



## Research report

## The impact of mood symptomatology on pattern of substance use among homeless



Angelo Giovanni Icro Maremmani<sup>a,b,\*</sup>, Silvia Bacciardi<sup>a</sup>, Nicole D. Gehring<sup>c,e,f</sup>,  
Luca Cambioli<sup>d</sup>, Christian Schütz<sup>f,g</sup>, Hagop S. Akiskal<sup>h</sup>, Kerry Jang<sup>g</sup>, Michael Krausz<sup>c,e,f,g</sup>

<sup>a</sup> “Vincent P. Dole” Dual Diagnosis Unit, Department of Clinical and Experimental Medicine, University of Pisa, Italy

<sup>b</sup> Association for the Application of Neuroscientific Knowledge to Social Aims (AU-CNS), Pietrasanta, Lucca, Italy

<sup>c</sup> Centre for Health Evaluation and Outcome Sciences, St. Paul's Hospital, Vancouver, BC, Canada

<sup>d</sup> University of Bicocca, Milan, Italy

<sup>e</sup> School of Population and Public Health, University of British Columbia, Canada

<sup>f</sup> Institute of Mental Health, Department of Psychiatry, University of British Columbia, Vancouver, BC, Canada

<sup>g</sup> Department of Psychiatry, University of British Columbia, Vancouver, BC, Canada

<sup>h</sup> International Mood Centre, University of California and Veterans Administration Hospital, San Diego, California, USA

## ARTICLE INFO

## Article history:

Received 17 October 2014

Received in revised form

28 January 2015

Accepted 29 January 2015

Available online 7 February 2015

## Keywords:

Homeless

Substance use

Bipolar depression

Unipolar depression

Mood disorder

Self-medication

## ABSTRACT

**Background:** Homeless individuals are an extremely vulnerable and underserved population characterized by overlapping problems of mental illness and substance use. Given the fact that mood disorders are frequently associated with substance use disorders, we wanted to further highlight the role of excitement in substance abuse. Patterns of substance abuse among homeless suffering from unipolar and bipolar depression were compared. The “self-medication hypothesis” which would predict no-differences in substance preference by unipolar (UP) and bipolar (BP) depressed homeless was tested.

**Methods:** Homeless individuals from the Vancouver At Home/Chez Soi study were selected for lifetime UP and lifetime BP depression and patterns of substances abused in the previous 12 months were identified with the Mini-International Neuropsychiatric Interview. Differences in substance use between BP-depressed homeless and UP-depressed homeless were tested using Chi-square and logistic regression techniques.

**Results:** No significant differences were observed between UP and BP homeless demographics. The bipolar depressed homeless (BDH) group displayed a higher percentage of Central Nervous System (CNS) Stimulants ( $\chi^2$  8.66,  $p=0.004$ ) and Opiates ( $\chi^2$  6.41,  $p=0.013$ ) as compared to the unipolar depressed homeless (UDH) group. CSN Stimulant was the only predictor within the BDH Group ( $\chi^2$  8.74 df 1  $p < 0.003$ ).

**Limitations:** Data collected are self-reported and no urinalyses were performed.

**Conclusions:** The results support the hypothesis that beyond the self-medication hypothesis, bipolarity is strictly correlated to substance use; this correlation is also verified in a homeless population.

© 2015 Elsevier B.V. All rights reserved.

## 1. Introduction

Homeless individuals are an extremely vulnerable and an underserved population (Krausz et al., 2013) and pose a challenge to individuals, communities, and public systems of care (Fichter and Quadflieg, 2001). Homeless populations are characterized by a high prevalence of substance use disorders (SUD) and serious mental illness (Fazel et al., 2008; Krausz et al., 2013; Palepu et al., 2013; Patterson et al., 2013). Between 29% and 75% of homeless use alcohol and/or

illicit drugs (Edens et al., 2011; Schutz et al., 2013; Velasquez et al., 2000; Vila-Rodriguez et al., 2013), while alcohol in particular has been found to be used by 35–51% of homeless samples tested (Haugland et al., 1997; Kushel et al., 2001; O'Toole T et al., 2004).

With drug use increasing it can be challenged that illicit drugs may eclipse or outcompete alcohol as the substance of choice in this population (North et al., 2004; O'Toole T et al., 2004). Substances such as cocaine have become extremely popular and found to be used by 29–49% of homeless (Appel et al., 2001; Haugland et al., 1997; Lambert and Caces, 1995; Lee et al., 2005) with a SUD prevalence rate of about 49–53% (Haugland et al., 1997; O'Toole T et al., 2004). Crack cocaine in particular has experienced a remarkable rise in use among homeless populations over the last two decades (Fischer and Breakey, 1991; North et al., 2004), attributed at least in part to greater availability and affordability of the drug (North et al., 2010).

\* Corresponding author at: Vincent P. Dole Dual Diagnosis Unit, Department of Clinical and Experimental Medicine, Santa Chiara University Hospital, University of Pisa, Via Roma, 67 56100 Pisa, Italy, EU. Tel.: +1 39 328 8427217; fax: +1 39058472081.

E-mail address: [angelogimaremmani@gmail.com](mailto:angelogimaremmani@gmail.com) (A.G.I. Maremmani).

A number of studies have found between one quarter and one third of homeless persons have a serious mental illness such as schizophrenia, bipolar disorder, or major depressive disorder (Fischer and Breakey, 1991; Folsom and Jeste, 2002; Sullivan et al., 2000). Of particular interest is the huge variation in prevalence for major psychiatric diagnoses observed across studies. For example, psychosis ranges from 2% to 31%, depression from 4% to 41%, and personality disorder from 3% to 71% (Fazel et al., 2008). Mental disorder estimates from homeless studies in Western countries have found the prevalence rate of having at least one current mental disorder to be approximately 50–70% (Fazel et al., 2008; Fischer and Breakey, 1991; Koegele et al., 1988; North et al., 2004; Vazquez et al., 1997), while in North America, in particular, can be as high as 95%. This large variation is likely driven by a high prevalence of co-morbid substance dependence (82.6%) (Krausz et al., 2013).

### 1.1. Bipolar disorder in homeless populations

Bipolar depression is of particular interest in homeless populations because individuals with bipolar disorder have higher rates of homelessness, compared to those with unipolar depression (Folsom et al., 2005). Similarly, patients who had a history of homelessness have increased odds of being assessed for bipolar symptoms (Kilbourne et al., 2010). In recent studies, bipolar disorder, particularly lifetime hypomanic symptoms were found to be present in 40–44% of a Canadian homeless population (Krausz et al., 2013; Schutz et al., 2013). Moreover, homeless individuals described as problem gamblers were 3.6 times more likely than non-problem homeless gamblers to meet diagnostic criteria for bipolar disorder (Nower et al., 2014). However, the extant literature provides circumstantial evidence at best on substance use and bipolar disorder in actual homeless populations.

