

Published in final edited form as:

Drug Alcohol Depend. 2011 November 1; 118(2-3): 92–99. doi:10.1016/j.drugalcdep.2011.03.003.

An Examination of Psychiatric Comorbidities as a Function of Gender and Substance Type within an Inpatient Substance Use Treatment Program

Kevin W. Chen^{1,2,*}, Annie N. Banducci¹, Leila Guller¹, Richard J. Macatee¹, Anna Lavelle³, Stacey Daughters³, and C.W. Lejuez¹

¹ Center for Addictions, Personality, and Emotion Research, University of Maryland College Park, Department of Psychology. 1147 Biology Psychology Building, College Park, MD 20742

² Center for Integrative Medicine, University of Maryland, School of Medicine. 520 W Lombard St. East Hall, Room 101C. Baltimore, Maryland 21201

³ Department of Behavioral and Community Health, University of Maryland College Park SPH Building, Valley Drive, University of Maryland College Park, MD 20742

Abstract

Background—There are elevated rates of comorbid psychiatric disorders among individuals with substance dependence; however, little research examines these rates within inpatient settings, particularly in relation to gender and type of substance. The current study aimed to fill this gap.

Method—465 patients (71.4% male) were recruited from an inpatient substance use treatment facility from 2006 to 2009. These patients were interviewed and diagnosed using the Structure Clinical Interview for DSM-IV and the Diagnostic Interview for Personality Disorders.

Results—60.6% of patients with substance dependence had a current comorbid psychiatric disorder, and more than 30% had at least two psychiatric disorders. The most common current Axis I diagnosis was major depressive disorder (25.8%), followed by PTSD (14%). Comparable rates were found for Antisocial and Borderline Personality Disorders. Females were significantly more likely to meet diagnostic criteria for a psychiatric disorder than were males (73.7% versus 55.4%). When examining comorbidities across different substance dependences, the highest rates of comorbid psychiatric disorders were found among individuals with alcohol dependence (76.8%) and cannabis dependence (76%), although rates were above 60% for cocaine and opioid dependence. Rates of psychiatric diagnoses were significantly lower (27%) among patients who did not meet diagnostic criteria for substance dependence.

Conclusions—There are particularly elevated rates of psychiatric disorders among individuals with substance dependence in inpatient treatment. These rates differ as a function of substance dependence type and gender, making these factors important to consider when researching and treating this type of population.

© 2011 Elsevier Ireland Ltd. All rights reserved.

*Corresponding author: Kevin W Chen, Ph.D. MPH, Associate Professor, Center for Integrative Medicine, University of Maryland, School of Medicine. 520 W Lombard St. East Hall, Room 101C. Baltimore, MD 21201, Tel: 410-706-6188 or 410-448-6876, Fax: 410-706-6208 or 410-448-6875, kchen@compmed.umm.edu.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Keywords

Comorbidity; substance dependence; psychiatric disorders; inpatient treatment; gender differences

1. INTRODUCTION

In the United States, individuals with substance use disorders (SUDs) are up to 4.5 times more likely to be diagnosed with comorbid psychiatric disorders than are individuals without SUDs (Jane-Llopis and Matytsina, 2006; Kessler et al., 2005; Kessler et al. 1994; Regier et al., 1990; Robins and Regier, 1991). Not surprisingly, some of the highest rates of comorbid psychiatric and SUDs are found within inpatient and outpatient substance use treatment settings (Compton et al., 2000a, b; Regier et al., 1990), with 45–84% of individuals receiving care in these facilities meeting diagnostic criteria for a psychiatric disorder (Hien et al., 1997; Johnson et al., 2002; Lehman et al., 1994; Substance Abuse and Mental Health Service Administration, 2007; Watkins et al., 2004). Individuals with comorbid psychiatric and SUDs have notoriously poor outcomes, characterized by high rates of inpatient and outpatient treatment dropout (Brady et al., 2004; Burnam et al., 1995; Jerrell et al., 2000; Lipsky et al., 2010), more frequent rehospitalizations (Benda, 2001), and increased suicidality (Cornelius et al., 1995) compared to individuals without comorbidities. Moreover, their cost of care is significantly higher than the cost for individuals solely diagnosed with SUDs (Hoff and Rosenheck, 1999).

In general, comorbid psychiatric disorders are both more common and more severe in inpatient as compared to outpatient substance use treatment settings (Duffy et al., 2008; Gastfriend and McLellan, 1997; Mattson, 2003). About 40% of substance users in the United States receive treatment in inpatient facilities (Substance Abuse and Mental Health Service Administration, 2005), yet little research has specifically focused on understanding the diagnostic profiles of patients who receive inpatient treatment, which provides clinicians with minimal guidance as to how to address the unique needs of these particularly vulnerable individuals. In one of the few studies focusing on an inpatient treatment setting, Skinstad and Swain (2001) reported that 36.8% of 125 substance dependent males (84% Caucasian) reported a lifetime history of an anxiety disorder, 31% a mood disorder, and 26.4% a personality disorder. These particularly elevated rates of psychiatric diagnoses begin to present a clearer picture of the diagnostic profiles of Caucasian males in inpatient treatment, primarily with alcohol, marijuana, and stimulant dependence, but more research is needed, especially examining women and minorities, and with a focus on differences as a function of substance dependence type.

Epidemiological studies have demonstrated that women generally are more likely to have mood and anxiety disorders than men (Jane-Llopis and Matytsina, 2006; Kessler et al., 2005; Lipsky et al., 2010) and similar findings have been found among male and female substance users (Compton et al., 2000; Stecker et al., 2007). Women make up about one third of those diagnosed with a SUD (Substance Abuse and Mental Health Service Administration, 2003), making it important to further examine the characteristics of females, since different types of substances are used and different rates of comorbid diagnoses exist, as a function of gender. To this end, the current study provides an examination of comorbid psychiatric disorders across specific substance dependences (e.g. cocaine, alcohol, etc.) as a function of gender among a sample of 465 predominantly African American individuals (88.4% African American) in inpatient substance use treatment.

2. METHOD

2.1. Participants

The current study examined the distribution and profile of mental health disorders and substance dependence in a sample of 465 individuals (Mean age= 43.3, S.D.= 9.8; 71.4% male, 88.6% African American, 72.3% single, 80.0% unemployed, 70.0% high school education or less, mean annual income < \$25,000, with 60.2% making less than \$10,000 past year, and 57.9% court-mandated to attend treatment) recruited from an inpatient substance use treatment facility in an inner city low-income setting in Washington D.C.

