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Profiles of psychiatric disorders among heroin dependent individuals in Changsha, China

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Abstract

Background—The strong comorbidity of psychiatric and substance use disorders is well documented outside of China, however it has not been studied extensively among drug using individuals in China. This study evaluated patterns of co-occurring psychiatric and substance use disorders among heroin dependent individuals in Changsha, China.

Methods—Participants were 1002 individuals consecutively admitted between March 10 and October 30, 2008 into two compulsory and one voluntary drug rehabilitation centers in Changsha. The Structured Clinical Interview for DSM-IV-TR Axis I Disorders-Patient Edition (SCID-I/P) and the Structured Clinical Interview for DSM-IV-TR Axis II personality Disorders (SCID-II) were used.

Results—Mental health disorders were highly prevalent among study participants: 29.6% had at least one lifetime DSM-IV Axis I and 19.5% had at least one current (past month) Axis I mental health disorder. Antisocial (40.7%) and Borderline (22.6%) Personality Disorders were most prevalent DSM-IV Axis II lifetime diagnoses and a mood disorder (19.1%) was the most prevalent Axis I lifetime disorder; 57.8% had other substance use disorder in addition to opioid dependence. Study results indicate that females in compulsory settings have lower socio-economic status than

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Contributors

All authors materially participated in the research and/or article preparation and have approved the manuscript. Authors Mei Yang, Yanhui Liao, and Qiang Wang, implemented research activities, managed literature searches, undertook the statistical analyses, and wrote the first draft of the manuscript. Author Wei Hao obtained financial support for the conduct of the study, participated in study design, supervised implementation of research activities, and reviewed and revised the manuscript. Authors Wei Hao and Marek Chawarski contributed ideas for revising and improving the manuscript, conducted additional literature searches, and participated in writing of the final version of the manuscript.

Conflict of interest

All authors declare no conflicts of interests.

males in compulsory settings, and that males in compulsory settings have higher rates of co-morbidities, including personality, mood disorders, substance use co-morbidities, and lower socioeconomic status than males in the voluntary setting.

Conclusions—The study findings suggest an urgent need to expand and improve diagnostic and treatment capabilities in compulsory rehabilitation settings in China and a need for additional services and interventions specific for female rehabilitants.

Keywords

Heroin; Substance use disorders; Co-occurring psychiatric disorders; China

1. Introduction

Psychiatric disorders and substance use disorders are frequently co-occurring (Compton et al., 2007; Conway et al., 2006; Darke et al., 2007; Grant et al., 2004b; Hasin et al., 2007; Iskandar et al., 2012; Kessler et al., 2005; Regier et al., 1990; Ross et al., 2005; Thirthalli et al., 2012), and often linked with worse outcomes and a higher risk of relapse (Compton et al., 2003; Havard et al., 2006; Landheim et al., 2006; Najt et al., 2011; Öhlin et al., 2011). Identifying patterns of co-occurrence may lead to a better understanding of the relationships between mental health disorders and substance use disorders and may improve diagnostic accuracy and effectiveness of prevention and treatment efforts.

Studies of heroin users have documented elevated rates of antisocial personality disorder (ASPD; Darke et al., 1998, 2007; Grella et al., 2009; Mackesy-Amity et al., 2012), major depressive disorders (MDD; Darke et al., 2007; Grella et al., 2009; Mackesy-Amity et al., 2012) and anxiety disorders including post-traumatic stress disorder (PTSD; Darke et al., 2007). For example, Brooner et al. (1997) found in a sample of methadone maintained patients in Baltimore that 25% of them met the diagnosis of ASPD and 16% of MDD. In the same study, women were more likely than men to have a lifetime Axis I diagnosis (33% vs. 16%), while men were more likely to have an ASPD (34% vs. 15%). More recently, Chen et al. (2011) reported high rates of psychiatric disorders among opioid-dependent patients recruited from an inpatient treatment facility in Washington DC, with 44% having a mood disorder, 36% anxiety disorder, 33% ASPD, and 29% borderline personality disorder (BPD). A number of Australian studies have also found high rates ASPD, mood and anxiety disorders, as well as substance use co-morbidities among heroin users across several treatment modalities (Callaly et al., 2001; Darke et al., 2007; Mills et al., 2004; Teesson et al., 2005). Little is known, and patterns of comorbidity of substance use and mental health disorders among Chinese heroin users however, about the prevalence, especially those confined in the compulsory rehabilitation settings.

The present study aims to evaluate patterns of co-occurring mental health and substance use disorders among heroin using individuals entering either voluntary or compulsory rehabilitation facilities in Changsha, China. By the end of 2012, about 2,098,000 drug users were registered and more than 300,000 of them were receiving rehabilitation interventions in compulsory settings in China (National Narcotic Control Commission, 2013). Interventions provided in these centers include detoxification, basic medical care, physical training, drug

and HIV/AIDS education, relapse prevention and drug counseling in group settings, job skills training, and medical treatment of psychiatric disorders, if needed. Typically, rehabilitants are remanded for 1 to 3 years (Standing Committee of the National People's Congress, 2007; State Council of the People's Republic of China, 2011). Voluntary drug rehabilitation centers in China are managed by health departments. They typically offer 1 month inpatient stay and provide medically assisted detoxification treatment with methadone or buprenorphine tapering, with very limited psychosocial interventions (Yang et al., 2014).

