



The impact of co-occurring mental health problems on referral to and initiation of treatment among youth under probation supervision: Findings from a cluster randomized trial

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ARTICLE INFO

Keywords:

Substance use
Mental health
Juvenile legal system
Community corrections

ABSTRACT

Introduction: Many youth under community supervision have substance use and co-occurring mental health issues. Yet, access to treatment is limited, and many programs cannot address co-occurring disorders. This study examines how co-occurring symptoms among youth on probation affect referral to and initiation of treatment. We hypothesize that both referral and initiation rates will be lower for youth with any co-occurring indicators.

Methods: This study collected administrative data from 14 sites in three states between March 2014 and November 2017 using JJ-TRIALS, a cluster randomized trial. Among 8552 youth in need of treatment (screened as having a substance use problem, drug possession arrest, positive drug test, etc.), 2069 received a referral to treatment and 1630 initiated treatment among those referred. A co-occurring indicator ($n = 2828$) was based on symptoms of an internalizing and/or externalizing issue. Descriptive analyses compared referral and initiation by behavioral health status. Two-level mixed effects logistic regression models estimated effects of site-level variables.

Results: Among youth in need with co-occurring internal, external, or both indicators, only 16 %, 18 %, and 20 % were referred to treatment and of those referred, 63 %, 69 %, and 57 % initiated treatment, respectively. Comparatively, 27 % and 83 % of youth with a substance use only indicator were referred and initiated treatment respectively. Multi-level multivariate models found that, contrary to our hypothesis, co-occurring-both ($p = 0.00$, OR 1.44) and co-occurring-internal indicators ($p = 0.06$, OR 1.25) predicted higher referral but there were no differences in initiation rates. However, there was substantial site-level variation.

Conclusions: Youth on probation in need of substance use treatment with co-occurring issues have low referral rates. Behavioral health status may influence youth referral to treatment depending on where a youth is located. Depending on the site, there may be a lack of community programs that can adequately treat youth with co-occurring issues and reduce unmet service needs.

1. Introduction

There are over 700,000 youth currently in the juvenile legal system (Hockenberry, 2022), the majority of whom are under community supervision (Hockenberry & Puzzenchera, 2019). Justice-involved youth suffer from higher rates of mental health (Teplin et al., 2002) and substance use disorders than their counterparts in the general population (Elkington et al., 2020; Mulvey et al., 2010; Scott et al., 2019; Wasserman et al., 2010), and these behavioral health issues often co-occur. A comprehensive review of community-based studies has shown that 60 % of adolescents with a substance use disorder had a comorbid MH

disorder (Armstrong & Costello, 2002). Yet, those with co-occurring disorders are often underdiagnosed. This is a major concern as co-occurring disorders are associated with increased risk of suicide, poor school performance, issues with family and peers (Hawkins, 2009), poor treatment outcomes (Robinson & Riggs, 2016), and recidivism (Colins et al., 2011; McReynolds et al., 2010; Tolou-Shams et al., 2023).

Ideally, evidence-based behavioral health services should be provided at initial contact with the juvenile legal system to prevent poor health and justice-related outcomes (Aalsma et al., 2019; Belenko et al., 2017; Johnson et al., 2004; Tolou-Shams et al., 2019; Wasserman et al., 2010). However, linkages to behavioral health services for justice-

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<https://doi.org/10.1016/j.josat.2023.209279>

Received 25 June 2023; Received in revised form 20 November 2023; Accepted 15 December 2023

Available online 21 December 2023

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involved youth are severely lacking (Belenko et al., 2022; Knight et al., 2022; Wasserman et al., 2021; Yonek et al., 2019). Because there is often a substantial gap in time between the release of justice-involved youth from detention and initial contact with a juvenile probation officer, a subsequent delay in need identification and service linkage occurs, as the probation officer typically functions as the primary mechanism for service activation (Aalsma et al., 2019). Additionally, standardized mental health and substance use screening instruments are lacking in the juvenile legal system (Young et al., 2007).

While scholars have demonstrated the high prevalence of mental illness and substance use in the legal system, there is still a lack of information on the effects of co-occurring disorders on access to treatment in youth populations (Haney-Caron et al., 2019), particularly among those on community supervision (Belenko et al., 2022; Wasserman et al., 2021). The current paper fills this gap in the literature by assessing how substance use and co-occurring mental health indicators among youth on probation affect referral to and initiation of treatment using data from the Juvenile Justice-Translational Research on Interventions for Adolescents in the Legal System study (JJ-TRIALS; Knight et al., 2016).

1.1. Literature review

1.1.1. Co-occurring disorders and justice-involved youth

Mental health and substance use issues typically begin during adolescence (Giedd, 2004). While nearly 25 % of youth in the general population have either a substance use disorder or major depressive disorder (Substance Abuse and Mental Health Services Administration (SAMHSA), 2021), as many as 70 % of justice-involved youth have a diagnosable mental health disorder (Vincent et al., 2008) and 60 % have a substance use disorder (Substance Abuse and Mental Health Services Administration (SAMHSA), 2016). Further, studies have found that between 60 and 68 % of justice-involved youth in community samples with substance use disorders, many of whom are justice-involved, also have a comorbid mental health disorder (Armstrong & Costello, 2002; Kilgus & Pumariega, 2009), with a high prevalence of affective, psychotic, anxiety, and disruptive behavior disorders (Armstrong & Costello, 2002; Underwood & Washington, 2016).

