Factors associated with antidepressant, anxiolytic, and other psychotropic medication use to treat psychiatric symptoms in the city of São Paulo, Brazil

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Abstract

The objective of this study was to examine the prevalence and characteristics of adult psychotropic medication use in São Paulo, Brazil. Information on lifetime and 12-month psychotropic medication use, and psychiatric status was obtained from a representative sample of 2,000 adults aged 18–65 in São Paulo, Brazil. Lifetime and 12-month use of psychotropic medications was 16.8% and 7.1% respectively. Of the 22.8% with current psychiatric problems, 29.5% reported lifetime use, and 15.8% (5.6% of the sample) reported 12-month use (anxiolytics: 2.7%, antidepressants: 1.8%, alternative medicines: 0.9%, antipsychotics: 0.4%, mood stabilizers: 0.4%, hypnotics: 0.3%; multiple class use occurred). The most frequent prescribers were psychiatrists and general practitioners. Determinants of use included identification as a psychiatric case (4-fold increased odds), being female (3-fold increase), age (4%–5% per additional year), and lower odds if married. Education, employment status, and birth in São Paulo were not associated with use. Income did not affect anxiolytic use, but antidepressant and alternative medicine use was associated with higher income. These results show that psychotropic drug use was comparatively low. Only 15.8% with psychiatric problems reported recent psychotropic use. Comparable to other studies, use was greater among women, and increased with age.

Keywords

psychotropic drugs; antidepressants; anxiolytics; psychiatric problems; depression; Brazil; pharmacoepidemiology; middle income country

Introduction

For the past 50 years, psychotropic drugs have been the mainstream treatment for adults with mental health problems (Zuvecas, 2005). Their efficacy has been well established in randomized controlled trials, and they have been found to be well tolerated and safe (Barbui et al., 2011; Hartling et al., 2012; Nardi et al., 2012; von Wolff et al., 2013).

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Several studies have investigated use of psychotropic drugs in upper income countries, and showed that extent of use varied. The European Study of the Epidemiology of Mental Disorders (ESEMeD /MHEDEA 2000 investigators, 2004), a 2001–2003 cross-sectional study of a representative sample of 21,425 adults aged 18 or older from six European countries (Belgium, France, Germany, Italy, The Netherlands and Spain), found that overall 12.3% had taken at least one psychotropic medication in the previous 12 months, ranging from 5.9% in Germany to 19.2% in France. Among those diagnosed with a mental disorder in the previous 12 months, 32.6% reported use of psychotropic medication. Current use among residents 15 years of age and older in France (in 1993), Germany (1996), Italy (1997) and the UK (1994), however, averaged 6.4% (Ohayon and Lader, 2002). Drug data published for Nordic countries in terms of defined daily dose (DDD)/1,000 inhabitants/day, for specific classes of medication (NOMESCO), report substantial differences in use across the eight countries. To take an extreme example, in 2002, DDD/1,000inhabitants/day for anxiolytics was 5.1 in Greenland and 31.5 in Finland; for antidepressants it was 14.2 and 43.1 respectively. In Norway, 15.3% of community residents were dispensed a prescription psychotropic drug in 2005 (Kjosavik et al., 2009).

Among Canadian residents age 15 years and older, 7.2% reported use of psychotropic medications in the previous 12 months (Beck et al., 2005). In the United States, for persons 6 years of age and older, psychotropic drug use increased from 5.9% in 1996 to 8.1% in 2001 (Zuvekas, 2005). In another study, of the population 17 years and older, psychotropic medication use increased from 6.1% 1988–1994 to 11.1% in 1999–2002 (Paulose-Ram et al., 2004; 2007).

