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Demographic and clinical characteristics of current comorbid psychiatric disorders in a randomized clinical trial for adults with stimulant use disorders

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Abstract

This study aimed to determine if current comorbid psychiatric disorders differ in adults with cocaine use disorder, other stimulant (primarily methamphetamine) use disorder, or both, and identify demographic and clinical characteristics in those with increasing numbers of comorbid disorders. Baseline data from a randomized controlled trial beginning in residential settings (N=302) was used. Mood disorders were present in 33.6%, and anxiety disorders in 29.6%, with no differences among stimulant use disorder groups. Panic disorder was more frequently present with other stimulant use disorder. Those with two or more comorbid psychiatric disorders were more often female, White, had more symptoms of depression, greater propensity and risk for suicidal behavior, lower functioning in psychiatric and family domains, lower quality of life, more symptoms with stimulant abstinence and greater likelihood of marijuana dependence. Those with one or more comorbid disorders had more medical disorder burden, lower cognitive and physical functioning, greater pain, and higher rates of other drug dependence. With current comorbid psychiatric disorders, the morbidity of stimulant use disorders increases. Use of validated assessments near treatment entry, and a treatment plan targeting not only substance use and comorbid psychiatric disorders, but functional impairments, medical disorder burden and pain, may be useful.

Keywords

Comorbidities; substance use disorder; cocaine; methamphetamine; panic disorder; residential treatment

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1. Introduction

The presence of comorbid psychiatric disorders in people with stimulant use disorders has been associated with poorer treatment outcomes, increased likelihood of drug use after treatment, and higher treatment attrition (Glasner-Edwards et al., 2010; Gonzalez-Saiz et al., 2014; Levin et al., 2004). Substantial rates of comorbid psychiatric disorders have been found in clinical, community and epidemiological samples of stimulant users (Conway et al., 2006; Salo et al., 2011). However, the majority of this literature does not consistently differentiate between substance induced and non-substance induced psychiatric disorders, or includes only those with a diagnosis of a stimulant use disorder, and describes lifetime rather than current disorders.

One of the challenges for clinicians and researchers is distinguishing independent psychiatric disorders from substance induced disorders and symptoms of intoxication and withdrawal (Herrero et al., 2008; Nunes and Weiss, 2009; Schuckit, 2006). The effects of intoxication, withdrawal, or chronic exposure to substances can include depressive and anxiety symptoms (Nunes and Weiss, 2009); therefore, comorbid disorders are best diagnosed after at least a brief time abstinent to screen out transient symptoms and correctly identify independent disorders (Nunes and Levin, 2004). Early reports of cocaine dependent patients in hospital based treatment settings documented substantial improvement in mood after cessation of drug use (Satel et al., 1991), especially in the first few days after admission (Weddington et al., 1990).

Studies which have identified stimulant use and psychiatric disorders using validated, diagnostically driven assessments designed to exclude substance induced psychiatric disorders primarily focused on lifetime psychiatric disorders. In amphetamine or methamphetamine dependent samples, rates of lifetime mood disorders were 32.3–64.3%, and anxiety disorders 24.3–50.3% (Conway et al., 2006; Salo et al., 2011). In cocaine dependent samples, rates of lifetime mood disorders were 12.3–62.5%, and anxiety disorders 20.7–45% (Conway et al., 2006; Vergara-Moragues et al., 2012). Current non-substance induced mood and anxiety disorders were much lower at 6.2% and 13.7% respectively (Vergara-Moragues et al., 2012). Current comorbid disorders are more relevant for treatment planning during substance use treatment than a history of lifetime disorders. The limited availability of data about *current* comorbid psychiatric disorders in treatment seeking individuals with stimulant use disorder and their correlates, especially in those with specific types of stimulant use disorders, represents an important gap in knowledge. Research often focuses on those with a substance use disorder and one comorbid psychiatric disorder. In clinical practice, however, patients often present with complex sets of comorbid disorders and impairments. The question of how number of current comorbid psychiatric disorders is associated with stimulant use disorder severity, or other demographic and clinical characteristics has not, to our knowledge, been addressed.