The American Psychiatric Association widely groups these disorders under the behavioral categories of “internalizing” and “externalizing” (American Psychiatric Association, 2013), where internalizing behavioral problems turn inward on oneself (e.g., withdrawal, anxiety, depressive symptoms) and externalizing behaviors turn outward, in interaction with an individual’s environment (e.g., impulsivity, hyperactivity; Nikstat & Riemann, 2020). Though internalizing disorders, particularly anxiety and depression, represent some of the most common mental health issues among adolescents (Costello et al., 2003), much of the existing adolescent substance use research focuses on externalizing disorders, despite evidence that externalizing and internalizing disorders often co-occur (Achenbach & Rescorla, 2001; Colder et al., 2013).

While the relationship between mental health and substance use is complex, some studies indicate that the presence of certain symptoms, such as conduct and anxiety disorders, may precede youth substance use (Kessler et al., 1996; Kilgus & Pumariega, 2009). Others have found reciprocal effects of depression, anxiety, and substance use disorders (Amendola et al., 2022). Histories of Attention Deficit Hyperactivity Disorder (Groenman et al., 2013), Post-Traumatic Stress Disorder (Abram et al., 2007; Kang et al., 2015; Sanders et al., 2018), sexual abuse (Townsend, 2013), mood and anxiety disorders (Conway et al., 2006), and paternal mental illness (Ali et al., 2016) have also been linked with youth substance use disorders.

Further, a growing body of research has examined the relationship between co-occurring disorders and delinquency and recidivism. Proctor and Kopak (2022) observed that justice-involved youth who were under the influence of a substance at the time of the offense had a higher likelihood of mental health symptoms compared to youths that were not using substances at the time of the offense. Research also indicates that

co-occurring disorders are predictive of youth violence (Colins et al., 2011; Goldstick et al., 2018). For example, Colins et al. (2011) found that male adolescents with a substance use disorder or co-occurring disorder were more likely to engage in violent and severe property recidivism, compared to youth with a mental health disorder only. More recently, Tolou-Shams et al. (2023) found that co-occurring disorders, particularly externalizing symptoms and alcohol-related problems, were predictive of recidivism among a sample of first-time justice-involved youth.

1.1.2. Linkage to treatment services

While there is little scholarship on youth referral to and initiation of substance use treatment, some research has found that only a small percentage of youth with an identifiable need for treatment are referred. However, most studies analyzing these outcomes have used detention-based samples (Johnson et al., 2004; Liebenberg & Ungar, 2014; Mulvey et al., 2010; Rogers et al., 2001; Stein et al., 2006; Young et al., 2007) and comparatively fewer have analyzed youth under community supervision (Belenko et al., 2022; DeLuca et al., 2022; Dennis et al., 2019; Knight et al., 2022; Wasserman et al., 2021; White, 2019), despite the fact this population represents most of the youth in the juvenile legal system (Hockenberry & Puzzenchera, 2019). In a recent study that assessed nearly 70 % of youth as having a substance use issue, Wasserman et al. (2021) found that only 1 in 5 youth on probation identified as needing substance use treatment were referred to treatment.

Evidence also suggests that this disparity worsens among those with co-occurring disorders, though most research has focused on samples in the general community. Kaminer et al. (2022) investigated challenges to recruitment and retention in treatment trials among a sample of general community adolescents with substance use disorders compared to those with co-occurring disorders. Overall, they found that youth with co-occurring disorders had worse retention in all phases, including referral, screening, eligibility interviews, baseline assessments, and first psychotherapy session. Additionally, Lu et al. (2021) found that between 2011 and 2019, <12 % of youth with a co-occurring disorder received treatment for both conditions. In contrast, a study of youth on probation found that, compared to those with only internalizing mental health conditions (40 %), youth with a substance use disorder or comorbid internalizing and externalizing disorder (75 %) were more likely to receive treatment referrals (Hoeve et al., 2014).

Further, recent studies have shown that access to treatment for youth under community supervision varies by youth demographics and supervision levels (Belenko et al., 2022; DeLuca et al., 2022; Wasserman et al., 2021). Among those designated as in need of treatment, youth who had a positive drug screen, an alcohol or other drug-related charge (Hoeve et al., 2014), pretrial detention (White, 2019), and higher levels of supervision (e.g., detention) were more likely to be referred to (Belenko et al., 2022; Wasserman et al., 2021) and to initiate treatment (DeLuca et al., 2022). Further, past literature shows that white youth are more likely to be referred to treatment and to initiate treatment once referred compared to Black or Hispanic youth (Belenko et al., 2022; DeLuca et al., 2022; Knight et al., 2022; White, 2019). Black and Hispanic youth have between 23 and 44 % lower odds of initiating treatment following referral (DeLuca et al., 2022; Johnson et al., 2022).

Treatment access may also depend on the location of probation and treatment agencies (Bowser et al., 2019). For instance, there are fewer treatment options in rural areas compared to urban locations (Anderson & Gittler, 2005). Using multi-level modeling, DeLuca et al. (2022) found that rates of substance use treatment initiation varied significantly across 22 sites, in which nearly 63 % of initiation variation was due to site disparities. Some probation agencies may lack the proper assessment tools to appropriately identify those in need of treatment and may not have services available to connect youth with outside agencies to meet their behavioral health needs (Belenko et al., 2017).

