment.^{28,43} Additionally, creating safe, trauma-informed care environments may be particularly beneficial for females, as they are more likely to have experienced past trauma that impacts their treatment engagement.^{43–45} Group settings that emphasize therapeutic alliance and peer support may enhance retention by fostering social connection, a factor shown to be particularly important for individuals from minoritized groups.⁴⁶ One evidence-based approach, Seeking Safety, is a structured, manualized therapy that educates participants, particularly females, on the long-term effects of trauma and its connection to substance use.⁴⁷

Incorporating vocational training may be an essential tool to improve addiction treatment outcomes.^{48,49} Past work has shown that unemployment significantly moderates the likelihood of Black and Latino patients completing addiction treatment.³⁰ Additionally, Black individuals are more likely to complete treatment when referred by employers.²³ Augmenting traditional interventions with vocational training and workforce education may help address socioeconomic barriers and enhance recovery capital during treatment. This approach may be particularly beneficial for females, who are less likely to be employed during recovery and may face unique barriers compared to males, potentially slowing their accumulation of recovery strengths.^{45,50}

Future research on why individuals, particularly from high-risk populations, leave treatment is crucial to better meet their needs. Increasing patient autonomy and collaborating with non-judgmental providers has correlated with improved patient experience for minoritized groups.⁵¹ As minoritized groups have reported differentially higher rates of healthcare-related stigma, research into mitigating stigma and improving the treatment experience is important.¹⁶ Additionally, granular data on treatment centers would improve understanding of programmatic factors that may alienate patients, an area less studied in the literature.¹⁴

Strengths and Limitations

This study extends previous encounter-based dataset analyses by incorporating RAB, an OR of readmission risk, and the interaction of sex and race and ethnicity to quantify the compounding effect of intersectionality. Previous work included all treatment encounters, which biases toward those who return to treatment multiple times. The present analysis emphasizes that individuals identifying as Black and Latino, particularly females, return to treatment significantly less often. Moreover, rates of treatment attrition are significantly greater for individuals from these groups. Focusing on treatment attrition is particularly important, as abrupt discharges from treatment represent a high-risk period.

Limitations also exist, including those inherent to the TEDS-D, which only includes data from treatment-seeking individuals within publicly funded treatment facilities and may not generalize to non-treatment-seeking individuals. The

TEDS-D is limited to administrative records and lacks detailed information on the specific treatment modalities used or a sufficient measure of clinical need or socioeconomic status. Although we adjusted for primary substance, we were unable to account for differences in treatment availability across substances (eg, medications available for opioid use disorder versus no approved options for stimulant use), which could influence attrition patterns and represents a potential unmeasured confounder. Additionally, TEDS-D substance use measures are self-reported, which may be subject to recall bias. The specific reason as to why an individual left treatment is unknown. Similarly, someone may not have returned because they sufficiently benefitted from an abbreviated treatment course. As the dataset lacks longitudinal follow-up, there is no ability to assess long-term treatment outcomes.

Conclusion

Individuals from minoritized populations face unique barriers to entering and completing outpatient addiction treatment, which intersect to have a compounded effect on outcomes. Black and Latino treatment-seeking patients are more likely than White treatment-seeking patients to drop out or be terminated by the treatment program, and are less likely to return. The sex differences in attrition and readmission rates are more pronounced for Black and Latino individuals relative to White individuals, placing females from these groups at a greater disadvantage. These disparities highlight the need for culturally responsive, intersectionality-informed interventions that address systemic and program-level barriers. Future research should identify and test programmatic strategies most effective in reducing attrition and supporting re-engagement among Black and Latina females.

Data Sharing Statement

Data used is publicly available at <https://www.samhsa.gov/data/data-we-collect/teds-treatment-episode-data-set/datafiles/teds-d-2021>, and is cited in the Methods section.

Disclosure

The authors report no conflicts of interest in this work.