Identifying the presence of current comorbid psychiatric disorders in adults with different types of stimulant use disorders and determining whether demographic or clinical features differentiate individuals based on number of comorbid disorders can be useful in both treatment planning and developing hypotheses for further research on effective treatments

and specific mechanisms of comorbidity. These complex patients may have distinctive features and patterns of symptoms and disorders which could indicate the need for more targeted treatment approaches. There is growing consensus that comorbid substance use and other psychiatric disorders may need their own distinct treatment plan based on clinical characteristics rather than treating each diagnosis separately, but these have not yet been well studied (Pettinati et al., 2013).

The current study was conducted using baseline data from participants enrolled in Stimulant Reduction Intervention using Dosed Exercise (STRIDE), a multisite randomized controlled trial that compared the efficacy of high intensity exercise and health education, both augmented to substance abuse treatment as usual in adults with stimulant use disorders (stimulant abuse and/or dependence) entering residential treatment settings. Evaluation of study participants in a residential setting provided an advantage for this analysis since participants had at least some days of abstinence prior to assessment, increasing the probability that independent psychiatric disorders would be correctly identified as substance use related symptoms decreased.

Specifically, the following questions were addressed: (1) In a residential treatment sample of patients with stimulant use disorders, what current comorbid psychiatric disorders are present, as determined by formal diagnostic interview, and do these differ by type of stimulant (cocaine only; other stimulants, primarily methamphetamine; or both)? (2) Is the number of diagnosed current psychiatric disorders in patients with stimulant use disorders associated with different demographic and clinical characteristics?

2. Methods

Details of the rationale and design of STRIDE, a National Drug Abuse Treatment Clinical Trials Network study (CTN-0037), have been described elsewhere (Trivedi et al., 2011a). STRIDE was conducted in 9 geographically diverse community treatment facilities across the United States with residential treatment programs and internal or closely affiliated outpatient programs. Institutional Review Boards for the community treatment sites and academic centers associated with each site approved the study. All participants provided written informed consent.

2.1. Participants

Participants in STRIDE (n=302) were treatment seeking individuals aged 18–65, admitted to residential substance abuse treatment with use of a psychostimulant (cocaine, methamphetamine, amphetamine, or other stimulant excluding caffeine and nicotine) in the past 30 days who met Diagnostic and Statistical Manual (DSM-IV) (American Psychiatric Association, 1994) criteria for stimulant abuse or dependence in the past 12 months. Exclusion criteria included failure to receive medical clearance to exercise, presence of a general medical condition that prevented exercise, opiate dependence, psychosis or other psychiatric issues that posed a safety risk, pregnancy, or concomitant therapy with beta blockers or opioid replacement therapy.

Participants were screened for study participation as soon after admission as clinically feasible, following evaluation of clinical suitability and upon approval from the clinical staff at the residential treatment program. For example, some patients experienced symptoms of acute withdrawal, and the clinical staff at the program monitored such patients to determine an appropriate time to approach them regarding potential participation in the study.

2.2. Measures

Demographic information was collected at the screening visit. Drug abuse and dependence diagnoses were assessed independently with the substance abuse modules of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI, Version 2.1) (WHO, 1997). Co-occurring DSM-IV (1994) Axis I diagnoses were assessed with the MINI International Neuropsychiatric Interview (MINI) (Sheehan et al., 1997), which emphasizes identification of psychiatric disorders, using a set of decision guidelines. Research assistants were trained and supervised in the differentiation of substance induced symptoms from those of an independent disorder based on the timing of symptoms relative to the substance use and the evaluation of symptoms that were substantially greater than would be expected based on the type, amount and duration of use. In addition, findings from the MINI were reviewed and confirmed by a clinician at the treatment site. Total number of current psychiatric disorders was summed for each participant (range 0 – 13). The median time from admission to administration of the MINI was 5 days (interquartile range: 3 to 8 days).

2.2.1. Psychiatric symptoms—Symptoms of depression were assessed with the 16-item Quick Inventory of Depressive Symptomatology-Clinician Rated version (QIDS-C₁₆) (Trivedi et al., 2004). With a score range of 0–27, higher scores indicate more severe depressive symptoms. Suicidality and related symptoms were evaluated with the Concise Health Risk Tracking-Self-Report (CHRT), a 14-item self-report assessment of suicidality and related thoughts and behaviors (Trivedi et al., 2011b). Scores for Propensity (items 1–11, range 0–44) and Risk (items 12–14, range 0–12) are calculated, with higher scores representing more propensity or risk.

