Recent illicit drug use among psychiatric patients in Brazil: a national representative study

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ABSTRACT

OBJECTIVE: To estimate factors associated to illicit drug use among patients with mental illness in Brazil according to gender.

METHODS: A cross-sectional representative sample of psychiatric patients (2,475 individuals) was randomly selected from 11 hospitals and 15 public mental health outpatient clinics. Data on self-reported illicit drug use and sociodemographic, clinical and behavioral characteristics were obtained from face-to-face interviews. Logistic regression was used to estimate associations with recent illicit drug use.

RESULTS: The prevalence of any recent illicit drug use was 11.4%. Men had higher prevalence than women for all substances (17.5% and 5.6%, respectively). Lower education, history of physical violence, and history of homelessness were associated with drug use among men only; not professing a religion was associated with drug use in women only. For both men and women, younger age, current hospitalization, alcohol and tobacco use, history of incarceration, younger age at sexual debut, and more than one sexual partner were statistically associated with illicit drug use.

CONCLUSIONS: Recent illicit drug use among psychiatric patients is higher than among the general Brazilian population and it is associated with multiple factors including markers of psychiatric severity. Our data indicate the need for the development of gender-based drug-use interventions among psychiatric patients in Brazil. Integration of substance use treatment strategies with mental health treatment should be a priority.

DESCRIPTORS: Mentally Ill Persons. Street Drugs. Risk Factors. Gender and Health. Multicenter Study.
INTRODUCTION

Illicit drug abuse and dependence are important public health issues worldwide. Data from the World Health Organization (WHO) show that substance use and mental disorders are, together, the number one cause of years lost due to disability (22% of YLD) and the 15 highest cause of disability-adjusted life years (7.4% of DALYs)\(^2\). During 2010, 3.4% to 6.6% of the worldwide adult population used some illicit substance, and 10% to 13% of this population demonstrated abuse or dependence. Illicit drug use greatly increases the probability of having health risk behavior and is associated with higher rates of overdose, suicide, violence, HIV infection, and sexual risk behavior\(^26,30\). Injecting drugs further increases these risks, and needle sharing may transmit blood-borne diseases among users\(^30\).

The association between mental disorders and psychoactive substance use has been frequently discussed in the literature since the 1990s. Despite varying prevalence rates in different countries\(^22\), high prevalence of illicit drug use in psychiatric patients is evident\(^21,18,23\). Data from the USA indicate that, while 3.7% of the persons without history of mental illness had a history of lifetime drug abuse or dependence, the rate was 14.7% (OR = 4.7; 95%CI 3.5–6.3) among those with any lifetime mental illness diagnosis\(^23\).

In the United Kingdom, Fisher et al.\(^6\) identified that psychiatric patients had twice the chance of developing a substance use disorder as compared to those with no mental disorders. A study carried out in São Paulo, Brazil, showed that 4.7% of adult patients with severe mental illness (SMI) in treatment fulfilled criteria for abuse or dependence of illicit drug use and 8.3% had used an illicit substance in the past year\(^19\). A current comorbid substance use disorder was present in 11.2% of a sample of outpatients with SMI in Rio de Janeiro, Brazil\(^31\).

Illicit drug use is associated with multiple factors, including child sexual abuse, parental violence, parents or sibling who also use drugs, and being younger, male, single, and with lower schooling\(^3,5\). Similar to the general population, drug use among patients with mental illness is higher among those who are male, younger\(^11,12,18\), single\(^18\), have family members who use drugs\(^3\), or have a history of homelessness or incarceration\(^21\).

There is a remarkable difference in rates of drug use between men and women. Use among women is lower than among men, with differences that vary from a 3:4 ratio in the United States to 1:10 in India and Indonesia\(^30\), indicating higher vulnerability among men. The only instance in which this ratio is reversed is in the use of tranquilizers and sedatives. Comorbidity between severe mental illness and substance use disorders is more prevalent among men, whereas women with alcohol or drug-associated disorders had twice the risk of having depressive and anxiety disorders when compared to men\(^29\).

Illicit drug use and mental illness can have a negative impact on health such as reduced adherence to treatment and worsen prognosis, leading to more intensive and expensive treatments in emergency settings\(^26\). However, few surveys on the association between illicit drug use and mental illness have been conducted in low and middle-income countries\(^11\). Brazil has scarce published data on illicit drug use among patients with mental illness and no studies with a national representative sample. This study aimed to estimate the risk behavior factors associated with recent illicit drug use among patients with mental illness in Brazil according to gender.

METHODS

We obtained data from a large national multicenter cross-sectional study conducted in 2006. The main objective was to determine the prevalence of infection with HIV, syphilis, and hepatitis B and C in a sample of adult psychiatric patients (18 years of age or older) in treatment in Brazil\(^30\).
A two-stage sampling procedure was carried out with a random selection of centers in each region followed by random selection of participants within each center\textsuperscript{20}. Sample size calculation considered 50\% average estimate of the conditions, 0.2\% precision, 5\% confidence level, and a potential 40\% loss. It was proportional to the type of care (hospital or Psychosocial Care Centers [CAPS]) and to the distribution of AIDS cases in the regions. Among the 3,255 patients recruited, 2,763 (84.9\%) were considered eligible as previously described\textsuperscript{8}. From these patients, 288 (10.4\%) did not participate for various reasons (such as refusal, non-attendance, death), amounting to a 26\% loss for the interview, below the initial estimate of 40\%. Public outpatient mental health clinics that exclusively treated substance use disorders (CAPS AD) were excluded from the sampling process to prevent the overestimation of the selected risk behaviors or prevalence rates. The study was carried out with 2,475 patients recruited from 11 psychiatric hospitals and 15 public mental health outpatient clinics (CAPS) distributed in the five Brazilian macroregions.

Patients who agreed to participate and were considered eligible underwent a face-to-face interview with a semi-structured questionnaire, tested in a preliminary pilot study\textsuperscript{8}, to collect information about health care, behavioral characteristics, and sociodemographic profile. Healthcare professionals who worked at the treatment services administered the interviews. Additional clinical data such as psychiatric diagnosis and treatment characteristics were collected from the medical records. The study included only patients able to provide written informed consent and who were able to answer the questionnaire after the administration of a preliminary assessment adapted from the Mini-Mental State Examination (MMSE). Further details have been previously published\textsuperscript{8}.