2. Methods

2.1. Participants

Study participants were heroin users consecutively admitted between March 10, 2008 and October 30, 2008 into two compulsory and one voluntary drug rehabilitation centers in Changsha, China: the Hunan Xinkaipu Compulsory Drug Rehabilitation Center (XCR), the Hunan Baimalong Compulsory Drug Rehabilitation Center (BCR) and the Hunan Voluntary Drug Rehabilitation Center (HVR). XCR is a compulsory rehabilitation setting for males only, BCR is a compulsory setting for females only, where as HVR is a voluntary setting for both sexes.

During the study period, 1275 heroin dependent rehabilitants were admitted into these centers: 659 in XCR, 356 in BCR, and 260 in HVR (239 males and 21 females). In the compulsory centers (XCR and BCR), two participants left before 30 days (one was sent to prison and one received a medical parole). In the voluntary center (HVR), 166/260(64%) (154 of 239 males and 12 of 21 females) completed their medication taper and were invited to participate in the study. A total of 1024/1179 (88%) eligible participants (600 in XCR, 295 in BCR, and 120 males and 9 females in HVR) agreed to participate. The study inclusion criteria included the DSM-IV criteria for heroin dependence and after the initial screen, 9 individuals were excluded for not meeting DSM-IV criteria for heroin dependence (three used mainly buprenorphine, with occasional heroin use, and six were diagnosed with heroin abuse but not dependence). Among 1015 eligible participants, 13 failed to complete the interview (due to long interview time, getting tired or sleepy, or without giving explicit reasons) and opted to withdraw from the study. The final sample included 1002 heroin dependent participants, with 590 males from XCR, 292 females from BCR, and 111 males and 9 females from HVR. All study participants signed a written informed consent. The study procedures were reviewed and approved by the Ethics Committee of Second Xiangya Hospital of Central South University. Nonmonetary compensation or other incentives were provided to study participants.

2.2. Settings

Both the compulsory and voluntary settings are controlled environments with structural and regulatory efforts to restrict or eliminate access to drugs or alcohol. Individuals in the compulsory rehabilitation centers are housed in penitentiary-like settings, they are searched for drugs and alcohol upon admission, and they cannot leave the centers during their remanded stay. They are allowed to be visited by family members once

or twice per month. The visitors are prohibited under the penalty of the law from bringing drugs and alcohol to the center and they are searched for drugs and alcohol before their visits. During visits, direct contact is not allowed: visitors are separated from rehabilitants by a glass wall and can only communicate via a phone. In rare instances when rehabilitants are allowed to leave the center (e.g., a medical evaluation or treatment at a different facility), they are guarded at all times by the security staff. Similarly, patients in the voluntary setting are not allowed to bring or possess drugs or alcohol during their stay, they are only permitted to leave for scheduled appointments (e.g., a medical visit at another facility) and they are accompanied by a security staff during all outside visits. Although complete elimination of drug and alcohol use in these rehabilitation centers could not be guaranteed, there were no indications that rehabilitants or patients in the studied centers continued their drug or alcohol use during their stay in the compulsory or voluntary rehabilitation facilities.

2.3. Procedures

Clinical interviews were conducted by four trained psychiatrists who completed a 3-week specialized SCID training program in Beijing Huilongguan Hospital prior to the study. Their training involved extensive didactic instruction, practice interviews with mock patients, and co-rating along an expert rater. During the study, interviewers were supervised by the corresponding and first authors (Hao and Yang).

The Structured Clinical Interview for DSM-IV-Axis I Disorders-Patient Edition (SCID-I/P), Chinese version (First et al., 2002; Phillips et al., 2009) was used to generate lifetime and current (past month) DSM-IV Axis I diagnoses, and the Structured Clinical Interview for DSM-IV Axis-II Disorders (SCID-II), Chinese version (Dai et al., 2006; First et al., 1997) was used to generate DSM-IV Axis II diagnoses. The Chinese version of SCID-I had shown excellent test–retest reliability with the Kappa values ranging from 0.937 to 0.981 (Phillips et al., 2009). The Chinese version of SCID-II had also shown good to excellent reliability for ASPD (Tang et al., 2013) and BPD (Dai et al., 2006).

Interviews with participants in compulsory centers were administered after at least 30 days after admission, whereas interviews with participants in the voluntary center were administered after participants completed agonist medication tapering, on average 13 days after admission (range 10–21 days). All participants exhibited no significant or visible drug withdrawal symptoms during interviews. The duration of the interview ranged from 2 to 3 h.