In Brazil, the 1988 Federal Constitution, declaring that health is a right of all and a duty of the state, established the Single Health System (SUS-Sistema Único de Saúde) to provide universal, free and equal access to health care. Federal legislation in 1989 (National Division of Pharmaceutical Surveillance (DIMED), Ministry of Health, reported in Mari et al., 1993), and in 1998 (Portaria n.° 344, de 12 de maio de 1998), prohibited over-the-counter 'antidistônicos' (benzodiazepines associated with antispasmodics), required medical prescriptions for benzodiazepines, and restricted access to specified pharmacies. Effect on use of psychotropic medications is unclear. Before the 1989 legislation, a survey in 1977 of São Paulo residents 16 years of age and older reported a prevalence rate of 12.2% (Tancredi, 1979), while in 1987, 5.2% of a representative sample of the general population in Rio de Janeiro used psychotropic drugs (Almeida et al., 1994). In 1990, psychotropics were used by 10.2% of residents 15 years of age and older in São Paulo (Mari et al., 1993). In 2001/2002 use of psychotropics in Botucatu was 13.3% (Lima et al., 2008). In the city of Pelotas, psychotropic medication use declined from 11.9% to 9.9% between 1994 and 2003 (Lima, 1995; Rodrigues et al., 2006), a decline more apparent than real, since there was no significant difference after age adjustment.

Although these various studies differ with respect to date and age range, they consistently indicate greater use in women than in men, and increased use with age, although sometimes higher in middle age (Pratt et al., 2011). Association with income varied: higher in persons with lower incomes (Zuvekas, 2005; Olfson and Marcus, 2009), higher for higher income persons (Lima et al., 2008; Mari et al., 1993; Pratt et al., 2011), and no association with income (Rodrigues et al., 2006). Association with education was rarely reported.

Information is limited on the pattern of psychotropic use in the general population in middle income countries, the characteristics of users, the extent to which patients with psychiatric problems receive medications, or the source from which they obtain them. In Brazil, the differences found across studies may reflect differences in health services access,

geographic differences in diagnosis and prescribing, and change in the population age structure.

To clarify some of these issues, and update previous reports, in 2002 we carried out a cross-sectional study of psychotropic use in a representative sample of community residents aged 18 to 65 in the city of São Paulo. We explored sociodemographic and clinical characteristics of users, determined the extent to which persons who might benefit from these products reported using them, and identified prescribers and providers of psychotropic products in order to obtain a comprehensive and integrated picture of psychotropic use.

Method

Sample

Our information comes from a representative survey of community residents of the city of São Paulo [10,4 million inhabitants according to the demographic census of 2000 produced by the Brazilian Institute of Geography and Statistics (IBGE)], aged 18 through 65 years, carried out in May-June 2002. We sought a sample of 2,000, based on estimates using "Stats Direct" statistical software (StatsDirect, 2008), that, for 80% power, response frequency of 5%, standard deviation of 1%, and P<.05, a minimum of 1825 individuals was needed. The districts constituting São Paulo were identified, and the population of each was determined using year 2000 census (IBGE, 2000). Districts selection was proportional to the population in each district. Census tracts were randomly selected within each district and two blocks were randomly selected from each census tract. After selecting the blocks, the first household to be approached was defined through random selection of a crossing of two streets or avenues. Other households were selected using a systematic procedure. In each household, one resident, at random, aged 18 through 65 was selected to participate in the interview based on the birthday closest to the date of interview. Five interviews (with replacement) were conducted within each block, yielding groups of 10 subjects. The resulting distribution was proportional to the populations of the districts. This study was approved by the Ethics Committee of the Federal University of São Paulo (UNIFESP). All participants signed informed consent forms.

Data gathering procedures

Information was gathered in person, in the home, by trained interviewers using structured questionnaires.

Assessment of psychotropic medication use

Each respondent was asked "Have you ever used a medication for anxiety, tension, problems sleeping, depression, mental problem or nervousness in your life?" If "yes", respondents were then asked "Have you ever used a medication for anxiety, tension, problems sleeping, depression, mental problem or nervousness in the last 12 months?"