The outcome of interest for this analysis was recent illicit drug use (i.e., patients that reported using any illicit drug at least once during the 12 months prior to the interview). The illicit drugs considered were marijuana, cocaine, crack, hallucinogens, amphetamines, opiates, solvents, or other non-prescribed or illicit drugs.

Potential explanatory variables were divided into three groups: sociodemographic, clinical characteristics, and risk behavior. Sociodemographic characteristics included age, skin color, marital status, schooling, having an income in the last six months, place of residence, and professing a religion. Median age (40 years old) was used as a cutoff point. Skin color was dichotomized as non-white and white. For marital status, those who were single, separated/divorced, or widowed were grouped into one category. The cutoff point for schooling was five years (first cycle of elementary school). For housing, those living in houses or apartments were considered stable, while those living in shelters, pensions, hostels, and on streets were grouped as unstable. Clinical characteristics included main psychiatric diagnosis, history of hospitalization, medical comorbidities, and history of sexually transmitted infections (STI). The main psychiatric diagnosis was classified according to the International Classification of Diseases (ICD-10), defined by a psychiatrist as registered in the medical chart. This variable was dichotomized into severe mental illness (SMI) and compared to the other diagnoses. Severe mental illnesses included diagnoses of schizophrenia, bipolar disorders, and depression with psychotic symptoms\textsuperscript{25}. History of hospitalization was analyzed by dividing the sample into three categories: those who were hospitalized in one of the participating psychiatric hospitals during the study; those who were under care in CAPS but had a history of any previous hospitalization; and those who were under care in CAPS and had never been hospitalized. Risk behavior characteristics included the following variables: lifetime tobacco use, lifetime alcohol use, history of homelessness, history of physical and sexual violence, history of incarceration, age of first sexual intercourse, number of partners, and practice of unprotected sex. Lifetime risk behavior self-reports have demonstrated reliability\textsuperscript{4}. The cutoff point for age at first sexual intercourse was 18 years. Finally, those with two or more lifetime sexual partners were compared to those with only one or no partners, and unprotected sex was defined as not always using condoms in all sexual practices (ever).
Analyses were conducted separately for men and women. Descriptive analyses were carried out and the prevalence of recent illicit drug use was calculated by dividing the number of participants who reported using any illicit drug in the 12 months prior to the interview by the total number of participants, with 95% confidence interval (95%CI). For the univariate analysis, differences in proportion were assessed by Pearson's Chi-square test, and the magnitude of the associations was estimated by the odds ratio (OR) with 95%CI. A multivariate logistic model was used to estimate the independent effect of potential explanatory variables, using a sequential backward elimination method. Variables that presented p < 0.20 in the univariate analysis were initially included. Wald test was used to assess the statistical significance of each variable. Only those with p < 0.05 remained in the final model. Goodness of fit was assessed by the Hosmer-Lemeshow test. For statistical analysis, EpiInfo 7 and Stata 12 were used.

RESULTS

All participants who answered to the questionnaire were included in the study (n = 2,475): 51.6% were women (n = 1,277) and 48.4% were men (n = 1,198). As shown in Table 1, most men and women were 40 years old or over, single, with no income in the last six months, had stable housing, and professed a religion. Men were more likely than women to be single (75.8%) and to live in unstable housing (17.5%), whereas women were more likely than men to profess a religion (87.8%). Men were also more likely than women to have a severe mental illness diagnosis (61.0%), to be hospitalized during the study period (45.0%), and to have a prior history of hospitalization (34.4%). Overall, high prevalence of self-reported medical comorbidities (45.3%) and history of STI (23.3%) was also found. In addition, men had a higher proportion of tobacco smoking, alcohol drinking, early sexual debut (< 18 years old), more than one lifetime sexual partner, and history of incarceration and homelessness, whereas women had a higher proportion of history of sexual violence and lifetime unprotected sex (Table 1).

The overall prevalence of any illicit drug use was 11.4% in the past year and 25.4% during lifetime (Table 2). Compared to women, men had a higher prevalence of drug use, 17.5% versus 5.6% in the past year and 36.8% versus 14.7% for lifetime, respectively. For both men and women, the substance used with the highest prevalence was marijuana (8.8% in the past year and 21.9% for lifetime), followed by cocaine (3.4%, in the past year and 10.6% for lifetime). Both were more prevalent among men than women. A small proportion of the sample (2.9%) reported lifetime injection drug use, and use of more than one drug was reported by 24.1% of the men and 5.7% of the women. Finally, men had a higher proportion of drug use during sex (13.4%) and exchange of money or drugs for sex (40.4%) compared to women (5.6% and 13.2%, respectively) (Table 2).

In the univariate analysis, most of the variables investigated were statistically associated (p < 0.05) with recent illicit drug use (Table 3) for both men and women, including being younger, having less schooling, previous history of hospitalization, history of STI, and all risk behavior characteristics. On the other hand, being single and having an unstable place of residence were associated with illicit drug use among men only, and not professing a religion and medical comorbidities were associated with women only.

The final multivariate models (Table 4) indicated that age (< 40 years old), history of hospitalization, lifetime tobacco use, lifetime alcohol use, history of incarceration, age at sexual debut (< 18 years old), and number of sexual partners (two or more) remained independently associated (p < 0.05) with illicit drug use for both genders. In addition, not professing a religion also remained statistically significant among women, and lower schooling (< 5 years), history of homelessness, and history of physical violence remained statistically significant among men in the respective final models. Having an SMI diagnosis did not remain significant.
Table 1. Sociodemographic, clinical, and risk behavior characteristics by gender. PESSOAS Project, 2006–2007, Brazil. (n = 2,475)

