

# Examination of Referral Source and Retention Among Women in Residential Substance Use Disorder Treatment: A Prospective Follow-Up Study

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## Research

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# Abstract

*Background:* Court-mandated substance use disorder (SUD) treatment, as compared to nonmandated treatment, has been associated with increased retention and completion. However, whether child protective services (CPS)-mandated women's residential SUD treatment leads to improved treatment retention in comparison to criminal justice (CJ)-mandated and nonmandated treatment remains unclear.

*Purpose:* This study compared the number of days retained in residential SUD treatment among three referral sources (CPS, CJ, and nonmandated), while also examining whether having a co-occurring mental health disorder or certain mental health characteristics (increased stress, depression, anxiety, and PTSD symptomology) contributed to decreased retention. This study tested the hypothesis that women mandated by the CPS and CJ systems would have improved residential SUD treatment retention compared with nonmandated women.

*Methods:* Multivariate regression analyses were conducted on data for a diverse sample of 245 women (Hispanic:  $N = 141$ , Black:  $N = 50$ , White:  $N = 50$ ) mandated or nonmandated (CJ:  $N = 114$ , CPS:  $N = 82$ , nonmandated:  $N = 49$ ) into residential SUD treatment to determine each group's treatment retention outcomes.

*Results:* Women mandated to SUD residential treatment regardless of source (CPS or CJ) remained in treatment significantly longer (CPS:  $M = 116.59$  days,  $SD = 65.59$ ,  $p = .023$ ; CJ:  $M = 133.86$  days,  $SD = 79.43$ ,  $p = .028$ ), compared to women not mandated ( $M = 96.11$  days,  $SD = 72.09$ ), representing a 34.4% and 31.6% increase, respectively. Findings further revealed a corresponding 2.3% decrease in retention ( $p = .024$ ) for each one-unit increase in a patient's stress score, whereas those with a co-occurring mental health diagnosis had a 43.6% decrease in SUD treatment retention ( $p < .001$ ).

*Conclusions:* This study highlights the importance of future research that examines the impact of referral source, co-occurring mental disorders, and stress on women's residential SUD treatment retention.

Further research is needed examining the variability in external motivation among referral sources compounded by dynamic intersections of risk associated with having a co-occurring disorder and stress on treatment retention.

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## 1. Introduction

Since 1980, the number of women incarcerated in U.S. prisons and jails has increased by more than 750%, outpacing the increase in male incarceration by more than 50% [1, 2]. To address this, mandated residential substance use disorder (SUD) treatment, as an external motivator, has become a commonly used treatment engagement strategy in lieu of prosecution by the criminal justice (CJ) and child

protective services (CPS) systems [3, 4]. Although there is some debate about the relative value of external motivation for increasing SUD treatment retention [5, 6], current evidence shows CJ-mandated treatment, as an external motivator, results in improved treatment retention as compared to nonmandated SUD treatment [7, 8]. Completing a full treatment program is vital, yet retention in residential SUD treatment is one of the major challenges for women [9]. Further, relatively few studies have investigated the effectiveness of CPS-mandated treatment on increasing women's residential SUD treatment retention, particularly compared to CJ- and nonmandated residential treatment [10–12].

Historically, court mandated SUD treatment research has focused largely on male or mixed-sex samples [13]. For instance, Wilson et al. [13] conducted a systematic review examining 55 independent drug court comparisons and revealed that 80% ( $N=44$ ) featured largely male samples (60–90% male), and only one study (2%) had an all-female sample. As of late, the importance of examining sex-specific (women only) SUD treatment retention and completion outcomes is increasingly being recognized.

Women entering SUD treatment through the CPS and CJ systems generally have more severe SUDs than their male counterparts [14]. Further, in contrast to women entering mixed-sex residential SUD treatment, those entering women's SUD treatment are more likely to have more extensive histories of substance use [15]. CPS- and CJ-mandated residential SUD treatment is a critical intervention for women, although challenges remain regarding this group's vulnerability to treatment dropout. Challenges associated with increasing susceptibility to treatment dropout include having a co-occurring mental health disorder [16], increased stress [17, 18], and histories of physical and sexual abuse trauma [19]. A large body of research on SUD treatment recognizes women who remain in treatment longer generally have improved treatment recovery outcomes, such as (a) reduction in substance use and long-term abstinence, (b) improved mental health conditions [20], and (c) increased family reunification rates [12]. These findings call attention to the need to examine treatment retention differences in a sociodemographic diverse group of women mandated (CPS and CJ) or nonmandated into women's residential SUD treatment.

CJ-mandated residential SUD treatment is generally an accepted predictor of increased treatment retention and completion rates [7, 8]. For instance, a large statewide study evaluating drug court programs in California revealed that the drug court model produced higher rates of SUD treatment completion and reduced recidivism as compared to a nondrug court model [7]. However, because women may contend with different mandating systems to address their SUD, understanding the variability in treatment retention among different referral statuses may inform targeted approaches that improve women's residential SUD treatment retention.

These separate referral sources function as three distinct external motivational conditions that may contribute to different residential treatment retention outcomes [21]. For example, women mandated by the CPS system are required to complete treatment to retain or regain child custodial rights, and noncompletion of treatment may result in lost custody of children. Women who are mandated by the CJ system are required to complete SUD treatment in lieu of criminal prosecution, and completing treatment can lead to criminal charges being dropped or reduced. Alternatively, women who are nonmandated may

not have the same weight of external pressure attached as with legal and CPS mandates; however, external motivation often comes in the form of family, significant other, or employer pressures to enter SUD treatment [22]. It is important to note that women mandated into treatment by the CJ system, due to overriding jurisdiction, may also have child custody cases, increasing external motivation to engage in and complete treatment, whereas those who are CPS-mandated or nonmandated may not contend with this same risk of “double jeopardy” [11]. Nevertheless, prior research has not adequately investigated the effects of CPS-mandated residential SUD treatment retention in comparison to CJ-mandated and nonmandated treatment [10, 12, 13].

Despite increased research interest on the role of court- or legally mandated SUD treatment in treatment retention, little is known about the effects of CPS-mandated in comparison to CJ- and nonmandated SUD treatment retention. A comprehensive review of the literature revealed few studies examining CPS-mandated treatment retention and completion outcomes compared to nonmandated women [12, 13]. For instance, participants in family dependency court (a CPS mandating agency) completed treatment at rates 20 to 30 percentage points higher than that of other parents not mandated by family dependency court, while remaining in SUD treatment longer [12].