References

1. Volkow ND, Blanco C. Substance use disorders: a comprehensive update of classification, epidemiology, neurobiology, clinical aspects, treatment and prevention. *World Psychiatry*. 2023;22(2):203–229. doi:10.1002/wps.21073
2. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 5th edn. American Psychiatric Association Publishing. 2013.
3. Buka SL. Disparities in health status and substance use: ethnicity and socioeconomic factors. *Public Health Rep*. 2002;117(Suppl 1):S118–25.
4. Friedman J, Hansen H, Bluthenthal RN, Harawa N, Jordan A, Beletsky L. Growing racial/ethnic disparities in overdose mortality before and during the COVID-19 pandemic in California. *Prev Med*. 2021;153:106845. doi:10.1016/j.ypmed.2021.106845
5. Arndt S, Acion L, White K. How the states stack up: disparities in substance abuse outpatient treatment completion rates for minorities. *Drug Alcohol Depend*. 2013;132(3):547–554. doi:10.1016/j.drugaledep.2013.03.015
6. Motyka MA, Al-Imam A, Haligowska A, Michalak M. Helping Women Suffering from Drug Addiction: needs, Barriers, and Challenges. *Int J Environ Res Public Health*. 2022;19(21):14039. doi:10.3390/ijerph192114039
7. Pinedo M, Zemore S, Beltran-Giron J, Gilbert P, Castro Y. Women's Barriers to Specialty Substance Abuse Treatment: a Qualitative Exploration of Racial/Ethnic Differences. *J Immigr Minor Health*. 2020;22(4):653–660. doi:10.1007/s10903-019-00933-2
8. Verissimo AD, Grella CE. Influence of gender and race/ethnicity on perceived barriers to help-seeking for alcohol or drug problems. *J Subst Abuse Treat*. 2017;75:54–61. doi:10.1016/j.jsat.2016.12.013
9. Crenshaw K. Mapping the Margins: intersectionality, Identity Politics, and Violence against Women of Color. *Stanford Law Rev*. 1991;43:1241–1299. doi:10.2307/1229039
10. Guerrero EG, Alibrahim A, Howard DL, Wu S, D'Aunno T. Stability in a large drug treatment system: examining the role of program size and performance on service discontinuation. *Int J Drug Policy*. 2020;86:102948. doi:10.1016/j.drugpo.2020.102948
11. Guerrero EG, Khachikian T, Frimpong JA, Kong Y, Howard DL, Hunter S. Drivers of continued implementation of cultural competence in substance use disorder treatment. *J Subst Abuse Treat*. 2019;105:5–11. doi:10.1016/j.jsat.2019.07.009
12. Redmond ML, Smith S, Collins TC. Exploring African-American women's experiences with substance use treatment: a review of the literature. *J Community Psychol*. 2020;48(2):337–350. doi:10.1002/jcop.22241
13. Vu M, Li J, Haardorfer R, Windle M, Berg CJ. Mental health and substance use among women and men at the intersections of identities and experiences of discrimination: insights from the intersectionality framework. *BMC Public Health*. 2019;19(1):108. doi:10.1186/s12889-019-6430-0
14. Brorson HH, Ajo Arnevik E, Rand-Hendriksen K, Duckert F. Drop-out from addiction treatment: a systematic review of risk factors. *Clin Psychol Rev*. 2013;33(8):1010–1024. doi:10.1016/j.cpr.2013.07.007
15. Lappan SN, Brown AW, Hendricks PS. Dropout rates of in-person psychosocial substance use disorder treatments: a systematic review and meta-analysis. *Addiction*. 2020;115(2):201–217. doi:10.1111/add.14793