| Characteristic                        | Men   | Women  | Total          |
|---------------------------------------|-------|--------|----------------|
|                                       | (n = 1,198) | (n = 1,277) | (n = 2,475) |
|                                       | n      | %*     | n      | %*     | n      | %*     |
| **Sociodemographic**                  |       |        |        |        |        |        |
| Age (years old)                       |       |        |        |        |        |        |
| < 40                                  | 594   | 49.6   | 530   | 41.5   | 1,124  | 45.4   |
| ≥ 40                                  | 604   | 50.4   | 747   | 58.5   | 1,351  | 54.6   |
| Skin color                            |       |        |        |        |        |        |
| Non-white                             | 613   | 51.2   | 587   | 46.0   | 1,200  | 48.5   |
| White                                 | 584   | 48.8   | 689   | 54.0   | 1,273  | 51.5   |
| Marital status                        |       |        |        |        |        |        |
| Single/Separated/Divorced/Widowed     | 907   | 75.8   | 746   | 58.4   | 1,653  | 66.8   |
| Married/Common-law marriage/Other     | 290   | 24.2   | 531   | 41.6   | 927    | 33.2   |
| Schooling (years)                     |       |        |        |        |        |        |
| < 5                                   | 593   | 49.5   | 660   | 51.7   | 1,253  | 50.6   |
| ≥ 5                                   | 605   | 50.5   | 617   | 48.3   | 1,222  | 49.4   |
| Income in last 6 months               |       |        |        |        |        |        |
| Yes                                   | 438   | 40.6   | 449   | 35.2   | 932    | 37.8   |
| No                                    | 708   | 59.4   | 825   | 64.8   | 1,533  | 62.2   |
| Housing                               |       |        |        |        |        |        |
| Unstable                              | 209   | 17.5   | 109   | 8.6    | 318    | 12.9   |
| Stable                                | 987   | 82.5   | 1,166 | 91.5   | 2,153  | 87.1   |
| Profess any religion                  |       |        |        |        |        |        |
| Yes                                   | 935   | 78.7   | 1,118 | 87.8   | 2,053  | 83.4   |
| No                                    | 253   | 21.3   | 155   | 12.2   | 408    | 16.6   |
| **Clinical**                          |       |        |        |        |        |        |
| Main psychiatric diagnosis            |       |        |        |        |        |        |
| SMI                                   | 731   | 61.0   | 682   | 53.4   | 1,413  | 57.1   |
| Non-SMI                               | 467   | 39.0   | 595   | 46.6   | 1,062  | 42.9   |
| Psychiatric hospitalization           |       |        |        |        |        |        |
| Current                               | 537   | 44.9   | 361   | 28.3   | 898    | 36.4   |
| Prior                                 | 411   | 34.4   | 378   | 29.7   | 789    | 31.9   |
| Never admitted                        | 247   | 20.7   | 535   | 42.0   | 782    | 31.7   |
| Self-reported medical comorbidity     |       |        |        |        |        |        |
| Yes                                   | 483   | 40.8   | 626   | 49.4   | 1,109  | 45.3   |
| No                                    | 700   | 59.2   | 641   | 50.6   | 1,341  | 54.7   |
| History of STI                        |       |        |        |        |        |        |
| Yes                                   | 311   | 26.4   | 257   | 20.4   | 568    | 23.3   |
| No                                    | 869   | 73.6   | 1,003 | 79.6   | 1,872  | 76.7   |
| **Risk behavior**                     |       |        |        |        |        |        |
| Tobacco use (ever)                    |       |        |        |        |        |        |
| Yes                                   | 970   | 81.3   | 798   | 62.9   | 1,768  | 71.8   |
| No                                    | 223   | 18.7   | 470   | 37.1   | 693    | 28.2   |
| Alcohol use (ever)                    |       |        |        |        |        |        |
| Yes                                   | 924   | 77.5   | 667   | 52.7   | 1,591  | 64.7   |
| No                                    | 269   | 22.5   | 598   | 47.3   | 867    | 35.3   |
| History of homelessness               |       |        |        |        |        |        |
| Yes                                   | 255   | 21.5   | 189   | 15.0   | 444    | 18.1   |
| No                                    | 934   | 78.5   | 1,071 | 85.0   | 2,005  | 81.9   |
| Physical violence                     |       |        |        |        |        |        |
| Yes                                   | 695   | 58.2   | 736   | 57.9   | 1,431  | 58.0   |
| No                                    | 499   | 41.8   | 536   | 42.1   | 1,035  | 42.0   |
Table 1. Sociodemographic, clinical, and risk behavior characteristics by gender. PESSOAS Project, 2006–2007, Brazil. (n = 2,475). Continuation

|                         | Men                  | Women                | Total               |
|-------------------------|----------------------|----------------------|---------------------|
|                         | n (n = 1,198) | %*   | n (n = 1,277) | %*  | n (n = 2,475) | %*  |
| Use in the past year    |                      |                     |                     |
| Marijuana               | 170                 | 14.2               | 47                  | 3.7  | 217          | 8.8   |
| Cocaine                 | 67                  | 5.6                | 18                  | 1.4  | 85           | 3.4    |
| Solvents                | 47                  | 3.9                | 12                  | 0.9  | 59           | 2.4    |
| Crack                   | 105                 | 8.8                | 28                  | 2.2  | 133          | 5.4    |
| Hallucinogens           | 18                  | 1.5                | 3                   | 0.2  | 21           | 0.9    |
| Amphetamine             | 21                  | 1.8                | 19                  | 1.5  | 40           | 1.6    |
| Opiates                 | 7                   | 0.6                | 2                   | 0.2  | 9            | 0.4    |
| Any illicit drug        | 210                 | 17.5               | 71                  | 5.6  | 281          | 11.4   |
| Lifetime use            |                      |                     |                     |
| Marijuana               | 403                 | 33.6               | 138                 | 10.8 | 541          | 21.9   |
| Cocaine                 | 205                 | 17.1               | 57                  | 4.5  | 262          | 10.6   |
| Solvents                | 198                 | 16.5               | 46                  | 3.6  | 244          | 9.9    |
| Crack                   | 164                 | 13.7               | 48                  | 3.8  | 212          | 8.6    |
| Hallucinogens           | 86                  | 7.2                | 20                  | 1.6  | 106          | 4.3    |
| Amphetamine             | 60                  | 5.0                | 44                  | 3.5  | 104          | 4.2    |
| Opiates                 | 22                  | 1.8                | 7                   | 0.6  | 29           | 1.2    |
| Any illicit drug        | 441                 | 36.8               | 188                 | 14.7 | 629          | 25.4   |
| Drug use (lifetime)     |                      |                     |                     |
| None                    | 752                 | 64.1               | 1,083               | 85.6 | 1,835        | 75.2   |
| One drug only           | 138                 | 11.8               | 111                 | 8.8  | 249          | 10.2   |
| Two or more drugs       | 283                 | 24.1               | 72                  | 5.7  | 355          | 14.6   |
| Injection drug use (lifetime) |          |                     |                     |
| Yes                     | 53                  | 4.5                | 19                  | 1.5  | 72           | 2.9    |
| No                      | 1,134               | 95.5               | 1,246               | 98.5 | 2,380        | 97.1   |
| Drug use during sexual practices |          |                     |                     |
| Yes                     | 132                 | 13.4               | 60                  | 5.6  | 192          | 9.3    |
| No                      | 853                 | 86.6               | 1,017               | 94.4 | 1,870        | 90.7   |
| Exchange money/drugs for sex |          |                     |                     |
| Yes                     | 484                 | 40.4               | 168                 | 13.2 | 652          | 26.3   |
| No                      | 714                 | 59.6               | 1,109               | 86.8 | 1,823        | 73.7   |