Respondents were asked to show their medications, together with packaging and instructions, when available. If not available, respondent recall was used. All medications taken in the past 12 months were recorded, and for psychotropic medications national brand names were noted. These were then converted using a drug coding system based on the Ministry of Health's National Agency of Sanitary Vigilance (ANVISA) list of controlled medicines. Participants using psychotropics in the last 12 months were also asked to identify the prescriber (by medical specialty, or whether a family member or friend), and the source from which obtained. Information on duration of use was not requested.

Psychotropic medications were grouped into five categories: anxiolytics (including benzodiazepines and non-benzodiazepine compounds such as buspirone), antidepressants (including tricyclics and new generation antidepressants), hypnotics (e.g., zolpidem, zoplicone, hypnotic benzodiazepines), antipsychotics (including typical, haloperidol, chlorpromazine and atypical antipsychotics such as clozapine, olanzapine, quetiapine and risperidone), and mood stabilizers (including lithium, carbamazepine, oxcarbazepine, valproate/divalproex, gabapentin, topiramate and lamotrigine). Anticonvulsants (carbamazepine, oxcarbazepine, valproate/divalproex, gabapentin, topiramate, lamotrigine) were considered mood stabilizers when participants indicated use in relation to a psychiatric condition. Teas, herbs, phytotherapy, and homeopathic preparations were labelled alternative medicine.

Inappropriately acquired medication was defined as a medication that required a prescription but which was obtained without one, or obtained from a source other than a dispensing pharmacy. Alternative medicine is excluded from this definition since it does not require a prescription.

Psychiatric assessment

Assessment of psychiatric morbidity was determined by the 12-item General Health Questionnaire (GHQ-12) (Goldberg, 1972; Goldberg and Williams, 1988), an evaluated modification of the GHQ-60, which was designed to detect minor psychiatric disorders in community and general practice studies. In particular, it identifies symptoms of depression and anxiety (Aalto et al., 2012). GHQ-12 was translated into Brazilian Portuguese. Evaluation indicated that performance was not affected by sex, age, marital status, income, education, or minority status, and that it could identify psychiatric "caseness" in primary care and community populations. Each of the 12 items is answered on a 4-point scale reflecting personal status in the last 30 days. For summary purposes, scores of 0 and 1 are coded as 0, scores of 2 and 3 are coded as 1. The potential scoring range is 0–12. A score of 4 or above identified "psychiatric cases" with a sensitivity of 82% and specificity of 77% (Mari and Williams, 1985).

Covariates

Based on a review of the literature, the following socio-demographic factors were examined as potentially predisposing to psychotropic use: gender; age; education (0–7 years of schooling vs. 8 years); income status, i.e., higher economic class (A, B; mean income >U.S.$200/month), vs. lower economic class (C, D, E; mean income U.S.$200/month), (classification system of the Brazilian Association of Market Research Institutes, ABEP, 2012); place of birth (São Paulo city vs. other); marital status (married, never married, previously married); and whether currently employed (yes, no).

Statistical procedures

The individual participant was the unit of analysis. The data were first summarized by means of percentages. Next, chi-square tests were used to examine differences in psychotropic use by sociodemographic and psychiatric case characteristics of (a) lifetime users, (b) all 12-month users, including those unable to provide specific psychotropic information, and (c) 12-month users who provided psychotropic medication information. We also compared the small group unable to provide medication information with the group who provided information. All variables were then entered into separate logistic regression models for users (a), (b), and (c), to examine association with psychotropic medication use, and compare these three groups. In particular we wished to compare the profiles of 12-month users who provided psychotropic medication information with those who did not, because further analyses on therapeutic drug classes depended on group (c). Since the N for

each therapeutic drug class was small, further logistic regressions were restricted to variables that had been found to be significant. Income was retained although not consistently significant, but marital status was dropped (policy may be more acceptable regarding income than regarding marital status). In examining determinants of anxiolytic and antidepressant use we therefore included gender, age, income, and psychiatric "caseness", but only income and "caseness" for alternative medicine use. All analyses used SPSS-15. An α-level of .05 indicated statistical significance.

