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ORIGINAL ARTICLE

Patterns and predictors of health service use among people with mental disorders in São Paulo metropolitan area, Brazil

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Aims. Important transformations in psychiatric healthcare (HC) delivery have been implemented in Latin America during the beginning of 21st century. However, information on current service uses patterns is scant, obstructing the estimates and proper planning of service needs for general population. The current investigation aims to describe patterns and estimates predictors of 12-month HC use by individuals with mental disorders in São Paulo metropolitan area, Brazil.

Method. Data are from São Paulo Mental Health Survey, a cross-sectional multistage representative study. Participants were face-to-face interviewed in their household, using a structured diagnostic interview, the World Mental Health Survey Initiative version of the Composite International Diagnostic Interview. A total of 5037 respondents, non-institutionalised, aged 18 years and older were interviewed. The response rate was 81.3%. We determined the percentages of individuals with 12-month *DSM-IV* anxiety, mood and substance disorders that received treatment in the 12 months prior to assessment in main service sectors (specialty mental health, general medicine, human services (HS), and complementary and alternative medicine). The number of visits and percentage of individuals who received treatment at minimally adequacy also was estimated. Multilevel regression controlled contextual variables that influenced the use of service and treatment adequacy.

Results. Only 10.1% of respondents used some HC service in the 12 months prior to assessment for their psychiatric problems, including 3.9% of them being treated either by a psychiatrist, 3.5% by a non-psychiatrist mental health specialist, 3.3% by a general medical (GM) provider, 1.5% by a HS provider and 1.4% by a complementary and alternative medical provider. In general, those participants who received service in the mental health specialty sector reported more visits than those in the GM sector (median 3.9 *v.* 1.5 visits). The cases seen in specialty sector outnumber those visiting GM treatment in terms of minimally adequate treatment (54.6 *v.* 23.2%). The likelihood of receiving treatment was significantly greater among individuals diagnosed with any anxiety and mood disorder, presenting more severe disorders, and with possession of HC insurance.

Conclusions. The great majority of individuals with an active mental disorder in São Paulo were either untreated or insufficiently treated. Awareness and training programmes to GM professionals are advocated to improve recognition, care take and referral to specialty care when needed. Proper integration among HC sectors is recommended.

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Key words: Brazil, determinants of health, mental health, use of health service.

Background

Reviews of burden of disease have reported high prevalence of common mental disorders across world regions (Baxter *et al.* 2013; Ferrari *et al.* 2013), but less than one-third of people with neuropsychiatric disorders receive the care they need (Lopez *et al.* 2006). Albeit efficacious treatments for psychiatric disorders are increasingly obtainable in healthcare (HC) services,

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the identification of emotional problems and access to treatment remain low (Demyttenaere *et al.* 2004). Though non-developed regions account for three-quarters of the global burden attributable to neuropsychiatric disorders, health facilities are undersupplied and insufficient personnel exists (Wang *et al.* 2007; Kessler *et al.* 2008). Hence, comprehensive data on extent and nature of treatment needs for the HC services being used (Mechanic, 2003) are decisive in reorganisation of health systems and resource distribution (Hu, 2003).

Traditional focus of mental health treatment in Latin America and Caribbean (LAC) was disproportionately placed on severe and low prevalence mental disorders, such as psychotic disorders (Kohn *et al.* 2005). After psychiatric reform in LAC (de Almeida & Horvitz-Lennon, 2010), resources were progressively directed for less serious but more common disorders. However, services for treating mental disorders in both general health and mental health sectors persist deeply deregulated and uncoordinated, indicating enduring fragmentation of under-resourced HC systems (Gregório *et al.* 2012).