* Total values vary because of missing observations.

Table 2. Descriptive characteristics of illicit drug use (recent and lifetime) by gender. PESSOAS Project, 2006–2007, Brazil. (n = 2,475)

| Characteristic                  | Men (n = 1,198) | %* | Women (n = 1,277) | %* | Total (n = 2,475) | %* |
|---------------------------------|-----------------|----|-------------------|----|-------------------|----|
| Use in the past year            |                 |    |                   |    |                   |    |
| Marijuana                       | 170             | 14.2 | 47                 | 3.7 | 217               | 8.8 |
| Cocaine                         | 67              | 5.6  | 18                 | 1.4 | 85                | 3.4 |
| Solvents                        | 47              | 3.9  | 12                 | 0.9 | 59                | 2.4 |
| Crack                           | 105             | 8.8  | 28                 | 2.2 | 133               | 5.4 |
| Hallucinogens                   | 18              | 1.5  | 3                  | 0.2 | 21                | 0.9 |
| Amphetamine                     | 21              | 1.8  | 19                 | 1.5 | 40                | 1.6 |
| Opiates                         | 7               | 0.6  | 2                  | 0.2 | 9                 | 0.4 |
| Any illicit drug                | 210             | 17.5 | 71                 | 5.6 | 281               | 11.4|
| Lifetime use                    |                 |    |                   |    |                   |    |
| Marijuana                       | 403             | 33.6 | 138               | 10.8 | 541                | 21.9|
| Cocaine                         | 205             | 17.1 | 57                 | 4.5 | 262                | 10.6|
| Solvents                        | 198             | 16.5 | 46                 | 3.6 | 244                | 9.9 |
| Crack                           | 164             | 13.7 | 48                 | 3.8 | 212                | 8.6 |
| Hallucinogens                   | 86              | 7.2  | 20                 | 1.6 | 106                | 4.3 |
| Amphetamine                     | 60              | 5.0  | 44                 | 3.5 | 104                | 4.2 |
| Opiates                         | 22              | 1.8  | 7                  | 0.6 | 29                 | 1.2 |
| Any illicit drug                | 441             | 36.8 | 188               | 14.7 | 629                | 25.4|
| Drug use (lifetime)             |                 |    |                   |    |                   |    |
| None                            | 752             | 64.1 | 1,083             | 85.6 | 1,835              | 75.2|
| One drug only                   | 138             | 11.8 | 111               | 8.8 | 249                | 10.2|
| Two or more drugs               | 283             | 24.1 | 72                | 5.7 | 355                | 14.6|
| Injection drug use (lifetime)   |                 |    |                   |    |                   |    |
| Yes                             | 53              | 4.5  | 19                 | 1.5 | 72                 | 2.9 |
| No                              | 1,134           | 95.5 | 1,246             | 98.5 | 2,380             | 97.1|
| Drug use during sexual practices |                 |    |                   |    |                   |    |
| Yes                             | 132             | 13.4 | 60                 | 5.6 | 192                | 9.3 |
| No                              | 853             | 86.6 | 1,017             | 94.4 | 1,870             | 90.7 |
| Exchange money/drugs for sex    |                 |    |                   |    |                   |    |
| Yes                             | 484             | 40.4 | 168               | 13.2 | 652                | 26.3|
| No                              | 714             | 59.6 | 1,109             | 86.8 | 1,823              | 73.7|