Because prior work examining mandated SUD treatment retention has primarily focused on CJ-mandated treatment [10, 13], it is not known if CPS-mandated treatment, as an external motivator, results in improved treatment retention in comparison to CJ- and nonmandated women’s residential SUD treatment. With the continuing expansion of family drug courts (CPS mandating agency) in the United States from two in 1994 to 495 in 2018, this is particularly relevant [23]. Nevertheless, no known studies have examined CPS-mandated women’s SUD residential treatment retention outcomes in comparison to CJ-mandated and nonmandated treatment [10, 12]. Because women enter women’s residential SUD treatment through coercively distinct pathways (CPS, CJ, or nonmandated), it is critical to understand the treatment retention differences among these groups to provide more effective treatment.

Moreover, among women who enter residential SUD treatment, the evidence is not clear whether having a co-occurring mental health disorder is a predictor of decreased treatment retention [16, 24]. Research that has examined associations between co-occurring mental health and SUD treatment has often found that having a mental health disorder is associated with lower treatment retention and poorer outcomes [16, 25]. However, the impact of co-occurring mental health disorders on SUD treatment retention may not always be uniform, varying by treatment modality, psychiatric diagnosis, and sex [16, 24–26]. For example, Choi et al. [24] found women with a co-occurring disorder were more likely to stay longer in treatment when compared to men with a co-occurring disorder. In contrast, prior work has shown women with co-occurring disorders in general have poorer SUD treatment retention than women without a co-occurring disorder [27]. Advancing the current literature, a better understanding of whether having a co-occurring mental health disorder affects SUD treatment retention among mandated (CPS and CJ) or nonmandated women may have implications for women’s SUD treatment, particularly given the distinct coercive pressures associated with the three respective referral conditions.

To gain a fuller understanding and address the aforementioned limitations, this study examined specific psychological characteristics and whether having a co-occurring mental health disorder are contributors to SUD treatment retention among women mandated and nonmandated into residential treatment. These psychological characteristics include increased levels of stress [17, 28], depression [29], posttraumatic stress disorder (PTSD) [30], and anxiety [31, 32]. However, few studies have examined if known psychological contributors (i.e., PTSD, stress, depression, and anxiety) affected treatment retention between mandated and nonmandated referral statuses. Therefore, the current study sought to address each of these gaps by comparing samples of women mandated (CPS and CJ) or nonmandated into women's residential SUD treatment to determine whether having a co-occurring mental health disorder or certain psychological characteristics affected number of days retained in treatment.

## **1.2. Study summary and hypotheses**

Guided by prior empirical research, the primary purpose of this study was to examine differences in women's residential SUD treatment retention (as measured by number of days in treatment) by referral status (CJ, CPS, and nonmandated). This study generated important insights for understanding retention differences among women entering residential SUD treatment via three primary treatment entry pathways. Moreover, understanding the effects on retention from having a co-occurring mental health disorder and certain psychological characteristics (PTSD, depression, stress, and anxiety) may aid treatment planning that mitigates early treatment dropout. Hypothesis 1 posits that women mandated by the CPS or CJ system into residential SUD treatment will be associated with more days retained in treatment compared to those nonmandated. Hypothesis 2 posits that women mandated into residential SUD treatment, in general, will be associated with more days retained in treatment compared to those who were nonmandated to treatment. Hypothesis 3 posits that women mandated by the CJ system into residential SUD treatment will be associated with more days retained in treatment compared to those mandated by the CPS system. Further, Hypothesis 4 posits certain psychological characteristics (increased stress, PTSD, anxiety, and depression symptomology) and having an additional mental health diagnosis will be associated with fewer days retained in treatment.

## **2. Methods**

### **2.1. Study design**

Data utilized in this paper were from baseline interviews conducted as part of a randomized controlled trial conducted between 2016 and 2018. In the current study, we did not focus on intervention effects; therefore, we controlled for group assignment in the analysis. The parent study was a parallel-group trial (NCT02977988) designed to compare retention days between women randomly assigned to one of two study conditions during residential SUD treatment: (a) a mindfulness-based intervention and (b) education regarding the neurobiology of addiction, which served as the control group. Baseline interviews occurred prior to randomization and intervention delivery. All participants received SUD treatment as

usual in a therapeutic community setting without affecting standard level of care typically provided to patients [33].

## **2.2. Participants and procedures**

All participants ( $N = 245$ ) were adult women (aged 18–65) diagnosed with a SUD, alcohol use disorder (AUD), or both and who spoke English. Women were mandated by the CJ and CPS systems or nonmandated (i.e. self-referred) and had an expected length of residential inpatient stay of 6 months. Approximately 3 weeks after residential treatment entry, women who assented to participate provided informed consent and learned about HIPAA processes, then completed the baseline assessment interview. Trained research interviewers using computer-assisted interview procedures collected data from all study participants [33].

## **2.3. Inclusion and exclusion criteria**

Eligibility criteria were as follows: participant housed at SUD program treatment site, female, adult (18–65 years old), able to speak fluent English, diagnosed with a SUD, and signed informed consent form agreeing to participate in research. Exclusion criteria were as follows: inability to comprehend or sign informed consent to participate due to language barrier, severe cognitive impairment, untreated psychotic disorder, severe mental health condition, past-30-day suicidality based on clinical assessment, currently incarcerated, participating in other research, > 6 months pregnant, > 65 years of age, and not willing to sign HIPAA form or be audio recorded during interviews and intervention sessions [33].

## **2.4. Data sources and measures**

### **2.4.1. Demographic, clinical, referral, and retention data**

Baseline demographic information was obtained via in-person interview and included age, race and ethnicity, parental status, housing status, education, and employment status. Admitted patients met one-on-one with a clinician coordinator who assessed for number of mental health diagnoses, substance or alcohol use disorders, and suicidality using the DSM-5 [34]. Referral status (CJ mandated, CPS mandated, or nonmandated) and number of days retained in treatment were likewise extracted from clinical records. Nonmandated patients self-referred at their own initiative or as a result of a recommendation from a nonmandating provider, family member, or friend. For women who were mandated, legal and child custody status was monitored by CJ and CPS systems throughout treatment with updates in addition to coordinated and integrated interagency support and case management services.