For the case of Brazil, recent advance in health conditions and life expectancy can be attributable to improvement of social determinants of health and broad enforcement of a national health system (Victora *et al.* 2011). Nevertheless, enrooted socio-economic inequality remains elevated, with huge impact in the health system, being comparable with countries in LAC and Africa (Central Intelligence Agency, 2015). Over the past two decades, the custodial hospital-centred system has gradually replaced by community-centred facilities (Rosen *et al.* 2012) and the Family Health Programme has extended universal coverage of the Unified Health System (SUS) to general population, along with complex health services and outreach programmes. Nevertheless, the access to health service seems unceasingly restricted in size: growing coverage of mental HC by primary care sector (Fortes *et al.* 2014) and adoption of alternative treatments for mental problems (Barros & Fiuza, 2014) suggest the high demand of health needs. Many people still prefer resort to private health insurance and private doctors for treatment of emotional problems.

Service utilisation research on how individuals receive treatments and why seek or do not seek health care for emotional suffering may improve HC system through intricate perspective of mental health (Pescosolido & Olafsdottir, 2013). For examining changes in treatment delivery, we aimed to describe health service use by people with mental disorders from São Paulo metropolitan area. First, the percentages of individuals whom received any type of service were assessed, in accordance with disorder diagnoses, service sector, number of visits and treatment adequacy. Also, socio-demographic and contextual factors associated with service use were determined.

Methods

Survey population

The São Paulo Mental Health Survey, the Brazilian branch of the World Mental Health Survey Initiative (Kessler *et al.* 2006), was conducted as a cross-sectional representative survey of non-institutionalised adults living in São Paulo metropolitan area. The city of São Paulo and 38 contiguous municipalities comprise this urban region of around 20 million inhabitants. In accordance with the Brazilian Institute of Geographic and Statistics (IBGE, 2001), about 11 million residents of area were aged ≥18 years during data collection (from 2005 to 2007). Participants were selected through a stratified, multistage area probability sampling. Households from two strata of the Sao Paulo metropolitan area were selected: the city of São Paulo and the surrounding municipalities.

The primary sampling units (PSUs) were the year 2000 census count areas cartographically defined by IBGE. The city of São Paulo made up 40% of the sample (96 PSUs) and contiguous municipalities 60% (38 PSUs), totalling 134 PSUs. Projecting non-response rate of 35%, 7700 households were selected. Within each household, one respondent per dwelling was selected through Kish table. The final sample size was 5037, response rate 81.3% (Viana *et al.* 2009).

The Research and Ethics Committee of the University of São Paulo Medical School authorized the field protocols. After information, all participants have signed a written consent before entering the study.

Socio-demographic variables

Socio-demographic factors were: sex; age; education (fundamental, high school, college and post-graduate); marital status (married/cohabiting, previously married and single); and family income. Household income ratio was calculated per-family-member in relation to the median in the sample. The possession of private HC insurance was recorded as 'yes' or 'not'.

Twelve-month mental disorders and severity

Trained lay interviewers assessed the diagnoses of mental disorder by World Mental Health Survey version of Composite International Diagnostic Interview (WMH-CIDI) (Kessler & Üstün, 2004). The algorithm generated DSM-IV disorders for all 5037 participants

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(Part I): anxiety (panic, agoraphobia without panic, specific phobia, social phobia, generalised anxiety, separation anxiety), mood (bipolar I and II, major depression and dysthymia) and substance use (alcohol/drug abuse and dependence) disorders.

For 2942 respondents, diagnoses of obsessive-compulsive and post-traumatic stress disorders also were assessed (Part II). This subsample of respondents included (a) all individuals with diagnosis of 'core' mental disorders assessed in Part I; (b) subthreshold disorders (symptomatic, but without meeting the diagnostic criteria); and (c) random subsample of subjects without psychopathology. Clinical reappraisal with the Structured Clinical Interview for DSM-IV axis I diagnoses (First *et al.* 2002) has demonstrated acceptable agreement between CIDI and clinician-rated diagnoses (Haro *et al.* 2006).