* Total values vary because of missing observations.
| Characteristic                                      | Total* | Drug use | OR  | 95%CI | p    | Total* | Drug use | OR  | 95%CI | p    |
|----------------------------------------------------|--------|----------|-----|------|------|--------|----------|-----|------|------|
|                                                    | n      | %        |    |      |      | n      | %        |    |      |      |
| Sociodemographic                                   |        |          |    |      |      |        |          |    |      |      |
| Age (years old)                                     |        |          |    |      |      |        |          |    |      |      |
| < 40                                               | 594    | 168      | 28.3| 5.28 | 3.68–7.57 | 0.000 | 530     | 45  | 8.5  | 2.57 | 1.56–4.23 | 0.000 |
| ≥ 40                                               | 604    | 42       | 6.9 | 1.00 |        | 747    | 26       | 3.5  | 1.00 |      |        |
| Skin color                                         |        |          |    |      |      |        |          |    |      |      |
| Non-white                                          | 613    | 108      | 17.6| 1.01 | 0.75–1.36 | 0.945 | 587     | 38  | 6.5  | 1.37 | 0.85–2.22 | 0.190 |
| White                                              | 584    | 102      | 17.5| 1.00 |        | 689    | 33       | 4.8  | 1.00 |      |        |
| Marital status                                     |        |          |    |      |      |        |          |    |      |      |
| Single/Separated/Divorced/Widowed                  | 907    | 181      | 20.0| 2.24 | 1.48–3.40 | 0.000 | 746     | 47  | 6.3  | 1.42 | 0.86–2.35 | 0.171 |
| Married/Common-law marriage/Other                  | 290    | 29       | 10.0| 1.00 |        | 531    | 24       | 4.5  | 1.00 |      |        |
| Schooling (years)                                  |        |          |    |      |      |        |          |    |      |      |
| < 5                                                | 593    | 146      | 24.6| 2.76 | 2.00–3.80 | 0.000 | 660     | 45  | 6.8  | 1.66 | 1.01–2.73 | 0.042 |
| ≥ 5                                                | 605    | 64       | 10.6| 1.00 |        | 617    | 26       | 4.2  | 1.00 |      |        |
| Income in last 6 months                            |        |          |    |      |      |        |          |    |      |      |
| Yes                                                | 483    | 85       | 17.6| 0.99 | 0.74–1.35 | 0.979 | 449     | 28  | 6.2  | 1.21 | 0.74–1.98 | 0.446 |
| No                                                 | 708    | 125      | 17.7| 1.00 |        | 825    | 43       | 5.2  |      |      |        |
| Housing                                            |        |          |    |      |      |        |          |    |      |      |
| Unstable                                           | 209    | 24       | 11.5| 0.56 | 0.35–0.88 | 0.011 | 109     | 6   | 5.5  | 1.00 | 0.42–2.38 | 0.994 |
| Stable                                             | 987    | 186      | 18.8| 1.00 |        | 1,166  | 64       | 5.5  | 1.00 |      |        |
| Profess any religion                               |        |          |    |      |      |        |          |    |      |      |
| Yes                                                | 935    | 167      | 17.9| 1.00 |        | 1,118  | 55       | 4.9  | 1.00 |      |        |
| No                                                 | 253    | 43       | 17.0| 0.94 | 0.65–1.36 | 0.749 | 155     | 16  | 10.3 | 2.22 | 1.24–3.99 | 0.006 |
| Clinical                                           |        |          |    |      |      |        |          |    |      |      |
| Main psychiatric diagnosis                         |        |          |    |      |      |        |          |    |      |      |
| SMI                                                | 731    | 125      | 17.1| 0.93 | 0.68–1.26 | 0.641 | 682     | 41  | 6.0  | 1.20 | 0.74–1.96 | 0.450 |
| Non-SMI                                            | 467    | 85       | 18.2| 1.00 |        | 595    | 30       | 5.0  | 1.00 |      |        |
| Psychiatric hospitalization                         |        |          |    |      |      |        |          |    |      |      |
| Current                                            | 537    | 145      | 27.0| 3.98 | 2.45–6.47 | 0.000 | 361     | 41  | 11.3 | 6.10 | 3.09–12.05 | 0.000 |
| Prior                                              | 411    | 44       | 10.7| 1.29 | 0.75–2.23 | 0.360 | 378     | 19  | 5.0  | 2.52 | 1.19–5.36 | 0.016 |
| Never admitted                                     | 247    | 21       | 8.5 | 1.00 |        | 535    | 11       | 2.1  | 1.00 |      |        |
| Self-reported medical comorbidity                  |        |          |    |      |      |        |          |    |      |      |
| Yes                                                | 483    | 89       | 18.4| 1.09 | 0.80–1.48 | 0.587 | 626     | 27  | 4.3  | 0.61 | 0.37–1.00 | 0.048 |
| No                                                 | 700    | 120      | 17.4| 1.00 |        | 641    | 44       | 6.9  | 1.00 |      |        |
| History of STI                                      |        |          |    |      |      |        |          |    |      |      |
| Yes                                                | 311    | 76       | 24.4| 1.77 | 1.29–2.44 | 0.000 | 257     | 23  | 8.9  | 1.96 | 1.17–3.28 | 0.009 |
| No                                                 | 869    | 134      | 15.4| 1.00 |        | 1,003  | 48       | 4.8  | 1.00 |      |        |
| Risk behavior                                       |        |          |    |      |      |        |          |    |      |      |
| Tobacco use (ever)                                  |        |          |    |      |      |        |          |    |      |      |
| Yes                                                | 970    | 210      | 17.6| 6.22 | 3.13–12.33 | 0.000 | 798     | 63  | 7.9  | 4.95 | 2.35–10.42 | 0.000 |
| No                                                 | 223    | 9        | 4.0 | 1.00 |        | 470    | 8        | 1.7  | 1.00 |      |        |
| Alcohol use (ever)                                  |        |          |    |      |      |        |          |    |      |      |
| Yes                                                | 924    | 197      | 21.3| 5.34 | 2.99–9.52 | 0.000 | 667     | 58  | 8.7  | 4.29 | 2.32–7.90 | 0.000 |
| No                                                 | 269    | 13       | 4.83| 1.00 |        | 598    | 13       | 2.2  | 1.00 |      |        |
| History of homelessness                            |        |          |    |      |      |        |          |    |      |      |
| Yes                                                | 255    | 78       | 30.6| 2.72 | 1.97–3.77 | 0.000 | 189     | 24  | 12.7 | 3.17 | 1.89–5.32 | 0.000 |
| No                                                 | 934    | 130      | 13.9| 1.00 |        | 1,071  | 47       | 4.4  | 1.00 |      |        |
| Physical violence                                  |        |          |    |      |      |        |          |    |      |      |
| Yes                                                | 695    | 166      | 23.9| 3.33 | 2.33–4.76 | 0.000 | 736     | 56  | 7.6  | 3.07 | 1.69–5.58 | 0.000 |
| No                                                 | 499    | 43       | 8.6 | 1.00 |        | 536    | 14       | 2.6  | 1.00 |      |        |

Continue
### Table 3. Univariate analysis of recent illicit drug use stratified by gender. PESSOAS Project, 2006–2007, Brazil. (n = 2,475). Continuation

| Characteristics                  | Men (n = 2,475) | Women (n = 2,475) |
|----------------------------------|-----------------|-------------------|
|                                  | Yes            | Yes               |
| Sex difference                   |                |                   |
| Yes                              | 150 (6.1)      | 339 (6.6)         |
| No                               | 1,040 (42.0)   | 928 (45.0)        |
| History of incarceration          |                |                   |
| Yes                              | 493 (20.0)     | 339 (6.6)         |
| No                               | 701 (28.0)     | 34 (2.8)          |
| Age of first sexual intercourse   |                |                   |
| < 18 years old                   | 632 (26.0)     | 339 (6.6)         |
| ≥ 18 years old                   | 341 (14.0)     | 34 (2.8)          |
| Number of sexual partners        |                |                   |
| Only one or never had sex        | 292 (12.0)     | 513 (5.1)         |
| Two or more                      | 832 (34.0)     | 691 (6.6)         |
| Unprotected sex                  |                |                   |
| Yes                              | 909 (37.0)     | 1,055 (21.0)      |
| No                               | 275 (11.0)     | 209 (4.1)         |

SMI: Severe mental illness
* Total values vary because of missing observations.