Many treatment programs lack the ability to meet the needs of those with co-occurring disorders. McGovern et al. (2014) found that only 18

% of substance use and 9 % of mental health treatment programs are capable of treating individuals with a dual diagnosis. Additionally, estimates suggest that over 70 % of substance use treatment providers in the U.S. do not have programs specifically for adolescents (Asarnow et al., 2015). As a result, youth with co-occurring disorders tend to have worse treatment outcomes (Morisano et al., 2014; Robinson & Riggs, 2016; Tomlinson et al., 2004). Further, justice-involved youth with co-occurring disorders have been associated with long-term deleterious effects, such as worsening mental health symptoms, increased criminality, and poorer juvenile legal system outcomes (Clingempeel et al., 2008; Manchak et al., 2014). Treatment of co-occurring disorders can also be complicated and take longer for recovery, as typical pharmacological solutions to treat depression and other symptoms (e.g., antidepressants) may not be as successful due to potential interactions with substances used (Yen et al., 2016).

Treatment for co-occurring disorders is most effective when integrated rather than treating diagnoses separately (Hills, 2000; Substance Abuse and Mental Health Services Administration (SAMHSA), 2009). Integrated treatment involves a comprehensive treatment approach that incorporates both substance use and mental health services and typically involves the same practitioner or treatment team. Common strategies include taking a low-stress and harm reduction approach, using motivation-based treatment and cognitive behavioral therapy, supporting functional recovery, and engaging in one's social network (Mueser & Gingerich, 2013). Programs that have been properly designed to treat youth with co-occurring disorders have seen some positive results among community samples. Wolff et al. (2020) compared treatment programs among co-occurring youth in an intensive cognitive behavioral therapy (I-CBT) program versus those in a treatment as usual group (e.g., supportive therapy). The I-CBT program targets maladaptive behaviors by focusing on problem solving, affect regulation, and communication skills, while incorporating the family through parent therapy and family modules. While the I-CBT group had better improvement in behavioral health symptoms overall, the effects were small. However, youth in the I-CBT group had significantly fewer justice involvements compared to the treatment as usual group (Wolff et al., 2020).

1.2. The current study

Although the above review suggests that justice-involved youth with co-occurring disorders have worse outcomes compared to those with one or no disorders (Clingempeel et al., 2008; Manchak et al., 2014), and that externalizing and internalizing symptoms often co-occur (Achenbach & Rescorla, 2001; Colder et al., 2013), there is still a relative dearth of literature regarding the effects of co-occurring disorders on treatment linkage among youth populations overall (Hulvershorn et al., 2015) and youth in the juvenile legal system under community supervision (Haney-Caron et al., 2019). Further, only one study known to the authors examined treatment referrals by disorder type among youth on probation, though they did not directly compare substance use and co-occurring disorders (Hoeve et al., 2014). The current study helps to fill this gap in the literature and is guided by the following research questions: how does behavioral health status among youth on probation affect referral to and initiation of treatment? How much variation in referral and initiation to treatment is due to site level differences? We hypothesize that both referral and initiation rates will be lower for youth with both substance use and any co-occurring indicator (i.e., internal, external, both) compared to a substance use only indicator. We also hypothesize that there will be substantial site-level variation in these outcomes.

2. Methods

2.1. Method sample and procedures

This study derived data from the JJ-TRIALS study, a multi-site research cooperative that aimed to improve the delivery of evidence-based treatment services for justice-involved youth with substance use needs (Belenko et al., 2017; Dennis et al., 2019; Knight et al., 2016). The study utilized the Behavioral Health Services Cascade framework that depicts movement of youth through the juvenile legal system and behavioral health systems, with the goal of continuing care in appropriate evidence-based treatment (Belenko et al., 2017). The Cascade framework stresses the importance of identifying youth in need of services, linking them to appropriate treatment services within the community, and initiating and continuing treatment (Belenko et al., 2017; Wasserman et al., 2021).

JJ-TRIALS was a cluster-randomized trial involving community supervision agencies in 36 counties in 7 states with a phased rollout with three site waves, each starting two months apart (Knight et al., 2016). The study collected all youth data from administrative records of juvenile legal system agencies between March 2014 and November 2017. The study collected data for youth referred to probation at various time periods, including baseline (6 months before JJ-TRIALS), experimental phase (12 months), and post experiment (6 months). After the baseline period, the experimental phase began where the study randomly assigned 18 matched pairs of sites to either a Core or Enhanced condition. The study was double blinded so that neither research nor site staff knew to which condition they were assigned until after the Core components were completed. The Core condition, received by all sites, included five interventions implemented at all sites after the baseline period: staff orientation meetings, needs assessment and systems mapping, behavioral health training, site feedback reports, goal achievement training, monthly site check-ins, and quarterly reports (Knight et al., 2016). The Enhanced condition added continuing support for the use of data-driven decision-making tools by adding research staff facilitation over 12 months and formalized local change teams from the juvenile legal system and behavioral health agencies (see Knight et al., 2016 for more details). IRBs from each of the participating research centers reviewed and approved the study procedures.

2.1.1. Analytic sample

The analytic sample includes a subset of youth who were designated as in need of treatment. Youth were considered in need of treatment if at least one of the following conditions were indicated in administrative records: having an alcohol or other drug charge; clinically assessed as having a substance use issue; or a positive drug test (Dennis et al., 2019).

2.2. Measures

2.2.1. Dependent variables

Referral to treatment: This variable indicates whether youth who were designated as in need of treatment were referred to substance use treatment and was coded as 0 = no and 1 = yes.