For categorising functional impairment, 'severe' mental disorders labelled respondents who were diagnosed with bipolar I disorder, or substance dependence with physiologic signs; had attempted suicide in the past year, or were diagnosed with more than one core DSM-IV diagnosis and showed high impairment as rated on the Sheehan Disability Scale. The impairment ascribed to mental disorder during the worse month in past year was assessed for following domains: work performance, household maintenance, social life and intimate relationship. Possible categories and scores of impairment were: none = 0; mild = 1–3; moderate = 4–6; severe = 7–9; and very severe = 10. Respondents presenting multiple disorders were assigned to the highest score for any single disorder.

Otherwise, respondents were labelled 'moderate' if they had at least one disorder with moderate impairment on any domain or substance dependence without physiological signs. The remaining respondents with any active disorder were categorised as 'mild'. Accordingly, respondents were classified as having 'no disorders', 'mild', 'moderate' or 'severe' disorders.

Twelve-month use of health services

After assessment of mental disorders, respondents ($N = 2942$) were inquired whether they ever obtained care for 'problems with…emotions or nerves or…use of alcohol or drugs'. Contacts with following professionals were asked: psychiatrist, general practitioner or family physician, any other physician (e.g., cardiologist, gynaecologist or urologist), social worker, counsellor, any other mental health personnel (e.g., psychotherapist or mental health nurse), religious or spiritual advisor (e.g., minister, priest or rabbi) or healer (e.g., chiropractor, herbalist or spiritualist). Assessments included other types of HC specialists, self-help groups, support groups, non-psychiatric mental health telephone hotlines, complementary and alternative medicine (CAM) cares and hospital admissions. Further questions on number and duration of visits in the past 12 months were recorded.

The use of health service was categorised as a visit to: (i) psychiatrist; (ii) non-psychiatrist mental health specialist: other mental health professional or psychologist, counsellor or social worker in a mental health specialty (MHS) setting, or mental health hotline; (iii) general medical (GM) provider: primary care physician, nurse, other general physician or professional; (iv) human services (HS): social worker, counsellor, religious or spiritual advisor in any non-MHS setting; and (v) CAM professional: any type of healer, such as a chiropractor, Internet support or self-help group. Psychiatrist and non-psychiatrist specialists were merged into the category of MHS. In addition, MHS was combined with GM as HC sector. Likewise, HS and CAM were grouped as a non-HC sector.

Minimally adequate treatment

Based on the clinical guidelines (Katon *et al*. 1995, 2002; Wells *et al*. 2000; American Psychiatric Association, 2002, 2006; Bandelow *et al*. 2012), adequate treatment was considered either ≥2 months of an adequate medication for target disorders and ≥4 visits to any type of professionals, or ≥8 appointments to receive psychotherapy sessions (≥30 min). When respondents presented multiple disorders, the treatment adequacy was assessed independently for each disorder.

A broader criterion of treatment adequacy was adopted in sensitivity analyses for those respondents at the beginning of treatment or receiving brief interventions for some disorders (e.g., Ost *et al*. 1997; Ballesteros *et al*. 2004). Therefore, obtaining ≥2 visits to a suitable treatment sector, i.e., 1 visit for diagnosis and ≥1 visit for treatment, were considered appropriate.

Theoretical model of health services utilisation

Treatment was examined in multilevel theoretical framework that incorporates both individual and contextual determinants of service use (Andersen *et al*. 2014), the Behavioral Model of Health Services Utilization (Andersen, 1995). In this model, the treatment need is indicated as the presence of psychopathology (health status or diagnosis of mental disorder) and illness severity. Need factor must be examined along with individual predisposing factors (e.g., sex, age, marital status, schooling, genetics), enabling factors (income and possession of health insurance), health behaviours (contact to HC services) and outcomes (quality of life). Effective allocation of treatment is related to enabling contextual factors (provider

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density, socio-economic inequality, area-level of violence, area-level median-income) to meet the needs (Babitsch *et al.* 2012).