### Table 4. Multivariate analysis stratified by gender. PESSOAS Project, 2006–2007, Brazil. (n = 2,358)

| Characteristic                   | Men (n = 1,146) | Women (n = 1,212) |
|----------------------------------|-----------------|-------------------|
|                                  | OR              | 95% CI            | p     | OR              | 95% CI            | p     |
| Sociodemographic                |                |                   |       |                |                   |       |
| Age (years old)                 |                |                   |       |                |                   |       |
| < 40                             | 6.12 (4.06–9.26)| 0.000             | 1.87  | 1.06–3.30      | 0.030             |       |
| ≥ 40                             | 1.00            |                   |       | 1.00           |                   |       |
| Schooling (years)                |                |                   |       |                |                   |       |
| < 5                              | 2.72 (1.84–4.02)| 0.000             | -     | -              | -                 | -     |
| ≥ 5                              | 1.00            |                   |       | -              | -                 | -     |
| Profess a religion               |                |                   |       |                |                   |       |
| Yes                              | -               | -                 | -     | 1.00           |                   |       |
| No                               | -               | -                 | -     | 2.09           | 1.07–4.08         | 0.032 |
| Clinical                         |                |                   |       |                |                   |       |
| Psychiatric hospitalization      |                |                   |       |                |                   |       |
| Current                          | 2.37 (1.36–4.13)| 0.002             | 4.46  | 2.13–9.31      | 0.000             |       |
| Prior                            | 0.93 (0.50–1.72)| 0.818             | 1.96  | 0.88–4.36      | 0.097             |       |
| Never admitted                   | 1.00            |                   |       | 1.00           |                   |       |
| Risk behavior                    |                |                   |       |                |                   |       |
| Tobacco use (ever)               |                |                   |       |                |                   |       |
| Yes                              | 5.57 (2.64–11.75)| 0.000             | 2.47  | 1.12–5.42      | 0.025             |       |
| No                               | 1.00            |                   |       | 1.00           |                   |       |
| Alcohol use (ever)               |                |                   |       |                |                   |       |
| Yes                              | 2.35 (1.22–4.54)| 0.011             | 2.17  | 1.12–4.22      | 0.022             |       |
| No                               | 1.00            |                   |       | 1.00           |                   |       |
| History of homelessness          |                |                   |       |                |                   |       |
| Yes                              | 1.75 (1.17–2.63)| 0.007             | -     | -              | -                 | -     |
| No                               | 1.00            |                   |       | -              | -                 | -     |
| Physical violence                |                |                   |       |                |                   |       |
| Yes                              | 1.78 (1.16–2.73)| 0.008             | -     | -              | -                 | -     |
| No                               | 1.00            |                   |       | -              | -                 | -     |
| History of incarceration         |                |                   |       |                |                   |       |
| Yes                              | 2.49 (1.78–3.5)| 0.000             | 1.98  | 1.07–3.65      | 0.029             |       |
| No                               | 1.00            |                   |       | 1.00           |                   |       |
| Age of first sexual intercourse  |                |                   |       |                |                   |       |
| < 18 years old                   | 1.66 (1.07–2.58)| 0.023             | 2.39  | 1.23–4.63      | 0.010             |       |
| ≥ 18 years old                   | 1.00            |                   |       | 1.00           |                   |       |
| Number of sexual partners        |                |                   |       |                |                   |       |
| One or never had sex             | 1.00            |                   |       | 1.00           |                   |       |
| Two or more                      | 3.26 (1.55–6.86)| 0.002             | 4.32  | 1.58–11.83     | 0.004             |       |

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DISCUSSION

Our study found higher rates of both past year (11.4%) and lifetime (25.4%) illicit drug use among psychiatric patients in relation to the rates in the Brazilian general population according to a household survey on drug use carried out in a similar period (2005) in collaboration with the Brazilian National Department on Drug Policies. Moreover, we found higher proportions of specific drug use compared with the same study in the past year (8.8% and 2.6% for marijuana, 3.4% and 0.7% for cocaine, 2.4% and 1.2% for solvents, 5.4% and 0.1% for crack use, respectively) and lifetime (21.9% and 8.8% for marijuana, 10.6% and 2.9% for cocaine, 9.9% and 6.1% for solvents, 8.6% and 0.7% for crack use, respectively). Higher proportions of illicit drug consumption among psychiatric patients are also found in other countries when compared to the general population, with similar results in a study carried out in London, Menezes et al. found that 43.3% of patients with SMI had used any drug during lifetime, and 4.7% of them presented some degree of substance use disorder in the year prior to the study. A review of the published literature on drug use among psychotic patients in the United Kingdom showed prevalence rates varying from 15% to 45% in the past year and from 16% to 68% for lifetime use.

In this study, for all substances, men had higher prevalence of use than women in the past year (marijuana: 14.2% versus 3.7%; cocaine: 5.6% versus 1.4%; solvents: 3.9% versus 0.9%; and crack: 8.8% versus 2.2%, respectively). Menezes et al. found similar results, in which men with SMI were 2.7 times more likely than women to have problems related to drug use. In Brazil, a household survey on drug use also indicated that men had a higher prevalence of use (lifetime) than women (marijuana: 14.3% versus 5.1%; cocaine: 5.4% versus 1.2%; solvents: 10.3% versus 3.3%, respectively).

We found that recent illicit drug use has strong and significant associations with alcohol and tobacco use for both men and women. Hasin et al. point out the consistency of associations between drug abuse, nicotine dependence, and alcohol use disorders even when controlling for sociodemographic characteristics and other comorbidities. De Leon et al. indicate that these overlapping disorders have important implications for treatment as patients with SMI who also abuse both alcohol and drugs rarely stop abusing just one of them.

The sociodemographic characteristics associated with drug use among patients with mental illnesses in our study are similar to those found in the general population. Our results are corroborated by previous studies that also indicate higher prevalence among men, younger persons, and those with lower schooling. Lower schooling was associated with recent use among men only, and professing a religion was negatively associated among women only. Professing a religion leads to the adoption of values and behavioral changes that restrict the use of illicit substances, thus acting as a protective factor.