To enter the treatment facility, patients were required to evidence a negative urine drug screen; those with positive urine screens entered a detoxification program before admittance. The majority of patients entering the center were required to attend treatment by the court system, thus a number of patients did not want, or believe they needed, treatment. Typical inpatient treatment lasted between 30 and 180 days, depending on clients' treatment funding sources. During treatment, patients were only permitted to leave the center for scheduled appointments (e.g. appointments with psychiatrists, primary care physicians). Patients at the center were involved in a variety of programs from 8am to 9pm daily, intended to help them develop a substance-free lifestyle, based on AA and NA techniques as well as on strategies focusing on the development of relapse prevention skills. As in many other substance use facilities, there generally was little treatment for comorbid psychiatric disorders and the center did not employ a psychiatrist or psychologist.

2.2. Recruitment and Consent

Doctoral level graduate students and senior research staff conducted intake assessments with patients during their first week at the treatment center. The purpose of the intake assessments was twofold: to provide diagnostic information to counselors at the treatment center and to gather data for the current study. Upon completing the intake assessment, patients were invited to participate in research and were provided with detailed information about how information collected during the interview would be used, if consent were provided. Data are presented here only in cases where informed consent was obtained from patients at the end of the assessment session (< 5% missing for this reason). The University of Maryland Institutional Review Board reviewed and approved the study protocol.

2.3. Measurements

The Structured Clinical Interview for the DSM-IV (SCID-IV; First et al., 1995) was used to assess for Axis I disorders and Antisocial Personality Disorder (ASPD). A brief assessment was included to collect demographic information and the Diagnostic Interview for Personality Disorders (DIPD) was used to assess for Borderline Personality Disorder (BPD), as it has been argued to be a more comprehensive and precise measure of this disorder than the SCID-IV (Zanarini et al., 1987). Patients were diagnosed with current substance dependence with the SCID-IV when they endorsed three dependence symptoms over the prior year, while past dependence was diagnosed when patients endorsed three dependence symptoms before the prior year (patients were diagnosed with both only when there were distinct periods of abstinence delineating their current and prior use). Substance abuse was not assessed, as most clients endorsed dependence symptoms. However, as in other treatment facilities, a small percentage of clients who were mandated by the court system to attend treatment denied any substance use problems. Interviewers were instructed to attend to the timeline of substance use so as to determine whether Axis I diagnoses (e.g. depression, mania, psychotic symptoms) were due to substance use or other underlying causes. Diagnoses were made only when the disorder was not substance-induced.

Interviewers received extensive training and comprehensive weekly supervision by a doctoral level clinical psychologist to ensure the accuracy of diagnoses. The training included viewing of the complete video protocol from the developers of the SCID-IV, conducting two mock interviews using the SCID-IV and the DIPD, observing two full interviews by experienced interviewers, conducting a final certification practice interview (with the SCID-IV and the DIPD), and participating in weekly supervision. During weekly supervision meetings, clinical questions were addressed and group feedback about the appropriateness of SCID-IV and DIPD diagnoses was offered. In cases of disagreement, discussion continued until consensus was reached and any agreed upon changes to diagnoses were made.

2.4. Analytic Strategy

Prior to data entry, the completed questionnaires and interview sheets were reviewed and checked for completeness or obvious errors. Data were double entered into SPSS (versions 14–18 over the course of the study) so potential inconsistencies or inaccuracies could be easily detected. There were occasional missing data points due to non-responses such as: “don’t know” or “refused” as patients could choose to not answer questions asked during the intake assessment. We did not implement any imputation procedure for these missing data, and only report results based on patients with valid and complete responses for the *relevant* questions (thus the N’s vary across analyses). Descriptive analyses, ANOVAs, and cross-tabulations were used for the major descriptions of clinical characteristics and the profiles of the participants. Chi-square tests for categorical variables and ANOVAs for continuous variables were used to examine the significance of group differences.

3. RESULTS

3.1. Demographic Variables as a Function of Gender

Demographic variables were examined as a function of gender to determine whether women and men differed on these key variables. There were no significant gender effects for demographic variables (Table 1).

3.2. Substance Dependence Profiles

The overall prevalence of substance dependence was 88% for past dependence, and 77% for current dependence (Table 2). 2.1% of patients interviewed reported they had never used any illicit drugs. Substance abuse was not assessed in the current study.

We first examined the prevalence of substance dependence as a function of gender (Table 2). A significantly lower prevalence of the following substance dependences was observed among males than among females: current cocaine dependence (51.8% vs. 66.7%; $p < .01$, $OR = 0.54$, $CI = 0.35–0.82$), hallucinogen/PCP dependence (4.9% vs. 13.1%; $p < .01$, $OR = 0.34$, $CI = 0.17–0.70$), and any current substance dependence (74.4% vs. 84.1%; $p < .05$, $OR = 0.52$, $CI = 0.32–0.93$). Male patients reported a significantly higher rate of lifetime cannabis dependence than did females (31.0% vs. 19.7%; $p < .05$, $OR = 1.83$, $CI = 1.12–2.98$). Patients were also highly likely to be dependent on more than one substance; past dependence on multiple substances was reported by 56% of patients and current dependence on multiple substances was reported by 36.5% of patients (Table 3). There were no significant gender differences in dependence on multiple substances; however significantly more males reported no current substance dependence than did females (25.6% vs. 15.9%; $p < .025$, $OR = 0.55$, $CI = 0.32–0.93$).

3.3. Psychiatric Disorder Profiles

Table 4 presents the prevalence of psychiatric disorders diagnosed by the SCID-IV and DIPD, other than SUDs. Overall, 60.6% of patients at the treatment center met diagnostic criteria for a psychiatric disorder, with 32.5% of patients meeting criteria for a current mood disorder, 32.0% for an anxiety disorder, 25.3% for ASPD, 24.2% for BPD, and 8.4% for psychotic symptoms. Overall, 55.4% of males and 73.7% of females were diagnosed with a psychiatric disorder ($p = 0.001$, $OR = 0.44$, $CI = 0.29–0.69$). In terms of gender differences in specific psychiatric disorders, females were more likely to be diagnosed with all of the psychiatric disorders than were males ($p < .01$ for mood disorders, anxiety disorders, psychotic symptoms, and BPD), except for ASPD (where male patients had a significantly higher diagnosis rate; $p < 0.01$). Additionally, 16.2% of males versus 23.3% of females met diagnostic criteria for three or more psychiatric disorders ($p < 0.05$).