Results

Of the sample, 52% were female, 43% were age 18 through 34, and 61% had 8 or more years of education. Seventy one per cent were in the low income category, and 68.2% were employed; 59% were married (11% were no longer married), and approximately half were born in the city of São Paulo. Nearly a quarter met 12-item GHQ criteria for "caseness" (see Table 1).

Of the 22.8% who met "caseness" criteria, 29.5% reported lifetime use of psychotropic medications, and 15.8% reported use in the past 12 months. Of those not meeting "caseness" criteria, 13.0% reported lifetime use of psychotropics, while 4.6% reported past 12-month use.

Lifetime use of psychotropic medication was reported by 16.8%, and use in the previous 12 months by 7.2%. Bivariate analyses indicated that the characteristics of recent users were comparable to those of lifetime users, i.e., compared to nonusers, both lifetime and 12-month users were more likely to be female, older, have higher income, previously married, and a larger proportion met "caseness" criteria (Table 1). Nearly twice as many women (21.7%) as men (11.4%) had taken at least one psychotropic drug at some time, while 3.8% of men and 10.2% of women had taken a psychotropic medication in the previous 12 months. Education, birth in São Paulo, and employment status did not distinguish psychotropic medication users from nonusers.

The 7.2% who had used some form of psychotropic intervention in the previous 12 months was made up of 5.6% who provided details of medication use, and 1.6% who were unable to do so. Bivariate analysis indicated that those unable to name their medications were younger, and more likely to be unemployed, but were otherwise comparable (data not shown).

Types of psychotropic medications taken in the previous 12 months

Psychotropic medications were first subdivided into prescription drugs (used by 4.8%) and alternative medicine (used by 0.9%). Marital status distinguished among psychotropic medication users, but not among alternative medicine users. Otherwise, there were no significant differences (data not shown).

Of the total sample, 2.7% reported taking anxiolytics, 1.8% antidepressants, 0.4% antipsychotics, 0.4% mood stabilizers, and 0.3% hypnotics, in addition to the 0.9% who used alternative medicine (some participants reported psychotropics in more than one class). Of the 38 antidepressants reported, 24 were tricyclic antidepressants (TCAs), nearly twice as many as selective serotonin reuptake inhibitors (SSRIs) (N=12), or newer agents (N=2). With the sole exception of buspirone, a non-benzodiazepine compound, all prescription anxiolytics were benzodiazepines.

Controlled characteristics of psychotropic medication users (Table 2)

Logistic regressions for (a) lifetime users (N=335), (b) all 12-month users (N=143), and (c) 12-month users who provided psychotropic medication information (N=112) (Table 2) found that the main differences among the three groups were with respect to income (higher income associated with providing psychotropic information), and marital status (the never married had a greater odds of being 12-month users). For all three groups, the odds of psychotropic use were 2-fold greater for women than for men (odds ratio (OR) ranging from 2.10 to 2.87), increased with age (by 3%–5% per year), and with "caseness": a 3-fold increase for "cases" if a lifetime user (OR=2.83), and a 4-fold increase among 12-month users (all 12-month users: OR=4.08; 12-month users providing psychotropic information: OR=4.27). Uniformly, psychotropic medication use was not associated with education, employment status, or São Paulo birth.

Characteristics associated with therapeutic drug class (Table 3)

Because of small sample sizes, only gender, age, income, and "caseness" status were included in analysis of anxiolytic and antidepressant use, and only income and "caseness" for alternative medicine users. Two notable differences were found between anxiolytic and antidepressant users. Income was not associated with use of anxiolytics, but higher income was associated with antidepressant use; and the odds of "cases" using anxiolytics (OR=7.02) was far higher than their odds of using antidepressants (OR=2.20). This difference, however, was not significant as indicated by overlapping confidence intervals. Women were about three times more likely than men to use anxiolytics or antidepressants, and use for each class of medication increased with age by 5% a year. Alternative medicine use was also more likely among those with higher income, and among "cases". The number of users of antipsychotics (n=9), hypnotics (n=6), and mood stabilizers (n=9) was too small to permit analysis.