### **2.4.2. Self-report measures: Depression, anxiety, stress, and PTSD**

Psychological symptoms were measured via the Depression, Anxiety and Stress Scale (DASS-21) and the Posttraumatic Symptom Scale-Interview (PSS-I) [35, 36]. The DASS-21 features three self-report subscales designed to measure the emotional states of depression (7 items), anxiety (7 items), and stress (7 items) on a 4-point Likert scale. The PSS-I was utilized to assess frequency of PTSD symptom severity

in the last 30 days and includes re-experiencing (5 items), avoidance (7 items), and arousal (5 items) on a 4-point Likert scale. Participants replied regarding any traumatic event experienced, not an explicit traumatic event as the traditional instructions recommend.

## 2.5. Data analysis

Descriptive characteristics of pretreatment factors were examined for the three referral groups (CJ mandated, CPS mandated, and nonmandated). Utilizing *t*-tests and analysis of variance for comparison of means for continuous variables and chi-square tests for comparison of percentages with categorical variables, we compared sociodemographic and pretreatment characteristics among the referral groups. If significant differences between groups were found, pairwise comparisons (i.e., CPS versus CJ, CPS versus nonmandated, CJ versus nonmandated, and mandated versus nonmandated) were conducted. For continuous variables, Tukey's method was used to consider all possible pairwise differences of means at the same time. For categorical variables, chi-square tests were conducted for each mandating agency and nonmandated group. If the chi-square *p*-value was less than .017 (i.e., alpha .05 divided by 3) based on number of group comparisons, the difference was considered statistically significant.

All study variables were tested for confirmation in meeting core model assumptions of normality, linearity, and homoscedasticity. A log<sub>10</sub> transformation was conducted for the dependent variable, number of days in treatment, to reduce skewness. Additionally, a square-root transformation was conducted for independent variables of age, posttraumatic stress scores, and stress scores to reduce skewness and improve normality.

To address Hypotheses 1, 2, and 3, a multivariate linear regression model-building method was used to determine if mandated (CJ or CPS) or nonmandated referral status predicted increased days in treatment. The primary independent variable of interest was referral status, and number of days in treatment was the outcome variable. Univariate analyses were conducted to determine potential associations between being CJ mandated, CPS mandated, or nonmandated and the number of days in treatment.

Next, potential covariates and control variables were evaluated to determine if there was a greater than 10% change in the effect estimate of the mandating variable (CJ or CPS) or nonmandating variable and the number of days in treatment. Based on prior work, potential covariates and control variables tested for possible inclusion in the final models were (a) age, race and ethnicity, being a mother, housing, education, and employment status and (b) number of mental health diagnoses, mental health characteristics (PTSD, depression, stress, and anxiety), and SUD and AUD diagnoses. Control variables determined to be retained in final models were age, stress (mental health characteristic), and number of mental health diagnoses.

Addressing Hypothesis 4, all models were examined for stress, having one or more mental health diagnoses, and their association with increased days in treatment among the three treatment referral groups. For all final multivariate linear regression models, parameter estimates and corresponding *p*-

values are presented. Percentages representing back-transformed ( $\log_{10}$ ) parameter estimates are further presented for clarity of interpretation. All statistical analyses were conducted using SAS version 9.4.

## 3. Results

### 3.1. Participant demographics, mental health, and referral status comparison

Descriptive sociodemographic characteristics data for all study variables are presented in Table 1. The sample featured 245 women; 46.5% were mandated to SUD treatment by the CJ system, 33.5% by the CPS system, and 20% were nonmandated. Ages varied from 18 to 61 years, with a mean of 32.2 years. Most of the women had children (89.8%). The majority of participants were Hispanic (57.6%), followed by non-Hispanic White (20.4%), non-Hispanic Black (20.4%), and another race or ethnicity (1.6%). Most of the participants were homeless or had unstable housing prior to entering treatment (82%), nearly half had less than a high school diploma (47.8%), and many were unemployed (73.9%). More than half of the participants had one or more co-occurring mental health disorders (57.7%) in addition to a SUD or AUD diagnosis. In addition, the majority (76.2%) of women had a SUD and 10% had an AUD, whereas 13.8% had both a SUD and AUD.

Bivariate analyses identified significant differences by mandated status for being a mother ( $p < .001$ ), PTSD ( $p = .003$ ), depression ( $p < .001$ ), perceived stress ( $p < .001$ ), anxiety ( $p < .001$ ), and SUD or AUD diagnosis ( $p < .001$ ; Table 1). In addition, there was a significant difference between referral status category and number of days retained in treatment ( $p = .012$ ). Pairwise comparisons (uncontrolled) found that women mandated to treatment by either the CJ or CPS system were retained in treatment more days than nonmandated participants. Significant pairwise group comparisons are presented in Table 1.

### 3.2. Findings for main hypotheses

Tables 2, 3, and 4 present models of separate regressions for the number of days an individual was retained in SUD treatment relative to being CPS, CJ, or nonmandated. Addressing Hypothesis 1 (Table 2), women mandated by CPS remained in treatment significantly longer ( $M = 116.59$  days,  $SD = 65.59$ ,  $p = .023$ ), representing a 34.4% increase in the number of days retained in treatment compared to those who were nonmandated ( $M = 96.11$  days,  $SD = 72.09$ ), holding all other variables in the model constant. Women mandated by the CJ system remained in treatment significantly longer ( $M = 133.86$  days,  $SD = 79.43$ ,  $p = .028$ ), representing a 31.6% increase in the number of days retained in treatment compared to those who were nonmandated ( $M = 96.11$  days,  $SD = 72.09$ ), holding all other variables in the model constant. Addressing Hypothesis 2 (Table 3), analysis revealed being mandated was a significant predictor of number of days retained in SUD residential treatment ( $M = 126.61$  days,  $SD = 74.25$ ,  $p = .016$ ), representing a 32.8% increase compared to those who were nonmandated ( $M = 96.11$  days,  $SD = 72.09$ ), holding all other variables in the model constant.

Hypothesis 3 was not supported (Table 4); women mandated by the CJ system did not remain in treatment significantly more days ( $M = 133.86$  days,  $SD = 79.43$ ,  $p = .43$ ) compared to those mandated by the CPS system ( $M = 116.59$  days,  $SD = 65.59$ ), while controlling for all other variables in the model. Addressing Hypothesis 4, findings in all three models revealed that higher stress scores and having one or more mental health diagnoses were significantly associated with fewer days of SUD residential treatment. Findings revealed that for each one-unit increase in a patient's stress score, there was a corresponding 2.3% decrease in the number of days an individual was retained in treatment ( $p = .024$ ), holding all variables in the model constant. For women with one or more mental health diagnoses, in addition to a SUD or AUD diagnosis, there was a 43.6% decrease in the number of days they were retained in treatment ( $p < .001$ ), controlling for all other variables in the model.