2.4. Statistical analyses

Descriptive statistics were used to characterize the study sample. Lifetime and current rates of DSM-IV diagnoses (Axis I and Axis II) were calculated and presented in cross-tabulations. Differences among participant groups based on settings and sex were evaluated using Chi-square and analysis of variance tests. Because of a very small number of females recruited in the voluntary rehabilitation center, statistical comparisons are presented for male participants in compulsory and voluntary centers (compulsory males and voluntary males) and for male and female participants in the compulsory centers (compulsory males and compulsory females). To adjust for multiple comparisons the significance level was set to $p < 0.01$ (two-tailed) for all comparisons in the study.

3. Results

3.1. Participant characteristics

Descriptive information on participant demographics and drug use history are provided in Table 1. The results show that compulsory females had lower socio-economic status as compared to compulsory males: significantly less income and more likely to be engaged in illegal work. Whereas compulsory males had lower socio-economic status (less educated, more likely to be unemployed, less income, and higher proportion of never married, divorced or widowed) than voluntary males. Compulsory males also showed longer years of chronic heroin use and higher rates of injection drug use as compared to voluntary males.

3.2. Mental health disorders among participants

Mental health disorders were highly prevalent among study participants: 29.6% of the study participants had at least one lifetime DSM-IV Axis I mental health disorder and 19.5% had at least one current Axis I mental health disorder (see Table 2). ASPD (40.7%) and BPD (22.6%) were most prevalent DSM-IV Axis II diagnoses and mood disorders (19.1%) was the most prevalent Axis I lifetime diagnosis and 57.8% also had other substance use disorders (denoted as any non-opioid substance use disorder in Table 2), with 27.5% having a lifetime alcohol use disorder and 45.7% a lifetime diagnosis of drug use disorder.

Compared to voluntary males, compulsory males showed higher rates in many diagnoses (see Table 2), including ASPD, avoidant personality disorder, lifetime and current mood disorders with specifically MDD, and other substance use disorders including lifetime and current sedative-hypnotics use disorder and current alcohol use disorder, with an exception of paranoid personality disorder which had a higher rate among voluntary males. As compared to compulsory females, compulsory males also showed higher rates of any Axis II personality disorder with especially ASPD and avoidant personality disorder (Table 2), while showed no significant difference in rates of any Axis I diagnosis with exception of PTSD that had a higher lifetime rate in compulsory females (15.1 vs. 4.7), and alcohol and sedative-hypnotics use disorders with higher rates in compulsory males (higher in current rate for alcohol and lifetime for sedative-hypnotics respectively).

4. Discussion

While the strong comorbidity of psychiatric and substance use disorders is well documented outside of China (Brooner et al., 1997; Compton et al., 2003, 2007; Darke et al., 2007; Grella et al., 2009; Mackesy-Amiti et al., 2012; Öhlin et al., 2011), the present study provides a unique data on comorbidity profiles among Chinese drug using individuals in voluntary and compulsory rehabilitation settings. To our knowledge, to date there have been two prior studies on this topic in China, both with smaller samples, using an older diagnostic system (DSM-III), and published in Chinese domestic journals (Lu et al., 2005; Zhao et al., 2001). Of those two studies, Zhao et al.'s (2001) was conducted among heroin dependent patients in compulsory setting and found comparable results to the current study, with the rates of lifetime mood disorder of 15.7% and ASPD of 47.7%. In the current study, nearly 30% of participants had a lifetime Axis I disorder other than a substance use disorder and

nearly 60% met criteria for a personality disorder. Mood disorders, particularly MDD and ASPD and BPD, were the most common lifetime Axis I and Axis II diagnoses. Current Axis I psychiatric disorders were also prevalent (19.5% of the overall study participants), and mood disorders (12.8%) were the most common current disorder. The rate of current MDD found in the study sample (8.2%) is four times higher than in Chinese general population (Phillips et al., 2009). The rates of the study participants who had ASPD (40%) and BPD (20%) respectively, represent dozens of times the rates in the general population in China (Grant et al., 2008, 2004a; Huang et al., 2009; Lenzenweger et al., 2007).

Similar to the current study, high prevalence of ASPD, BPD, mood disorders as well as other substance use co-morbidities has been found in other studies and settings (Brooner et al., 1997; Compton et al., 2003, 2007; Darke et al., 2007; Grella et al., 2009; Mackesy-Amity et al., 2012; Öhlin et al., 2011). While the current study showed comparable rates of ASPD and BPD to those among western in-treatment heroin individuals, the rate of mood disorders, specifically MDD, were found to be relatively lower than in western study populations (Brooner et al., 1997; Chen et al., 2011; Ross et al., 2005). Similar cross-national differences in prevalence of mood disorders have been found in general populations with MDD more prevalent in western populations (Demyttenaere et al., 2004; Grant et al., 2004b; Kessler et al., 1994; Phillips et al., 2009), suggesting a broad pattern of cross-national variation. Such variations may be attributable to psychosocial and cultural disparities (e.g., Chinese populations may be less emotionally expressive than western populations) or other factors that have not been yet extensively studied.