2.2.2. Health-related quality of life and function—The Self-Administered Comorbidity Questionnaire (SCQ) (Sangha et al., 2003) assessed the presence of medical conditions receipt of treatment for the condition, and whether the condition limited functioning. Scores range from 1–54, with higher scores indicating greater medical burden. The self-report Short-Form Health Survey (SF-36) (Ware, 2003) assessed quality of life and general health in both mental and physical domains. With a score range of 0–100, higher scores indicate perceived better health and functioning.

The Quality of Life Enjoyment and Satisfaction Questionnaire Short Form (Q-LES-Q-SF) (Endicott et al., 1993) self-report assessed satisfaction with physical health, feeling, work, household duties, school/course work, leisure time activities and social relations. Scores range from 0–100 and higher scores indicate greater life satisfaction and enjoyment. The Pain Frequency, Intensity, and Burden Scale (P-FIBS) (dela Cruz et al., 2014), a 4-item self-report developed for this trial evaluated the frequency, intensity and burden of pain and the

use of pain medication or treatment over the prior week. Scores range from 0–32. Higher scores indicate more pain or pain burden.

The Addiction Severity Index-Lite (ASI-Lite) evaluated domains commonly affected by substance use, including medical, employment/self-support, legal status, family/social, and psychiatric status. Composite scores were calculated with higher scores indicating greater problem severity (McLellan et al., 1980). The Massachusetts General Hospital (MGH) Cognitive and Physical Functioning Questionnaire (CPFQ), (Fava et al., 2009) a 7-item self-report, assessed physical and cognitive symptoms of depression. With a score range of 7–42, higher scores indicate poorer functioning.

2.2.3. Drug use—The Timeline Followback (TLFB) assessed number of days of use, quantity, and route for all substances of abuse in the 30 days prior to treatment entry (Sobell and Sobell, 1992). A qualitative urine drug screen (UDS), collected at baseline, tested for the presence of marijuana, cocaine, opiates, amphetamine, methamphetamine, benzodiazepines, barbiturates, methadone, methylenedioxymethamphetamine (MDMA, Ecstasy) and oxycodone.

The Stimulant Craving Questionnaire-Brief (STCQ-Brief), (Sussner et al., 2006) a 10-item self-report, assessed current craving for stimulants. Scores range from 0–6 with higher scores indicating more craving. The Stimulant Selective Severity Assessment (SSSA) (Kampman et al., 1998), an 18-item clinician-rated scale, assessed signs and symptoms of stimulant abstinence. With a score range of 0–140, higher scores indicate greater intensity or frequency.

2.3. Statistical analysis

Chi-square tests were used to detect differences between participants with 0, 1, or 2+ psychiatric comorbidities and those with abuse or dependence on cocaine, other stimulants, or both, at baseline. Significant chi-square tests were followed by chi-square tests between each pair of groups using a Bonferroni-corrected p-value of $0.05/3=0.0167$. For continuous outcomes, analysis of variance (ANOVA) was used and significant ANOVAs were followed by pair-wise comparisons using the Tukey-Kramer test. As this study is intended to characterize the sample using retrospective analysis of baseline data, no correction was made for the number of outcomes examined.

3. Results

3.1. General characteristics of the sample

In this sample of stimulant users (N=302), 40% (n=121) were female, 50% (n=148) White and 46% (n=138) Black (Table 1). The mean age of the sample was 39 years (SD=10.8) and mean education level 12.4 years (SD=2.0), with 53.3% never married, and 31.5% currently employed. Cocaine use disorder was present in 59% (n=177), other stimulant use disorder in 11% (n=32), and both cocaine use disorder and other stimulant use disorder (combination group) in 31% (n=92). Those in the other stimulant use disorder group were primarily methamphetamine users (n=26).