## 4. Discussion

This is the first known study comparing the associations between women's residential SUD treatment referral groups (CPS, CJ, and nonmandated) and treatment retention, as measured by the number of days an individual was retained in treatment. Results from this study will contribute to the literature on mandated (CJ and CPS) and nonmandated women's residential SUD treatment. Findings confirmed our hypotheses that women mandated into residential SUD treatment by the CJ and CPS systems, compared to women who were nonmandated, were associated with more days retained in treatment. Contrary to our hypothesis, we did not find that women mandated into residential SUD treatment by the CJ system had significantly improved treatment retention as compared to women mandated by the CPS system. Our study did find that women who had one or more mental health diagnoses, in addition to their SUD or AUD diagnosis, had significantly decreased retention as measured by number of days retained in residential SUD treatment. Further, analysis of women with increased stress symptomology revealed that patients with increased stress had significantly reduced treatment retention.

### 4.1. Referral source and retention

In line with prior research, our study found women who entered SUD treatment through mandated referral from the CJ system had improved treatment retention compared to those who were nonmandated [8, 10]. This raises important emergent presuppositions pertaining to the treatment motivation and readiness of mandated and nonmandated women who enter treatment, which may explain these disparate findings. For example, research from a large federally funded multisite evaluation of 380 adult drug courts found time elapsed between arrest and incarceration and first court appearance was more than 30 days in 35% of courts and from 16 to 30 days in 23% of courts [37]. For those with co-occurring mental health disorders, this time between arrest and treatment entry may enhance treatment readiness through psychiatric stabilization by beginning psychotropic medication treatment for their mental health disorders while incarcerated. Psychotropic medication can take 4 to 6 weeks to take effect [38]. This reasoning is further supported in this study by pairwise group comparisons showing women mandated by the CJ system had significantly lower scores for mental health characteristics (PTSD, depression, stress, and anxiety) compared to those who were CPS mandated or nonmandated. This is critical because

psychiatric stabilization is a key component in SUD treatment readiness and engagement [39] and also an eligibility component for entry into mandated residential SUD treatment [37].

Further supporting our study's findings, previous research revealed that integrated interagency collaboration and services (CJ and SUD treatment program) promote treatment engagement and completion [40]. For instance, additional support accompanies women mandated by the CJ system in the form of: (a) collaborative legal and treatment system approaches in assessment, treatment planning, and SUD treatment placement; (b) ongoing monitoring of patient advancement with interagency progress meetings during SUD treatment; and (c) increased patient accountability with increasing rewards and sanctions based on progress [40]. This suggests that combined integrated interagency supports accompanying the external motivation associated with completion of mandated treatment (e.g., dropped criminal charges, substance use recovery, or criminal prosecution and incarceration) promotes improved treatment retention and outcomes, which is not otherwise available to those nonmandated.

The current findings showing that women who entered treatment via the CPS system were associated with more days retained in treatment when compared to those who were nonmandated are in line with the existing literature [12]. Unlike women who are nonmandated, women mandated by the CPS system, as with those from the CJ system, typically have extended resources and incentives that are integrated into SUD treatment through case management and childcare supports [12, 41]. Research has demonstrated that interagency (CPS and SUD treatment program) planning and support during SUD treatment encompasses case management and wraparound services that meet multiple service needs of parents with SUDs including, (a) parenting classes or groups, (b) housing transition supports after treatment completion, and (c) matching and obtaining social services tailored to the women and their children's respective needs. Research has shown that integrated CPS and SUD treatment services lead to improved retention, reductions in substance use, and family reunification [12, 41].

There is limited literature to which we can link our findings of SUD treatment retention regarding CJ- and CPS-mandated women compared to women who are not mandated to SUD treatment. However, similar results between CJ and CPS retention in this study may be partly due to enhanced external motivational factors associated with (a) having interagency case management support services integrated among CPS, CJ, and SUD treatment program services [12, 40, 41]; (b) having criminal charges reduced or dismissed upon successful SUD treatment completion; and (c) retaining or regaining child custody upon successful SUD treatment completion. This may further explain the increased treatment retention rates of women who were CPS mandated, as compared to nonmandated, which are similar to women who were referred into SUD treatment by the CJ system.

Contrary to our second hypothesis, we did not find that women mandated by the CJ system had significantly increased treatment retention as compared to those mandated by the CPS system. Although a portion of women who entered treatment via the CJ system may have experienced the "double jeopardy" threat of having a CPS case running concurrently, findings suggest this did not induce

increased external motivation leading to increased treatment retention. For this study, we only had data on primary referral source; therefore, we were unable to control for any concurrent legal involvement.

## **4.2. Co-occurring mental health disorders and stress**

In each model, co-occurring mental health disorders and stress negatively affected the number of days retained in treatment among women from all referral sources. For women with co-occurring disorders, this is consistent with prior evidence showing that patients with higher psychiatric comorbidity receiving SUD treatment have increased odds of treatment noncompletion and earlier attrition rates [16]. Prior work has suggested that individuals with SUDs and psychiatric comorbidities may have more difficulty integrating and fully participating in SUD treatment programs [42, 43]. This is exacerbated when women who enter into residential SUD treatment are challenged with more severe mental health conditions, overloading treatment retention and completion efforts [15, 44, 45]. This suggests further research is needed to obtain a clearer understanding of how co-occurring mental health disorders affect women's treatment integration and engagement and their link to decreased SUD residential treatment retention. A greater comprehension of this complex interplay of treatment integration and engagement among women with co-occurring disorders and SUD treatment retention may inform improved design of tailored services for this vulnerable subgroup of women.

Additionally, consistent with prior research, current findings revealed that higher levels of perceived stress were negatively associated with number of days retained in treatment across models [28]. Supporting this finding, prior work has shown that individuals who report higher levels of stress experienced more frequent and stronger substance and alcohol use cravings [18, 46]. Importantly, Law et al. [18] found that craving mediated the relationship between stress and relapse during treatment. This supports the explanation that people with higher perceived stress were negatively associated with number of days retained in treatment, given that relapse is a well-established predictor of treatment dropout. Behavioral interventions aimed at improving women's SUD treatment retention may be enhanced by focusing on cultivating the ability to persist through stress-induced drug craving (e.g., mindfulness-based relapse prevention [47] and dialectical behavior therapy [48]). Findings support future research on interventions for women in the early stages of residential treatment who are particularly susceptible to stress and craving, in addition to those with co-occurring mental health conditions, which may ameliorate early treatment dropout while reducing stress-induced relapse.