Studies have shown that patients with mental illnesses are sexually active and present high rates of sexual risk behavior. In our study, we observed that recent illicit drug use was associated with younger age at sexual debut and having two or more sexual partners. The use of drugs may increase sexual risk behavior by modifying sexual impulses, thus increasing sexual desire, disinhibiting sexual behavior, or interfering with the practice of safer sex, or all of these.

Illicit drug use was independently associated with a history of incarceration for both genders and with homelessness and physical violence for men. A British survey showed that 16% to 42% of the incarcerated population with psychosis presented dependence on some drug in the year prior to incarceration. Persons with mental illness are more exposed to physical violence than the general population, which in turn is associated with illicit drug use, unstable housing or homelessness, and a history of incarceration. There is evidence that persons with mental illness are most often victims rather than perpetrators of violence. However, some authors have suggested an increase in violent behaviors when illicit drug use is present. These associations suggest the need to introduce new policies to address drug use...
and the need to prevent violence in mental health programs. We should note the existence of an important initiative in Brazil, named "doctor's office in the street" (Consultório de Rua, in Portuguese), which provides mobile health units for the health care of the homeless and it attempts to link them to health care units for continuous follow-up.

The association between current psychiatric hospitalization and illicit drug use in the past year found in our study is of clinical and management relevance. First, this finding corroborates the evidence that the association between mental disorders and drug use may lead to results of great severity. Furthermore, according to the studies of Kessler13, a history of previous psychiatric hospitalization may indicate higher chances of developing future substance use disorders. The temporal relationship between the emergence of psychiatric and substance use disorders is widely discussed in the literature. Kessler et al.14 and Swendsen et al.28 indicate that the emergence of a psychiatric disorder typically precedes substance use disorder. However, in a literature review of studies with patients with schizophrenia, Gregg et al.7 reported no clear consensus regarding this matter.

This study is the first one to assess illicit drug use in a representative sample of psychiatric patients under care in public mental health services in Brazil. However, some limitations must be pointed out. The results presented here may not be generalized to all psychiatric patients because of the exclusion of more severely ill patients who were unable to participate. We did not directly assess psychiatric diagnoses or symptoms, but we rather obtained these data from medical charts. Patients who were treated exclusively at substance use centers (CAPS AD) were excluded, which might have led to the underestimation of the prevalence of illicit drug use among persons with mental illnesses. Despite the odds ratio being an appropriate measure for this study, it can potentially overestimate associations. In addition, the cross-sectional design of the study limits our capacity to establish a direct cause and effect and additional studies are necessary.

Our results have important implications for the psychiatric care in Brazil. The treatment of psychiatric patients who use illicit drugs is a major challenge for mental health services. Often professionals are not prepared to assist these persons, and services are not structured to provide high quality treatment or referral. There is a need for comprehensive integrated services to assist this vulnerable population. Strategies should be gender specific with a particular emphasis on the vulnerability to illicit drug use of men with mental illness.

REFERENCES

1. Carlini EA, supervisor, Galduróz JCE, coordenador. II Levantamento domiciliar sobre o uso de drogas psicotrópicas no Brasil: estudo envolvendo as 108 maiores cidades do país 2005. São Paulo: Centro Brasileiro de Informação sobre Drogas Psicotrópicas; UNIFESP; 2006 [cited 2017 Apr 5]. Available from: http://www.cebrid.com.br/wp-content/uploads/2014/10/II-Levantamento-Domiciliar-sobre-o-Uso-de-Drogas-Psicotrópicas-no-Brasil.pdf

2. Carra G, Johnson S. Variations in rates of comorbid substance use in psychosis between mental health settings and geographical areas in the UK: a systematic review. Soc Psychiatry Psychiatr Epidemiol. 2009;44(6):429-47. https://doi.org/10.1007/s00127-008-0458-2

3. Degenhardt L, Hall W. Extent of illicit drug use and dependence, and their contribution to the global burden of disease. Lancet. 2012;379(9810):55-70. https://doi.org/10.1016/s0140-6736(11)61138-0

4. Farrell M, Boys A, Bebbington P, Brugha T, Cold J, Jenkis R, et al. Psychosis and drug dependence: results from a national survey of prisoners. Br J Psychiatry. 2002;181(5):393-8. https://doi.org/10.1192/bjp.181.5.393

5. Fergusson DM, Boden JM, Horwood LJ. The developmental antecedents of illicit drug use: evidence from a 25-year longitudinal study. Drug Alcohol Depend. 2008;96(1-2):165-77. https://doi.org/10.1016/j.drugalcdep.2008.03.003
Drug use in psychiatric patients in Brazil

6. Frisher M, Crome I, Macleod J, Millson D, Croft P. Substance misuse and psychiatric illness: prospective observational study using the general practice research database. *J Epidemiol Community Health.* 2005;59(10):847-50. https://doi.org/10.1136/jech.2004.030833

7. Gregg L, Barrowclough C, Haddock G. Reasons for increased substance use in psychosis. *Clin Psychol Rev.* 2007;27(4):494-510. https://doi.org/10.1016/j.cpr.2006.09.004

8. Guimarães MDC, Oliveira HN, Campos LN, Santos CA, Gomes CER, Oliveira SB, et al. Reliability and validity of a questionnaire on vulnerability to sexually transmitted infections among adults with chronic mental illness: PESSOAS Project. *Rev Bras Psiquiatr.* 2008;30(1):55-9. https://doi.org/10.1590/S1516-44462008000100005

9. Guimarães MDC, Campos LN, Melo APS, Carmo RA, Machado CJ, Accurso FA; PESSOAS Project Network Group. Prevalence of HIV, syphilis, hepatitis B and C among adults with mental illness: a multicenter study in Brazil. *Rev Bras Psiquiatr.* 2009;31(1):43-7. https://doi.org/10.1590/S1516-44462009000100011

10. Hasin DS, Stinson FS, Ogburn E, Grant BF. Prevalence, correlates, disability, and comorbidity of DSM-IV alcohol abuse and dependence in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Arch Gen Psychiatry.* 2007;64(7):830-42. https://doi.org/10.1001/archpsyc.64.7.830