The present study also identified differences in comorbidity rates and patterns, as well as other characteristics between participants in different rehabilitation settings and with regard of their sex. The study results indicate that compulsory females may have lower socio-economic status than compulsory males and that compulsory males have higher levels of co-morbidities, with particularly high rates of ASPD, mood disorders and substance use co-morbidities, as well as lower socio-economic status as compared to voluntary males. Another point should also be noted here is that this study indicates that compulsory females had the highest rate of PTSD in their life. Although recent changes in Chinese drug policy have recognized drug use disorders as a chronic medical condition that requires treatment, evidence-based treatment or efficacious rehabilitation services and interventions in current compulsory rehabilitation centers are very limited (Yang et al., 2014). The higher rates of comorbidity and the lower socio-economic status among individuals in these centers than those seeking treatment voluntarily found in this present study suggests an urgent need to expand and improve diagnostic and treatment capabilities in compulsory drug rehabilitation settings in China. The finding of females in compulsory rehabilitation setting having lower social-economic status and a high rate of lifetime PTSD diagnosis indicates a need for additional services and interventions specific for female rehabilitants.

The current study did not find different rates of MDD between compulsory males and females. This finding is in contrast to many earlier studies, including community-based (Grella et al., 2009; Rubio et al., 2011) and clinical-based (Brooner et al., 1997; Chen et al., 2011; Ross et al., 2005; Shand et al., 2011) samples and in and out of China (Kessler et al., 1994, 2003; Phillips et al., 2009) that have found higher rates of MDD in females than in

males. The lack of gender differences in MDD rates among patients in compulsory settings in the present study may be due to the rehabilitants in compulsory settings presenting with more severe psychopathology including elevated MDD rates, therefore somewhat diluting potential gender differences. Similarly to recent studies from the United States, the National Comorbidity Survey Replication (Lenzenweger et al., 2007) and the Wave2NationalEpidemiologic Survey on Alcohol and Related Conditions (Grant et al., 2008), the current study did not find gender differences in BPD rates. While other studies reported gender differences in BPD rates (Chen et al., 2011; Ross et al., 2005; Shand et al., 2011), it has been argued by researchers that the observed higher rates of BPD in females of clinical samples appears to be largely a function of sampling or diagnostic bias (Goldstein et al., 2012; Skodal and Bender, 2003).

The present study also found a high prevalence of co-morbid disorders among heroin dependent individuals who seek treatment voluntarily. In current practice, heroin/opiate patients in the voluntary rehabilitation settings receive detoxification only with minimal or no psychosocial or psychiatric interventions. Thus, the results of the current study also indicate a need for more comprehensive treatment approach in the voluntary rehabilitation centers in China. One obstacle of providing comprehensive treatment might be the high service price, which is often beyond the paying capacity of heroin patients who are normally marginalized in the society without third party payers (Michels et al., 2007). Thus, the government was suggested to control costs of voluntary rehabilitation and expand medical insurance to drug use disorders and the co-morbidities.

The current study also found substantial rates of alcohol and sedative-hypnotics use disorders among heroin dependent individuals. These diagnoses are of particular relevance to heroin users and the concurrent use of these drugs has been strongly associated with heroin overdoses (Darke and Hall, 2003). The absence of a substantial difference between males and females in compulsory settings in lifetime rates of alcohol use disorder should be also noted, as alcohol use is much more prevalent among males within general population in China.

The causal relationships between co-occurring disorders have been bogged long in the debate, with almost all directions conceivable recommended: drug use prompts mental illness; mental illnesses lead to drug abuse; bidirectional relationships; and both disorders are caused by shared underlying etiology such as genetic vulnerabilities or environmental adversities, and none of them seems won (Brady and Sinha, 2005; Cerdá et al., 2010; Mueser et al., 1998; National Institute on Drug Abuse, 2010). Nevertheless whatever relationships and underlying mechanisms, comprehensive treatment of dual diagnoses to these patients is in need to get comprehensive rehabilitation.

One of the study limitations is that it enrolled participants from institutionalized drug rehabilitation settings. Participants in such settings may have different (generally higher) prevalence of co-occurring disorders than individuals in different rehabilitation settings or not in treatment, limiting the generalizability of the study findings for all heroin dependent individuals in China. Additionally, approximately 36% of participants enrolled in the voluntary treatment center dropped out before completing their medication taper and

therefore were not eligible to participate in the study. Although data on those who left the center before completing the medication taper was not collected, it is possible that those who left the center early had higher levels of drug use and psychiatric co-morbidities.

An important strength of the study is that it enrolled large consecutive samples that are likely to be representative within these selected centers. All interviews were conducted after patients had completed at least 30 days after admission (for compulsory center participants) or after opioid detoxifications (for voluntary center participants), thus decreasing the likelihood that any of the diagnosed psychiatric disorders were substance-related.

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Table 1

Participants characteristics.