3.2. Presence of current comorbid psychiatric disorders

There were no differences in number of psychiatric disorders among the cocaine, other stimulant and combination use disorder groups ($p=0.128$). One or more mood disorders were present in 33.6% ($n=101$) of the sample and one or more anxiety disorders in 29.6% ($n=89$), with no differences among the substance use disorder groups. The most frequent disorder in the full sample was major depressive disorder (MDD) (22.6%), followed by generalized anxiety disorder (GAD) (15.3%), social phobia (10.6%) and dysthymia (9.4%). MDD and GAD were the most common diagnoses in all three groups. Participants with other stimulant use disorder were more likely to have a comorbid panic disorder (12.5%), as were participants in the combination group (9.0%), compared with the cocaine use only group (2.8%), $p=.027$. No other specific psychiatric disorders differed among groups.

3.3. Demographic characteristics and number of current psychiatric disorders (Table 1)

In the full sample, those with two or more current disorders were more frequently female (52.1%), and White (62.3%) compared with those with fewer disorders. Number of current disorders was not associated with age, education, employment status, marital status, or interpersonal living arrangements (data for latter three not shown).

3.4. Clinical characteristics and number of current psychiatric disorders (Table 2)

Those with two or more disorders compared with those with one or no disorder had more symptoms of depression, greater propensity for suicidal behavior, and lower family functioning. They had higher risk for suicidal behavior and lower quality of life than those with no disorders. Mental and psychiatric functioning (SF-36 and ASI respectively) were progressively lower with increasing numbers of disorders. The presence of one or more disorders was associated with increased medical comorbid disorder burden (SCQ) and lower medical functioning (ASI), lower cognitive and physical functioning (CPFQ), and more pain (P-FIBS).

3.5. Drug use characteristics and number of current psychiatric disorders (Table 3)

Participants with two or more psychiatric disorders compared with one or no disorders had the most symptoms with stimulant abstinence (SSSA). Those with two or more disorders compared to no disorders had the highest rates of marijuana dependence. Those with one or more disorder had higher rates of dependence on alcohol and other drugs, although the former finding was no longer significant after Bonferroni correction in pairwise comparisons. Number of current psychiatric disorders was unrelated to injection drug use or level of stimulant craving.

4. Discussion

For our sample of patients with any stimulant use disorder receiving treatment in a residential setting, current mood or anxiety disorders were frequently present when assessed by a validated formal diagnostic interview. Those with two or more current comorbid psychiatric disorders were more often female, White, and presented for treatment with not only a more complex group of psychiatric symptoms, lower functioning across psychiatric and family domains, and lower satisfaction with their quality of life, but also with greater

symptoms with abstinence from stimulants and greater likelihood of dependence on marijuana. Diagnosis of only one or more disorders was associated with more comorbid medical disorder burden, greater experience of pain, lower cognitive, physical and medical functioning, and greater likelihood of dependence on other drugs.

At 33.6% and 29.6% respectively, the frequencies of mood and anxiety disorders in this sample are considerably higher than rates of current disorders in a previous study of cocaine dependent patients in residential treatment (Vergara-Moragues et al., 2012), but similar to 12 month prevalence of mood and anxiety disorders among those with any drug use disorder in an epidemiological sample (Grant et al., 2004). The more frequent presence of current panic disorder in those with other stimulant use disorder compared with those with cocaine use disorder was a novel preliminary finding, although numbers were small.

The association between comorbid disorders and increased symptoms with stimulant abstinence highlights the potential impact of psychiatric comorbidity on the process of addiction recovery and is consistent with a prior report of increased cocaine withdrawal symptoms in those with MDD or dysthymia (Helmus et al., 2001). The association between two or more disorders and increased symptoms of stimulant withdrawal does raise the possibility that the MINI misattributed withdrawal symptoms to psychiatric disorders. Administrators of the MINI for our study, however, were trained to exclude substance-induced disorders and clinician judgment and oversight was also used at the residential treatment program prior to finalizing the diagnoses. There is evidence that experienced clinician judgment can be useful in making this distinction (Ries et al., 2008). A number of mechanisms have been proposed to account for the comorbidity of substance use and psychiatric disorders, including: 1) pre-existing neurobiological abnormalities may account for both types of disorders which reflect different symptom expressions, 2) neuroadaptation resulting from repeated drug use is associated with biological changes in some psychiatric disorders, and 3) substance use reflects self-medication of symptoms of psychiatric disorders (Herrero et al., 2008; Torrens et al., 2006).