Initiation of treatment: Among youth who were referred to treatment, this variable captured whether youth had initiated treatment and was coded as 0 = no and 1 = yes.

2.2.2. Independent variable

Behavioral Health Status: The main independent variable is whether a youth had a co-occurring mental health indicator in addition to a substance use indicator. Substance use was determined if a youth was assessed as needing substance use treatment. A co-occurring indicator includes a combined measure of substance use and either internalizing, externalizing, or both symptoms that was noted in administrative records. This variable was coded as 0 = substance use indicator, 1 = co-occurring-internal indicator, 2 = co-occurring-external indicator, and 3

= co-occurring -both indicators. For regression analyses, this variable was dummy coded with substance use as the reference group. While not all probation agencies used standardized assessment instruments, nearly 67 % of the sites relied on evidence-based instruments, such as the Massachusetts Youth Screening Instrument (Wasserman et al., 2021).

2.2.3. Covariates

This study selected youth level covariates informed by the literature and findings from previous studies using JJ-TRIALS data (Belenko et al., 2022; DeLuca et al., 2022; Knight et al., 2022; Wasserman et al., 2021).

Experimental condition. This variable indicated to which experimental condition (Core or Enhanced) a youth’s site was randomly assigned. This was a dichotomous variable coded as: Core = 0; Enhanced = 1.

Demographics. Youth-level variables included: age at time to referral to probation, gender (male = 0; female = 1), Black (no = 0; yes = 1), and Hispanic (no = 0; yes = 1).

Alcohol and drug charge. This was a dichotomous variable that indicated if a youth had a drug or alcohol charge (0 = no; 1 = yes).

Detention. This was a dichotomous variable that indicated if a youth was in a secure detention facility at some point during their current case (0 = no; 1 = yes).

Supervision level. This indicates the level of supervision youth were assigned to in which “higher” includes formal supervision such as probation, parole, or juvenile drug court and all other statuses were coded as “lower,” such as diversion or informal probation (0 = higher; 1 = lower).

2.2.4. Missing data

The current analysis includes a subset of 14 sites in three states out of the original 36 JJ-TRIALS sites in seven states with valid data on mental health measures for internalizing and externalizing indicators, as well as valid data on referral to and initiation of treatment. Listwise deletion for missing data on other variables brought the final sample down from 9427 to 8552 youth in need of treatment (about 9 % missing).

As detailed in previous articles using JJ-TRIALS administrative data (Belenko et al., 2022; Dennis et al., 2019; Knight et al., 2022; Wasserman et al., 2021), the study coded blank data fields for need for treatment, referral, and initiation as “no” responses, representing a “lower bound” conservative estimate of positive Cascade outcomes. For sensitivity analysis, the study calculated a second, “upper bound” estimate for these Cascade measures using hot deck imputation (Little & Rubin, 2019). The study replaced missing data with the median of the nearest 20 valid (non-missing) values, providing unbiased estimates of the mean and standard error at the group level (see Dennis et al., 2019 for more details). Comparisons of multiple imputation methods for replacing missing data (Andridge & Little, 2010; Little & Rubin, 2019; Stavseth et al., 2019) have found similar outcomes in studies with large samples (n ≥ 1000). As reported previously, we compared inter-item correlations of the lower bound (not imputed) and the upper bound (imputed) estimates for the variables used in the imputation, and found that, across 81 comparisons, inter-item correlations differed by r = 0.10 or less, providing reasonable evidence to meet the assumptions that data were missing at random (Belenko et al., 2022).

2.3. Analysis plan

We conducted bivariate analyses to assess relationships between the dependent variables (i.e., treatment referral and initiation) and behavioral health status. To examine the effects of behavioral health status on referral to and initiation of treatment among those designated as in need of substance use treatment, we estimated a series of mixed effects logistic regression models given the interest in examining site variation in these outcomes. We used multi-level modeling to assess differences in behavioral health status on referral to treatment while controlling for youth-level and site-level variables. Finally, among those referred, we conducted multi-level modeling to examine differences in mental health

status on initiation of treatment. The study conducted all analyses using Stata v.16.1 (StataCorp., 2019).

3. Results

3.1. Descriptive statistics (Table 1)

Among youth in need of treatment, only 24.2 % were referred (n = 2069), of whom 78.8 % initiated treatment (n = 1630). Among the referral sample (n = 8552), 66.9 % had a substance use indicator and 33.1 % had any co-occurring indicator. Within co-occurring categories, 10.5 % had a co-occurring-internal indicator, 15.8 % had a co-occurring-external indicator, and 6.8 % had co-occurring-both indicators. Among the initiation sample (n = 2069), 75.5 % had a substance use indicator, and 24.6 % had any co-occurring indicator. Within co-occurring categories, 7.1 % had a co-occurring-internal indicator, 11.9 % had a co-occurring-external indicator, and 5.6 % had a co-occurring-both indicators. Among the referral sample, 37.3 % identified as Black non-Hispanic, 29.8 % Hispanic, 81.1 % male, and 54.1 % were 15 and younger. Among the initiation sample, demographics were largely the same except for race, in which only 25.9 % were Black. As for agency-level characteristics among the referral sample, 54.4 % received detention and 58.6 % were on higher supervision, and 24.6 % had an alcohol/drug charge and 60.5 % were in the Enhanced condition. Notably among the initiation sample, 58.5 % and 82.6 % had detention and higher supervision levels, respectively, and 26.6 % had an alcohol or drug charge and 41.5 % were in the Enhanced condition.