In contrast, within non-homeless populations a great deal more is understood between the relationship of bipolar disorder and substance misuse. Foremost, they are commonly co-morbid (Merikangas et al., 2008) with the bipolar spectrum being associated with cocaine (Cocores et al., 1987; Maremmi et al., 2008; Nunes et al., 1989; Perugi et al., 2012; Post and Kalivas, 2013; Weiss and Mirin, 1986), cannabis (Arias et al., 2013; Ashton et al., 2005; Do and Mezuk, 2013; Maremmi et al., 2000b, 2004, 2006a), benzodiazepines (Brunette et al., 2003; Lin et al., 2011; Perugi et al., 2002), alcohol (Bernardt and Murray, 1986; Brousse et al., 2008; Chengappa et al., 2000; Dunner et al., 1979; Farren et al., 2013; Fletcher et al., 2013; Freed, 1969; Nery et al., 2010; Weiss and Mirin, 1989) and heroin (Maremmi, 2013; Maremmi et al., 2014a). Indeed, because bipolar spectrum disorders and addiction are so often comorbid, each operates as reciprocal risk factors and should be viewed from a unified perspective (Camacho and Akiskal, 2005; Maremmi et al., 2006b). Maremmi et al. (2002) and later Pani et al. (2010) suggested that the bipolar spectrum is the psychic substrate for the development of a substance-resorting attitude. For example, cyclothymic and irritable traits rather than mood elation and mania can lead to increase exposure of pro-manic stimulation in a self-regenerating circuit (Maremmi et al., 2009, 2006b). From this broader perspective, mood, anxiety and impulse-control dysregulation is thought to be at the very core of both the origins and clinical manifestations of addiction (Pani et al., 2010).

A popular explanatory construct is the “self-medication hypothesis” (SMH), as originally described by Khantzian (Khantzian, 1985). The SMH suggests that at the heart of addictive disorders is suffering, not the seeking of pleasure, reward, or self-destruction. There are two important aspects of the SMH: (1) Individuals use, abuse, and become dependent upon substances because they relieve states of distress; and (2) there is a considerable degree of psychopharmacologic specificity in an individual's preferred drug. Experimenting with different drugs, a person susceptible to addiction would discover that a particular drug relieves, ameliorates, or changes different painful affect (e.g. feeling) states and becomes a favoured drug (Khantzian, 1985).

The purpose of this paper is two-fold: first, to describe the pattern of substance use in a homeless population with mood disorders in the past 12 months. Second, to determine if different mood symptoms (unipolar vs. bipolar) are associated with different substances as suggested by the self-medication hypothesis (SMH).

## 2. Methods

### 2.1. Design of the study

This study is a cross sectional naturalistic study. The study utilizes data from the At Home/Chez Soi study which is a 4-year randomized control study, designed to test the effectiveness of Housing First for mentally ill homeless across five major cities in Canada (Goering et al., 2011). The present study included patients who participated in the City of Vancouver wing of the At Home/Chez Soi study. All participants are Canadian citizens, at least 19 years of age, who met criteria for homelessness or precarious housing and have a current mental disorder. Data were collected during face-to-face interviews in specific facilities. For details see Goering et al. (2011) and Somers et al. (2013).

### 2.2. Sample

The Vancouver sample of the At Home/Chez Soi study sample is comprised of 497 subjects. All subjects met criteria for homelessness or precarious housing and received a diagnosis of mental illness, according to Mini-International Neuropsychiatric Interview (MINI). For the present study, these patients were screened for 1) current or past depressive episodes, and 2) current or past manic or hypomanic episodes to a baseline evaluation to identify subjects affected by unipolar and bipolar depression. This yielded 319 homeless individuals: mean age was  $39 \pm 10$  (range: 19–66). A total of 223 (69.9%) were males; 52 (16.3%) with aboriginal origin; 180 (56.4%) with less than 9 years of education; 302 (94.7%) living alone; 303 (95%) unemployed. Of the 319 subjects, 153 homeless had a history of bipolar depression (48%). Of these, 101 (66%) were males; mean age was  $40 \pm 10$  (range: 20–66). A total of 166 homeless had a history of unipolar depression (52%). Of these 122 (73.5%) were males; mean age was  $39 \pm 11$  (range: 19–65). These two groups were then compared for demographic and substance use variables.

### 2.3. Instruments

The following instruments were used:

#### 2.3.1. Mini-International Neuropsychiatric Interview (MINI)

Lifetime and current mental and substance use disorders were estimated from the MINI International Neuropsychiatric Interview Plus, version 5.0.0 (Sheehan et al., 1998). The MINI Plus is a structured clinical interview based on the diagnostic criteria in the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV) (A.P.A., 1994) and the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10) (WHO, 1992). It was designed to assess Axis I substance use disorders and mental disorders as well as Axis II antisocial personality disorder. For the current study, we included information regarding the following diagnoses: drug dependence, alcohol dependence, depressive, manic, and hypomanic episodes, psychotic disorders, panic disorder, social anxiety disorder, posttraumatic stress disorder (PTSD), and obsessive-compulsive disorder (OCD). The time frames used to assess current mental disorders were 4 weeks for psychotic disorder, panic disorder, social anxiety disorder, PTSD, and OCD; 12 months for alcohol dependence and drug dependence; 2 weeks for depressive episodes; and “current” for manic and hypomanic episodes. The MINI Plus has been shown to be reliable

and valid in several studies in the United States and Europe (Sheehan et al., 1998).

### 2.3.2. Demographics, Service and Housing History (DSHH)

Demographic information collected was age, marital status, housing situation, education, source of income, and social contacts. Participants were also asked whether they had ever been in prison, jail, or juvenile detention overnight or longer. They were also asked to identify which ethnic group/descent they belonged to. The list of options included European/Caucasian, Aboriginal, African, Asian, Hispanic/Latin American, and other. The Aboriginal people – Cree, Carrier, Dene who participated in this study represented First Nations found throughout British Columbia (Goering).

### 2.3.3. Substances of abuse

The pattern of substance abuse by patients in the previous 12 months was assessed using the MINI. We decided to cluster substance abuse into seven major groups based on the psychoactive effect of the drugs:

1. *Central Nervous System Stimulants* (CNS Stimulants), which comprise amphetamines, crystal methamphetamine, dextroamphetamine, methylphenidate, diet pills, cocaine (taken as nasal insufflation, intravenous, freebase, crack).
2. *Alcohol*
3. *Tranquillizers*, which comprise methaqualone, secobarbital, diazepam, alprazolam, chlordiazepoxide, lorazepam, flurazepam, triazolam, barbiturates, meprobamate, gamma hydroxybutyrate, flunitrazepam.
4. *Hallucinogens*, which comprise lysergic acid diethylamide (LSD), mescaline, peyote, psilocybin, 2,5-dimethoxy-4-methylamphetamine (STP), ecstasy (MDMA), methylenedioxyamphetamine (MDA), 1-(1-phenylcyclohexyl) piperidine (PCP), ketamine.
5. *Inhalants*, which comprise ethyl chloride, nitrous oxide, amyl or butyl nitrate (poppers).
6. *Cannabinoids*, which comprise marijuana, hashish,  $\Delta$ 9-tetrahydrocannabinol (THC).
7. *Opioids*, which comprise heroin, morphine, hydromorphone, opium, meperidine, methadone, propoxyphene, codeine, oxycodone, hydrocodone.