16. Pro G, Zaller N. Interaction effects in the association between methadone maintenance therapy and experiences of racial discrimination in U.S. healthcare settings. *PLoS One*. 2020;15(2):e0228755. doi:10.1371/journal.pone.0228755
17. Delk J, Bensley K, Ye Y, et al. Intersectional disparities in outpatient alcohol treatment completion by gender and race and ethnicity. *Alcohol Clin Exp Res*. 2024;48(2):389–399. doi:10.1111/acer.15243
18. Substance Abuse and Mental Health Services Administration. *Data From: Treatment Episode Data Set: Discharges (TEDS-D)*. 2021.
19. Marotta PL, Tolou-Shams M, Cunningham-Williams RM, Washington Sr DM, Voisin D. Racial and Ethnic Disparities, Referral Source and Attrition From Outpatient Substance Use Disorder Treatment Among Adolescents in the United States. *Youth Soc*. 2022;54(1):148–173. doi:10.1177/0044118x20960635
20. Bormann NL, Arndt S. Evidence of “Repeated Admission Bias” Among Those Who Use Injection Drugs Across 2 Decades of US Treatment Admissions: 2000–2020. *J Addict Med*. 2024;2024:1. doi:10.1097/ADM.0000000000001265
21. Bormann NL, Weber AN, Oesterle TS, Miskle B, Lynch AC, Arndt S. State inequities: gaps in planned treatment for criminal legal referrals with opioid use disorder across two decades of US treatment admissions. *Am J Addict*. 2024;2024:13636. doi:10.1111/ajad.13636
22. Bormann NL, Miskle B, Holdefer P, Arndt S, Lynch AC, Weber AN. Evidence of telescoping in females across two decades of US treatment admissions for injection drug use: 2000–2020. *Drug Alcohol Depend Rep*. 2023;9:100204. doi:10.1016/j.dadr.2023.100204
23. Sahker E, Toussaint MN, Ramirez M, Ali SR, Arndt S. Evaluating racial disparity in referral source and successful completion of substance abuse treatment. *Addict Behav*. 2015;48:25–29. doi:10.1016/j.addbeh.2015.04.006
24. von Elm E, Altman DG, Egger M, et al. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *Epidemiology*. 2007;18(6):800–804. doi:10.1097/EDE.0b013e3181577654
25. R-Projects. *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing. 2022. Available from: <https://www.R-project.org/>. Accessed October 8, 2025.
26. Greenfield SF, Grella CE. What is “women-focused” treatment for substance use disorders? *Psychiatr Serv*. 2009;60(7):880–882. doi:10.1176/ps.2009.60.7.880
27. Scheidell JD, Hoff L, Khan MR, Bennett AS, Elliott L. Parenting and childcare responsibilities, harm reduction service engagement, and opioid overdose among women and men who use illicit opioids in New York City. *Drug Alcohol Depend Rep*. 2022;3:100054. doi:10.1016/j.dadr.2022.100054
28. Neale J, Nettleton S, Pickering L. Gender sameness and difference in recovery from heroin dependence: a qualitative exploration. *Int J Drug Policy*. 2014;25(1):3–12. doi:10.1016/j.drugpo.2013.08.002
29. Jacobson JO, Robinson PL, Bluthenthal RN. Racial disparities in completion rates from publicly funded alcohol treatment: economic resources explain more than demographics and addiction severity. *Health Serv Res*. 2007;42(2):773–794. doi:10.1111/j.1475-6773.2006.00612.x
30. Saloner B, Le Cook B. Blacks and Hispanics are less likely than whites to complete addiction treatment, largely due to socioeconomic factors. *Health Aff*. 2013;32(1):135–145. doi:10.1377/hlthaff.2011.0983
31. Greenfield SF, Brooks AJ, Gordon SM, et al. Substance abuse treatment entry, retention, and outcome in women: a review of the literature. *Drug Alcohol Depend*. 2007;86(1):1–21. doi:10.1016/j.drugaldep.2006.05.012
32. Lewis B, Hoffman L, Garcia CC, Nixon SJ. Race and socioeconomic status in substance use progression and treatment entry. *J Ethn Subst Abuse*. 2018;17(2):150–166. doi:10.1080/15332640.2017.1336959
33. Acevedo A, Panas L, Garnick D, et al. Disparities in the Treatment of Substance Use Disorders: does Where You Live Matter? *J Behav Health Serv Res*. 2018;45(4):533–549. doi:10.1007/s11414-018-9586-y
34. Zemore SE, Murphy RD, Mulia N, et al. A moderating role for gender in racial/ethnic disparities in alcohol services utilization: results from the 2000 to 2010 national alcohol surveys. *Alcohol Clin Exp Res*. 2014;38(8):2286–2296. doi:10.1111/acer.12500
35. Stahler GJ, Mennis J, Baron DA. Racial/ethnic disparities in the use of medications for opioid use disorder (MOUD) and their effects on residential drug treatment outcomes in the US. *Drug Alcohol Depend*. 2021;226:108849. doi:10.1016/j.drugaldep.2021.108849
36. McGregor B, Li C, Baltrus P, et al. Racial and Ethnic Disparities in Treatment and Treatment Type for Depression in a National Sample of Medicaid Recipients. *Psychiatr Serv*. 2020;71(7):663–669. doi:10.1176/appi.ps.201900407
37. Schulman KA, Berlin JA, Harless W, et al. The effect of race and sex on physicians’ recommendations for cardiac catheterization. *N Engl J Med*. 1999;340(8):618–626. doi:10.1056/NEJM199902253400806
38. Nadeem E, Lange JM, Edge D, Fongwa M, Belin T, Miranda J. Does stigma keep poor young immigrant and U.S.-born Black and Latina women from seeking mental health care? *Psychiatr Serv*. 2007;58(12):1547–1554. doi:10.1176/ps.2007.58.12.1547
39. Adams C, Chatterjee A, Harder BM, Mathias LH. Beyond unequal access: acculturation, race, and resistance to pharmaceuticalization in the United States. *SSM Popul Health*. 2018;4:350–357. doi:10.1016/j.ssmph.2018.04.003
40. McQuaid EL, Landier W. Cultural Issues in Medication Adherence: disparities and Directions. *J Gen Intern Med*. 2018;33(2):200–206. doi:10.1007/s11606-017-4199-3
41. Huey Jr SJ, Tilley JL, Jones EO, Smith CA. The contribution of cultural competence to evidence-based care for ethnically diverse populations. *Annu Rev Clin Psychol*. 2014;10:305–338. doi:10.1146/annurev-clinpsy-032813-153729
42. Bazargan M, Cobb S, Assari S. Discrimination and Medical Mistrust in a Racially and Ethnically Diverse Sample of California Adults. *Ann Fam Med*. 2021;19(1):4–15. doi:10.1370/afm.2632
43. Grella CE. From generic to gender-responsive treatment: changes in social policies, treatment services, and outcomes of women in substance abuse treatment. *J Psychoactive Drugs*. 2008;5(5):327–343. doi:10.1080/02791072.2008.10400661
44. Gutowski ER, Badio KS, Kaslow NJ. Trauma-informed inpatient care for marginalized women. *Psychotherapy*. 2022;59(4):511–520. doi:10.1037/pst0000456
45. Bormann NL, Weber AN, Miskle B, Arndt S, Lynch AC. Sex Differences in Recovery Capital Gains Post-Incarceration. *Subst Use Misuse*. 2023;1–8. doi:10.1080/10826084.2023.2257303
46. Jason LA, Guerrero M, Bobak T, Light JM, Stoolmiller M. Reducing health disparities among black individuals in the post-treatment environment. *J Ethn Subst Abuse*. 2020;1–17. doi:10.1080/15332640.2020.1861497
47. Lynch SM, Heath NM, Mathews KC, Cepeda GJ. Seeking safety: an intervention for trauma-exposed incarcerated women? *J Trauma Dissociation*. 2012;13(1):88–101. doi:10.1080/15299732.2011.608780
48. Sahker E, Ali SR, Arndt S. Employment recovery capital in the treatment of substance use disorders: six-month follow-up observations. *Drug Alcohol Depend*. 2019;205:107624. doi:10.1016/j.drugaldep.2019.107624