Table 1
Descriptive statistics of youth demographics by treatment referral and initiation samples.

Variable	Referral sample % (n = 8552)	Initiation sample % (n = 2069)
Behavioral health status		
Substance use only	66.9	75.5
CO – Any	33.1	24.6
CO – Internal	10.5	7.1
CO – External	15.8	11.9
CO – Both	6.8	5.6
Race		
Black non-Hispanic	37.3	25.9
All others	62.7	74.1
Ethnicity		
Hispanic	29.8	30.3
Non-Hispanic	70.2	69.7
Gender		
Male	81.1	84.2
Female	18.9	15.8
Age		
15 and younger	54.1	55.8
16 and older	45.9	44.2
Detention status		
Yes	54.4	58.5
No	45.6	41.5
Supervision level		
Higher	58.6	82.6
Lower	41.4	17.4
AOD charge		
Yes	24.6	26.6
No	75.4	73.4
Experimental condition		
Core	39.5	58.5
Enhanced	60.5	41.5

Note. The referral sample represents a subset of youth in need of treatment and whether they were referred. The initiation sample is a subset of referred youth and whether they initiated treatment. For the behavioral health status independent variable, substance use represents youth with a substance use only indicator, CO – Internal represents youth that are identified with a co-occurring internalizing indicator, CO – External represents youth that are identified with a co-occurring externalizing indicator, and CO – Both represents youth that have a substance use indicator and both internalizing and externalizing indicators.

3.2. Bivariate analysis

Table 2 shows results for bivariate analysis of referral to and initiation of treatment by behavioral health status. Referrals were more likely for youth with a substance use indicator (27.3 %) compared to youth with any co-occurring indicator (18.0 %) and more specifically, co-occurring-internal (16.2 %), co-occurring-external (18.3 %), or co-occurring-both (19.9 %) indicators ($p = 0.00$). Similarly, among those referred, youth with a substance use indicator (83.3 %) were more likely to initiate treatment compared to youth with any co-occurring indicator (64.8 %), and more specifically, co-occurring-internal (63.0 %), co-occurring-external (69.2 %), or co-occurring-both (57.4 %) indicators, respectively ($p = 0.00$). However, it is important to note that referral and initiation rates varied greatly by site (Table 3). For example, in some sites, youth with co-occurring indicators were more likely to be referred to treatment than youth with substance use indicators, while in other sites they were less likely to be referred or there was no significant difference.

3.3. Multi-level regression models

In Table 4, Model 1 (null model) for referral to treatment by site the likelihood ratio chi-squared test indicated significant outcome variation across sites ($\chi^2(1) = 1318.58, p = 0.00$). The intraclass coefficient (ICC) demonstrated that about 21 % of the outcome variation in referral is related to site-level factors. In Model 3, net of youth-level and agency-related factors, youth with CO-both indicators had 44 % higher odds of being referred ($p = 0.00$) and youth with a co-occurring-internal indicator had 25 % higher odds of being referred to treatment than youth with a substance use indicator ($p = 0.06$). There was no statistical difference between those with a co-occurring-external indicator versus substance use indicator. Aside from these main findings, also of interest was that referral varied by gender, race, and alcohol/drug charge. Males had 24 % higher odds of being referred than females, Black youth had 22 % lower odds of a referral, and youth with an alcohol/drug charge had 43 % higher odds of being referred to treatment compared to those with no alcohol/drug charge. Supervision level and detention status increased odds by 369 % and 38 %, respectively.

Examining initiation to treatment among those referred (Table 5), the likelihood ratio chi-squared test ($\chi^2(1) = 866.81, p = 0.00$) of Model 1 (null model) indicates significant outcome variation across sites; the intraclass coefficient demonstrates that 63 % of the variation in initiation is related to site-level factors. However, there is no statistically

Table 2
Bivariate analyses for BH status by treatment referral and initiation.

Behavioral health status	Referral (n = 8552)		Initiation (n = 2069)	
	Yes %	No %	Yes %	No %
substance use only indicator	27.3	72.7	83.3	16.7
CO – Any indicator	18.0	82.0	64.8	35.2
CO – Internal indicator	16.2	83.8	63.0	37.0
CO – External indicator	18.3	81.7	69.2	30.8
CO – Both indicators	19.9	80.1	57.4	42.6
Chi2 test	p = 0.000		p = 0.000	

Note. The substance use indicator represents youth with a substance use only indicator, CO – Internal represents youth that are identified with a co-occurring internalizing indicator, CO – External represents youth that are identified with a co-occurring externalizing indicator, and CO – Both represents youth that have a substance use indicator and both internalizing and externalizing indicators.

significant difference in initiation between those with any co-occurring and substance use indicator (Model 2). Only two covariates significantly predicted treatment initiation (Model 3); Black youth had 37 % lower odds of initiation ($p = 0.01$) and higher supervision levels increased the odds of initiation by 66 % compared to youth with low supervision ($p = 0.01$).¹