### 2.4. Data analyses

We compared substance use between bipolar depressed homeless (BDH) and unipolar depressed homeless (UDH) using Chi-square test and Student's *t*-test as appropriate ( $p < 0.05$ ).

Multivariate logistic regression analyses were used to calculate odds ratios for the factors associated with BDH, considering different cluster of substance abuse. All analyses were performed using SPSS 20.0.

**Table 1**  
Demographic data of 153 BDH compared with 172 UDH.

	Total N=319 M ± SD	Bipolar depression homeless N=153 M ± SD	Unipolar depression homeless N=166 M ± SD	T	p
Age	39 ± 10 (19–66) N (%)	40 ± 10 (20–66) N (%)	39 ± 11 (19–65) N (%)	–1.005	0.316
Sex (Male)	223 (69.9)	101 (66.0)	122 (73.5)	2.11	0.179
Living (Alone)	302 (94.7)	144 (94.1)	158 (95.2)	0.178	0.804
Education (< 9 years)	180 (56.4)	80 (52.3)	100 (60.2)	2.04	0.175
Occupation (unemployed)	303 (95.0)	142 (92.8)	161 (97.0)	2.91	0.123
Ethnicity (aboriginal)	52 (16.3)	21 (13.7)	31 (18.7)	1.42	0.288

## 3. Results

Table 1 shows that no differences were observed between BDH and UDH regarding to age, sex, living situation (alone or otherwise), educational level (less or more than 9 years), occupation (employer or unemployed) and ethnicity (aboriginal or otherwise).

Table 2 shows the differences between BDH and UDH regarding to their substance abuse in the previous 12 months. BDH more frequently used CNS stimulants and opiates compared to UDH. No differences were found between the 2 groups regarding the use of alcohol, tranquillizers, cannabinoids, hallucinogens and inhalants.

Table 3 shows the results of the backward logistic regression including predictive factors identified in the BDH group from the univariate analysis. On the basis of this analysis, the odds of having bipolar depression were higher for homeless using CNS stimulants (OR=2.00).

## 4. Discussion

The present study found distinct differences between UDH and BDH groups in respect to patterns of substance abuse in the past 12 months. The BDH group expressed higher abuse levels of CNS stimulants and opiates than the UDH group. These findings coincide to the extant literature describing the relationship between mental

**Table 2**  
Substance use (last 12 months) of 153 BDH compared with UDH.

	Bipolar depression homeless N=153 N(%)	Unipolar depression homeless N=166 N(%)	$\chi$	p
CNS stimulants	110 (71.9)	93 (56.0)	8.66	0.004
Alcohol	66 (43.1)	81 (48.8)	1.02	0.315
Tranquillizer	21 (13.7)	14 (8.4)	2.28	0.153
Opiates	64 (41.8)	47 (28.3)	6.41	0.013
Cannabinoids	79 (51.6)	91 (54.8)	0.32	0.577
Hallucinogens	27 (17.6)	20 (12.0)	1.98	0.206
Inhalants	3 (2.0)	5 (3.0)	0.36	0.725

**Table 3**  
Logistic regression: Bipolar depression is criterion. Substance use patterns are predictors.

	STEP	B	Odds ratio	Min	Max	p
Variables in the equation						
CNS stimulants	1	0.697	2.00	1.259	3.204	0.003
Variables not in the equation						
Opiates						
Statistics: $\chi^2$ 8.74 df 1 $p < 0.003$ .						

illness and substance abuse in general (Foster et al., 2012; Krausz et al., 2013; O'Toole T et al., 2004; Palepu et al., 2013; Patterson et al., 2013; Schutz et al., 2013; Taplin et al., 2014; Torchalla et al., 2011) however, studies looking into the relationship between substance abuse and bipolar disorder in homeless populations is lacking at best. Furthermore, no difference in alcohol, sedative, cannabis, inhalant and hallucinogen use was found between BDH and UDH groups, contradicting previous studies on the relationship between bipolar disorder and substance use. For example, a 6.2 odds ratio for the co-occurrence of mania and alcoholism and a 1.7 odds ratio for comorbid depression and alcoholism have been reported (Helzer and Pryzbeck, 1988). In addition, the Epidemiologic Catchment Area (ECA) Survey of Mental Disorders reported higher alcohol abuse and dependence between bipolar II subjects (Bernardt and Murray, 1986; Regier et al., 1990; Sherwood Brown et al., 2001). Similarly, some studies suggest that in addition to alcohol, cannabis, cocaine and other opioids are most often abused by bipolar subjects (Cerullo and Strakowski, 2007). However, as shown by the present study such patterns of use are not specific to bipolar homeless patients as shown by other studies that difference between alcohol, sedatives, cannabis, inhalants and hallucinogens use between BDH and UDH (Hasin et al., 1985). Lifetime use of cannabis among bipolar patients appears to be around 70% and approximately 30% of patients with bipolar disorder report comorbid cannabis abuse or dependence (Agrawal et al., 2011; Bally et al., 2014). There is a lack of data in literature regarding inhalant and hallucinogen use with respect to unipolar and bipolar depression.

With regards to cocaine abuse in BDH, the present research found a higher rate of cocaine abuse among the BDH sample. This is consistent with previous research that has reported a correlation between cocaine abuse and bipolar spectrum disorders (Maremmani et al., 2008). Bipolar patients have also been reported to increase stimulant use during mania in order to accentuate the manic high (Strakowski and DelBello, 2000). The rate of comorbidity reported between cocaine and bipolarity has been in the range of 29–39% (Estroff et al., 1985; Mueser et al., 1992) and prevalence rates of bipolar disorder of 22% (Mirin and Weiss, 1986) and 30% (Nunes et al., 1989) have been reported among cocaine users. In the latter study, bipolar depression was more frequent than unipolar depression (30% vs. 13%). In terms of specificity, a link seems to exist between cocaine use, as evaluated among polyabusers of different categories, and bipolar disorders (Maremmani et al., 2000b, 2008; Pacini et al., 2010). With regards to the self-medication hypothesis (Khantzian, 1985, 1997), the present findings show that individuals with bipolar disorder have a predisposition for stimulant use in order to maintain their euphoria. Specifically, hypomania and mood elation are a pleasurable and rewarding experience that, in bipolar patients, can be started or prolonged by the use of central nervous system stimulant drugs. For such patients, the “self-medication” hypothesis is best termed the “self-enhancement” hypothesis (Camacho and Akiskal, 2005; Maremmani et al., 2012).