Variable	Compulsory males (n=590)	Compulsory females (n=292)	Voluntary males (n=111)	Voluntary females (n=9)	Total N=1002	Compulsory males vs. compulsory females		Compulsory males vs. voluntary males	
						χ^2/df	p	χ^2/df	p
Ethnicity, n (%)						9.04	0.003	0.77	0.379
Han nationality	577 (97.8)	274 (93.8)	107 (96.4)	91 (100.0)	967 (96.5)				
Minority	13 (2.2)	18 (6.2)	4 (3.6)	0 (0.0)	35 (3.5)				
Age, M$\pm$SD years	33.6 $\pm$ 6.7	32.2 $\pm$ 7.1	31.9 $\pm$ 6.1	32.1 $\pm$ 8.6	33.0 $\pm$ 6.8	2.78	0.006	2.49	0.013
Marital status, n (%)						8.09	0.018	41.96	0.000
Married or cohabiting	165 (28.0)	67 (22.9)	66 (59.5)	4 (44.4)	302 (30.1)				
Never married	306 (51.9)	142 (48.6)	33 (29.7)	5 (55.6)	486 (48.5)				
Divorced or widowed	119 (20.2)	83 (28.4)	12 (10.8)	0 (0.0)	214 (21.4)				
Educational years, M$\pm$SD	8.9 $\pm$ 2.5	8.5 $\pm$ 2.8	9.8 $\pm$ 2.6	11.0 $\pm$ 1.5	8.9 $\pm$ 2.6	2.17	0.030	3.49	0.001
Employment, n (%)						56.36	0.000	14.68	0.001
Employed in legal work	271 (45.9)	107 (36.6)	72 (64.9)	5 (55.6)	455 (45.4)				
Unemployed	297 (50.3)	130 (44.5)	34 (30.6)	3 (33.3)	464 (46.3)				
Engaged in illegal work ^a	22 (3.7)	55 (18.8)	5 (4.5)	1 (11.1)	83 (8.3)				
Personal income, ^b Chinese yuan/year						49.86	0.000	13.89	0.003
<10,000	239 (40.5)	183 (64.9)	29 (27.1)	3 (37.5)	454 (46.0)				
10,000–29,999	102 (17.3)	30 (10.6)	28 (26.2)	2 (25.0)	162 (16.4)				
30,000–99,999	175 (29.7)	38 (13.5)	27 (25.2)	2 (25.0)	242 (24.5)				
100,000	74 (12.5)	31 (11.0)	23 (21.5)	1 (12.5)	129 (13.1)				
Age of first heroin use, M$\pm$SD years	23.5 $\pm$ 8.7	22.1 $\pm$ 5.6	23.6 $\pm$ 6.2	25.4 $\pm$ 7.5	23.1 $\pm$ 7.7	2.65	0.008	0.01	0.996
Years of chronic heroin use, ^c M$\pm$SD	10.3 $\pm$ 4.5	10.4 $\pm$ 5.0	8.4 $\pm$ 4.8	6.3 $\pm$ 4.5	10.1 $\pm$ 4.8	0.26	0.797	4.07	0.000
Injection drug use, ^d n (%)						4.22	0.040	63.70	0.000
Yes	524 (88.8)	245 (83.9)	65 (58.6)	6 (66.7)	840 (83.8)				
No	66 (11.2)	47 (16.1)	46 (41.4)	3 (33.3)	162 (16.2)				
Daily amount of heroin use before admission, ^e M$\pm$SD g/d	0.7 $\pm$ 0.5	0.6 $\pm$ 0.5	0.9 $\pm$ 0.8	0.6 $\pm$ 0.7	0.6 $\pm$ 0.6	2.37	0.018	2.68	0.008

^a Illegal work included stealing, robbing, drug trafficking, gambling, sex trafficking, running a gambling house.

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p Personal income refers to the income of participant personal over the year before admission.
 c Years of chronic heroin use refers to the total number of years from first heroin use to the current admission, subtracting out years of continued abstinence within this time period.
 d Injection drug use refers to the most common route of heroin use is injection during the two weeks prior to admission.
 e Daily amount of heroin use before admission refers to the mean amount of heroin used per day within two weeks before admission to the drug rehabilitation center.

Table 2

Rates of DSM-IV Axis I and Axis II diagnoses by participant settings and sex.