4. Discussion

The current study sought to analyze differences in referral to and initiation of treatment among youth under community supervision with substance use versus any co-occurring indicators, as well as to explore variations in these outcomes by site. Since past research has indicated that youth with co-occurring disorders tend to have less access to treatment (Kaminer et al., 2022) and worse treatment outcomes (Robinson & Riggs, 2016), we hypothesized that youth with a co-occurring indicator would be less likely to be referred to treatment and to initiate treatment once referred. However, we found mostly the opposite. Perhaps this discrepancy is due to most research focusing on community-based samples, rather than justice-involved youth, in which youth under supervision may be subjected to more scrutiny. Compared to youth with a substance use indicator, youth with co-occurring-both indicators were more likely to be referred to treatment, though we found no significant differences among youth with singular co-occurring indicators (i.e., co-occurring-external or co-occurring-internal). This finding indicates that odds of referral may depend on types of co-occurring indicators. Youth with both a co-occurring internal and external indicator had the highest odds of referral (44 %) compared to those with a substance use or only one co-occurring indicator. This finding can be partially explained by screening and assessment procedures within probation agencies. Youth with both internalizing and externalizing indicators may be more likely to be flagged for treatment needs (Hoeve et al., 2014), whereas those with only one indicator, particularly internalizing issues that often go undetected, may fall through the cracks (Wasserman et al., 2008). Higher referral rates among youth with externalizing issues might reflect that disruptive behaviors are more discernable by probation officers and trigger a referral (Wasserman et al., 2008). In contrast, we also found that those with co-occurring-internal indicators were more likely (25 %) than those with substance use-only indicators to be referred, but this was only marginally significant ($p = 0.06$). However, this finding may be an artifact of this sample and the subset of sites that were used.

Our results were inconsistent with prior research on community-based samples of youth with co-occurring disorders, which have found worse access to treatment for youth with co-occurring disorders compared to those with substance use disorders (Kaminer et al., 2022; Lu et al., 2021). Only one prior study to the authors' knowledge analyzed referrals among justice-involved youth by disorder category and found that youth on probation with either substance use or co-occurring disorders were more likely to be referred to treatment than youth with internalizing mental health disorders only (Hoeve et al., 2014). However, Hoeve et al. (2014) did not directly compare substance use versus co-occurring disorder, like the present study.

It is important to note that 21 % of the variance in treatment referral and 63 % of the variance in initiation to treatment were due to site-level differences. While referral rates were low overall, sites varied greatly among those with either a substance use or any co-occurring indicator being referred to treatment. This finding could be due to differences in local treatment services, access to resources, screening resources, staff capacity, and budgetary allocations in how funds are distributed across each site (DeLucca et al., 2022). The inconsistent results may also reflect

¹ The models presented in Tables 4 and 5 were re-estimated using the imputed referral and initiation variables, and the results were similar. These model results are available from the first author upon request.

Table 3
Bivariate analysis for BH status by treatment referral and initiation by site.

Site	Referral %					Initiation %				
	n	SU	CO – I	CO – E	CO – B	n	SU	CO – I	CO – E	CO – B
State 1										
Site 1	89	54.2	75.0	100.0	56.2	50	84.4	–	100.0	100.0
Site 2	678	23.9**	43.8**	34.1**	53.2**	193	22.7	42.9	31.3	40.5
Site 3	287	7.3**	50.0**	14.3**	6.3**	27	93.3	83.3	100.0	100.0
Site 4	315	29.6**	83.3**	78.6**	93.3**	113	50.6	40.0	27.3	35.7
Site 5	119	45.5	33.3	16.7	45.5	52	82.2	100.0	100.0	80.0
Site 6	69	13.8	0.0	33.3	28.6	11	62.5	–	100.0	100.0
State 2										
Site 7	780	35.1	27.7	36.8	25.8	272	48.9	46.2	49.0	62.6
Site 8	826	14.2	0.00	9.6	33.3	108	96.7	–	93.8	100.0
Site 9	1177	24.9	27.1	22.4	25.0	291	97.7 +	92.3 +	93.0 +	83.3 +
Site 10	224	40.0	33.3	34.8	20.0	84	98.3	100.0	100.0	100.0
Site 11	1853	4.6	4.3	4.8	2.9	83	100.0	100.0	100.0	100.0
Site 12	1160	55.6	70.0	41.2	55.5	644	100.0	100.0	100.0	–
State 3										
Site 13	543	10.0	11.6	25.0	10.0	60	58.3	39.4	50.0	53.9
Site 14	432	20.8	18.5	0.0	15.7	81	68.6	48.5	–	69.2
Total N	8552					2069				

** p < 0.01, * p < 0.05, + p < 0.10 (within each site).

Note. The n represents the sample size of each based on the outcome variable. The referral % and initiation % represent youth that were referred and youth that initiated, respectively. SU represents youth with a substance use only indicator, CO – I represents youth with co-occurring internalizing disorders, CO – E represents youth with co-occurring externalizing disorders, and CO – B represents youth identified with a substance use indicator and both internalizing and externalizing indicators.

Table 4
Mixed effects logistic regression models – predictors of treatment referral.

