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Original article

## Association Between Substance Use Diagnoses and Psychiatric Disorders in an Adolescent and Young Adult Clinic-Based Population



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### A B S T R A C T

**Purpose:** Adolescents with substance use disorders are more likely to have a current psychiatric disorder. However, when compared with the adult literature, there is relatively limited information regarding the specific co-occurrence of certain mental health diagnoses and substance use disorders in adolescents. The objectives of this study were to build on the previous literature regarding mental health diagnoses and different types of substance use disorders in adolescents, as well as explore the differences, if any, between groupings of mental health diagnosis and type of substance used.

**Methods:** Data were extracted from the clinical records of 483 individuals aged 11–24 years referred for an evaluation at the Adolescent Substance Abuse Program at Boston Children's Hospital. According to DSM-IV-Text Revision criteria, individuals received diagnoses of substance abuse or dependence and any additional psychiatric disorders. Problematic use was included within the sample for greater power analysis. A multivariable logistic regression model estimated the association between psychiatric diagnosis and substance use while adjusting for covariates including age and gender.

**Results:** Multiple significant associations were found, including having any anxiety-related diagnosis and opioid use (odds ratio [OR] = 2.23,  $p < .001$ ), generalized anxiety disorder and opioids (OR = 3.42,  $p = .008$ ), cocaine and post-traumatic stress disorder (OR = 3.61,  $p = .01$ ), and marijuana and externalizing behavior disorders (OR = 2.10,  $p = .024$ ).

**Conclusions:** Our study found multiple significant associations between specific substances and certain co-occurring psychiatric disorders. The use of office screening systems to efficiently identify these youths should be a part of routine medical and psychiatric care.

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### IMPLICATIONS AND CONTRIBUTION

There is limited information regarding the specific co-occurrence of certain mental health diagnoses and substance use disorders in adolescents. This study found significant associations between specific substances used and certain co-occurring psychiatric disorders. This information may assist screening for co-occurring psychiatric disorders and making treatment and referral recommendations.

**Conflicts of Interest:** The authors have no conflicts of interest to disclose.

Clinical trial registration: N/A.

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According to the nationally administered survey Monitoring the Future, 66% of 12th grade students have consumed alcohol within their lifetime and 49.1% have used any illicit drug [1].

Early onset of substance use, especially by those with genetic vulnerability, can lead to substantial changes in structure and

function of the still-developing adolescent brain [2]. This makes primary care offices promising settings for screening, prevention, and early intervention. Positive screens by treatment providers for substance use should be followed by a brief severity assessment, such as the CRAFFT [3], and a screening for comorbid/co-occurring disorders. However, relatively little is known about their prevalence during adolescence.

In a study of 1,420 children aged 9–13 years followed longitudinally until the age of 16, 36.7% had at least one DSM-4 diagnosable psychiatric disorder during the study period [4]. Adolescents with substance use disorders are even more likely to have an additional current psychiatric disorder [5]. Although the adult literature has noted a high concordance of anxiety disorders and opioid use, specifically generalized anxiety disorder (GAD) [6], there is limited research exploring this association in adolescents. The correlation between cocaine use and post-traumatic stress disorder (PTSD) has been previously highlighted. In a sample of 1,560 individuals aged 18–24 years, those who had used crack cocaine were eight times more likely to meet criteria for PTSD than those who had not [7]. Although some studies have failed to identify a significant link between substance use and anxiety disorders, previous studies have demonstrated a 20%–30% co-occurrence rate for substance use disorders and depression [8]. According to the 2014 National Survey on Drug Use and Health, 28.4% of individuals aged 12–17 years with a diagnosable substance use disorder in the last year experienced a major depressive episode within the past 12 months [9]. Prevalence of past year substance use problems and co-occurring externalizing problems in adolescents aged 15–17 years has been cited as high as 64%, with a decreasing trend by age [10]. Specifically, attention deficit hyperactivity disorder (ADHD) has also been shown to occur in greater than one third of those with cannabis use disorders [11] and has been linked with other substance use disorders, including alcohol and nicotine when controlled for co-occurring conduct disorder [12].