Psychotropic drug prescribers (Table 4, final column)

The main prescribers for both anxiolytics and antidepressants were psychiatrists, representing 49% of all prescribers. They were followed by other specialists (31%), general practitioners (22%), and family and friends (2%). While psychiatrists were most likely to prescribe anxiolytics to 35–49 year olds, general practitioners and cardiologists did so for 50–65 year olds. Psychiatrists were also the main prescribers of antidepressants, particularly for age 35 and over. Neurologists were the next most important prescribers of antidepressants, more so than general practitioners.

Inappropriate acquisition of psychotropic medications

Five subjects obtained psychotropic drugs inappropriately. For four individuals this involved anxiolytic medications (two obtained them from a pharmacy but without a prescription, and two obtained them from family or friend), and for one person an antidepressant (obtained without a prescription from a pharmacy). Their characteristics were comparable to those of the group of psychotropic drug users as a whole.

Discussion

This study provides information on extent of use of medications for psychiatric symptoms in a representative sample of community residents aged 18–65 in the city of São Paulo. The sample's gender distribution is comparable to that obtained two years earlier in a census of the city, however, the sample's age distribution includes a smaller proportion of persons age 18–34 (43.1% vs. 47.7%), and a larger proportion age 50–65 (25.3% vs. 20.4%) (http://www.ibge.gov.br/censo)

Information was obtained on both lifetime use of psychotropic products, and use in the previous 12 months. The majority of the latter also provided information on the medication used, and the provider and source of acquisition.

Prevalence of psychotropic drug use

Lifetime use of psychotropic medication was reported by 16.8%, and use in the previous 12 months by 7.2%. Few studies report on lifetime use. Use in the previous 12 months is a more conventional time interval. Compared to other studies, the current study identified low use. Previous studies of São Paulo residents indicated 12-month use by 12.2% for 1977 (Tancredi, 1979), 10.2% for 1990 (Mari et al., 1993), and now 7.2% for 2002. If true, these findings suggest that in the city of São Paulo, legislation restricting access to psychotropic medications and to benzodiazepines has been effective, particularly since there has been an increase in the number of older people, who are more likely to be psychotropic drug users.

There is, however, no assurance of this throughout the country. In 2001/2002 in Botucatu, a major city about 240 km from São Paulo but in the same state, 13.3% reported use of psychotropic medications in the previous 3 days. Higher use was attributed to a population-responsive network of healthcare services. Further, 2003 data from Pelotas, in southern Brazil, reported use by 9.9% in the previous two weeks. This city had expanded its mental health services. It is possible that in some locations legislation reduced psychotropic drug use (e.g., in São Paulo), while with improved health care access, psychotropic drug use increased elsewhere.

Comparison with prevalence data across countries is difficult because of methodological differences, including data gathering approach (in person vs. telephone), data source (self-report vs. administrative data), actual use vs. receipt of prescription, age range and age structure of the sample, sampling strategies, and the time frame considered. Comparison is also questionable because each country's health system makes different provisions for medications. Nevertheless, the differences in prevalence rates may provide interesting information. The ESEMeD/MHEDEA 2000 study (ESEMeD/MHEDEA 2000 investigators, 2004) in six European countries showed a greater than 3-fold difference in prevalence between the low of 5.9% for Germany and the high of 19.2% for France; in this series our study has the next-to-lowest prevalence rate. Our rate is comparable to the 7.2% rate reported for Canada (Beck et al., 2005), lower than rates reported for the US (Paulose-Ram et al., 2007; Zuvekas, 2005), and less than half the 15.3% reported for Norway (Kjosavik et al., 2009). Our rate is, however, higher than the 6.4% obtained in a 1994–1997 general population survey in France, Germany, Italy and the UK (Ohayon and Lader, 2002), but the latter refers to current use, 12-month use is likely higher.