3.4. Comorbid Substance Use and Psychiatric Disorder Profiles

We further examined the prevalence of current comorbid substance dependence and current psychiatric disorders among the total treatment sample, as well as the conditional prevalence of each psychiatric disorder among specific substance dependent groups (Tables 5 and 6, respectively).

3.4.1. Comorbidity profiles—Cocaine dependence and any psychiatric disorder was the most frequently occurring comorbidity (40% of the sample) and there were fewer males than females with this comorbidity ($p < .01$, $OR = 0.54$, $CI = 0.36–0.81$). When examining the rates of comorbid cocaine dependence and psychiatric disorders as a function of gender, there was a greater percentage of females than males for all diagnoses, except ASPD ($p < .01$ for mood disorders, anxiety disorders, psychotic symptoms, and BPD; Table 5). For other substances, the rates of comorbid psychiatric disorders and substance dependence did not differ by gender.

3.4.2. Conditional prevalence comorbidity profiles—Table 6 presents the prevalence of each comorbid psychiatric disorder given dependence across substance type; that is, if a patient was dependent on a particular substance, what was the likelihood that he or she would have a particular comorbid psychiatric disorder. We conducted these analyses to better understand which types of substance dependences and psychiatric disorders were most likely to co-occur, without base rates of disorders biasing our results. When examining the conditional prevalence of disorders by gender, several findings emerged (Table 6). Broadly, females with substance dependence had higher rates of mood disorders, anxiety disorders, psychotic symptoms, or BPD than males (see Table 6 for statistically significant differences) across drug-dependent groups (except mood disorders and psychotic symptoms in patients with cannabis dependence). Males with substance dependence, in contrast, were diagnosed with higher rates of ASPD than were females in all drug-dependent groups, except for opioid dependence. These patterns are in concordance with the rates of comorbid psychiatric disorders observed among women and men.

3.4.2.1. Conditional comorbidities among alcohol dependent patients: The highest rates of co-occurring psychiatric disorders were evident among alcohol-dependent patients. If a patient was diagnosed with alcohol dependence, there was a 77% chance he or she would also have a comorbid psychiatric disorder. When we further broke this down by gender, 71.2% of males with alcohol dependence had a comorbid psychiatric disorder, while 94% of females had a comorbid psychiatric disorder ($p < .01$, $OR = 0.15$, $CI = 0.04–0.68$). Mood disorders and anxiety disorders most frequently co-occurred among alcohol-dependent patients (52.9% and 44.9% correspondingly) with significantly lower rates of mood disorders among alcohol dependent males than females (46.2% vs. 73.5%; $p < .01$, $OR =$

0.31, $CI = 0.13-0.73$). Alcohol-dependent patients also showed higher rates of co-occurring BPD (39.9%) and psychotic symptoms (11.8%) than patients diagnosed with dependence on other substances.

3.4.2.2. Conditional comorbidities among illicit substance dependent patients: For illicit substances, patients with cannabis dependence had the highest rates of diagnosed mood disorders (46%), anxiety disorders (42%), and ASPD (40%). In contrast, patients with cocaine dependence had the highest rates of psychotic symptoms (11.2%); males with cocaine dependence were significantly less likely to have psychotic symptoms than were females (6.5% vs. 19.8%, $p < .01$, $OR = 0.28$, $CI = 0.13-0.64$). In addition, males with cocaine dependence were also less likely to have BPD than females (26.3% vs. 41.4%; $p < .05$, $OR = 0.51$, $CI = 0.29-0.87$).

3.4.2.3. Psychiatric disorders among non-dependent patients: Among patients who did not meet diagnostic criteria for current substance dependence, the prevalence of any psychiatric disorder was 27% (Table 6), which was significantly lower than rates among individuals with current substance dependence (67.3%; $p < 0.01$). Interestingly, the prevalence of various psychiatric disorders was at least 2–3 times higher among those with current dependence than among those without current dependence, with the largest difference seen in mood disorder diagnosis rates; the prevalence of mood disorders was 5.4 times higher among individuals with substance dependence than that among individuals without substance dependence.

In general, dependence on multiple substances was highly correlated with multiple mental health diagnoses ($r = 0.43$; $p < .01$). A further analysis indicates that those dependent on 3+ substances were most likely to have three or more psychiatric disorders.

4. DISCUSSION

This is the first paper to our knowledge that examines specific clinical profiles of patients with comorbid substance dependence and psychiatric disorders presenting for inpatient drug treatment, as a function of gender and particular substance type. The need for such research is highlighted by the high rates of psychiatric disorders among patients with SUDs (Johnson et al., 2002; Skinstad and Swain, 2001; Watkins et al., 2004), combined with the fact that only 42% of substance use treatment facilities employ mental health screenings (Substance Abuse and Mental Health Service Administration, 2009) and that about 50% of patients with comorbid disorders in substance use treatment report never having received any mental health treatment (Watkins et al., 2004; Weaver et al., 2001). Moreover, there is little research specifically focusing on low income minority individuals in these treatment settings.

In our inpatient treatment sample, there were significant differences in substance dependence and psychiatric disorders as a function of gender. Women had significantly higher rates of cocaine dependence than men (66.7% versus 51.8%), which is in concordance with the findings of Stecker and colleagues (2007) who examined veterans in intensive outpatient substance use treatment and the findings of Compton and colleagues (2000b) who compared male and female African Americans in inpatient and outpatient treatment. As expected, there were much higher rates of dependence in our inpatient sample; 56.1% of our sample had current dependence, while 20.7% (27.6% of women, 20.5% of men) of patients in Stecker's sample had cocaine abuse/dependence. Our rates are also comparable, albeit lower, to those of Compton and colleagues (2000b), where 74% of men and 80% of women were cocaine dependent. Finally, in the Treatment Episode Dataset (TEDS; SAMHSA, 2007), a greater percentage of females as a group than males as a group

reported cocaine as their primary substance of abuse. Our rates of other dependences were similar to those of Compton and colleagues (2000b) for cannabis (31%) and hallucinogens (6%), while they were lower for opioids (51%).