Opioids were more frequently abused in BDH. The link between heroin addiction and bipolar disorder is generally accepted both in in-patient and out-patient settings (Maremmani et al., 2000a, 2000b, 1994, 2012, 2005). Some data indicated about one quarter of bipolar patients with dual diagnosis using opioids (Nallet et al., 2013). Mood disorders are the most frequent form of psychiatric comorbidity for heroin addiction with 12–54% of heroin addicts currently depressed (Dorus and Senay, 1980; Lehman and De Angelis, 1972; Steer and Kotzer, 1980; Wieland and Sola, 1970). Cyclothymia has been observed in 3–6% of cases (Kosten and Rounsaville, 1986; Mirin and Weiss, 1986) and hypomania in 16% (Mirin and Weiss, 1986). A later study found that cyclothymia, and to a lesser extent irritable traits could represent the temperamental profile of heroin addicts (Khazaal et al., 2013; Maremmani et al., 2009). In the last decade the impact of opioids on psychopathology has been investigated (Comfort, 1977; Emrich et al., 1982; Gold et al., 1982; Maremmani et al., 2014b) and although results cannot rule out the possibility that bipolar heroin addicts use heroin in

a self-therapeutic manner, any initial beneficial effect exerted by the substance on emotional instability would soon be followed by a mood-destabilizing action, which would accelerate the course of the illness and ultimately lead to a worse clinical presentation, both on the addictive and psychopathological plane (Maremmani et al., 2013). The link between bipolarity and substance abuse is still an open and unclear issue. Some studies find no differences in substance use between bipolar and unipolar subjects (Galvão et al., 2013; Rastelli et al., 2013; Scott et al., 2013), while others suggest that drug abuse co-occurs with mania or bipolar depression with greater probability than with unipolar depression (Bernardt and Murray, 1986; Grant et al., 2004; Leventhal et al., 2011; Olsson et al., 2005; Regier et al., 1990). More than half of bipolar subjects in the ECA Survey had a SUD (Regier et al., 1990), most frequently alcohol and cannabis, followed by cocaine and opioids (Cerullo and Strakowski, 2007). Alcohol, cocaine and cannabis are commonly abused in bipolar patients, although reported prevalence rates are widely variable from 18% to 75% (Bernardt and Murray, 1986; Dunner et al., 1979; Estroff et al., 1985; Freed, 1969; Hensel et al., 1979; Maremmani et al., 2000b, 2000c; Miller et al., 1989; Weiss and Mirin, 1989). Individuals with mania are 8.4 times more likely to experience lifetime drug dependence as compared to the general population (Do and Mezuk, 2013). Even sub-syndromal forms of bipolar disorder, such as hypomania, are associated with a wide range of substance use and misuse outcomes (D'Mello et al., 1995; Do and Mezuk, 2013). A history of substance abuse preceding first episode has been reported to correlate with a manic predominant polarity (Carvalho et al., 2014; Colom and Vieta, 2009; Popovic et al., 2014). More than one third of individuals with hypomania had a comorbid SUD, and these associations were seen across a range of psychoactive substances (Albanese et al., 2006; D'Mello et al., 1995; Do and Mezuk, 2013). Results support the categorical approach of bipolar disorders, thus it seems that a vulnerability factor for a subgroup of homeless patients with substance abuse has been underlined (Hesselbrock and Hesselbrock, 2006; Schlaff et al., 2011). The extraordinary high incidence of co-occurring substance abuse is in general associated with bipolar disorder and, in particular, a high occurrence of stimulant use cannot be reduced to “self-medication hypothesis” as it was originally described (Goldberg, 2001; Khantzian, 1985; Khantzian and Albanese, 2009; Maremmani et al., 2012).

Examining substance abuse overall, bipolar spectrum disorders and addiction should be best considered under a unitary perspective. A common background links mania and addiction: excitement and impulsivity. For these reasons, and looking at the high frequency of comorbidity, we can assume that the two conditions probably share a common biological substrate with common reinforcement. Patients whose disorders fall under the bipolar spectrum, considering its soft-spectrum and its hyperthymic and cyclothymic temperamental substrates, are at increased risk for substance use, possibly moving towards addiction through exposure to intrinsically dependence-producing substances (Bacciardi et al., 2013; Maremmani et al., 2006b; Swann et al., 2004).

## 5. Limitations

Data collected are self-reported and no urinalyses were performed. We considered lifetime psychiatric diagnosis and self-reported substance use in the previous 12 months and therefore cannot highlight which specific substances were used during single polarity on the mood disorder spectrum.

## 6. Conclusions

This study further supports the hypothesis that, beyond the self-medication hypothesis, bipolarity is strictly correlated to substance

use. This correlation is verified also in the particular population of homeless.

#### Role of funding source

The database-source At Home/Chez Soi Vancouver was funded by the Mental Health Commission of Canada (MHCC)—a Health Canada mandate. The Mental Health Commission of Canada (MHCC) played no role in study design; nor in the collection, analysis and interpretation of data; nor in the writing of the report; nor in the decision to submit the paper for publication.

#### Conflict of interest

Dott. Krausz was the co-PI of At Home/Chez Soi Vancouver as funded by Health Canada –Mental Health Commission of Canada (MHCC).

Other Authors declare not to have any conflict of interest.

#### Acknowledgment

Thanks to Jayne Barker (2008–11), Cameron Keller (2011–12), and Catharine Hume (2012–present), Mental Health Commission of Canada At Home/Chez Soi National Project Leads, as well as the National Research Team, led by Paula Goering, the five site research teams, the Site Coordinators, the numerous service and housing providers, and people with lived experience who contributed to the original At Home/Chez Soi research demonstration project. We would, most especially, like to acknowledge the contributions of At Home/Chez Soi participants, whose willingness to share their lives, experiences, and stories were central and essential to the original project. The original research was made possible through a financial contribution from Health Canada. The views expressed herein are solely those of the authors. Thanks to Icro Maremmi for supporting us in the interpretation of the data.