## **4.3. Limitations**

As with any scientific study, there are limitations to the current study. First, findings are limited to a single treatment program and modality of women's residential SUD treatment. This limits generalizability to other treatment modalities, in addition to mixed-sex or all-male residential SUD treatment programs. Second, the current study did not analyze program-level factors associated with early treatment dropout (i.e., insurance limitations for nonmandated women and family financial obligations) [49, 50]. A strength of this study is its rigorous approach to measurement, having drawn data from a randomized controlled trial, in addition to its diverse representativeness of women with CJ and CPS histories with lower

socioeconomic status. Thus, findings are likely more generalizable to women served in most publicly funded women's SUD residential treatment programs with similar demographic characteristics.

## 4.4. Conclusion

This study provides several implications for women's mandated residential SUD treatment. The current study demonstrated that women who were CPS or CJ mandated into women's residential SUD treatment had more days retained in treatment compared to nonmandated women. These findings highlight that CPS-mandated treatment, as an external motivator, results in increased treatment retention, similar to women mandated by the CJ system. These findings indicate that unlike women who are not mandated, those mandated by the CPS system typically have extended resources and incentives that are integrated into SUD treatment through case management and childcare support, as with women from the CJ system. Moreover, women with co-occurring mental health disorders and increased stress are at a heightened risk of early dropout and reduced residential treatment retention. Future research should identify women at treatment entry with co-occurring disorders and increased stress so that individualized intervention approaches can mitigate these risk factors associated with reduced retention. The current study's findings highlight the importance of future research on referral source, co-occurring mental health disorders, and stress, which play a role in women's SUD residential treatment retention. This is particularly important given the complex external motivation conditions women face when mandated (CPS or CJ) or nonmandated into SUD treatment, which is further compounded by dynamic intersections of risk associated with having a co-occurring disorder and stress on treatment retention. Clinical implications may include incorporating a more nuanced treatment approach that manages mental health and stress symptomology early in treatment when women are most vulnerable to relapse and treatment dropout. However, future investigations should identify optimal research directions specific to women's SUD residential treatment, thereby maximizing treatment approach development and successful application.

## 5. Abbreviations

CJ: Criminal justice; CPS: Child protective service; SUD: Substance use disorder; AUD: Alcohol use disorder; PTSD: Posttraumatic stress disorder; DASS-21: Depression, Anxiety And Stress Scale; PSS-I: Posttraumatic Symptom Scale-Interview

## 6. Declarations

### **Ethics approval and consent to participate**

The Institutional Review Board of the University of Southern California approved all procedures of the parent study. All study participants provided informed consent prior to participation in the parent study. No individual data are reported in this paper.

### **Consent for publication**

Not applicable.

## Availability of data and materials

The data used or analyzed in the current study are available from Hortensia Amaro the senior author on this paper and PI of the parent grant based on time and resources available.

## Competing interests

The authors declare that they have no competing interests.

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## Authors' contributions

DR was responsible for conceptualization of study, performing the literature review, statistical analyses, interpretation of results, drafting of manuscript, and funding acquisition. DD was responsible for supervision of statistical analysis, data curation, and interpretation of results. HA was responsible for conceptualization of study, study supervision, project administration, and parent study funding acquisition. DR, DD, and HA each contributed to revisions of manuscript. All authors have read and approved the final manuscript.

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## 7. References

1. Carson E. Prisoners in 2016 (NCJ 251149). Washington, DC: Bureau of Justice Statistics; 2018.
2. Sentencing Project. Incarcerated women and girls. Available from: <https://www.sentencingproject.org/publications/incarcerated-women-and-girls/>. Accessed 15 June, 2020.
3. National Institute of Justice. Drug courts. Available from: <https://www.nij.gov/topics/courts/drug-courts/Pages/welcome.aspx>. Accessed 30 July, 2020.
4. Rittner B, Dozier CD. Effects of court-ordered substance abuse treatment in child protective services cases. *Soc Work*. 2000;45(2):131–40.

5. Hachtel H, Vogel T, Huber C. Mandated treatment and its impact on therapeutic process and outcome factors. *Front Psychiatry*. 2019;10:219.
6. Wild TC, Yuan Y, Rush BR, Urbanoski KA. Client engagement in legally-mandated addiction treatment: a prospective study using self-determination theory. *J Subst Abuse Treat*. 2016;69:35–43. doi:10.1016/j.jsat.2016.06.006
7. Carey SM, Pukstas K, Waller MS, Mackin RJ, Finigan M. Drug courts and state mandated drug treatment programs: outcomes, costs and consequences. Washington, DC: National Institute of Justice; 2008.
8. Coviello DM, Zanis DA, Wesnoski SA, Palman N, Gur A, Lynch KG, et al. Does mandating offenders to treatment improve completion rates? *J Subst Abuse Treat*. 2013;44(4):417–25. doi:10.1016/j.jsat.2012.10.003
9. Brorson HH, Arnevik EA, Rand-Hendriksen K, Duckert F. Drop-out from addiction treatment: a systematic review of risk factors. *Clin Psychol Rev*. 2013;33(8):1010–24.
10. Longinaker N, Terplan M. Effect of criminal justice mandate on drug treatment completion in women. *Am J Drug Alcohol Abuse*. 2014;40(3):192–9. doi:10.3109/00952990.2013.865033
11. Marlowe DB, Merikle EP, Kirby KC, Festinger DS, McLellan AT. Multidimensional assessment of perceived treatment-entry pressures among substance abusers. *Psychol Addict Behav*. 2001;15(2):97–108. doi:10.1037/0893-164X.15.2.97
12. Marlowe D, Carey S. (2012). Research update on family drug courts. Available from: <https://www.nadcp.org/wp-content/uploads/Reseach%20Update%20on%20Family%20Drug%20Courts%20-%20NADCP.pdf>. Accessed 30 June, 2001.
13. Wilson DB, Mitchell O, MacKenzie DL. A systematic review of drug court effects on recidivism. *J Exp Criminol*. 2006;2(4):459–87. doi:10.1007/s11292-006-9019-4
14. Greenfield SF, Brooks AJ, Gordon SM, Green CA, Kropp F, McHugh RK 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.drugalcdep.2006.05.012
15. Grella CE, Hser YI, Huang YC. Mothers in substance abuse treatment: differences in characteristics based on involvement with child welfare services. *Child Abuse Negl*. 2006;30(1):55–73.
16. Krawczyk N, Feder KA, Saloner B, Crum RM, Kealhofer M, Mojtabai R. The association of psychiatric comorbidity with treatment completion among clients admitted to substance use treatment programs in a U.S. national sample. *Drug Alcohol Depend*. 2017;175:157–63. doi:10.1016/j.drugalcdep.2017.02.006
17. Andersson HW, Steinsbekk A, Walderhaug E, Otterholt E, Nordfjærn T. Predictors of dropout from inpatient substance use treatment: a prospective cohort study. *Subst Abuse Res Treat*. 2018;12:1178221818760551.
18. Law B, Gullo MJ, Daghli M, Kavanagh DJ, Feeney GFX, Young RM, et al. Craving mediates stress in predicting lapse during alcohol dependence treatment. *Alcohol Clin Exp Res*. 2016;40(5):1058–64.