As expected, the most frequent comorbid psychiatric diagnoses were mood and anxiety disorders, with more females meeting diagnostic criteria for MDD (25.8% versus 21.0%) and PTSD (18.3% versus 12.2%) than males. These rates are comparable to those of Compton and colleagues (2000b), where 18% of African American women and 10% of African American men in treatment for SUDs met criteria for MDD, but are lower than those of Stecker and colleagues (2007), where 50% of women and 34% of men in the VA system with SUDs met criteria for MDD. Interestingly, among patients with cocaine dependence or cannabis dependence, rates of mood disorders did not differ by gender, which is similar to patterns observed by other researchers who have not found elevated rates of mood disorders among female as compared to male substance users for specific substance types (Brady et al., 1993; Denier et al., 1992). Among individuals with cannabis dependence, alcohol dependence, and opioid dependence, males and females were not significantly different in their likelihood of being diagnosed with ASPD, while among individuals with cocaine dependence, males were more likely to be diagnosed with ASPD than females.

Some of the most interesting findings focused on the likelihood of having specific psychiatric disorders among specific types of substance dependence. Here, individuals with alcohol dependence had particularly elevated rates of psychiatric disorders, which is in concordance with findings from the Drug Abuse Treatment Outcomes Study (DATOS), a national sample of individuals with substance dependence (Flynn et al., 1996), where higher rates of psychiatric disorders among individuals with alcohol dependence, as compared to individuals with heroin or cocaine dependence, were found. Aside from the more expected findings, such as higher rates of psychiatric comorbidities among women compared to men in general, our study indicates that this pattern holds when examining these comorbidities across specific substance dependences, which compliments and extends findings of other studies demonstrating that females with alcohol disorders are significantly more likely to have co-occurring psychiatric disorders than their male counterparts (Conway et al., 2006; Goldstein, 2009).

Particular examples of interesting findings for further exploration include the fact that cocaine dependent females were three times more likely to experience psychotic symptoms than cocaine dependent males. Beyond the differential relevance of particular drugs, it is notable that comorbidities were observed most frequently among patients with multiple drug dependence diagnoses and least frequently among individuals with no SUD diagnoses.

Although the current data offer a wealth of information about individuals in inpatient addictions treatment with comorbid psychiatric disorders, there are some limitations with this work. First, this is not a randomly selected sample, nor is it representative of all inpatient treatment facilities in the United States. Specifically, our work focuses on inner-city, low-income, minority inpatients, and thus it would be unwise to assume our findings applied to all individuals in substance use treatment. Second, it should be noted that the findings, especially as they relate to drug type, might be particularly influenced by aspects of the geographical location, like differential prevalence of drug use in inner city D.C., as compared to other settings. Third, although we took several steps to ensure the accuracy of the diagnoses, it would have been preferable to have audio-taped assessments for review or to have conducted multiple interviews with a subset of patients to establish reliability. Fourth, we could not determine the temporal order of diagnoses for many patients because

of the overlapping nature of their substance use and psychiatric histories. Thus, we were unable to present data on these relationships.

Within the context of these limitations, there are important clinical implications of the current findings that underscore the importance of targeted assessment and treatment for psychiatric comorbidities among patients in inpatient substance use settings. Indeed, there are many repercussions related to failing to identify co-occurring disorders, given that the presence of psychiatric disorders in these patients has been consistently linked with higher rates of service utilization and poorer treatment outcomes (Brown et al., 1998; Carroll et al., 1993; Comfort and Kaltenbach, 2000; Department of Health and Human Services, 2007; Lipsky et al., 2010; McLellan et al., 1983; Warner et al., 1995; Jerrell et al., 2000). Further, data have shown that the probability of relapsing to substance use and treatment re-entry are higher among these patients (Bradizza et al., 2006; Ilgen et al., 2008; Lipsky et al., 2010; Luchansky et al., 2000; Moos et al., 1995; Rush et al., 2008). Some data have shown that the extent of psychiatric severity is actually a better predictor of treatment outcome than substance abuse severity itself (McLellan et al., 1983). Therefore, the current findings lend further support to the notion of focusing upon and treating comorbidities within these settings, while also taking into account gender and drug type differences.

5. CONCLUSIONS

Within this inpatient substance use treatment population, patients were more likely than not to be diagnosed with comorbid psychiatric disorders. Mood and anxiety disorders were the most frequent diagnoses, although both BPD and ASPD were diagnosed at high rates as well. Females were more likely to have comorbid psychiatric disorders than were males and patients with substance dependence were three times more likely to have a psychiatric disorder than were those without substance dependence (67% vs. 27%), although these results must be replicated to determine whether they are generalizable outside of this setting. Overall, this study provides unique information regarding the prevalence of comorbid psychiatric disorders as a function of gender and specific substance dependences within an inpatient substance use treatment setting in inner city D.C.

References

- Burnam MA, Morton SC, McGlynn EA, Petersen LP, Stecher BM, Hayes C, Vaccaro JV. An experimental evaluation of residential and nonresidential treatment for dually diagnosed homeless adults. *J Addict Dis.* 1995; 14:111–134. [PubMed: 8929936]
- Benda B. Predictors of rehospitalization of military veterans who abuse substances. *Soc Work Res.* 2001; 25:199–212.
- Bradizza CM, Stasiewicz PR, Paas ND. Relapse to alcohol and drug use among individuals diagnosed with co-occurring mental health and substance use disorders: a review. *Clin Psychol Rev.* 2006; 26:162–178. [PubMed: 16406196]
- Brady KT, Grice DE, Dustan L, Randall C. Gender differences in substance use disorders. *Am J Psychiatry.* 1993; 150:1707–1711. [PubMed: 8214180]
- Brady TM, Krebs CP, Laird G. Psychiatric comorbidity and not completing jail-based substance abuse treatment. *Am J Addict.* 2004; 13:83–101. [PubMed: 14766441]
- Brown RA, Monti PM, Myers MG, Martin RA, Rivinus T, Dubreuil ME, Rohsenow DJ. Depression among cocaine abusers in treatment: relation to cocaine and alcohol use and treatment outcome. *Am J Psychiatry.* 1998; 144:220–225. [PubMed: 9464201]
- Burnam M, Morton S, McGlynn E, Petersen L. An experimental evaluation of residential and nonresidential treatment for dually diagnosed homeless adults. *J Addict Dis.* 1995; 14:111–134. [PubMed: 8929936]