The preliminary findings from this baseline sample of patients entering treatment for stimulant use disorder include: (1) clinical and demographic differences among stimulant use disorder groups, (2) more frequent presence of panic disorder in the presence of abuse or dependence on stimulants other than cocaine, and (3) an association between having psychiatric comorbid disorders and increased symptoms with stimulant abstinence. They may be used to develop hypotheses to further investigate the possible mechanisms of comorbid psychiatric disorders and effective treatments. For example, there is little research on comorbid substance use and panic disorders (Kelly et al., 2012). Evaluation of neurobiological characteristics in those with panic disorder and different types of stimulant use disorders may help identify potential targets for treatment.

Stimulant use can exacerbate symptoms of comorbid psychiatric disorders and abstinence can be associated with reduction in the severity of these symptoms (Glasner-Edwards et al., 2009; Zweben et al., 2004). The degree of impairment associated with comorbidity and the association of comorbidity and its related functional impairments with poorer outcome supports the need for (1) comprehensive assessment using diagnostically driven measures

designed to exclude substance induced symptoms at substance use treatment entry or following a period of abstinence, (2) a comprehensive treatment plan targeting not only the substance use and comorbid psychiatric disorders, but associated functional impairments, medical disorder burden, and pain, including the use of combined and sequential treatments to maximize outcomes (Drake et al., 2008; Weiss et al., 2007), (3) evaluation of whether number of comorbid psychiatric disorders or other measures of disease burden, in combination with other clinical characteristics, could be clinically useful predictors of treatment outcomes, and (4) ongoing assessment of the impact of treating multiple targets, both pharmacologic and psychosocial/behavioral, in those with complex symptom presentations. Questions remain about which types of treatments must be delivered, in which order, or concurrently, and what other impairments must be addressed at what point in the treatment to maximize outcomes for each disorder.

Findings highlight the importance of integrating mental health services into substance use disorder treatment programs. There is developing evidence that treating both substance use and comorbid disorders can be associated with improved outcomes for one or both disorders although findings are mixed (Kelly et al., 2012; Pettinati et al., 2013; Sacks et al., 2008; Weiss et al., 2007). Studies with stimulant dependent samples similarly report mixed results (McKay et al., 2002) or very modest effects (McDowell et al., 2005; Raby et al., 2014), although research on effective pharmacological treatments for substance use disorders in the context of mood disorders is a relatively neglected area and most research has focused on single rather than multiple disorders (Pettinati et al., 2013). Clinical typologies that reflect the real world decision making context of clinicians with complex patients merit additional study.

This report has a number of limitations. This residential treatment sample may have greater severity of drug use and functional impairment than an outpatient sample. Other characteristics of this sample may differ from those treated in outpatient and residential psychiatric settings, limiting generalizability to those groups. Our sample was also eligible and willing to participate in STRIDE and may not be representative of residential treatment seeking stimulant users due to the nature of the inclusion and exclusion criteria such as the need to have medical clearance to exercise and the exclusion for opiate dependence. Measures of symptom severity for most comorbid disorders, data on the order of onset of the drug and psychiatric disorders, and data fully characterizing the other stimulant use disorder group by specific stimulant drug used were not available. Ongoing measures of the symptoms of many of the psychiatric disorders, which might have provided a measure of symptoms after more time abstinent, were not available. Finally, the MINI was not specifically designed to identify psychiatric disorders in the context of substance use disorders, as was, for example, the Psychiatric Research Interview for Substance and Mental Disorders (PRISM; (Hasin et al., 2006; Hasin et al., 1996), although administrators of the MINI were trained to make that differentiation.

This study's strengths include comprehensive diagnostic assessment of psychiatric disorders with the MINI and substance use disorders with the CIDI, a focus on non-substance induced *current* comorbid disorders, and conduct of the study in residential treatment settings where participants had at least a short period of abstinence prior to evaluation.