doi:10.1111/acer.13034

19. Du J, Huang D, Zhao M, Hser YI. Drug-abusing offenders with co-morbid mental disorders: gender differences in problem severity, treatment participation, and recidivism. *Biomed Environ Sci*. 2013;26(1):32–9. doi:10.3967/0895-3988.2013.01.004
20. Clark C, Young MS. Outcomes of mandated treatment for women with histories of abuse and co-occurring disorders. *J Subst Abuse Treat*. 2009;37(4):346–52. doi:10.1016/j.jsat.2009.03.011
21. Klag S, O'Callaghan F, Creed P. The use of legal coercion in the treatment of substance abusers: an overview and critical analysis of thirty years of research. *Subst Use Misuse*. 2005;40(12):1777–95.
22. Wild TC, Cunningham JA, Ryan RM. Social pressure, coercion, and client engagement at treatment entry: a self-determination theory perspective. *Addictive Behaviors*. 2006;31(10): 1858-1872.
23. Lemus T, Richter T. A new approach: family treatment courts as part of a continuum of care. Presented at the 2018 NADCP Advancing Justice for All Families Conference, Houston, TX, May 31, 2018.
24. Choi S, Adams SM, Morse SA, MacMaster S. Gender differences in treatment retention among individuals with co-occurring substance abuse and mental health disorders. *Subst Use Misuse*. 2015;50(5):653–63. doi:10.3109/10826084.2014.997828
25. Bradizza CM, Stasiewicz PR, Paas ND. Relapse to alcohol and drug use among individuals diagnosed with co-occurring mental health and substance use disorders: a review. *Clin Psychol Rev*. 2006;26(2):162–78. doi:10.1016/j.cpr.2005.11.005
26. Compton WM III, Cottler LB, Jacobs JL, Ben-Abdallah A, Spitznagel EL. The role of psychiatric disorders in predicting drug dependence treatment outcomes. *Am J Psychiatry*. 2003;160(5):890–895. doi:10.1176/appi.ajp.160.5.890
27. Ashley OS, Marsden ME, Brady TM. Effectiveness of substance abuse treatment programming for women: a review. *Am J Drug Alcohol Abuse*, 2003;29(1):19–53.
28. Daughters SB, Richards JM, Gorka SM, Sinha R. HPA axis response to psychological stress and treatment retention in residential substance abuse treatment: a prospective study. *Drug Alcohol Depend*. 2009;105(3):202–8. doi:10.1016/j.drugalcdep.2009.06.026
29. Hom MA, Joiner TE. Predictors of treatment attrition among adult outpatients with clinically significant suicidal ideation. *J Clin Psychol*. 2017;73(1):88–98. doi:10.1002/jclp.22318
30. Tull MT, Gratz KL, Coffey SF, Weiss NH, McDermott MJ. Examining the interactive effect of posttraumatic stress disorder, distress tolerance, and gender on residential substance use disorder treatment retention. *Psychol Addict Behav*. 2013;27(3):763.
31. Elmquist J, Shorey RC, Anderson SE, Stuart GL. The relationship between generalized anxiety symptoms and treatment dropout among women in residential treatment for substance use disorders. *Substance Use Misuse*. 2016;51(7):835–9. doi:10.3109/10826084.2016.1155612
32. Lejuez C, Zvolensky MJ, Daughters SB, Bornovalova MA, Paulson A, Tull MT et al. Anxiety sensitivity: a unique predictor of dropout among inner-city heroin and crack/cocaine users in residential substance use treatment. *Behav Res Therapy*. 2008;46(7):811–8.