- Carroll KM, Power ME, Bryant K, Rounsaville BJ. One-year follow-up status of treatment-seeking cocaine abusers: psychopathology and dependence severity as predictors of outcome. *J Nerv Ment Dis.* 1993; 191:71–79. [PubMed: 8426174]
- Charney DA, Paraherakis AM, Negrete JC, Gill KJ. The impact of depression on the outcome of addictions treatment. *J Subst Abuse Treat.* 1998; 15:123–130. [PubMed: 9561951]
- Comfort M, Kaltenbach K. Predictors of treatment outcomes for substance-abusing women: a retrospective study. *Subst Abuse.* 2000; 21:33–45.
- Compton W, Cottler LB, Abdallah A, Phelps DL, Spitznagel EL, Horton JC. Substance dependence and other psychiatric disorders among drug dependent subjects: race and gender correlates. *Am J Addict.* 2000; 9:113–125. [PubMed: 10934573]
- Compton W, Cottler LB, Phelps D, Abdallah A, Spitznagel E. Psychiatric disorders among drug dependent subjects: are they primary or secondary? *Am J Addict.* 2000; 9:126–134. [PubMed: 10934574]
- Conway KP, Compton W, Stinson FS, Grant BF. Lifetime comorbidity of DSM-IV mood and anxiety disorders and specific drug use disorders: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *J Clin Psychiatry.* 2006; 67:247–57. [PubMed: 16566620]
- Cornelius J, Salloum I, Mezzich J, Cornelius M. Disproportionate suicidality in patients with comorbid major depression and alcoholism. *Am J Psychiatry.* 1995; 152:358–364. [PubMed: 7864260]
- Denier CA, Thevos AK, Latham PK, Randall CL. Psychosocial and psychopathology differences in hospitalized male and female cocaine abusers: a retrospective chart review. *Addict Behav.* 1992; 16:489–496. [PubMed: 1801572]
- Department of Health and Human Services-Substance Abuse and Mental Health Services. SAMHSA Drug and Alcohol Services Information System Series: S-7, Treatment Episode Data Set (TEDS), 1992–1997. Department of Health and Human Services; Rockville, MD: 1999.
- Duffy, SQ.; Zarkin, GA.; Dunlop, LJ. Do client characteristics affect admission to inpatient versus outpatient alcohol treatment in publicly monitored programs?. In: Council, CL., editor. *Health Services Utilization by Individuals with Substance Abuse and Mental Disorders.* Vol. Chapter 4. DHHS SAMHSA Office of Applied Studies; Rockville, MD: 2008.
- Feske U, Tarter R, Kirisci L, Pilkonis P. Borderline personality and substance use in women. *Am J Addict.* 2006; 15:131–137. [PubMed: 16595350]
- First, MB.; Spitzer, RL.; Gibbon, M.; Williams, JBW. *Structured Clinical Interview for DSM-IV Axis I Disorders.* New York State Psychiatric Institute; New York: 1995.
- Flynn P, Craddock S, Luckey J, Hubbard R, Duntzman G. Comorbidity of antisocial personality and mood disorders among psychoactive substance-dependent treatment clients. *J Pers.* 1996; 10:56–67.
- Gastfriend DR, McLellan AT. Treatment matching: theoretic basis and practical implications. *Med Clin North Am.* 1997; 81:945–966. [PubMed: 9222262]
- Goldstein, RB. Comorbidity of substance use with independent mood and anxiety disorders in women: results from the National Epidemiologic Survey on Alcohol and Related Conditions. In: Brady, KT.; Back, SE.; Greenfield, SF., editors. *Women and Addiction: A Comprehensive Handbook.* Guilford Press; New York: 2009. p. 173-92.
- Greenfield S, Back S, Lawson K, Brady K. Substance abuse in women. *Psychiatr Clin North Am.* 2010; 33:339–355. [PubMed: 20385341]
- Hien D, Zimberg S, Weisman S, First M, Ackerman S. Dual diagnosis subtypes in urban substance abuse and mental health clinics. *Psychiatr Serv.* 1997; 48:1058–1063. [PubMed: 9255839]
- Hoff R, Rosenheck R. The cost of treating substance abuse patients with and without comorbid psychiatric disorders. *Psychiatr Serv.* 1999; 50:1309–1315. [PubMed: 10506299]
- Ilgen MA, Hu KU, Moos RH, McKellar J. Continuing care after inpatient psychiatric treatment for patients with psychiatric and substance use disorders. *Psychiatr Serv.* 2008; 59:982–988. [PubMed: 18757590]
- Jané-Llopis E, Matytsina I. Mental health and alcohol, drugs and tobacco: a review of the comorbidity between mental disorders and the use of alcohol, tobacco and illicit drugs. *Drug Alcohol Rev.* 2006; 25:515–536. [PubMed: 17132571]