For conducting multilevel analysis, data on median area income, socio-economic inequality (Gini index) and local violence level (age-adjusted homicide rate) were extracted from IBGE and DATASUS for 38 adjacent municipalities (average of 232 751 residents) and 31 neighbourhoods ('subprefeituras') of the city of São Paulo (average of 355 467 residents), totalling 69 areas. Provider density was derived after exhaustive enumeration of public-funded services in each neighbourhood. Services were classified as MHS and GM providers in accordance with delivered type of care. Thereafter, the number of facilities was divided by the size of area population to denote provider density.

Analysis procedures

The data were weighted to adjust for differential likelihood of selection, non-response, residual disparities between the sample and Brazilian population, and oversampling of surveyed sample. Elementary patterns of HC sector use by type of active mental disorders were computed as proportions in treatment, median number of visits, and proportions of minimally adequate treatments. Analyses of pattern of service use determined the percentage of patients at the beginning of treatment or receiving brief interventions.

Multivariable logistic regression analyses examined socio-demographic variables of receiving any treatment in the sample, and treatments meeting the criteria for minimal adequacy (Model 1). The logistic regression coefficients were transformed to odds ratios (OR) with design-adjusted 95% confidence intervals (CI). Individual variables included in the Model 1 were: sex, age, marital status, schooling, family income, health insurance possession, health status (presence of psychiatric diagnosis) and disease severity.

Following, multilevel analyses were performed to investigate if contextual variables were associated with use of health services and treatment adequacy (Model 2). We performed multilevel logistic generalised estimating equations (GEE) to estimate the population-averaged results while accounting for the dependency between observations within areas of residence. Cluster-based measures of areas of residence (level 2) were: socio-economic inequality (Gini index), median income, local violence (homicide rate) and provider density (MHS and GM).

For the multivariable analysis, we used fractional polynomial (FP) transformations of the continuous variables (age, income, Gini, median income, local violence and provider density) to allow for non-linear modelling of continuous variables without losing information or inflating the number of parameters (Altman & Royston, 2006; Schmidt *et al.* 2013). We used the 'FP' procedure in Stata 13 (StataCorp, 2013), which enables the functional form of the predictors to be determined from the set {−2, −1, −0.5, 0, 0.5, 1, 2 and 3}. Power analysis using alpha 0.05 was performed using the Stata *powerlog* program for logistic regressions for our three classes of mental disorders in relation to dependent variables. Significance of design-based comparisons was set at level of 0.05, using two-sided tests.

Results

Probability of 12-month service use

The prevalence of 12-month disorders in the survey is high (Andrade *et al.* 2012). Briefly, around 30% of respondents reported one DSM-IV disorder, evenly distributed across severity levels. Anxiety disorders were the most common disorders (19.9%), followed by mood (11%), and substance use (3.6%) disorders. For the subsample of 2942 individuals, 10.1% of respondents reported any use of services in 12 months before the interview, including 23.0% of those with disorders and 4.8% of those without them (Table 1). The highest proportion of cases in treatment was panic disorder and the lowest was alcohol abuse. Most service use was provided by HC sector (8.8% of respondents, 87.1% of those in treatment) and, within the HC sector, in the MHS (6.3% of respondents, 62.4% of those in treatment).

Number of visits

Among patients receiving any treatment (data not shown), the mean number of visits was higher than median (7.7 *v.* 1.9). This also was evident for both non-HC (16.2 *v.* 3.4) and HC sector (9.4 *v.* 3.4). These figures suggest that only few patients received a disproportionately high number of visits.

The median number of 12-month visits (Table 2) among those receiving any treatment was 1.9, and was significantly higher among those with disorders than those without disorders (2.7 *v.* 1.4; $p < 0.001$). Though respondents with no disorder comprise 70.4% of the sample, they accounted for over 40% of all visits and one-third of visits to any HC sectors.