Overall, the literature highlighting the association between adolescent substance use disorders and mental health diagnoses is limited. To the authors' awareness, no other studies have examined this large of an adolescent and transitional age cohort within a substance abuse clinic population. The objective of this study was to clarify known associations and explore the differences, if any, between groupings of mental health diagnosis and type of substance use. We hypothesized that this sample would reflect previous associations between externalizing disorders and cannabis use. Based on the self-medication hypothesis [13], we theorized that individuals with anxiety would have a predisposition toward the use of perceived anxiolytics such as benzodiazepines and alcohol. We also thought that individuals with ADHD would be more inclined to abuse stimulant medication. This information is aimed to guide providers in their consideration of other psychiatric disorders in children and adolescents who screen positive for substance use.

## Methods

### Data collection

We extracted data from the clinical records of 483 adolescents and transitional age youths aged 11–24 years referred for an evaluation at the Adolescent Substance Abuse Program (ASAP) at Boston Children's Hospital. ASAP clinicians conduct extensive

interviews with adolescents and their parents or other caregivers through an extensive evaluation process. In this setting, pediatricians, a physician assistant, child and adolescent psychiatrists, and licensed independent social workers interview patients and their parent(s) or guardian(s) separately in a series of meetings totaling 4 hours. DSM-IV-Text Revision (TR) [14] diagnoses were determined at a meeting of the entire multidisciplinary treatment team. For this project, investigators performed an electronic query of the ASAP electronic medical record and extracted handwritten records of the treatment team minutes to create a separate, anonymized study database that included diagnoses, race/ethnicity, gender, and age at the time of evaluation. Boston Children's Hospital provided institutional review board approval.

### Measures

The sample originally consisted of 560 consecutive patients who scheduled initial appointments in ASAP from late 2009 through early 2013. Of those, 67 either did not attend the initial intake appointment or finish the evaluation. Individuals were diagnosed with substance abuse or dependence according to the DSM-IV-TR criteria [14]. In this study, we did not include 10 cases where a diagnosis of "rule out abuse" for a substance was recorded in the chart. We defined "problem use" as a DSM-IV-TR diagnosis of "not otherwise specified," indicating that the patient did not fulfill full DSM criteria for a diagnosis of abuse or dependence on a single substance but where the aggregate use of multiple substances was problematic in the individual's life. For simplification and greater power analysis, we also dichotomized problematic use, substance abuse, and substance dependence into a single category.

To determine correlations between specific type of substance use and psychiatric diagnosis, individuals who were diagnosed with problem use, abuse, or dependence on opioids, alcohol, nicotine, stimulants, cocaine, benzodiazepines, and cannabis were examined for the following psychiatric diagnoses: GAD, PTSD, major depressive disorder, and ADHD. Substance use and groups of anxiety, depressive, and externalizing/behavioral disorders were also compared. The anxiety disorders subgroup consisted of PTSD, GAD, obsessive compulsive disorder, panic disorder, social phobia, and anxiety not otherwise specified (NOS). PTSD was included in the anxiety disorder subgroup as per DSM-IV-TR categorization, although the authors recognize a more specific categorization of trauma- and stressor-related disorders subgroup in DSM 5 [15]. The depressive disorders subgroup consisted of dysthymia, depression NOS, and major depressive disorder. The externalizing behavior group consists of ADHD, conduct disorder, oppositional defiant disorder, and disruptive behavioral disorder NOS. Social phobia, obsessive compulsive disorder, dysthymia, conduct disorder, oppositional defiant disorder, and disruptive behavioral disorder were included in the overall groupings but not singled out individually for analysis owing to smaller sample sizes.

### Data analysis

We used logistic regression models to determine the odds ratios and 95% confidence intervals, defining statistical significance as *p* values less than .05. A multivariable logistic regression model estimated the association between psychiatric diagnosis and substance use (problem use, abuse, or dependence) while adjusting for covariates including age and gender. The model

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