- Jerrell J, Wilson J, Hiller D. Issues and outcomes in integrated treatment programs for dual disorders. *J Behav Health Serv Res.* 2000; 27:303–313. [PubMed: 10932443]
- Johnson ME, Brems C, Burke S. Recognizing comorbidity among drug users in treatment. *Am J Drug Alcohol Abuse.* 2002; 28:243–261. [PubMed: 12014815]
- Kessler RC, Berglund P, Demler O, Jin R, Merikangas KR, Walters EE. Lifetime prevalence and age of onset distributions of DSM-IV disorders in the National Comorbidity Replication. *Arch Gen Psychiatry.* 2005; 62:593–602. [PubMed: 15939837]
- Kessler RC, Chiu WT, Demler O, Walters EE. Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry.* 2005; 62:617–627. [PubMed: 15939839]
- Kessler R, McGonagle K, Zhao S, Nelson C, Hughes M, Eshleman S, Wittchen H, Kendler KS. Lifetime and 12-month prevalence of DSM-III—R psychiatric disorders in the United States: results from the National Comorbidity Study. *Arch Gen Psychiatry.* 1994; 51:8–19. [PubMed: 8279933]
- Lehman AF, Myers C, Dixon LB, Johnson JL. Defining subgroups of dual diagnosis patients for service planning. *Hosp Community Psychiatry.* 1994; 45:556–561. [PubMed: 8088734]
- Lipsky S, Krupski A, Roy-Byrne P, Lucenko B, Mancuso D, Huber A. Effect of co-occurring disorders and intimate partner violence on substance abuse treatment outcomes. *J Subst Abuse Treat.* 2010; 38:231–244. [PubMed: 20129753]
- Luchansky B, He L, Krupski A, Stark KD. Predicting readmission to substance abuse treatment using state information systems: the impact of client and treatment characteristics. *J Subst Abuse.* 2000; 12:255–270. [PubMed: 11367603]
- Mattson, ME. The search for a rational basis for treatment selection. In: Galanter, M., editor. *Recent Developments in Alcoholism.* Kluwer Academic/Plenum Publishers; New York: 2003. p. 97-113.
- McLellan AT, Luborsky L, Woody GE, O'Brien CP, Druley KA. Predicting response to alcohol and drug abuse treatments: role of psychiatric severity. *Arch Gen Psychiatry.* 1983; 40:620–625. [PubMed: 6847331]
- Moos RH, Pettit B, Gruber V. Longer episodes of community residential care reduce substance abuse patients' readmission rates. *J Stud Alcohol.* 1995; 56:433–443. [PubMed: 7674679]
- Regier DA, Farmer ME, Rae DS, Locke BZ, Keith SJ, Judd LL, Goodwin FK. Comorbidity of mental disorders with alcohol and other drug abuse. Results from the Epidemiologic Catchment Area (ECA) Study. *JAMA.* 1990; 264:2511–2518. [PubMed: 2232018]
- Robins, LN.; Regier, DA. *Psychiatric Disorders in America.* The Free Press; New York: 1991.
- Rush BR, Dennis ML, Scott CK, Castel S, Funk RR. The interaction of co-occurring mental disorders and recovery management checkups on substance abuse treatment participation and recovery. *Eval Rev.* 2008; 32:7–38. [PubMed: 18198169]
- Skinstad AH, Swain A. Comorbidity in a clinical sample of substance abusers. *Am J Drug Alcohol Abuse.* 2001; 27:45–64. [PubMed: 11373036]
- Stecker T, Han X, Curran G, Booth B. Characteristics of women seeking intensive outpatient substance use treatment in the VA. *J Womens Health.* 2007; 16:1478–1484.
- Watkins KE, Hunter SB, Wenzel SL, Tu W, Paddock SM, Griffin A, Ebener P. Prevalence and characteristics of clients with co-occurring disorders in outpatient substance abuse treatment. *Am J Drug Alcohol Abuse.* 2004; 30:7497–64.
- Warner L, Kessler R, Hughes M, Anthony J. Prevalence and correlates of drug use and dependence in the United States: results from the National Comorbidity Survey. *Arch Gen Psychiatry.* 1995; 52:219–229. [PubMed: 7872850]
- Weaver T, Hickman M, Rutter D, Ward J, Stimson G, Renton A. The prevalence and management of co-morbid substance misuse and mental illness: results of a screening survey in substance misuse and mental health treatment populations. *Drug Alcohol Rev.* 2001; 20:407–416.
- Westreich L, Guedj P. Differences between men and women in dual-diagnosis treatment. *Am J Addict.* 1997; 6:311–317. [PubMed: 9398929]
- Wu LT, Ringwalt CL, Williams CE. Use of substance abuse treatment services by persons with mental health and substance use problems. *Psychiatr Serv.* 2003; 54:363–369. [PubMed: 12610245]

Zanarini MC, Frankenburg FR, Chauncey DL, Gunderson JG. The Diagnostic Interview for Personality Disorders: interrater and test-retest reliability. *Compr Psychiatry*. 1987; 28:467–80. [PubMed: 3691072]

Table 1

Demographics as a Function of Gender

Demographics	By Gender			<i>p</i> value ¹ =
	Total	Female	Male	
Marital Status (% single)	83.4%	85.8%	82.4%	.348
Race (% African American)	90.5%	92.6%	89.7%	.315
Education (% < high school)	30.0%	32.4%	29.0%	.642
Income (% > \$10,000)	40.4%	35.7%	42.4%	.170
Employment (% Unemployed)	79.4%	85.8%	76.6%	.025
Referral Status (% Court-Mandated)	59.2%	61.6%	58.2%	.477

¹Chi-square test for the 2 × 2 or corresponding contingency table

Table 2

Prevalence (%) of Substance Dependence by Gender

Substance Use Disorder	By Gender		p-value ¹	M/F Odds Ratios (95% C.I.)	
	Total	Male			Female
	<i>N</i> =464	332	132		
Past alcohol dependence	40.9	43.6	34.1	.061	1.49 (0.98, 2.27)
Current alcohol dependence	30.0	31.7	25.8	.208	1.34 (0.85, 2.11)
Past cannabis dependence	27.8	31.0	19.7	.014	1.83 (1.12, 2.98)
Current cannabis dependence	10.9	11.0	10.8	.949	1.02 (0.53, 1.96)
Past cocaine dependence	63.9	61.6	69.7	.103	0.70 (0.56, 1.06)
Current cocaine dependence	56.1	51.8	66.7	.004	0.54 (0.35, 0.82)
Past Hal/PCP dependence	18.0	17.6	18.9	.730	0.91 (0.54, 1.53)
Current Hal/PCP dependence	7.2	4.9	13.1	.002	0.34 (0.17, 0.70)
Past opioid dependence	26.7	28.7	22.0	.143	1.43 (0.89, 2.30)
Current opioid dependence	21.8	22.7	19.7	.481	1.20 (0.72, 1.98)
Past sedative dependence	1.5	1.2	2.3	.394	0.52 (0.12, 2.37)
Current sedative dependence	0.9	0.6	1.5	.345	0.40 (0.06, 2.86)
Past stimulants dependence	2.0	1.8	2.3	.763	0.81 (0.20, 3.27)
Current stimulants dependence	0.7	0.6	0.8	.862	0.81 (0.07, 8.98)
Past poly-drug dependence	4.1	4.3	3.8	.826	1.12 (0.40, 3.18)
Current poly-drug dependence	2.8	2.8	3.1	.865	0.90 (0.27, 2.98)
Past any substance dependence	87.9	89.2	84.8	.199	1.47 (0.82, 2.64)
Current substance dependence	77.2	74.4	84.1	.025	0.55 (0.32, 0.93)
No past substance dependence	12.1	10.8	15.2	.199	0.68 (0.38, 1.23)
No current substance dependence	22.8	25.6	15.9	.025	1.81 (1.07, 3.12)