Within-sector medians ranged from ≥4 visits for psychiatrists in GAD, social phobia, specific phobia, and major depression patients to a low of 1.5 for GM in major depression. The median number of visits among individuals with substance disorders was around 2 or 3 visits, either for any service and any

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Table 1. *Prevalence of 12-month mental health service use in separate service sectors by 12-month DSM-IV/WMH CIDI disorder (N = 2942)**

				Health care†				Non-health care†		
				Mental health specialty (MHS)				General medical‡		
Type of disorder	No. of respondents *N*	Any service use† *N* (%)	Any health care† *N* (%)	Any MHS *N* (%)	Psychiatrist *N* (%)	Non-psychiatrists§ *N* (%)	*N* (%)	Any non-health care *N* (%)	Human services‖ *N* (%)	CAM¶ *N* (%)
Composite										
Any mental disorder**	1219	334 (23.6)	297 (20.8)	208 (15.1)	156 (10.6)	98 (7.7)	124 (8.6)	79 (6.1)	45 (3.5)	41 (3.3)
No mental disorder**	1723	142 (4.9)	120 (4.0)	74 (2.9)	42 (1.2)	41 (1.8)	50 (1.2)	27 (1.0)	18 (0.7)	15 (0.6)
Total sample**	2942	476 (10.1)	417 (8.8)	282 (6.3)	198 (3.9)	139 (3.5)	174 (3.3)	106 (2.4)	63 (1.5)	56 (1.4)
Any anxiety disorders**	857	242 (23.0)	218 (20.2)	152 (14.9)	115 (10.7)	69 (7.5)	89 (7.7)	56 (6.5)	30 (3.4)	30 (3.7)
Specific phobia	572	127 (18.9)	114 (16.9)	84 (13.3)	63 (9.9)	36 (5.9)	40 (5.1)	31 (5.1)	13 (2.3)	20 (3.3)
Generalised anxiety disorder	187	70 (35.0)	64 (32.5)	41 (22.8)	31 (17.8)	19 (9.5)	29 (13.8)	20 (11.3)	10 (5.9)	12 (8.1)
Social phobia	186	62 (32.9)	59 (32.1)	44 (24.5)	30 (16.9)	22 (10.7)	25 (12.0)	14 (5.7)	7 (3.3)	8 (2.6)
Obsessive compulsive disorder**	155	48 (25.8)	43 (21.7)	32 (17.2)	25 (12.7)	14 (8.3)	19 (10.0)	9 (6.3)	8 (6.2)	3 (1.9)
Adult separation anxiety disorder	111	30 (28.9)	28 (26.8)	20 (18.6)	11 (6.3)	13 (14.5)	12 (14.4)	5 (5.5)	2 (2.0)	3 (3.4)
Agoraphobia w/o panic	88	35 (37.1)	33 (35.3)	22 (26.2)	19 (23.7)	8 (9.0)	13 (10.7)	6 (3.5)	3 (2.2)	4 (1.6)
Posttraumatic stress disorder**	81	31 (31.7)	26 (24.8)	20 (17.5)	19 (16.8)	6 (6.5)	9 (11.0)	11 (12.6)	4 (1.8)	8 (11.3)
Panic disorder	61	35 (56.7)	35 (56.7)	27 (46.6)	23 (42.8)	14 (24.5)	14 (20.9)	4 (12.5)	2 (2.7)	3 (11.3)
Any mood disorders	570	214 (36.4)	188 (32.2)	134 (22.3)	104 (16.6)	60 (10.2)	77 (15.3)	53 (8.9)	32 (6.4)	27 (4.2)
Major depressive episode	540	204 (37.2)	178 (32.8)	129 (22.9)	101 (17.0)	58 (10.6)	72 (15.6)	51 (9.3)	32 (6.8)	25 (4.3)
Dysthymia	88	34 (37.9)	30 (34.4)	19 (20.8)	15 (16.2)	7 (7.9)	15 (22.1)	10 (11.9)	3 (5.9)	8 (10.0)
Bipolar disorder (broad)	73	34 (42.7)	29 (35.9)	24 (32.5)	20 (25.1)	9 (12.3)	10 (11.9)	9 (9.8)	6 (5.1)	4 (5.7)
Any substance disorders	164	32 (18.6)	30 (16.8)	27 (15.4)	18 (9.3)	16 (9.7)	4.4 (1.6)	10 (6.5)	3 (1.1)	8 (5.9)
Alcohol abuse	135	20 (13.7)	19 (11.7)	17 (10.4)	12 (6.2)	10 (6.8)	8 (4.8)	5 (3.8)	1 (0.4)	4 (3.4)
Alcohol abuse w/dependence	64	17 (22.4)	16 (18.5)	13 (15.0)	10 (11.8)	7 (7.7)	9 (10.4)	4 (6.9)	0 (0.0)	4 (6.9)
Drug abuse	31	14 (48.7)	13 (46.7)	12 (43.0)	6 (21.1)	8 (30.7)	2 (6.5)	5 (20.8)	2 (4.5)	4 (18.8)
Drug abuse with dependence	21	10 (45.4)	10 (43.7)	10 (44.4)	5 (20.1)	6 (28.3)	0 (0.0)	3 (15.2)	2 (5.8)	2 (11.4)