	Model 1	Model 2	Model 3
	OR (95 % CI)	OR (95 % CI)	OR (95 % CI)
Behavioral health status			
CO – I vs. SU only		1.17 (0.93, 1.46)	1.25 (0.99, 1.58)
			+
CO – E vs. SU only		1.05 (0.88, 1.25)	1.07 (0.89, 1.29)
CO – B vs. SU only		1.36 (1.07, 1.74)	1.44 (1.12, 1.86)
		*	*
Male			1.24 (1.06, 1.44)
			*
Age			0.95 (0.85, 1.07)
Black non-Hispanic			0.78 (0.67, 0.92)
			*
Hispanic			1.01 (0.88, 1.17)
Supervision			4.69 (4.00, 5.50)
			**
Detention			1.38 (1.21, 1.57)
			**
Experimental condition			0.71 (0.26, 1.91)
AOD Charge			1.43 (1.25, 1.64)
			**
Site-level variance	0.87 (0.41, 1.86)	0.92 (0.42, 1.96)	0.87 (0.40, 1.88)
Constant	0.32 (0.19, 0.52)	0.30 (0.18, 0.50)	0.09 (0.05, 0.19)
BIC	8163.11	8183.32	7739.26
Wald Chi-square	–	7.08 +	452.33**
LR Test	1318.58**	–	–

** p < 0.01, * p < 0.05, + p < 0.10.

Note. Outcome scored 1 if youth was in need and referred to treatment; 0 if youth was in need but not referred. For the behavioral health status covariates, substance use (SU) only is the reference group. CO – I represents youth identified with a co-occurring internalizing indicator; CO – E represents youth identified with a co-occurring externalizing indicator, and CO – B represents youth identified with a substance use indicator and both internalizing and externalizing indicators. The coefficients for the covariates are in odds ratios (OR). Site-level variance equals Level 2 outcome variation or remaining outcome variation; corresponding 95 % confidence intervals (CI) for those variances shown in parentheses.

Table 5
Mixed effects logistic regression models – predictors of treatment initiation.

	Model 1	Model 2	Model 3
	OR (95 % CI)	OR (95 % CI)	OR (95 % CI)
Behavioral health status			
CO – I vs. SU only		0.64 (0.38, 1.08)	0.66 (0.39, 1.11)
			+
CO – E vs. SU only		0.91 (0.61, 1.35)	0.98 (0.65, 1.47)
CO – B vs. SU only		1.32 (0.82, 2.12)	1.33 (0.82, 2.16)
Male			1.15 (0.80, 1.65)
Age			0.89 (0.67, 1.19)
Black non-Hispanic			0.63 (0.44, 0.91)
			*
Hispanic			0.66 (0.42, 1.05)
			+
Supervision			1.66 (1.17, 2.36)
			**
Detention			0.88 (0.64, 1.22)
Experimental condition			0.96 (0.84, 10.95)
AOD Charge			1.13 (0.81, 1.58)
Site-level variance	5.66 (2.29, 13.93)	5.65 (2.29, 13.94)	5.70 (2.30, 14.11)
Constant	8.74 (2.59, 29.55)	9.11 (2.68, 30.94)	7.99 (1.34, 47.62)
BIC	1287.10	1304.54	1349.23
Wald Chi-square	–	5.41	21.10*
LR Test	866.81**	–	–

** p < 0.01, * p < 0.05, + p < 0.10.

Note. Outcome scored 1 if youth was referred and initiated treatment; 0 if youth was referred but did not initiate treatment. For the behavioral health status covariates, substance use (SU) only is the reference group. CO – I represents youth identified with a co-occurring internalizing indicator; CO – E represents youth identified with a co-occurring externalizing indicator, and CO – B represents youth identified with a substance use indicator and both internalizing and externalizing indicators. The coefficients for the covariates are in odds ratios (OR). Site-level variance equals Level 2 outcome variation or remaining outcome variation; corresponding 95 % confidence intervals (CI) for those variances shown in parentheses.

small sample sizes within some study sites (Table 3) and the number of sites included in this study that have valid data (discussed in the limitations section below). Further, sites may differ systematically in how juvenile legal system agencies handle youth with substance use or co-occurring issues. Court dispositions for youth with substance use or co-occurring indicators may vary by site, and research indicates that youth with higher levels of supervision are more likely to be referred to treatment (Belenko et al., 2022; Wasserman et al., 2021). Additional analyses (not shown) indicated that youth with any co-occurring indicator (except co-occurring-external) were more likely to receive a higher level of supervision compared to substance using youth. Youth with substance use or co-occurring indicators under lower supervision may be at a disadvantage in getting access to treatment services.

It is also important to consider youth-level factors that may influence access to treatment services. Overall, in the mixed effects model, Black, non-Hispanic youth were less likely to be referred and to initiate treatment once referred compared to youth from other races. Further, there may be a relationship between race and behavioral health status, as Black youth are less likely to be identified as having mental health problems (Alegria et al., 2012) and are more likely to be referred to the juvenile legal system rather than treatment relative to their white counterparts (Breland-Noble, 2004). Minority youth may face significant disparities in access to health services to be appropriately referred to treatment such as access to transportation, quality health care, or a lack of health insurance (Bailey et al., 2017; Flores & Lin, 2013; Lau et al., 2012). Additionally, Black youth have a lower likelihood of having a personal doctor and they are more likely to have insufficient contact with a healthcare provider (Flores & Lin, 2013) which further suggests a lower likelihood of being properly identified and referred to treatment services.

4.1. Limitations

This research should be considered along with its limitations. One limitation relates to missing data in administrative records. There was no uniform method of data collection among individual juvenile legal system agencies and, as such, some agencies may have been better at keeping records on behavioral health status than others (Dennis et al., 2019). However, as noted earlier, the model results did not change when we used imputed outcome variables. The current study is also limited by selection effects by not being able to use data from all the JJ-TRIALS sites. Only sites with valid mental health data were used in the current study, reducing the number of sites from 36 to 14. As such, this is not a random sample of juvenile legal system agencies and therefore may not be generalizable.