With comorbid psychiatric disorders, the morbidity of drug use disorders increases (e.g., increased symptoms with stimulant abstinence, more drug dependencies), and, not surprisingly, functioning across multiple areas decreases. The impairments present in daily life, increased comorbid medical disorder burden, and greater pain associated with even one disorder in this sample are areas often excluded in treatment plans. Integrating treatment for psychiatric disorders, other medical disorders and symptoms, and stimulant use disorders could have a positive impact on treatment outcomes. Efforts to link treatment seeking substance users to psychiatric care are important (Nunes and Levin, 2006).

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Table 1

Demographic characteristics based on number of comorbid psychiatric disorders.

	Number of comorbid psychiatric disorders*				
	All	0	1	2+	
	N=302	N=171 (57%)	N=60 (20%)	N=71 (24%)	
Demographic	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	p-value
Age (years)	39.0 (10.8)	38.1 (10.6)	41.1 (10.7)	39.2 (11.3)	0.177
Education (years)	12.4 (2.0)	12.4 (1.9)	12.3 (2.5)	12.2 (1.7)	0.723
	N (%)	N (%)	N (%)	N (%)	
Female	121 (40.1)	59 (34.5)	25 (41.7)	37 (52.1)	0.038 ¹
Race ^{**}					
White	148 (49.7)	80 (47.1)	25 (42.4)	43 (62.3)	0.047 ²
Black	138 (46.3)	84 (49.4)	32 (54.2)	22 (31.9)	0.019 ³
Other	24 (8.1)	11 (6.5)	6 (10.2)	7 (10.1)	0.512
Hispanic	31 (10.3)	15 (8.8)	7 (11.7)	9 (12.7)	0.620

SD=standard deviation

* Diagnoses based on the MINI International Neuropsychiatric Interview (range 0 – 13) and include major depression (n=68), dysthymia (n=22), mania (n=15), hypomania (n=7), panic disorder (n=17), social phobia (n=32), obsessive-compulsive disorder, (n=18), post-traumatic stress disorder (n=28), generalized anxiety (n=46), bulimia (n=6).

** Participants could select more than one race/ethnicity

¹ 2+ comorbid disorders significantly different from 0 disorder (p<0.0167)

² No significant differences in pairwise comparisons after Bonferroni adjustment

³ 2+ disorders significantly different from 1 and from 0 disorder (p<0.0167)

Table 2

Clinical characteristics based on number of comorbid psychiatric disorders.

	Number of comorbid psychiatric disorders*				P-value
	All	0	1	2+	
Psychiatric symptoms					
QIDS-C ₁₆ (depression severity, range of 0–27)	N=302 Mean (SD) 5.4 (3.1)	N=171 (57%) Mean (SD) 4.6 (2.8)	N=60 (20%) Mean (SD) 5.6 (2.6)	N=71 (24%) Mean (SD) 6.9 (3.6)	<0.001 ¹
CHRT-SR suicide propensity (items 1–11, range 0–44)	8.6 (6.9)	7.1 (6.0)	8.5 (6.7)	12.3 (7.8)	<0.001 ¹
CHRT-SR suicide risk (items 12–14, range 0–12)	0.5 (1.2)	0.4 (1.0)	0.4 (1.0)	0.8 (1.6)	0.023 ²
Health related quality of life and function					
SCQ (medical disorder burden, range 1–54)	1.2 (1.9)	0.9 (1.7)	1.6 (2.3)	1.5 (2.1)	0.011 ³
SF-36 mental functioning (range of 0–100)	42.5 (13.7)	46.7 (12.9)	40.1 (12.0)	34.4 (12.9)	<0.000 ⁴
SF-36 physical functioning (range of 0–100)	55.0 (7.3)	55.4 (6.4)	54.4 (8.1)	54.4 (8.7)	0.530
Q-LES-Q (life satisfaction/enjoyment, range of 0–100)	68.6 (16.3)	72.2 (15.7)	67.0 (14.3)	61.6 (17.1)	<0.001 ²
P-FIBS (pain, range of 0–32)	5.0 (6.9)	3.5 (5.5)	6.4 (7.4)	7.5 (8.4)	<0.001 ³
ASI employment subscale	0.7 (0.3)	0.7 (0.3)	0.8 (0.3)	0.7 (0.3)	0.060
ASI family subscale	0.2 (0.2)	0.2 (0.2)	0.2 (0.2)	0.3 (0.2)	<0.001 ¹
ASI legal subscale	0.1 (0.2)	0.1 (0.2)	0.1 (0.2)	0.2 (0.2)	0.570
ASI medical subscale	0.2 (0.3)	0.1 (0.2)	0.2 (0.3)	0.2 (0.3)	0.003 ³
ASI psychiatric subscale	0.3 (0.2)	0.2 (0.2)	0.3 (0.2)	0.5 (0.2)	<0.001 ⁴
CPFQ (cognitive and physical functioning, range of 7–42)	17.9 (6.3)	16.4 (5.7)	19.0 (6.5)	20.5 (6.4)	<0.001 ³