CAM, complementary and alternative medicine, CIDI, Composite International Diagnostic Interview.

*Data are calculated using Part I weighted number meeting the criteria for each 12-month *DSM-IV*/WMH CIDI disorder, unless otherwise indicated.

†Data are given as unweighted number (*N*) and weighted percentage (%).

‡Defined as a primary care physician, other general physician, nurse, and any other health professional not previously mentioned.

§Defined as psychologists or other non-psychiatrist mental health professionals in any setting, social worker or counsellor in a MHS setting or use of a mental health hotline.

‖Defined as a religious or spiritual advisor or social worker or counsellor in any setting other than a specialty mental health setting.

¶Defined as any other type of healer, participation in an Internet support group, or participation in a self-help group.

**Part II sample, data are calculated using Part II weights.

Table 2. *Median number of visits in separate service sectors among patients treated in those sectors by 12-month DSM-IV/WMH CIDI disorders (N = 2942)**

			Health care*				Non-health care*		
			Mental health specialty (MHS)						
Type of disorder	Any service use* *M*	Any health care* *M*	Any MHS *M*	Psychiatrist *M*	Non-psychiatrists *M*	General medical *M*	Any non-health care *M*	Human services *M*	CAM *M*
Composite									
Any mental disorder†	2.7	3.4	4.5	3.8	4.0	1.5	3.4	2.0	4.0
No mental disorder†	1.4	1.7	2.8	3.7	1.6	NA	NA	NA	NA
Total sample†	1.9	2.9	3.9	3.8	2.4	1.5	3.4	1.8	4.0
Any anxiety disorders†	2.9	3.7	5.1	3.9	3.5	1.6	3.5	2.2	4.0
Specific phobia	3.7	4.6	5.8	4.8	5.3	1.8	4.0	NA	NA
Generalised anxiety disorder	4.4	4.2	5.1	4.4	NA	NA	NA	NA	NA
Social phobia	3.5	3.7	4.2	5.4	NA	NA	NA	NA	NA
Obsessive compulsive disorder†	3.9	5.0	NA	NA	NA	NA	NA	NA	NA
Adult separation anxiety disorder	4.2	NA	NA	NA	NA	NA	NA	NA	NA
Agoraphobia w/o panic	4.8	5.1	NA	NA	NA	NA	NA	NA	NA
Posttraumatic stress disorder†	NA	NA	NA	NA	NA	NA	NA	NA	NA
Panic disorder	4.7	4.8	NA	NA	NA	NA	NA	NA	NA
Any mood disorders	3.3	4.0	5.3	4.0	5.6	1.5	3.5	2.7	NA
Major depressive episode	3.3	4.0	5.4	4.3	5.6	1.5	3.4	2.7	NA
Dysthymia	2.9	4.2	NA	NA	NA	NA	NA	NA	NA
Bipolar disorder (broad)	4.9	NA	NA	NA	NA	NA	NA	NA	NA
Any substance disorders	2.2	2.2	NA	NA	NA	NA	NA	NA	NA
Alcohol abuse	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alcohol abuse w/dependence	NA	NA	NA	NA	NA	NA	NA	NA	NA
Drug abuse	NA	NA	NA	NA	NA	NA	NA	NA	NA
Drug abuse with dependence	NA	NA	NA	NA	NA	NA	NA	NA	NA

CAM, complementary and alternative medicine; CIDI, Composite International Diagnostic Interview; NA, data not available (i.e., the number of patients with the disorder who were treated in the sector was <30, in which case no estimate was made).