33. Black DS, Amaro H. Moment-by-Moment in Women's Recovery (MMWR): mindfulness-based intervention effects on residential substance use disorder treatment retention in a randomized controlled trial. *Behav Res Therapy*. 2019;120:103437. doi:10.1016/j.brat.2019.103437
34. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders*. 5th ed. Arlington, VA: Author; 2013.
35. Antony MM, Bieling PJ, Cox BJ, Enns MW, Swinson RP. Psychometric properties of the 42-item and 21-item versions of the Depression Anxiety Stress Scales in clinical groups and a community sample. *Psychol Assess*. 1998;10(2):176.
36. Foa EB, Cashman L, Jaycox L, Perry K. The validation of a self-report measure of posttraumatic stress disorder: the Posttraumatic Diagnostic Scale. *Psychol Assess*. 1997;9(4):445.
37. Zweig JM, Rossman S, Roman J, Markman JA, Lagerson E, Shafer C. *The Multi-Site Adult Drug Court Evaluation: what's happening with drug courts? a portrait of adult drug courts in 2004*. Vol. 2. Washington, DC: Urban Institute.
38. National Institute of Mental Health. *Mental health medications*. Available from: <https://www.nimh.nih.gov/health/topics/mental-health-medications/index.shtml>. Accessed 30 June, 2020.
39. Cook JM, Simiola V, Hamblen JL, Bernardy N, Schnurr PP. The influence of patient readiness on implementation of evidence-based PTSD treatments in veterans affairs residential programs. *Psychol Trauma Theory Res Pract Policy*. 2017;9:51–8. doi:10.1037/tra0000162
40. Belenko S. Research on drug courts: a critical review. *Natl Drug Court Inst Rev*. 1998;1(1):1–42.
41. Marsh JC, Smith BD, Bruni M. Integrated substance abuse and child welfare services for women: a progress review. *Child Youth Serv Rev*. 2011;33(3):466–72.
42. Torrens M, Rossi PC, Martinez-Riera R, Martinez-Sanvisens D, Bulbena A. Psychiatric co-morbidity and substance use disorders: treatment in parallel systems or in one integrated system? *Subst Use Misuse*. 2012;47(8–9):1005–14. doi:10.3109/10826084.2012.663296
43. Urbanoski KA, Rush BR, Wild TC, Bassani DG, Castel S. Use of mental health care services by Canadians with co-occurring substance dependence and mental disorders. *Psychiatr Serv*. 2007;58(7):962–9. doi:10.1176/ps.2007.58.7.962
44. Brady TM, Ashley OS. *Women in substance abuse treatment: results from the Alcohol and Drug Services Study (ADSS)*. Citseer: 2005.
45. Wechsberg WM, Luseno W, Ellerson RM. Reaching women substance abusers in diverse settings: stigma and access to treatment 30 years later. *Subst Use Misuse*. 2008;43(8–9):1277–9.
46. Panlilio LV, Stull SW, Kowalczyk WJ, Phillips KA, Schroeder JR, Bertz JW et al. Stress, craving and mood as predictors of early dropout from opioid agonist therapy. *Drug Alcohol Depend*. 2019;202:200–8. doi:10.1016/j.drugalcdep.2019.05.026
47. Bowen S, Chawla N, Marlatt GA. *Mindfulness-based relapse prevention for addictive behaviors: a clinician's guide*. New York: Guilford Press; 2011.

48. Linehan MM. Cognitive-behavioral treatment of borderline personality disorder. New York: Guilford Press; 2018.
49. Guerrero EG, Cepeda A, Duan L, Kim T. Disparities in completion of substance abuse treatment among Latino subgroups in Los Angeles County, CA. *Addict Behav.* 2012;37(10):1162–6.
50. Guerrero EG, Khachikian T, Kim T, Kong Y, Vega WA. Spanish language proficiency among providers and Latino clients' engagement in substance abuse treatment. *Addict Behav.* 2013;38(12):2893–7.

## 8. Tables

Table 1: Participant Sociodemographic and Pretreatment Characteristics<sup>a</sup>

| Characteristics                                           | CJ<br>(N=114)<br>M(SD) or N(%) | CPS<br>(N=82)<br>M(SD) or N(%) | Nonmandated<br>(N=49)<br>M(SD) or N(%) | Mandated<br>(N=196)<br>M(SD) or N(%) | Total<br>(N=245)<br>M(SD) or N(%) | Sign. test       | P      | Pairwise <sup>e</sup><br>group significance |
|-----------------------------------------------------------|--------------------------------|--------------------------------|----------------------------------------|--------------------------------------|-----------------------------------|------------------|--------|---------------------------------------------|
| Number of days in treatment                               | 133.86 (79.43)                 | 116.59 (65.59)                 | 96.11 (72.09)                          | 126.61 (74.25)                       | 120.64 (74.67)                    | F = 4.54         | .012   | CJ/NM; M/NM                                 |
| Age <sup>e</sup>                                          | 32.89 (9.92)                   | 30.33 (6.34)                   | 33.76 (9.53)                           | 31.82 (8.68)                         | 32.21 (8.87)                      | F = 2.97         | .053   |                                             |
| Race and ethnicity                                        |                                |                                |                                        |                                      |                                   | $\chi^2 = 5.7$   | .458   |                                             |
| Non-Hispanic White                                        | 19 (16.67)                     | 17 (20.73)                     | 14 (28.57)                             | 36 (18.37)                           | 50 (20.41)                        |                  |        |                                             |
| Non-Hispanic Black                                        | 29 (25.44)                     | 13 (15.85)                     | 8 (16.33)                              | 42 (21.43)                           | 50 (20.41)                        |                  |        |                                             |
| Hispanic                                                  | 64 (56.14)                     | 51 (62.2)                      | 26 (53.06)                             | 115 (58.67)                          | 141 (57.55)                       |                  |        |                                             |
| Other                                                     | 2 (1.75)                       | 1 (1.22)                       | 1 (2.04)                               | 3 (1.53)                             | 4 (1.63)                          |                  |        |                                             |
| Children                                                  |                                |                                |                                        |                                      |                                   | $\chi^2 = 10.87$ | < .001 | CJ/CPS; CPS/NM                              |
| Yes                                                       | 97 (85.09)                     | 81 (98.78)                     | 42 (85.71)                             | 178 (90.82)                          | 220 (89.8)                        |                  |        |                                             |
| No                                                        | 17 (14.91)                     | 1 (1.22)                       | 7 (14.29)                              | 18 (9.18)                            | 25 (10.2)                         |                  |        |                                             |
| Housing                                                   |                                |                                |                                        |                                      |                                   | $\chi^2 = 1.41$  | .49    |                                             |
| Homeless/unstable                                         | 97 (85.09)                     | 65 (79.27)                     | 38 (79.17)                             | 162 (82.65)                          | 200 (81.97)                       |                  |        |                                             |
| Stable                                                    | 17 (14.91)                     | 17 (20.73)                     | 10 (20.83)                             | 34 (17.35)                           | 45 (18.03)                        |                  |        |                                             |
| Education                                                 |                                |                                |                                        |                                      |                                   | $\chi^2 = 3.95$  | .41    |                                             |
| Less than high school diploma                             | 51 (44.74)                     | 41 (50.00)                     | 25 (51.02)                             | 92 (46.94)                           | 117 (47.76)                       |                  |        |                                             |
| High school diploma or equivalent                         | 33 (28.95)                     | 25 (30.49)                     | 9 (18.37)                              | 58 (29.59)                           | 67 (27.35)                        |                  |        |                                             |
| Some post-high school                                     | 30 (26.32)                     | 16 (19.51)                     | 15 (30.61)                             | 46 (23.47)                           | 61 (24.9)                         |                  |        |                                             |
| Employment                                                |                                |                                |                                        |                                      |                                   |                  |        |                                             |
| Full-time                                                 | 11 (9.65)                      | 14 (17.07)                     | 9 (18.37)                              | 25 (12.76)                           | 34 (13.88)                        |                  |        |                                             |
| Part-time                                                 | 13 (11.40)                     | 8 (9.76)                       | 9 (18.37)                              | 21 (10.71)                           | 30 (12.24)                        |                  |        |                                             |
| Not working                                               | 90 (78.95)                     | 60 (73.17)                     | 31 (63.27)                             | 150 (76.53)                          | 181 (73.88)                       |                  |        |                                             |
| Number of mental health diagnoses <sup>b</sup>            |                                |                                |                                        |                                      |                                   | $\chi^2 = 1.22$  | .542   |                                             |
| None                                                      | 51 (44.74)                     | 29 (37.18)                     | 21 (44.68)                             | 80 (41.67)                           | 101 (42.26)                       |                  |        |                                             |
| One or more                                               | 63 (55.26)                     | 49 (62.82)                     | 26 (55.32)                             | 112 (58.33)                          | 138 (57.74)                       |                  |        |                                             |
| Mental health characteristics <sup>d</sup>                |                                |                                |                                        |                                      |                                   |                  |        |                                             |
| PTSD <sup>c</sup>                                         | 14.96 (12.18)                  | 19.00 (11.99)                  | 21.84 (13.81)                          | 16.65 (12.23)                        | 17.69 (12.71)                     | F = 5.91         | .003   | CJ/NM; M/NM                                 |
| Depression                                                | 3.87 (4.00)                    | 5.79 (5.03)                    | 7.47 (6.23)                            | 4.67 (4.55)                          | 5.23 (5.04)                       | F = 10.20        | < .001 | CJ/NM; CPS/CJ; M/NM                         |
| Stress <sup>c</sup>                                       | 5.69 (4.53)                    | 8.05 (4.85)                    | 8.96 (4.51)                            | 6.68 (4.80)                          | 7.13 (4.82)                       | F = 10.90        | < .001 | CJ/NM; CPS/CJ; M/NM                         |
| Anxiety                                                   | 4.53 (4.01)                    | 6.26 (4.38)                    | 7.96 (4.76)                            | 5.25 (4.24)                          | 5.79 (4.48)                       | F = 11.69        | < .001 | CJ/NM; CPS/CJ; M/NM                         |
| Substance and alcohol use disorder diagnosis <sup>b</sup> |                                |                                |                                        |                                      |                                   | $\chi^2 = 6.86$  | < .001 |                                             |
| Alcohol use disorder                                      | 9 (7.89)                       | 7 (8.97)                       | 8 (17.02)                              | 16 (8.33)                            | 24 (10.04)                        |                  |        |                                             |
| Substance use disorder                                    | 86 (75.44)                     | 59 (75.64)                     | 37 (78.72)                             | 145 (75.52)                          | 182 (76.15)                       |                  |        |                                             |
| Both                                                      | 19 (16.67)                     | 12 (15.38)                     | 2 (4.26)                               | 31 (16.15%)                          | 33 (13.81)                        |                  |        |                                             |