11. 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(6):515-36. https://doi.org/10.1080/09595230600944461

12. Kessler RC, McGonagle KA, Zhao S, Nelson CB, Hughes M, Eshleman S, et al. Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States: results from the National Comorbidity Survey. *Arch Gen Psychiatry.* 1994;51(1):8-19. https://doi.org/10.1001/archpsyc.1994.03950010008002

13. Kessler RC, Nelson CB, McGonagle KA, Edlund MJ, Frank RG, Leaf PJ. The epidemiology of co-occurring addictive and mental disorders: implications for prevention and service utilization. *Am J Orthopsychiatry.* 1996;66(1):17-31. https://doi.org/10.1037/h0080151

14. Kessler RC. The epidemiology of dual diagnosis. *Biol Psychiatry.* 2004;56(10):730-7. https://doi.org/10.1016/j.biopsych.2004.06.034

15. Leon J, Diaz FJ. A meta-analysis of worldwide studies demonstrates an association between schizophrenia and tobacco smoking behaviors. *Schizophr Res.* 2005;76(2-3):135-57. https://doi.org/10.1016/j.schres.2005.02.010

16. McNiel DE, Binder RL, Robinson JC. Incarceration associated with homelessness, mental disorder, and co-occurring substance abuse. *Psychiatr Serv.* 2005;56(7):840-6. https://doi.org/10.1176/appi.ps.56.7.840

17. Meade CS, Sikkema KJ. HIV risk behavior among adults with severe mental illness: a systematic review. *Clin Psychol Rev.* 2005;25(4):433-57. https://doi.org/10.1016/j.cpr.2005.02.001

18. Menezes PR, Johnson S, Thornicroft G, Marshall J, Prosser D, Bebbington P, et al. Drug and alcohol problems among individuals with severe mental illness in south London. *Br J Psychiatry.* 1996;168(5):612-9. https://doi.org/10.1192/bjp.168.5.612

19. Menezes PR, Ratto LR. Prevalence of substance misuse among individuals with severe mental illness in Sao Paulo. *Soc Psychiatry Psychiatr Epidemiol.* 2004;39(3):212-7. https://doi.org/10.1007/s00127-004-0730-z

20. Ministério da Saúde (BR), Secretaria de Vigilância em Saúde, Programa Nacional de DST e Aids. Prevenção e atenção às IST/aids na saúde mental no Brasil: análises, desafios e perspectivas. Brasília (DF): 2008 [cited 2017 Apr 5]. (Série B. Textos Básicos de Saúde) (Série Pesquisas, Estudos e Avaliação, 11). Available from: http://bvsms.saude.gov.br/bvs/publicacoes/prevcaoo_atencao_istsaude_mental.pdf

21. Oliveira HN, Machado CJ, Guimarães MD. Factors associated with self-report of sexual violence against men and women with mental disorders in Brazil. *Soc Psychiatry Psychiatr Epidemiol.* 2012;47(10):1567-79. https://doi.org/10.1007/s00127-011-0463-8

22. Phillips P, Johnson S. How does drug and alcohol misuse develop among people with psychotic illness? A literature review. *Soc Psychiatry Psychiatr Epidemiol.* 2001;36(6):269-76. https://doi.org/10.1007/s001270170044

23. Regier DA, Farmer ME, Rae DS, Locke BZ, Keith SJ, Judd LL, et al. Comorbidity of mental disorders with alcohol and other drug abuse: results from the Epidemiologic Catchment Area (ECA) Study. *JAMA.* 1990;264(19):2511-8. https://doi.org/10.1001/jama.1990.03450190043026
24. Room R. Smoking and drinking as complementary behaviours. *Biomed Pharmacother.* 2004;58(2):111-5. https://doi.org/10.1016/j.biopha.2003.12.003

25. Schinnar AP, Rothbard AB, Kanter R, Jung YS. An empirical literature review of definitions of severe and persistent mental illness. *Am J Psychiatry.* 1990;147(12):1602-8. https://doi.org/10.1176/ajp.147.12.1602

26. Secretaria Nacional de Políticas sobre Drogas (BR). Relatório Brasileiro Sobre Drogas. Brasília (DF): SENAD; 2009 [cited 2017 Apr 5]. Available from: http://justica.gov.br/central-de-conteudo/politicas-sobre-drogas/relatorios-politicas-sobre-drogas/relatoriobrasileirosobredrogas-2010.pdf

27. Stall R, McKusick L, Wiley J, Coates TJ, Ostrow DG. Alcohol and drug use during sexual activity and compliance with safe sex guidelines for AIDS: the AIDS Behavioral Research Project. *Health Educ Q.* 1986;13(4):359-71. https://doi.org/10.1177/109019818601300407

28. Swendsen J, Conway KP, Degenhardt L, Glantz M, Jin R, Merikangas KR, et al. Mental disorders as risk factors for substance use, abuse and dependence: results from the 10-year follow-up of the National Comorbidity Survey. *Addiction.* 2010;105(6):1117-28. https://doi.org/10.1111/j.1360-0443.2010.02902.x

29. Teesson M, Hall W, Lynskey M, Degenhardt L. Alcohol and drug-use disorders in Australia: implications of the National Survey of Mental Health and Wellbeing. *Aust N Z J Psychiatry.* 2000;34(2):206-13. https://doi.org/10.1046/j.1440-1614.2000.00715.x

30. United Nations Office on Drugs and Crime. World Drug Report 2012. New York: United Nations; 2012 [cited 2017 Apr 5]. Available from: https://www.unodc.org/documents/data-and-analysis/WDR2012/WDR_2012_web_small.pdf

31. Wainberg ML, McKinnon K, Elkington KS, Mattos PE, Mann CG, Pinto DS, et al. HIV risk behaviors among outpatients with severe mental illness in Rio de Janeiro, Brazil. *World Psychiatry.* 2008;7(3):166-72. https://doi.org/10.1002/j.2051-5545.2008.tb00190.x

32. Whiteford HA, Degenhardt L, Rehm J, Baxter AJ, Ferrari AJ, Erskine HE, et al. Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. *Lancet.* 2013;382(9904):1575-86. https://doi.org/10.1016/s0140-6736(13)61611-6

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