*Data are given as median (*M*) number of visits. No data are given for posttraumatic stress disorder, and alcohol/drug use disorders (abuse and dependence) because the number of patient with disorder who was treated in each sector was less than 20 in which case no estimate was made. The non-psychiatrist, general medical, HS and CAM sector are defined in footnotes to Table 1.

†Part II sample, data are calculated using Part II weights.

HC. The highest within-sector median visits were reported for CAM and the lowest for GM (4.0 *v.* 1.5).

Minimally adequate treatment

Of the treated patients with active disorders, 40.5% of them were classified as receiving minimally adequate treatment (Supplementary Table S1). Probabilities of treatment being at least minimally adequacy were highest in MHS sector and lowest in GM sector (54.6 *v.* 23.2%).

Using broader characterisation of minimally adequate treatment, the percentage of patients receiving adequate treatment increased to 76.3% (Supplementary Table S2). Similarly, probabilities were highest in MHS sector and lowest in GM sector (84.1 *v.* 65.8%).

Predictors of treatment

In Table 3, two models depicted the predictors of any service use and minimally adequate treatment in the previous year. The multivariable regression in model 1 showed that male participants (OR 0.7) less likely used any service than female. In contrast, the possession of insurance, anxiety and mood disorders and severity levels were associated with higher use of any treatment modalities (OR range 1.5–6.4). The likelihood of receiving minimally adequate treatment was associated with possession of insurance, anxiety and mood disorders, and severe disorders (OR range 1.8–7.0).

In model 2, areas of residence contextual variables were incorporated to analyses. No area-level variables emerged as significant predictors of any service use or receiving minimally adequate treatment. However, male and less educated participants utilised fewer health services (OR range 0.6–0.7). Possession of insurance, anxiety and mood disorders, and disease severity were predictors of using any treatment (OR range 1.5–6.6). For receiving minimally adequate treatment, possession of insurance, anxiety and mood disorders, and disease severity were significant predictors (OR range 1.8–7.1).

Discussion

This is the first time that health service use and adequacy of treatment are examined in general population living in the largest metropolitan area in Brazil: less than one in four adults with any psychiatric disorder in the last 12 months used any service, where one in five obtained treatment from HC sector and one in ten from psychiatrists. MHS sector delivered more appointments than GM sector, with a higher proportion of individuals receiving minimal threshold of adequacy in the MHS sector than in the GM sector. Besides, the likelihood to receive treatment was greater among those individuals with any anxiety and mood disorder and with higher education.

Our findings showed serious insufficiencies in the treatment of individuals with mental disorders in São Paulo, whose mental health needs are overly unmet. These data are in agreement with HC shortage reported in previous survey in São Paulo (Andrade *et al.* 2008) and confirm similar level of service use in non-developed countries (Demyttenaere *et al.* 2004; Wang *et al.* 2007). The proportion of community individuals who reported 12-month MHS use (10.1%) is slightly higher than the value of 7.8% depicted in the São Paulo Epidemiological Catchment Area Study (Andrade *et al.* 2002, 2008), indicating modest expansion of Brazilian HC system.

In comparison with the level of unmet needs in established HC systems such as USA, these values for São Paulo are far above the data reported in National Comorbidity Survey-Replication (NCS-R) of 17.9% (Wang *et al.* 2005). While most treatments for mental disorders were delivered in Brazilian specialty sector (6.3% of respondents, 62.4% of those in treatment), they occurred mainly in the GM sector of the USA (9.3% of respondents, 52% of those in treatment). Non-MHS physicians provided majority of mental health care, showing increased adjustment of the entire health system to tackle population's need (Olfson *et al.* 2014). Recent trend in the USA has indicated that larger percentage of participants reported access to treatments for their psychological distress and depression, but mismatch between need for treatment and actual treatments received are worrisome (Mojtabai & Jorm, 2015).