SD-standard deviation, QIDS-C₁₆-Quick Inventory of Depressive Symptoms-Clinician Rated, CHRT-SR-Concise Health Risk Tracking-Self Report, SCQ-Self-Administered Comorbidity Questionnaire, SF-36-Short Form Health Survey, Q-LES-Q-Quality of Life Enjoyment and Satisfaction Questionnaire Short Form, P-FIBS-Pain Frequency, Intensity, and Burden Scale, ASI-Addiction Severity Index Lite, CPFQ-MGH Cognitive and Physical Functioning Questionnaire

* Diagnoses based on the MINI International Neuropsychiatric Interview and include major depression (n=68), dysthymia (n=22), mania (n=15), hypomania (n=7), panic disorder (n=17), social phobia(n=32), obsessive-compulsive disorder, (n=18), post-traumatic stress disorder (n=28), generalized anxiety (n=46), bulimia (n=6).

¹ 2+ disorders significantly different from 1 and from 0 disorders (Tukey HSD Test, p<0.05)

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- ² 2+ disorders significantly different from 0 disorder (Tukey HSD Test, p<0.05)
- ³ 2+ disorders significantly different than 0 disorder, 1 disorder significantly different than 0 disorder (Tukey HSD Test, p<0.05)
- ⁴ 2+, 1, and 0 disorder are all significantly different (Tukey HSD Test, p<0.05)

Table 3

Drug use characteristics based on number of comorbid psychiatric disorders.

	Number of comorbid psychiatric disorders*					
	All	0	1	2+		
Drug Use	N=302	N=171 (57%)	N=60 (20%)	N=71 (24%)		
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	P-value	
SSSA (stimulant abstinence symptoms)(range of 0–140)	16.6 (14.8)	13.4 (12.8)	17.2 (14.3)	23.6 (17.2)	< 0.001 ¹	
STCQ (stimulant craving) (range from 0–6)	0.8 (0.9)	0.8 (1.0)	0.8 (1.0)	0.9 (0.9)	0.698	
	N (%)	N (%)	N (%)	N (%)	P-value	
Alcohol dependence	152 (50.3)	74 (43.3)	36 (60.0)	42 (59.2)	0.020 ²	
Marijuana dependence	96 (31.9)	41 (24.0)	24 (40.0)	31 (44.3)	0.003 ³	
Other drug dependence ^{**}	53 (17.6)	20 (11.7)	15 (25.0)	18 (25.7)	0.008 ⁴	
Injection drug use	20 (6.6)	12 (7.0)	3 (5.0)	5 (7.0)	0.853	

SD=standard deviation, SSSA=Stimulant Selective Severity Assessment, STCQ=Brief-Stimulant Craving Questionnaire-Brief

* Diagnoses based on the MINI International Neuropsychiatric Interview and include major depression (n=68), dysthymia (n=22), mania (n=15), hypomania (n=7), panic disorder (n=17), social phobia(n=32), obsessive-compulsive disorder, (n=18), post-traumatic stress disorder (n=28), generalized anxiety (n=46), bulimia (n=6).

** Other drug dependence includes inhalants, opioids, PCP, psychedelics, sedatives, or other drugs

¹ 2+ disorders significantly different from 1 and from 0 disorders (Tukey HSD Test, p<0.05)

² No significant differences in pairwise comparisons after Bonferroni adjustment

³ 2+ comorbid disorders significantly different from 0 disorder (p<0.0167)

⁴ 2+ disorders significantly different from 0 disorder. 1 disorder significantly different than 0 disorder (p<0.0167)