49. Bormann NL, Oesterle TS, Weber AN, Choi DS, Karpyak V, Arndt S. Positive changes in employment status are associated with reduced alcohol use frequency at discharge from outpatient specialty treatment. *Alcohol Clin Exp Res*. 2025;2025:70044. doi:10.1111/acer.70044
50. Laudet AB. Rate and predictors of employment among formerly polysubstance dependent urban individuals in recovery. *J Addict Dis*. 2012;31(3):288–302. doi:10.1080/10550887.2012.694604
51. Hargons CN, Miller-Roenigk BD, Malone NJ, Mizelle DL, Atkinson JD, Stevens-Watkins DJ. “Can we get a Black rehabilitation center”? Factors impacting the treatment experiences of Black people who use opioids. *J Subst Abuse Treat*. 2022;142:108805. doi:10.1016/j.jsat.2022.108805

Substance Abuse and Rehabilitation

Publish your work in this journal

Substance Abuse and Rehabilitation is an international, peer-reviewed, open access journal publishing original research, case reports, editorials, reviews and commentaries on all areas of addiction and substance abuse and options for treatment and rehabilitation. The manuscript management system is completely online and includes a very quick and fair peer-review system. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <http://www.dovepress.com/substance-abuse-and-rehabilitation-journal>

Dovepress
Taylor & Francis Group