#### References

- A.P.A., 1994. Diagnostic and Statistical Manual of Mental Disorders, DSM-IV. American Psychiatric Association, Washington.
- Agrawal, A., Nurnberger Jr., J.I., Lynskey, M.T., 2011. Cannabis involvement in individuals with bipolar disorder. *Psychiatry Res* 185, 459–461.
- Albanese, M.J., Clodfelter Jr., R.C., Pardo, T.B., Ghaemi, S.N., 2006. Underdiagnosis of bipolar disorder in men with substance use disorder. *J. Psychiatr. Pract.* 12, 124–127.
- Appel, P.W., Hoffman, J.H., Blane, H.T., Frank, B., Oldak, R., Burke, M., 2001. Comparison of self-report and hair analysis in detecting cocaine use in a homeless/transient sample. *J. Psychoact. Drugs* 33, 47–55.
- Arias, F., Szman, N., Vega, P., Mesias, B., Basurte, I., Morant, C., Ochoa, E., Poyo, F., Babin, F., 2013. Abuse or dependence on cannabis and other psychiatric disorders. Madrid study on dual pathology prevalence. *Actas Espanolas de Psiquiatria* 41, 122–129.
- Ashton, C., Moore, P., Gallagher, P., Young, A., 2005. Cannabinoids in bipolar affective disorder: a review and discussion of their therapeutic potential. *J. Psychopharmacol.* 19, 293–300.
- Bacciardi, S., Maremmi, A.G.I., Rovai, L., Rugani, F., Pani, P.P., PAcini, M., Dell'Osso, L., Akiskal, H.S., Maremmi, I., 2013. Drug (heroin) addiction, bipolar spectrum and impulse control disorders. *Heroin Addict. Relat. Clin. Probl.* 15, 29–36.
- Bally, N., Zullino, D., Aubry, J.-M., 2014. Cannabis use and first manic episode. *J. Affect. Disord.* 165, 103–108.
- Bernardt, M.W., Murray, R.M., 1986. Psychiatric disorder, drinking and alcoholism: what are the links? *Br. J. Psychiatry*: *J. Ment. Sci.* 148, 393–400.
- Brousse, G., Garay, R.P., Benyamina, A., 2008. Management of comorbid bipolar disorder and alcohol dependence. *Presse. Med.* 37, 1132–1137.
- Brunette, M.F., Noordsy, D.L., Xie, H., Drake, R.E., 2003. Benzodiazepine use and abuse among patients with severe mental illness and co-occurring substance use disorders. *Psychiatr. Serv.* 54, 1395–1401.
- Camacho, A., Akiskal, H.S., 2005. Proposal for a bipolar-stimulant spectrum: temperament, diagnostic validation and therapeutic outcomes with mood stabilizers. *J. Affect. Disord.* 85, 217–230.
- Carvalho, A.F., McIntyre, R.S., Dimelis, D., Gonda, X., Berk, M., Nunes-Neto, P.R., Cha, D.S., Hyphantis, T.N., Angst, J., Fountoulakis, K.N., 2014. Predominant polarity as a course specifier for bipolar disorder: a systematic review. *J. Affect. Disord.* 163C, 56–64.
- Cerullo, M.A., Strakowski, S.M., 2007. The prevalence and significance of substance use disorders in bipolar type I and II disorder. *Subst. Abuse Treat., Prev. Policy* 2, 29.
- Chengappa, K.N., Levine, J., Gershon, S., Kupfer, D.J., 2000. Lifetime prevalence of substance or alcohol abuse and dependence among subjects with bipolar I and II disorders in a voluntary registry. *Bipolar Disord.* 2, 191–195.
- Cocores, J.A., Patel, M.D., Gold, M.S., Pottash, A.C., 1987. Cocaine abuse, attention deficit disorder, and bipolar disorder. *J. Nerv. Ment. Dis.* 175, 431–432.
- Colom, F., Vieta, E., 2009. The road to DSM-V bipolar disorder episode and course specifiers. *Psychopathology* 42, 209–218.
- Comfort, A., 1977. Morphine as an antipsychotic. Relevance of a 19th-century therapeutic fashion. *Lancet* 2, 448–449.
- D'Mello, D.A., Boltz, M.K., Msibi, B., 1995. Relationship between concurrent substance abuse in psychiatric patients and neuroleptic dosage. *Am. J. Drug Alcohol Abuse* 21, 257–265.
- Do, E.K., Mezuk, B., 2013. Comorbidity between hypomania and substance use disorders. *J. Affect. Disord.* 150, 974–980.
- Dorus, W., Senay, E.C., 1980. Depression demographic dimensions, and drug abuse. *Am. J. Psychiatry* 137, 669–704.
- Dunner, D.L., Hensel, B.M., Fieve, R.R., 1979. Bipolar illness: factors in drinking behavior. *Am. J. Psychiatry* 136, 583–585.
- Edens, E.L., Mares, A.S., Rosenheck, R.A., 2011. Chronically homeless women report high rates of substance use problems equivalent to chronically homeless men. *Women's Health Issues: Official Publication of the Jacobs Institute of Women's Health* 21, 383–389.
- Emrich, H.M., Vogt, P., Herz, A., Kissling, W., 1982. Antidepressant effects of buprenorphine. *Lancet* 2, 709.
- Estroff, T.W., Dackis, C.A., Gold, M.S., Pottash, A.L., 1985. Drug abuse and bipolar disorders. *Int. J. Psychiatry Med.* 15, 37–40.
- Farren, C.K., Snee, L., Daly, P., McElroy, S., 2013. Prognostic factors of 2-year outcomes of patients with comorbid bipolar disorder or depression with alcohol dependence: importance of early abstinence. *Alcohol Alcohol* 48, 93–98.
- Fazel, S., Khosla, V., Doll, H., Geddes, J., 2008. The prevalence of mental disorders among the homeless in western countries: systematic review and meta-regression analysis. *PLoS Med.* 5, e225.
- Fichter, M.M., Quadflieg, N., 2001. Prevalence of mental illness in homeless men in Munich, Germany: results from a representative sample. *Acta Psychiatr. Scand.* 103, 94–104.
- Fischer, P.J., Breakey, W.R., 1991. The epidemiology of alcohol, drug, and mental disorders among homeless persons. *Am. Psychol.* 46, 1115–1128.
- Fletcher, K., Parker, G., Paterson, A., Synnott, H., 2013. High-risk behavior in hypomanic states. *J. Affect. Disord.* 150, 50–56.
- Folsom, D., Jeste, D.V., 2002. Schizophrenia in homeless persons: a systematic review of the literature. *Acta Psychiatr. Scand.* 105, 404–413.
- Folsom, D.P., Hawthorne, W., Lindamer, L., Gilmer, T., Bailey, A., Golshan, S., Garcia, P., Unutzer, J., Hough, R., Jeste, D.V., 2005. Prevalence and risk factors for homelessness and utilization of mental health services among 10,340 patients with serious mental illness in a large public mental health system. *Am. J. Psychiatry* 162, 370–376.
- Foster, A., Gable, J., Buckley, J., 2012. Homelessness in schizophrenia. *Psychiatr. Clin. N. Am.* 35, 717–734.
- Freed, E.X., 1969. Alcohol abuse by manic patients. *Psychol. Rep.* 25, 280.
- Galvão, F., Sportiche, S., Lambert, J., Amiez, M., Musa, C., Nieto, I., Dubertret, C., Lepine, J.P., 2013. Clinical differences between unipolar and bipolar depression: interest of BDRS (Bipolar Depression Rating Scale). *Compr. Psychiatry* 54, 605–610.
- Goering, P.N., Streiner, D.L., Adair, C., Aubry, T., Barker, J., Distasio, J., Hwang, S.W., Komaroff, J., Latimer, E., Somers, J., Zabkiewicz, D.M., 2011. The At Home/Chez Soi trial protocol: a pragmatic, multi-site, randomised controlled trial of a Housing First intervention for homeless individuals with mental illness in five Canadian cities. *BMJ Open* 1, e000323.
- Gold, M.S., Pottash, A.L.C., Sweeney, D.R., Martin, D., Extein, I., 1982. Antimanic, antidepressant, and antipanic effects of opiate: clinical, neuro-anatomical, and biochemical evidence. *Ann. New York Acad. Sci.* 398, 140–150.
- Goldberg, J.F., 2001. Bipolar disorder with comorbid substance abuse: diagnosis, prognosis, and treatment. *J. Psychiatr. Pract.* 7, 109–122.
- Grant, B.F., Stinson, F.S., Dawson, D.A., Chou, S.P., Dufour, M.C., Compton, W., Pickering, R.P., Kaplan, K., 2004. Prevalence and co-occurrence of substance use disorders and independent mood and anxiety disorders: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Arch. Gen. Psychiatry* 61, 807–816.
- Hasin, D., Endicott, J., Lewis, C., 1985. Alcohol and drug abuse in patients with affective syndromes. *Compr. Psychiatry* 26, 283–295.
- Haugland, G., Siegel, C., Hopper, K., Alexander, M.J., 1997. Mental illness among homeless individuals in a suburban county. *Psychiatr. Serv.* 48, 504–509.
- Helzer, J.E., Pryzbeck, T.R., 1988. The co-occurrence of alcoholism with other psychiatric disorders in the general population and its impact on treatment. *J. Stud. Alcohol* 49, 219–224.
- Hensel, B., Dunner, D.L., Fieve, R.R., 1979. The relationship of family history of alcoholism to primary affective disorder. *J. Affect. Disord.* 1, 105–113.
- Hesselbrock, V.M., Hesselbrock, M.N., 2006. Are there empirically supported and clinically useful subtypes of alcohol dependence? *Addiction* 101 (Suppl 1), 97–103.
- Khantzian, E.J., 1985. The self-medication hypothesis of addictive disorders: focus on heroin and cocaine dependence. *Am. J. Psychiatry* 142, 1259–1264.
- Khantzian, E.J., 1997. The self-medication hypothesis of substance use disorders: a reconsideration and recent applications. *Harv. Rev. Psychiatry* 4, 231–244.
- Khantzian, E.J., Albanese, M.J., 2009. Self-medication, bipolar disorders, and stimulant dependence. *J. Clin. Psychiatry* 70, 936–937 (935–936; author reply).
- Khazaal, Y., Gex-Fabry, M., Nallet, A., Weber, B., Favre, S., Voide, R., Zullino, D., Aubry, J.M., 2013. Affective temperaments in alcohol and opiate addictions. *Psychiatr. Quart.* 84, 429–438.
- Kilbourne, A.M., Farmer Teh, C., Welsh, D., Pincus, H.A., Lasky, E., Perron, B., Bauer, M.S., 2010. Implementing composite quality metrics for bipolar disorder: towards a more comprehensive approach to quality measurement. *Gen. Hosp. Psychiatry* 32, 636–643.