Sociodemographic characteristics of drug users

Our findings on higher use by women, and increased use with age agrees with the majority of investigations (Kjosavik et al., 2009; Lima et al., 2008; Mari et al., 1993; Paulose-Ram, 2007; Pratt, 2011; Tancredi, 1979; Zuvekas, 2005). Higher psychotropic drug use in women may be attributable to readier expression of emotional feelings, more frequent help-seeking behavior (Biddle et al., 2004), and biological factors associated with anxiety and/or depression (Holsen et al, 2011; Molendijk et al, 2012).

The literature presents conflicting reports regarding socioeconomic status and psychotropic use, at times differing across years in the same study. Data from Brazil indicate higher use with higher income (Lima et al., 2008; Mari et al., 1993), no association with income (Rodrigues et al., 2006), and no association with education in 1994, but less use with higher education in 2003 (Rodrigues et al., 2006). Similarly for the US, higher use with higher

income (Pratt et al., 2011), higher use with higher or lower income, depending on year (Olfson and Marcus, 2009), and higher use with lower income (Zuvekas, 2005).

Our findings show no association of prescription psychotropic medication use with education, but are unclear with respect to income. Lack of education does not appear to hinder access, but use of certain medications (antidepressants and alternative medicine), was associated with higher income. Alternative medicines are available without prescription, and are paid out-of-pocket. While Brazil has health units where prescription medications are available without cost, free access is not universal. In consequence, cheaper medications may be preferred.

Pattern of psychotropic medication use

Preference for cheaper medications may help explain the high use of anxiolytics (benzodiazepines are comparatively cheap), and among antidepressants the higher use of TCAs (1.2% vs. 0.8% for SSRIs and newer products). With efficacy comparable to that of TCAs, SSRIs and newer antidepressants have a preferred side-effect profile, but are also more expensive. The overlap in indications for anxiolytics and antidepressants provides additional freedom to prescribe that which can be afforded. Nevertheless, there appears to have been a marked change in psychotropic medication prescribing in São Paulo since the 1990 survey (Mari et al., 1993), when 8.04% were taking tranquilizers, and only 0.29% reported antidepressants. Twelve years later we found that anxiolytic use had dropped to nearly a third, while there had been a 6-fold increase in antidepressant use. This may reflect the impact of legislation restricting access to benzodiazepines, but there may also have been a change in clinical practice. Clinicians may have become more alert to detect and treat depressive symptoms or disorders. In addition, some psychiatrists may be placing greater emphasis on treating anxiety disorders with antidepressants, in line with current guidelines (National Guideline Clearinghouse, 2009). Such change has been noted elsewhere also (Stephenson et al., 2013).

The general pattern of therapeutic class use in the current study, i.e., where anxiolytic use exceeds antidepressant use, and use of other psychotropic classes is much less, agrees with most European and Nordic country studies (ESEMeD /MHEDEA 2000 investigators, 2004; Kjosavik et al., 2009; Ohayon and Lader, 2002). An exception is Ohayon et al. (1998). North American and Australian studies, however, not only report higher use of antidepressants than of anxiolytics (Beck et al., 2005; Paulose-Ram et al., 2007; Stephenson et al., 2013; Zuvekas, 2005), but find a marked increase in the rate of depression and antidepressant medication use (Colman et al., 2006; Compton et al., 2006; National Center for Health Statistics, 2011, pp. 19, 62; Olfson and Marcus, 2009; Stephenson eet al., 2013). Kessler et al. (2005), however, found no change in the prevalence of mental disorders between 1990/1992 and 2001/2003.

Studies in Brazil are mixed, two report higher use of anxiolytics (Mari et al., 1993; Rodrigues et al., 2006), and one higher use of antidepressants (Lima et al., 2008). It is unclear whether differences in anxiolytic and antidepressant use reflect changes in diagnostic criteria, treatment guidelines, differences in presentation of symptoms, prescriber knowledge, influence of pharmaceutical companies, insurance coverage, or medication affordability.