Diagnoses, <i>n</i> (%) ^a	Compulsory males (<i>n</i> =590)		Compulsory females (<i>n</i> =292)		Voluntary males (<i>n</i> =111)		Voluntary females (<i>n</i> =9)		Total (<i>N</i> =1002)		Compulsory males vs. compulsory females		Compulsory males vs. voluntary males	
	χ^2	<i>p</i>	χ^2	<i>p</i>	χ^2	<i>p</i>	χ^2	<i>p</i>	χ^2	<i>p</i>	χ^2	<i>p</i>	χ^2	<i>p</i>
Axis I														
Lifetime														
<i>Any Axis I non-substance use disorder</i>	172 (29.2)		101 (34.6)		20 (18.0)		4 (44.4)		297 (29.6)		2.70	0.100	5.82	0.016
Mood disorders	123 (20.8)		58 (19.9)		9 (8.1)		1 (11.1)		191 (19.1)		0.12	0.733	9.92	0.002
Major depressive disorder (MMD)	86 (14.6)		44 (15.1)		6 (5.4)		0		136 (13.6)		0.04	0.846	6.89	0.009
Dysthymic disorder	32 (5.4)		12 (4.1)		0		0		44 (4.4)		0.71	0.399	6.31	0.012
Bipolar disorders	7 (1.2)		3 (1.0)		0		0		10 (1.0)		-	-	-	-
Depressive disorder not otherwise specified (NOS)	11 (1.9)		6 (2.1)		3 (2.7)		1 (11.1)		21 (2.1)		0.04	0.847	0.34	0.562
Anxiety disorders	65 (11.0)		52 (17.8)		9 (8.1)		2 (22.2)		128 (12.8)		7.83	0.005	0.84	0.360
Post-traumatic stress disorder (PTSD)	28 (4.7)		44 (15.1)		8 (7.2)		1 (11.1)		81 (8.1)		27.76	0.000	1.16	0.281
Generalized anxiety disorder	12 (2.0)		4 (1.4)		0		0		16 (1.6)		0.48	0.487	2.30	0.130
Obsessive-compulsive disorder	11 (1.9)		1 (0.3)		1 (0.9)		1 (11.1)		14 (1.4)		-	-	-	-
Social phobia	8 (1.4)		1 (0.3)		0		0		9 (0.9)		-	-	-	-
Panic disorder	8 (1.4)		0		0		0		8 (0.8)		-	-	-	-
Specific phobia	4 (0.7)		2 (0.7)		0		0		6 (0.6)		-	-	-	-
Agoraphobia without history of panic disorder	1 (0.2)		0		0		0		1 (0.1)		-	-	-	-
Anxiety disorder NOS	3 (0.5)		1 (0.3)		0		0		4 (0.4)		-	-	-	-
Somatoform disorders	11 (1.9)		13 (4.5)		2 (1.8)		0		26 (2.6)		4.94	0.026	0.00	0.964
Pain disorder	10 (1.7)		9 (3.1)		1 (0.9)		0		20 (2.0)		1.78	0.182	0.38	0.537
Somatization disorder	1 (0.2)		4 (1.4)		0		0		5 (0.5)		-	-	-	-
Undifferentiated somatoform disorder	0		0		1 (0.9)		0		1 (0.1)		-	-	-	-
Psychotic disorders	1 (0.2)		2 (0.7)		0		1 (11.1)		4 (0.4)		-	-	-	-
Schizophrenia	1 (0.2)		2 (0.7)		0		0		3 (0.3)		-	-	-	-
Schizoaffective psychosis	0		0		0		1 (11.1)		1 (0.1)		-	-	-	-
Eating disorders	3 (0.5)		0		0		0		3 (0.3)		-	-	-	-
Anorexia nervosa	2 (0.3)		0		0		0		2 (0.2)		-	-	-	-

Diagnoses, <i>n</i> (%) ^a	Compulsory males (<i>n</i> =590)	Compulsory females (<i>n</i> =292)	Voluntary males (<i>n</i> =111)	Voluntary females (<i>n</i> =9)	Total (<i>N</i> =1002)	Compulsory males vs. compulsory females		Compulsory males vs. voluntary males	
						χ^2	<i>p</i>	χ^2	<i>p</i>
Bulimia nervosa	1 (0.2)	0	0	0	1 (0.1)	-	-	-	-
Adjustment disorder	9 (1.5)	2 (0.7)	0	0	11 (1.1)	-	-	-	-
<i>Any non-opioid substance use disorder</i>	368 (62.4)	161 (55.1)	48 (43.2)	2 (22.2)	579 (57.8)	4.26	0.039	14.17	0.000
Alcohol	175 (29.7)	73 (25.0)	27 (24.3)	1 (11.1)	276 (27.5)	2.10	0.147	1.30	0.255
Abuse	133 (22.6)	57 (19.5)	25 (22.5)	1 (11.1)	216 (21.6)	-	-	-	-
Dependence	42 (7.2)	16 (5.4)	2 (1.8)	0	60 (6.0)	-	-	-	-
Illicit Drug	288 (48.8)	137 (46.9)	32 (28.8)	1 (11.1)	458 (45.7)	0.28	0.596	15.04	0.000
Sedative-hypnotics	213 (36.1)	78 (26.7)	13 (11.7)	1 (11.1)	305 (30.4)	7.79	0.005	25.44	0.000
Abuse	83 (14.1)	29 (10)	9 (8.1)	1 (11.1)	122 (12.2)	-	-	-	-
Dependence	130 (22.1)	49 (16.8)	4 (3.6)	0	183 (18.3)	-	-	-	-
Stimulants	78 (13.2)	56 (19.2)	14 (12.6)	0	148 (14.8)	5.38	0.020	0.03	0.862
Abuse	59 (10.0)	36 (12.3)	12 (10.8)	0	107 (10.7)	-	-	-	-
Dependence	19 (3.2)	20 (6.8)	2 (1.8)	0	41 (4.1)	-	-	-	-
Hallucinogens	72 (12.2)	39 (13.4)	16 (14.4)	0	127 (12.7)	0.24	0.627	0.42	0.519
Abuse	60 (10.2)	30 (10.3)	16 (14.4)	0	106 (10.6)	-	-	-	-
Dependence	12 (2.0)	9 (3.1)	0	0	21 (2.1)	-	-	-	-
Cannabis	5 (0.8)	3 (1.0)	1 (0.9)	0	9 (0.9)	-	-	-	-
Abuse	4 (0.6)	3 (1.0)	1 (0.9)	0	8 (0.8)	-	-	-	-
Dependence	1 (0.2)	0	0	0	1 (0.1)	-	-	-	-
Cocaine	0	0	0	0	0	-	-	-	-
Other	52 (8.8)	22 (7.5)	8 (7.2)	0	82 (8.2)	0.42	0.519	0.31	0.579
Abuse	22 (3.7)	8 (2.7)	7 (6.3)	0	37 (3.7)	-	-	-	-
Dependence	30 (5.1)	14 (4.8)	1 (0.9)	0	45 (4.5)	-	-	-	-
Poly drug dependence	44 (7.5)	21 (7.2)	6 (5.4)	0	71 (7.1)	0.20	0.887	0.59	0.441
Current (1-month)									
<i>Any non-substance use axis I disorder</i>	128 (21.7)	57 (19.5)	7 (6.3)	3 (33.3)	195 (19.5)	0.56	0.455	14.23	0.000
Mood disorders	86 (14.6)	40 (13.7)	2 (1.8)	0	128 (12.8)	0.12	0.726	13.89	0.000
MMD	54 (9.2)	27 (9.2)	1 (0.9)	0	82 (8.2)	0.00	0.964	8.80	0.003