Another limitation is the lack of standardized assessment instruments for mental health indicators. While all sites in the current analysis indicated measures for both internalizing and externalizing symptoms, not all sites used the same assessments, and it was not known how some probation agencies measured mental health issues and to what extent they formally assessed mental health and substance use needs. However, 67 % of the sites utilized validated assessment tools such as the Massachusetts Youth Screening Instrument (Wasserman et al., 2021). Further, while past research has found that 60–68 % of youth with a substance use disorder have a co-occurring disorder (Armstrong & Costello, 2002; Kilgus & Pumariega, 2009), we found that among youth with a substance use need, only 33 % also had a co-occurring issue. This finding may be lower than other studies due to how mental health is measured as other studies may use a broader definition of a co-occurring issue. This lower percentage of youth with co-occurring issues may also be a result of missing data and only using a subset of sites from JJ-TRIALS.

A final limitation is that there is a lack of detailed information on the referral process and programs to which youth were referred. For example, it is unknown if a youth not referred to substance use treatment was referred to a mental health treatment program, or whether the

programs to which youth were referred were appropriate for their treatment needs. The specific details, procedures, and the quality of programs is also unknown and may depend on local community resources.

4.2. Implications

The current research has implications for policy and practice of juvenile probation and treatment agencies. Even with a designated substance use issue, less than one-quarter of youth in need are referred to treatment, similar to previous overall findings from JJ-TRIALS (Belenko et al., 2022; Knight et al., 2022; Wasserman et al., 2021). Further, there were differences in treatment referral and initiation among youth with substance use versus co-occurring indicators, but this disparity varied by site. As such, probation agencies should take this into account when making referrals to treatment programs to better ensure that all youth with substance use and co-occurring disorder needs have access to treatment. It is also important that probation agencies have procedures in place to properly assess youth for treatment need using validated clinical assessments (DeLuca et al., 2022). Further, treatment referral and initiation may depend on local probation and treatment agencies. Low referral and initiation could be indicative of poor interagency collaboration among probation and treatment services, particularly for youth with co-occurring mental health issues. Or, perhaps there is a need for more encouragement from probation officers to motivate youth and their families to initiate treatment following a referral and to lobby additional treatment providers that can adequately and appropriately seek out justice-involved youth with known substance use and/or co-occurring issues.

Additionally, it may be important to further investigate site-level factors that may impact referral to and initiation of treatment among justice-involved youth, such as staff characteristics. For example, Wasserman et al. (2021) found that youth from agencies where staff had more experience and larger caseloads were less likely to be referred to treatment. Interestingly, youth were less likely to initiate treatment once referred if they were from agencies that indicated greater levels of intra- and inter-organizational communication and collaboration (Wasserman et al., 2021). Except for higher caseloads, we would expect youth working with agencies with more experience and collaboration to have higher levels of referrals.

4.3. Future directions and conclusion

Given these findings, future research should investigate other site-level differences that may impact youth access and quality of treatment. For example, it may be pertinent to explore rural versus urban settings, given the relative lack of access to treatment services in rural areas (Anderson & Gittler, 2005). It may also be important to look further into agency and staff-level characteristics that impact treatment referral and initiation, particularly for youth with substance use and co-occurring issues as intra-organizational collaboration with behavioral health agencies is imperative. Further, there is a need to better understand local treatment infrastructure, limitations, and availability of existing services as this could help explain differences in access to services for youth on probation. Given the finding that Black youth were less likely to be referred and to initiate treatment, future research should examine the racial diversity of probation officers to ensure they are representative of the communities they serve, as well as the quality of relationships between youth and probation officers. Further research should also investigate which indicators of substance use needs are more likely to trigger a referral, such as a positive drug test or a clinical assessment. Referrals by mental health status may also differ by youth charge types. For example, do some programs limit access to youth charged with violent offenses? Finally, qualitative research would be beneficial to assess the nuances of inter-agency collaboration among probation and treatment staff to further investigate the quality of

treatment programs, how staff determines who is referred, barriers encountered when making referrals, and the unique treatment access challenges faced by youth with co-occurring issues.

Co-occurring mental health and substance use issues are highly prevalent among justice-involved youth and maximizing access to evidence-based treatment is imperative to improve behavioral health outcomes and to reduce future legal system involvement. However, the current research shows that there may be disparities in access to treatment depending on youth mental health status and location of probation agencies. These factors should be considered when planning and implementing programs for youth in need of substance use and mental health treatment.

Funding

This study was funded under the Juvenile Justice Translational Research on Interventions for Adolescents in the Legal System project (JJ-TRIALS) cooperative agreement, funded by the National Institute on Drug Abuse (NIDA), National Institutes of Health (NIH). The authors gratefully acknowledge the collaborative contributions of NIDA's scientific officer, Dr. Tisha Wiley, and support from the following grant awards: Chestnut Health Systems (U01DA036221); Columbia University (U01DA036226); Emory University (U01DA036233); Mississippi State University (U01DA036176); Temple University (U01DA036225); Texas Christian University (U01DA036224); and University of Kentucky (U01DA036158).

CRedit authorship contribution statement

Jennifer N. Stanley: Conceptualization, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. **Sarah C. DeLuca:** Formal analysis, Writing – original draft, Writing – review & editing. **Lauren Perron:** Writing – original draft, Writing – review & editing. **Steven Belenko:** Data curation, Funding acquisition, Supervision, Writing – original draft, Writing – review & editing.

Declaration of competing interest

None.

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