<sup>a</sup>Table consists of categorical and continuous variables by group (mandating agencies, mandated and nonmandated status). CJ = criminal justice; CPS = child protective services.

<sup>b</sup>Frequency missing (N = 6); two missing from mandated group and four from nonmandated group for each variable.

<sup>c</sup>Pairwise between group significance (CJ = criminal justice; CPS = child protective services; M = mandated; NM = nonmandated).

<sup>d</sup>Mental health characteristics and stress scores reflect symptom severity ranges (higher scores represent increased severity).

<sup>e</sup>Square-root transformations were conducted for age, PTSD, and stress scores to reduce skewness and improve normality.

Table 2:  
Associations of referral status and pretreatment characteristics with retention  
(N = 245; One-tailed)

| Parameter                                                                                | <i>b</i> | <i>p</i> |
|------------------------------------------------------------------------------------------|----------|----------|
| Intercept                                                                                | 1.77     | <.001    |
| Criminal justice <sup>a</sup>                                                            | 0.12     | .028     |
| Child protective services <sup>a</sup>                                                   | 0.13     | .023     |
| Age                                                                                      | 0.04     | .079     |
| Stress score                                                                             | -0.01    | .024     |
| 1 or more mental health diagnoses <sup>b</sup>                                           | -0.16    | <.001    |
| <i>Note.</i> Parameter estimates were log10 back-transformed for results section.        |          |          |
| <sup>a</sup> CJ ( <i>N</i> = 114); CPS ( <i>N</i> = 82). Nonmandated is reference group. |          |          |
| <sup>b</sup> No mental health diagnoses is reference group.                              |          |          |

Table 3:  
Associations of referral status and pretreatment characteristics with retention  
(N = 245; One-tailed)

| Parameter                                                                         | <i>b</i> | <i>p</i> |
|-----------------------------------------------------------------------------------|----------|----------|
| Intercept                                                                         | 1.77     | <.001    |
| Mandated <sup>a</sup>                                                             | 0.12     | .016     |
| Age                                                                               | 0.04     | .081     |
| Stress score                                                                      | -0.01    | .023     |
| 1 or more mental health diagnoses <sup>b</sup>                                    | -0.16    | <.001    |
| <i>Note.</i> Parameter estimates were log10 back-transformed for results section. |          |          |
| <sup>a</sup> Mandated ( <i>N</i> = 196). Nonmandated is reference group.          |          |          |
| <sup>b</sup> No mental health diagnoses is reference group.                       |          |          |

Table 4:  
 Associations of referral status and pretreatment characteristics with retention  
 (N = 245; One-tailed)

| Parameter                                                                                | <i>b</i> | <i>p</i> |
|------------------------------------------------------------------------------------------|----------|----------|
| Intercept                                                                                | 1.89     | <.001    |
| Criminal justice <sup>a</sup>                                                            | 0.01     | .43      |
| Nonmandated <sup>a</sup>                                                                 | -0.13    | .028     |
| Age                                                                                      | 0.04     | .08      |
| Stress score                                                                             | -0.01    | .024     |
| 1 or more mental health diagnoses <sup>b</sup>                                           | -0.16    | <.001    |
| <i>Note.</i> Parameter estimates were log10 back-transformed for results section.        |          |          |
| <sup>a</sup> CJ ( <i>N</i> = 114); nonmandated ( <i>N</i> = 49). CPS is reference group. |          |          |
| <sup>b</sup> No mental health diagnoses is reference group.                              |          |          |