Diagnoses, <i>n</i> (%) ^a	Compulsory males (<i>n</i> =590)	Compulsory females (<i>n</i> =292)	Voluntary males (<i>n</i> =111)	Voluntary females (<i>n</i> =9)	Total (<i>N</i> =1002)	Compulsory males vs. compulsory females		Compulsory males vs. voluntary males	
						χ^2	<i>p</i>	χ^2	<i>p</i>
Dysthymic disorder	32 (5.4)	12 (4.1)	0	0	44 (4.4)	0.71	0.399	6.31	0.012
Depression disorder NOS	7 (1.2)	2 (0.7)	1 (0.9)	0	10 (1.0)	-	-	-	-
Bipolar disorders	4 (0.7)	3 (1.0)	0	0	7 (0.7)	-	-	-	-
Anxiety disorders	46 (7.8)	12 (4.1)	3 (2.7)	2 (22.2)	63 (6.3)	4.32	0.038	3.73	0.053
PTSD	8 (1.4)	4 (1.4)	2 (1.8)	1 (11.1)	15 (1.5)	0.00	0.987	0.13	0.716
General anxiety disorder	12 (2.0)	4 (1.4)	0	0	16 (1.6)	0.48	0.487	2.30	0.130
Obsessive-compulsive disorder	10 (1.7)	0	1 (0.9)	1 (11.1)	12 (1.2)	-	-	-	-
Social phobia	7 (1.2)	1 (0.3)	0	0	8 (0.8)	-	-	-	-
Panic disorder	8 (1.4)	0	0	0	8 (0.8)	-	-	-	-
Specific phobia	4 (0.7)	2 (0.7)	0	0	6 (0.6)	-	-	-	-
Agoraphobia without history of panic disorder	1 (0.2)	0	0	0	1 (0.1)	-	-	-	-
Anxiety disorder NOS	3 (0.5)	1 (0.3)	0	0	4 (0.4)	-	-	-	-
Somatoform disorders	11 (1.9)	13 (4.5)	2 (1.8)	0	26 (2.6)	4.94	0.026	0.00	0.964
Pain disorder	10 (1.7)	9 (3.1)	1 (0.9)	0	20 (2.0)	1.78	0.182	0.38	0.537
Somatization disorder	1 (0.2)	4 (1.4)	0	0	5 (0.5)	-	-	-	-
Undifferentiated somatoform disorder	0	0	1 (0.9)	0	1 (0.1)	-	-	-	-
Psychotic disorders	1 (0.2)	1 (0.3)	0	1 (11.1)	3 (0.3)	-	-	-	-
Schizophrenia	1 (0.2)	1 (0.3)	0	0	2 (0.2)	-	-	-	-
Schizoaffective psychosis	0	0	0	1 (11.1)	1 (0.1)	-	-	-	-
Eating disorders	3 (0.5)	0	0	0	3 (0.3)	-	-	-	-
Anorexia nervosa	2 (0.3)	0	0	0	2 (0.2)	-	-	-	-
Bulimia nervosa	1 (0.2)	0	0	0	1 (0.1)	-	-	-	-
Adjustment disorder	9 (1.5)	2 (0.7)	0	0	11 (1.1)	-	-	-	-
Any non-opioid substance use disorder	245 (41.5)	113 (38.7)	11 (9.9)	1 (11.1)	370 (36.9)	0.65	0.421	40.28	0.000
Alcohol	120 (20.3)	34 (11.6)	2 (1.8)	0	156 (15.6)	10.25	0.001	22.33	0.000
Abuse	102 (17.3)	26 (8.9)	2 (1.8)	0	130 (13.0)	-	-	-	-
Dependence	18 (3.1)	8 (2.7)	0	0	26 (2.6)	-	-	-	-
Illicit drug	172 (29.2)	92 (31.5)	11 (9.9)	1 (11.1)	276 (27.5)	0.52	0.472	17.93	0.000