¹ Chi-square test for the 2 × 2 or corresponding contingency table

Table 3

Prevalence (%) of Current Dependence on Multiple Substances by Gender

Number of Substance Dependences	Total	By Gender		p-value ¹	M/F Odds Ratios (95% C.I.)
		Male	Female		
<i>N</i> <=	464	332	132		
0 substances	22.8	25.6	15.9	.025	1.81 (1.07, 3.12)
1 substance	40.7	40.1	42.4		N/A
2 substances	27.2	25.0	32.6	.156 ²	
3 substances	6.3	6.6	5.3		
4 or more substances	3.0	2.7	3.8		
Main Combinations of Dependence on Multiple Substances					
Alcohol & cannabis dependence	5.9	6.4	4.6	.460	1.42 (0.56, 3.60)
Alcohol & cocaine dependence	21.4	22.0	19.7	.583	1.15 (0.70, 1.90)
Alcohol & opioid dependence	6.8	7.7	4.5	.225	1.75 (0.70, 4.37)
Alcohol & other drug dependence	3.7	3.0	5.3	.236	0.56 (0.21, 1.49)
Cocaine & cannabis dependence	5.0	5.5	3.8	.464	1.46 (0.53, 4.01)
Cocaine & opioid dependence	13.5	12.6	15.9	.345	0.76 (0.43, 1.34)
Cocaine & other drug dependence	4.3	3.9	5.3	.507	0.73 (0.28, 1.87)
Opioid & cannabis dependence	2.9	3.4	1.5	.286	2.24 (0.49, 10.26)
Opioid & other drug dependence	3.2	3.0	3.8	.670	0.79 (0.26, 2.35)

¹ Chi-square test for the 2 × 2 or corresponding contingency table² For the test based on the 2 × 5 contingency table.

Table 4

Prevalence (%) of Psychiatric Disorders Diagnosed by SCID by Gender

SCID Diagnosis	Total	By Gender		p-value ¹	M/F Odds Ratios (95% C.I.)
		Male	Female		
<i>N</i> <=	465	332	133		
Any current psychiatric disorder ²	60.6	55.4	73.7	.001	0.44 (0.29, 0.69)
Past any mood disorder	44.1	38.9	57.1	.001	0.48 (0.32, 0.72)
Current any mood disorder	32.5	28.6	42.1	.005	0.55 (0.36, 0.84)
Current bipolar disorder	2.8	3.4	1.5	.287	2.24 (0.49, 10.2)
Past major depressive disorder	37.9	31.9	53.0	.001	0.42 (0.28, 0.63)
Current major depressive disorder	25.8	21.0	37.6	.001	0.44 (0.29, 0.69)
Past substance-induced mood disorder	6.9	7.6	5.3	.385	1.46 (0.62, 3.47)
Current substance-induced mood disorder	5.5	5.8	4.6	.596	1.29 (0.50, 3.30)
Current any anxiety disorder	32.0	28.3	41.4	.006	0.56 (0.37, 0.85)
Current panic disorder	2.8	2.7	3.1	.849	0.89 (0.27, 2.94)
Current social phobia	9.3	9.1	9.9	.782	0.91 (0.46, 1.80)
Current specific phobia	9.2	5.8	17.7	.001	0.28 (0.15, 0.54)
Current OCD	2.6	2.7	2.3	.796	1.19 (0.37, 4.47)
Current PTSD	14.0	12.2	18.3	.089	0.62 (0.36, 1.08)
Current GAD	8.2	7.9	9.2	.629	0.84 (0.41, 1.72)
Past psychotic symptoms	11.7	9.1	18.2	.006	0.45 (0.25, 0.81)
Current psychotic symptoms	8.4	5.9	14.5	.003	0.37 (0.19, 0.72)
BPD	24.2	19.9	35.4	.001	0.45 (0.29, 0.71)
ASPD	25.3	28.7	16.8	.008	1.99 (1.19, 3.34)
Number of Psychiatric Disorders ²					N/A
1	26.5	23.5	33.8		
2	15.9	15.7	16.5		
3	11.0	10.2	12.8	.007	

SCID Diagnosis	Total	By Gender		<i>p</i> -value ¹	M/F Odds Ratios (95% C.I.)
		Male	Female		
<i>N</i> <=	465	332	133		
4	5.8	4.5	9.0		
5	1.5	1.5	1.5		

¹ Chi-square test

² Counted by five categories of SCID diagnosis: any mood disorder, any anxiety disorder, psychotic symptoms, borderline personality disorder and antisocial personality disorder.

Abbreviations: Obsessive Compulsive Disorder (OCD), Post-traumatic Stress Disorder (PTSD), Generalized Anxiety Disorder (GAD), Borderline Personality Disorder (BPD), Antisocial Personality Disorder (ASPD)

Table 5

Prevalence (%) of Comorbidity of Current Psychiatric and Substance Use Disorders by Gender