Twelve-month use of alternative medicine was reported by 0.9% of the participants (2.2% meeting psychiatric "caseness" status). The lower rate than reported by population studies elsewhere undoubtedly reflects the restricted range of alternative medicine used here (alternative medical approaches were excluded).

Psychotropic medication providers

In the current study, psychiatrists were the main providers of psychotropic medications, followed by general practitioners. This is contrary to most other studies that indicate that general practitioners were the primary prescribers (anywhere from 47%–80%) (Kjosavik et al., 2009; Mari et al., 1993; Ohayon et al., 1998; 2002; Tancredi, 1989), particularly for older people (Kjosavik et al., 2009). It is unclear why, in the current study, general practitioners, who 12 years earlier, in the same city, were the main prescribers of tranquilizers (Mari et al., 1993), and who can be expected to represent the first line of medical care, may no longer be the main providers of psychotropic medication. While the shift to psychiatrists may be associated with use of private insurance which allows direct access to specialists, it is a matter of concern, since in Brazil the percentage of 20–64 year olds seeking medical treatment has increased from 56.6% in 1998 to 69.1% in 2008 (IBGE, 1998; 2010), probably attributable to revised health policies, and programs improving access to health care (Atenção Básica, 2012). As medical visits increase, psychiatric problems are more likely to be recognized, and psychotropic medications to be prescribed. To maintain control of medical costs, attention should be paid to providing the general practitioner with the means to recognize when psychiatric treatment is needed, and what treatment to prescribe.

Inappropriate acquisition

Four of the five people who obtained psychotropic medications inappropriately obtained anxiolytics, half obtained them from friends. Although these figures may indicate the success of the new medication policy they also highlight the relevance of close personal relationships for getting these medications.

Medication use and psychiatric status

Of those evaluated, nearly a quarter, 22.8%, met criteria for "caseness". Of these, only 16.2%, approximately one in six, reported using any psychotropic product within the past 12 months, and only 29.5% had ever used such a product. Considered another way, of those taking psychotropic medication in the past 12 months, approximately half (71/143) were not "cases". They represent 4.6% of "non-cases". We cannot determine whether "cases" received adequate treatment since non-drug treatment was not assessed, and we cannot say that psychotropic medication use by "non-cases" is inappropriate. Treated "cases" may keep psychotropics in reserve against future need. Many psychotropics may be prescribed for reasons other than mental health, or may be prescribed for specific symptoms in a patient who does not meet "caseness" criteria (Stephenson et al., 2013).

Limitations

This study has limitations common to epidemiological surveys. Certain people (the homeless, the incarcerated, the institutionalized), are not represented. Findings hold only for 18–65 year olds, must be generalized with care in São Paulo, and may not be generalizable beyond that city because of differential access to health care services, we do not know whether the psychiatric "caseness" criteria used fit standard diagnostic criteria (e.g., ICD-9, ICD-10, DSM-IV-R). Current "caseness" may not reflect lifetime "caseness", or "caseness" during the previous 12 months. Although as far as possible the information obtained was objective, some information on psychotropic drug use, the provider, and the manner of acquisition was self-reported, and open to errors of recall. Other studies, however, have found self-reported drug use to be reliable (Solbergsdottir et al., 2004). Stigma may have posed threats to reporting information (Blay et al., 2008; Peluso and Blay, 2004; 2009a; 2009b). We did not enquire into the presence of a seizure condition, and have classified anticonvulsants as mood stabilizers, since that is how they are also used.

The information obtained here is a single occasion snapshot. Neither past psychiatric history nor past treatment is known. If a case received effective treatment, that person should no longer be identifiable as a "case". If onset is recent, treatment may not yet have been received. Even gold standard diagnosis, is not always accurate. Brief screens, such as the GHQ-12 (which has high sensitivity but lower specificity), while valuable for epidemiological surveys, may misclassify as "cases" persons who are not, resulting in attenuation of findings. However, while weaker associations may be missed, stronger associations will stay, so that confidence in the findings remains.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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