Diagnoses, <i>n</i> (%) ^a	Compulsory males (<i>n</i> =590)	Compulsory females (<i>n</i> =292)	Voluntary males (<i>n</i> =111)	Voluntary females (<i>n</i> =9)	Total (<i>N</i> =1002)	Compulsory males vs. compulsory females		Compulsory males vs. voluntary males	
						χ^2	<i>p</i>	χ^2	<i>p</i>
Sedative-hypnotics	139(23.6)	60 (20.5)	5 (4.5)	1 (11.1)	205(20.5)	1.01	0.314	20.78	0.000
Abuse	43 (7.3)	23 (7.9)	3 (2.7)	1 (11.1)	70 (7.0)	-	-	-	-
Dependence	96 (16.3)	37 (12.7)	2 (1.8)	0	135(13.5)	-	-	-	-
Stimulants	30 (5.1)	27 (9.2)	4 (3.6)	0	61 (6.1)	5.60	0.018	0.44	0.505
Abuse	26 (4.4)	18 (6.2)	4 (3.6)	0	48 (4.8)	-	-	-	-
Dependence	4 (0.7)	9 (3.1)	0	0	13 (1.3)	-	-	-	-
Hallucinogens	28 (4.7)	16 (5.5)	3 (2.7)	0	47 (4.7)	0.22	0.638	0.92	0.337
Abuse	25 (4.2)	14 (4.8)	3 (2.7)	0	42 (4.2)	-	-	-	-
Dependence	3 (0.5)	2 (0.7)	0	0	5 (0.5)	-	-	-	-
Marijuana	2 (0.3)	1 (0.3)	0	0	3 (0.3)	-	-	-	-
Abuse	2 (0.3)	1 (0.3)	0	0	3 (0.3)	-	-	-	-
Dependence	0	0	0	0	0	-	-	-	-
Cocaine	0	0	0	0	0	-	-	-	-
Other	18 (3.1)	14 (4.8)	3 (2.7)	0	35 (3.5)	1.70	0.192	0.04	0.844
Abuse	7 (1.2)	7 (2.4)	3 (2.7)	0	17 (1.7)	-	-	-	-
Dependence	11 (1.9)	7 (2.4)	0	0	18 (1.8)	-	-	-	-
Poly drug dependence	26 (4.4)	12 (4.1)	1 (0.9)	0	39 (3.9)	0.04	0.838	3.01	0.078
Axis II									
Any Axis II Personality disorder	405(68.6)	116(39.7)	69(62.2)	4(44.4)	594(59.3)	67.56	0.000	1.79	0.181
Antisocial (ASPD)	320(54.2)	45(15.4)	43(38.7)	0	408(40.7)	121.39	0.000	8.99	0.003
Borderline (BPD)	134(22.7)	61 (20.9)	29(26.1)	2(22.2)	226(22.6)	0.376	0.540	0.61	0.435
Avoidant	82(13.9)	22(7.5)	5(4.5)	0	109(10.9)	7.61	0.006	7.58	0.006
Passive-aggressive	70(11.9)	20(6.8)	14(12.6)	2(22.2)	106(10.6)	5.36	0.021	0.05	0.824
Paranoid	50(8.5)	16(5.5)	19(17.1)	1(11.1)	86(8.6)	2.53	0.112	7.86	0.005
Depressive	47(8.0)	16(5.5)	4(3.6)	1(11.1)	68(6.8)	1.82	0.117	2.64	0.104
Obsessive-compulsive	25(4.2)	9(3.1)	8(7.2)	0	42(4.2)	0.70	0.402	1.84	0.175
Narcissistic	26(4.4)	7(2.4)	7(6.3)	0	40(4.0)	2.19	0.139	0.75	0.386
Dependent	8(1.4)	5(1.7)	2(1.8)	1(11.1)	16(1.6)	-	-	-	-

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Diagnoses, <i>n</i> (%) ^a	Compulsory males (<i>n</i> =590)	Compulsory females (<i>n</i> =292)	Voluntary males (<i>n</i> =111)	Voluntary females (<i>n</i> =9)	Total (<i>N</i> =1002)	Compulsory males vs. compulsory females		Compulsory males vs. voluntary males	
						χ^2	<i>p</i>	χ^2	<i>p</i>
Schizoid	14(2.4)	3(1.0)	2(1.8)	0	19(1.9)	-	-	-	-
Histrionic	4(0.7)	1(0.3)	1(0.9)	0	6(0.6)	-	-	-	-
Schizotypal	3(0.5)	1	0	0	4(0.4)	-	-	-	-
Unspecified	1(0.2)	1(0.3)	0	0	2(0.2)	-	-	-	-

- statistical analysis not conducted; *p* < 0.01 was denoted in boldface

^a Rates calculations were column-based.