Comorbid Substance and Psychiatric Diagnoses	Total	By Gender		p-value ¹	M/F Odds Ratios (95% C.I.)
		Male	Female		
<i>N</i> <=	465	332	133		
Alcohol dependence & any psychiatric disorder	23.0	22.6	24.2	.698	0.91 (0.57, 1.46)
Alcohol dependence & any mood disorder	15.9	14.6	18.9	.253	0.73 (0.43, 1.25)
Alcohol dependence & any anxiety disorder	13.5	13.7	12.9	.811	1.08 (0.59, 1.96)
Alcohol dependence & psychotic symptoms	3.5	3.1	4.6	.432	0.66 (0.24, 1.86)
Alcohol dependence & BPD	12.0	11.0	14.6	.280	0.72 (0.40, 1.31)
Alcohol dependence & ASPD	11.1	12.8	6.9	.066	2.00 (0.94, 4.23)
Cocaine dependence & any psychiatric disorder	40.0	35.8	50.8	.003	0.54 (0.36, 0.81)
Cocaine dependence & any mood disorder	23.2	19.4	32.6	.002	0.50 (0.32, 0.78)
Cocaine dependence & any anxiety disorder	21.4	17.6	31.1	.001	0.47 (0.30, 0.75)
Cocaine dependence & psychotic symptoms	6.2	3.4	13.1	.001	0.23 (0.11, 0.52)
Cocaine dependence & BPD	17.6	13.6	27.7	.001	0.41 (0.25, 0.68)
Cocaine dependence & ASPD	17.4	19.5	12.2	.065	1.74 (0.96, 3.13)
Opioid dependence & any psychiatric disorder	14.0	12.9	16.7	.290	0.74 (0.42, 1.30)
Opioid dependence & any mood disorder	9.6	8.3	12.9	.131	0.61 (0.32, 1.16)
Opioid dependence & any anxiety disorder	7.9	6.4	11.4	.076	0.54 (0.27, 1.08)
Opioid dependence & psychotic symptoms	1.8	1.6	2.3	.588	0.67 (0.16, 2.85)
Opioid dependence & BPD	6.4	5.8	7.7	.461	0.74 (0.34, 1.64)
Opioid dependence & ASPD	7.2	7.4	6.9	.848	1.08 (0.49, 2.39)
Cannabis dependence & any psychiatric disorder	8.3	7.9	9.2	.648	0.85 (0.41, 1.73)
Cannabis dependence & any mood disorder	5.0	5.2	4.6	.802	1.13 (0.44, 2.93)
Cannabis dependence & any anxiety disorder	4.6	3.7	6.9	.132	0.51 (0.21, 1.24)
Cannabis dependence & psychotic symptoms	1.1	1.2	0.8	.689	1.61 (0.18, 14.54)
Cannabis dependence & BPD	3.3	3.0	3.9	.645	0.77 (0.26, 2.31)
Cannabis dependence & ASPD	4.4	4.9	3.1	.400	1.61 (0.53, 4.90)

¹ Chi-square test

Table 6
Conditional Prevalence of Current Psychiatric Disorders among Patients with Current Substance Dependence

Substance Dependence	By Gender			<i>p</i> -value ¹		
	Total	Male	Female			
Alcohol Dependence (Nm=104; Nf=34) ²	Any psychiatric disorder	76.8	71.2	94.1	.006	0.15 (0.04, 0.68)
	Any mood disorder	52.9	46.2	73.5	.006	0.31 (0.13, 0.73)
	Any anxiety disorder	44.9	43.3	50.0	.493	0.76 (0.35, 1.66)
	Psychotic symptoms	11.8	9.7	18.2	.189	0.48 (0.16, 1.45)
	BPD	39.9	34.6	55.9	.028	0.42 (0.19, 0.92)
ASPD	37.2	40.8	26.5	.135	1.91 (0.81, 4.51)	
Cannabis Dependence (Nm=36; Nf=14) ²	Any psychiatric disorder	76.0	72.2	85.7	.316	0.43 (0.08, 2.29)
	Any mood disorder	46.0	47.2	42.9	.781	1.19 (0.34, 4.14)
	Any anxiety disorder	42.0	33.3	64.3	.046	0.28 (0.08, 1.01)
	Psychotic symptoms	10.2	11.4	7.1	.654	1.67 (0.17, 16.5)
	BPD	30.0	27.8	35.7	.582	0.69 (0.19, 2.58)
ASPD	40.0	44.4	28.6	.304	2.00 (0.53, 7.58)	
Cocaine Dependence (Nm=170; Nf=85) ²	Any psychiatric disorder	71.4	69.0	76.1	.229	0.70 (0.39, 1.26)
	Any mood disorder	41.3	37.4	48.9	.077	0.63 (0.37, 1.05)
	Any anxiety disorder	38.2	33.9	46.6	.047	0.59 (0.35, 0.99)
	Psychotic symptoms	11.0	6.5	19.8	.001	0.28 (0.13, 0.64)
	BPD	31.4	26.3	41.4	.014	0.51 (0.29, 0.87)
ASPD	31.0	37.4	18.4	.002	2.65 (1.42, 4.96)	
Opioid Dependence (Nm=74; Nf=24) ²	Any psychiatric disorder	64.0	56.8	84.6	.011	0.24 (0.08, 0.76)
	Any mood disorder	44.0	36.5	65.4	.011	0.30 (0.12, 0.78)
	Any anxiety disorder	36.0	28.4	57.7	.007	0.29 (0.12, 0.73)
	Psychotic symptoms	8.2	6.8	12.0	.417	0.54 (0.12, 2.44)
	BPD	29.3	25.7	40.0	.174	0.52 (0.20, 1.35)
ASPD	33.0	32.4	34.6	.839	0.91 (0.35, 2.33)	
Any Substance Dependence (Nm=248, Nf=112)	Any psychiatric disorder	67.3	63.2	76.6	.012	0.52 (0.32, 0.87)
	Any mood disorder	39.1	35.6	46.8	.044	0.63 (0.40, 0.99)

Substance Dependence	SCID Diagnosis	By Gender		<i>p</i> -value ¹		
		Total	Male		Female	
	Any anxiety disorder	36.9	33.2	45.0	.032	0.61 (0.38, 0.96)
	Psychotic symptoms	9.7	6.6	16.5	.004	0.36 (0.17, 0.73)
	BPD	27.2	23.1	36.7	.008	0.52 (0.32, 0.84)
	ASPD	28.4	33.3	17.3	.002	2.39 (1.37, 4.20)
No Substance Dependence (Nm=85, Nf=21) ²	Any psychiatric disorder	27.3	25.5	32.5	.392	0.71 (0.32, 1.56)
	Any mood disorder	7.3	6.4	10.0	.450	0.61 (0.17, 2.21)
	Any anxiety disorder	11.3	10.9	12.5	.786	0.86 (0.28, 2.61)
	Psychotic symptoms	3.9	3.7	4.5	.856	0.81 (0.08, 8.17)
	BPD	14.2	10.6	28.6	.034	0.30 (0.09, 0.96)
	ASPD	15.1	15.3	14.3	.908	1.08 (0.28, 4.21)

¹ Chi-square test

² Nm = number of male patients, Nf = number of female patients.