- Koegel, P., Burnam, M.A., Farr, R.K., 1988. The prevalence of specific psychiatric disorders among homeless individuals in the inner city of Los Angeles. *Arch. Gen. Psychiatry* 45, 1085–1092.
- Kosten, T.R., Rounsaville, J., 1986. Psychopathology in opioid addicts. In: Mirin, S.M. (Ed.), *Substance Abuse, Psychiatric of Clinics North America*, pp. 515–532.
- Krausz, R.M., Clarkson, A.F., Strehlau, V., Torchalla, I., Li, K., Schuetz, C.G., 2013. Mental disorder, service use, and barriers to care among 500 homeless people in 3 different urban settings. *Soc. Psychiatry Psychiatr. Epidemiol.* 48, 1235–1243.
- Kushel, M.B., Vittinghoff, E., Haas, J.S., 2001. Factors associated with the health care utilization of homeless persons. *JAMA* 285, 200–206.
- Lambert, E.Y., Caces, M.F., 1995. Correlates of drug abuse among homeless and transient people in the Washington, DC, metropolitan area in 1991. *Public Health Rep.* 110, 455–461.
- Lee, T.C., Hanlon, J.G., Ben-David, J., Booth, G.L., Cantor, W.J., Connelly, P.W., Hwang, S.W., 2005. Risk factors for cardiovascular disease in homeless adults. *Circulation* 111, 2629–2635.
- Lehman, W.X., De Angelis, G.C., 1972. Adolescents, methadone, and psychotherapeutic agents. In: *Proceedings of the Fourth National Conference on Methadone Treatment. National Association for the Prevention of the Addiction to Narcotics*, New York, NY, pp. 95–104.
- Leventhal, A.M., Gelernter, J., Oslin, D., Anton, R.F., Farrer, L.A., Kranzler, H.R., 2011. Agitated depression in substance dependence. *Drug and Alcohol Dependence* 116, 163–169.
- Lin, S.C., Chen, C.C., Chen, Y.H., Chung, K.S., Lin, C.H., 2011. Benzodiazepine prescription among patients with severe mental illness and co-occurring alcohol abuse/dependence in Taiwan. *Human Psychopharmacology* 26, 201–207.
- Maremmani, A.G., 2013. Is opioid agonist treatment the only way to treat the psychopathology of heroin addicts? *Heroin Addiction and Related Clinical Problems* 15, 57–60.
- Maremmani, A.G., Rugani, F., Bacciardi, S., Rovai, L., Pacini, M., Dell'osso, L., Maremmani, I., 2014a. Does dual diagnosis affect violence and moderate/superficial self-harm in heroin addiction at treatment entry? *Journal of addiction medicine* 8, 116–122.
- Maremmani, A.G.I., Bacciardi, S., Rovai, L., Rugani, F., Akiskal, H.S., Maremmani, I., 2013. Do bipolar patients use street opioids to stabilize mood? *Heroin Addiction and Related Clinical Problems* 15, 25–32.
- Maremmani, A.G.I., Rovai, L., Rugani, F., Bacciardi, S., Dell'Osso, L., Maremmani, I., 2014b. Substance abuse and psychosis. The strange case of opioid. *European Review for Medical and Pharmacological Sciences*.
- Maremmani, I., Canoniero, S., Pacini, M., 2000a. Methadone dose and retention in treatment of heroin addicts with Bipolar I Disorder comorbidity. *Preliminary Results. Heroin Addict Relat Clin Probl* 2, 39–46.
- Maremmani, I., Canoniero, S., Pacini, M., 2002. Psycho(patho)logy of “addiction.” Interpretative hypothesis. *Ann Ist Super Sanita* 38, 241–257.
- Maremmani, I., Canoniero, S., Pacini, M., Lazzeri, A., Placidi, G.F., 2000b. Opioids and cannabinoids abuse among bipolar patients. *Heroin Addiction and Related Clinical Problems* 2, 35–42.
- Maremmani, I., Capone, M.R., Aglietti, M., Castrogiovanni, P., 1994. Heroin dependence and bipolar disorders. *New Trends in Experimental and Clinical Psychiatry* X, 179–182.
- Maremmani, I., Lazzeri, A., Lovrecic, M., Placidi, G.F., Perugi, G., 2004. Diagnostic and symptomatological features in chronic psychotic patients according to cannabis use status. *Journal of Psychoactive Drugs* 36, 235–241.
- Maremmani, I., Maremmani, A.G., Rugani, F., Rovai, L., Pacini, M., Bacciardi, S., Deltito, J., Dell'osso, L., Akiskal, H.S., 2012. Clinical presentations of substance abuse in bipolar heroin addicts at time of treatment entry. *Ann Gen Psychiatry* 11, 23.
- Maremmani, I., Pacini, M., Lazzeri, A., Perugi, G., Deltito, J., 2006a. Concurrent abuse of cannabis is associated with a shorter duration of hospitalization in treatment-resistant psychotic bipolar inpatients treated with clozapine. *Addict Disord Their Treatment* 5, 1–7.
- Maremmani, I., Pacini, M., Perugi, G., 2005. Addictive disorders, bipolar spectrum and the impulsive link: the psychopathology of a self-regenerating pathway. *Heroin Addict Relat Clin Probl* 7, 33–46.
- Maremmani, I., Pacini, M., Perugi, G., Deltito, J., Akiskal, H., 2008. Cocaine abuse and the bipolar spectrum in 1090 heroin addicts: clinical observations and a proposed pathophysiological model. *Journal of Affective Disorders* 106, 55–61.
- Maremmani, I., Pacini, M., Popovic, D., Romano, A., Maremmani, A.G.I., Perugi, G., Deltito, J., Akiskal, K., Akiskal, H.S., 2009. Affective temperaments in heroin addiction. *Journal of Affective Disorders* 117, 186–192.
- Maremmani, I., Perugi, G., Pacini, M., Akiskal, H.S., 2006b. Toward a unitary perspective on the bipolar spectrum and substance abuse: opiate addiction as a paradigm. *Journal of affective disorders* 93, 1–12.
- Maremmani, I., Zolesi, O., Aglietti, M., Marini, G., Tagliamonte, A., Shinderman, M., Maxwell, S., 2000c. Methadone dose and retention during treatment of heroin addicts with Axis I psychiatric comorbidity. *J Addict Dis* 19, 29–41.
- Merikangas, K.R., Herrell, R., Swendsen, J., Rossler, W., Ajdacic-Gross, V., Angst, J., 2008. Specificity of bipolar spectrum conditions in the comorbidity of mood and substance use disorders: results from the Zurich cohort study. *Archives of General Psychiatry* 65, 47–52.
- Miller, F.T., Busch, F., Tanenbaum, J.H., 1989. Drug abuse in schizophrenia and bipolar disorders. *The American Journal of Drug and Alcohol Abuse* 15 (3), 291–295.
- Mirin, S.M., Weiss, R.D., 1986. Affective illness in substance abusers. *The Psychiatric clinics of North America* 9, 503–514.
- Mueser, K.T., Yarnold, P.R., Bellack, A.S., 1992. Diagnostic and demographic correlates of substance abuse in schizophrenia and major affective disorder. *Acta Psychiatrica Scandinavica* 85, 48–55.
- Nallet, A., Weber, B., Favre, S., Gex-Fabry, M., Voide, R., Ferrero, F., Zullino, D., Khazaal, Y., Aubry, J.M., 2013. Screening for bipolar disorder among outpatients with substance use disorders. *Eur Psychiatry* 28, 147–153.
- Nery, F.G., Stanley, J.A., Chen, H.H., Hatch, J.P., Nicoletti, M.A., Monkul, E.S., Lafer, B., Soares, J.C., 2010. Bipolar disorder comorbid with alcoholism: a 1H magnetic resonance spectroscopy study. *Journal of Psychiatric Research* 44, 278–285.
- North, C.S., Eyrich, K.M., Pollio, D.E., Spitznagel, E.L., 2004. Are rates of psychiatric disorders in the homeless population changing? *Am J Public Health* 94, 103–108.
- North, C.S., Eyrich-Garg, K.M., Pollio, D.E., Thirthalli, J., 2010. A prospective study of substance use and housing stability in a homeless population. *Social Psychiatry and Psychiatric Epidemiology* 45, 1055–1062.
- Nower, L., Eyrich-Garg, K.M., Pollio, D.E., North, C.S., 2014. Problem gambling and homelessness: results from an epidemiologic study. *Journal of gambling studies/co-sponsored by the National Council on Problem Gambling and Institute for the Study of Gambling and Commercial Gaming*.
- Nunes, E.V., Quitkin, F.M., Klein, D.F., 1989. Psychiatric diagnosis in cocaine abuse. *Psychiatry Res* 28, 105–114.
- O'Toole, T.P., Conde-Martel, A., Gibbon, J.L., Hanusa, B.H., Freyder, P.J., Fine, M.J., 2004. Substance-abusing urban homeless in the late 1990s: how do they differ from non-substance-abusing homeless persons? *Journal of Urban Health: Bulletin of the New York Academy of Medicine* 81, 606–617.
- Olfson, M., Das, A.K., Gameroff, M.J., Pilowsky, D., Feder, A., Gross, R., Lantigua, R., Shea, S., Weissman, M.M., 2005. Bipolar depression in a low-income primary care clinic. *The American Journal of Psychiatry* 162, 2146–2151.
- Pacini, M., Maremmani, I., Vitali, M., Romeo, M., Santini, P., Vermeil, V., Ceccanti, M., 2010. Cocaine abuse in 448 alcoholics: evidence for a bipolar connection. *Addict Disord Their Treatment* 9, 164–171.
- Palepu, A., Patterson, M., Strehlau, V., Moniruzzaman, A., Tan de Bibiana, J., Frankish, J., Krausz, M., Somers, J., 2013. Daily substance use and mental health symptoms among a cohort of homeless adults in Vancouver, British Columbia. *Journal of Urban Health: Bulletin of the New York Academy of Medicine* 90, 740–746.
- Pani, P.P., Maremmani, I., Trogu, E., Gessa, G.L., Ruiz, P., Akiskal, H.S., 2010. Delineating the psychic structure of substance abuse and addictions: should anxiety, mood and impulse-control dysregulation be included? *Journal of Affective Disorders* 122, 185–197.
- Patterson, M., Moniruzzaman, A., Palepu, A., Zabkiewicz, D., Frankish, C.J., Krausz, M., Somers, J.M., 2013. Housing First improves subjective quality of life among homeless adults with mental illness: 12-month findings from a randomized controlled trial in Vancouver, British Columbia. *Social Psychiatry and Psychiatric Epidemiology* 48, 1245–1259.
- Perugi, G., Ceraudo, G., Vannucchi, G., Rizzato, S., Toni, C., Dell'osso, L., 2012. Attention deficit/hyperactivity disorder symptoms in Italian bipolar adult patients: a preliminary report. *Journal of Affective Disorders*.
- Perugi, G., Toni, C., Frare, F., Ruffolo, G., Moretti, L., Torti, C., Akiskal, H.S., 2002. Effectiveness of adjunctive gabapentin in resistant bipolar disorder: is it due to anxious-alcohol abuse comorbidity? *J Clin Psychopharmacol* 22, 584–591.
- Popovic, D., Torrent, C., Goikolea, J.M., Cruz, N., Sanchez-Moreno, J., Gonzalez-Pinto, A., Vieta, E., 2014. Clinical implications of predominant polarity and the polarity index in bipolar disorder: a naturalistic study. *Acta Psychiatrica Scandinavica* 129, 366–374.
- Post, R.M., Kalivas, P., 2013. Bipolar disorder and substance misuse: pathological and therapeutic implications of their comorbidity and cross-sensitisation. *The British Journal of Psychiatry: the Journal of Mental Science* 202, 172–176.
- Rastelli, C.P., Cheng, Y., Weingarden, J., Frank, E., Swartz, H.A., 2013. Differences between unipolar depression and bipolar II depression in women. *Journal of Affective Disorders* 150, 1120–1124.
- Regier, D.A., Farmer, M.E., Rae, D.S., Locke, B.Z., Keith, S.J., Judd, L.L., Goodwin, F.K., 1990. Comorbidity of mental disorders with alcohol and other drug abuse. *JAMA* 19 (264), 2511–2518.
- Schlaff, G., Walter, H., Lesch, O.M., 2011. The Lesch alcoholism typology - psychiatric and psychosocial treatment approaches. *Annals of Gastroenterology: Quarterly Publication of the Hellenic Society of Gastroenterology* 24, 89–97.
- Schutz, C., Linden, I.A., Torchalla, I., Li, K., Al-Desouki, M., Krausz, M., 2013. The Burnaby treatment center for mental health and addiction, a novel integrated treatment program for patients with addiction and concurrent disorders: results from a program evaluation. *BMC Health Services Research* 13, 288.
- Scott, E.M., Hermens, D.F., Naismith, S.L., Guastella, A.J., De Regt, T., White, D., Lagopoulos, J., Hickie, I.B., 2013. Distinguishing young people with emerging bipolar disorders from those with unipolar depression. *Journal of Affective Disorders* 144, 208–215.
- Sheehan, D.V., Lecrubier, Y., Sheehan, K.H., Amorim, P., Janavs, J., Weiller, E., Hergueta, T., Baker, R., Dunbar, G.C., 1998. The Mini-International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *The Journal of Clinical Psychiatry* 59 (Suppl 20), 22–33 (quiz 34–57).
- Sherwood Brown, E., Suppes, T., Adinoff, B., Rajan Thomas, N., 2001. Drug abuse and bipolar disorder: comorbidity or misdiagnosis? *Journal of Affective Disorders* 65, 105–115.

- Somers, J.M., Patterson, M.L., Moniruzzaman, A., Currie, L., Rezansoff, S.N., Palepu, A., Fryer, K., 2013. Vancouver At Home: pragmatic randomized trials investigating Housing First for homeless and mentally ill adults. *Trials* 14, 365.
- Steer, R.A., Kotzer, E., 1980. Affective changes in male and female methadone patients. *Drug and Alcohol Dependence* 5, 115–122.
- Strakowski, S.M., DelBello, M.P., 2000. The co-occurrence of bipolar and substance use disorders. *Clinical Psychology Review* 20, 191–206.
- Sullivan, G., Burnam, A., Koegel, P., Hollenberg, J., 2000. Quality of life of homeless persons with mental illness: results from the course-of-homelessness study. *Psychiatr Serv* 51, 1135–1141.
- Swann, A.C., Dougherty, D.M., Pazzaglia, P.J., Pham, M., Moeller, F.G., 2004. Impulsivity: a link between bipolar disorder and substance abuse. *Bipolar Disorders* 6, 204–212.
- Taplin, C., Sahoo, S., Li, K., Krausz, M.R., 2014. Family history of alcohol and drug abuse, childhood trauma, and age of first drug injection. *Substance Use & Misuse*.
- Torchalla, I., Strehlau, V., Li, K., Krausz, M., 2011. Substance use and predictors of substance dependence in homeless women. *Drug and Alcohol Dependence* 118, 173–179.
- Vazquez, C., Munoz, M., Sanz, J., 1997. Lifetime and 12-month prevalence of DSM-III-R mental disorders among the homeless in Madrid: a European study using the CIDI. *Acta Psychiatrica Scandinavica* 95, 523–530.
- Velasquez, M.M., Crouch, C., von Sternberg, K., Grosdanis, I., 2000. Motivation for change and psychological distress in homeless substance abusers. *Journal of Substance Abuse Treatment* 19, 395–401.
- Vila-Rodriguez, F., Panenka, W.J., Lang, D.J., Thornton, A.E., Vertinsky, T., Wong, H., Barr, A.M., Procyshyn, R.M., Sidhu, J.J., Smith, G.N., Buchanan, T., Krajden, M., Krausz, M., Montaner, J.S., MacEwan, G.W., Honer, W.G., 2013. The hotel study: multimorbidity in a community sample living in marginal housing. *The American Journal of Psychiatry* 170, 1413–1422.
- Weiss, R.D., Mirin, S.M., 1986. Subtypes of cocaine abusers. *The Psychiatric Clinics of North America* 9, 491–501.
- Weiss, R.D., Mirin, S.M., 1989. Tricyclic antidepressants in the treatment of alcoholism and drug abuse. *The Journal of Clinical Psychiatry* 50 (Suppl), 4–9 (discussion 9–11).
- WHO, 1992. The ICD-10 classification of mental and behavioral disorders. Clinical descriptions and diagnostic guidelines. World Health Organization, Geneva.
- Wieland, W.F., Sola, S., 1970. Depression in opiate addicts measured by objective tests. In: *Proceedings of the III National Conference on Methadone Treatment*. AMTA, New York, pp. 187–202.