In Europe, 18.9 to 25.7% participants had used a HC service (Alonso *et al.* 2004; Mack *et al.* 2014), being GM sector responsible by around two-thirds of treatments and combined use of GM and MHS sectors by one-third (Alonso *et al.* 2007). Since the number of clinicians in Brazilian GM sector is undersupplied, as well the MHS sector, general physicians should act as responsible caretakers for starting treatments of active disorders and for determining referrals toward specialty care.

As the consequence of emphasis in specialty care for mental HC in LAC (Kohn *et al.* 2005), the treatment adequacy among those treated cases in São Paulo (40.5%) was closer to rate of 51.2% reported in Mexico (Borges *et al.* 2006). Both countries outperformed the adequacy level of 32.7% reported in the USA (Wang *et al.* 2005). Although analogous deficiency of resources, services and personnel are commonplace in other LAC and less-developed countries (Saldivia *et al.* 2004; Borges *et al.* 2006; Gureje &

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Table 3. *12-month service usage in Brazil, individual and contextual predictors of any and minimally adequate treatment (N = 2942)**

Variable	Model 1		Model 2†	
	Any treatment OR (95% CI)	Minimally adequate treatment OR (95% CI)	Any treatment OR (95% CI)	Minimally adequate treatment OR (95% CI)
Individual variables				
Sex				
Male	**0.7 (0.5–0.8)**	0.7 (0.5–1–0)	**0.7 (0.5–0.9)**	0.7 (0.5–1.0)
Female	1.0	1.0	1.0	1.0
Age, years[a]	1.0 (1.0–1.0)	1.0 (0.9–1.0)	1.0 (1.0–1.0)	1.0 (1.0–1.0)
Marital Status				
Single	1.0 (0.7–1.3)	0.8 (0.5–1.3)	0.9 (0.7–1.3)	0.8 (0.5–1.3)
Separated/Widowed/Divorced	1.3 (0.9–1.8)	0.8 (0.5–1.5)	1.2 (0.9–1.8)	0.8 (0.4–1.37)
Married/Cohabitating	1.0	1.0	1.0	1.0
Education				
Fundamental	**0.6 (0.4–0.9)**	0.8 (0.5–1.4)	**0.6 (0.4–0.9)**	0.7 (0.4–1.3)
High school	**0.7 (0.5–0.9)**	0.7 (0.4–1.2)	**0.6 (0.5–0.9)**	0.7 (0.4–1.2)
College	0.8 (0.6–1.1)	0.7 (0.5–1.2)	0.8 (0.6–1.1)	0.7 (0.4–1.2)
Post-graduate	1.0	1.0	1.0	1.0
Income[b]	0.9 (0.7–1.3)	0.9 (0.9–1.1)	0.9 (0.9–1.0)	0.9 (0.9–1.1)
Insurance possession				
No	1.0	1.0	1.0	1.0
Yes	**1.5 (1.2–1.9)**	**1.8 (1.3–2.6)**	**1.5 (1.2–1.9)**	**1.8 (1.2–2.5)**
Any anxiety				
No	1.0	1.0	1.0	1.0
Yes	**1.5 (1.1–2.0)**	**1.8 (1.1–2.9)**	**1.5 (1.1–2.0)**	**1.8 (1.2–2.9)**
		Any mood		
No	1.0	1.0	1.0	1.0
Yes	**2.5 (1.8–3.4)**	**2.5 (1.6–4.0)**	**2.5 (1.8–3.4)**	**2.6 (1.6–4.0)**
Any substance				
No	1.0	1.0	1.0	1.0
Yes	1.0 (0.6–1.6)	0.8 (0.4–1.6)	1.0 (0.6–1.6)	0.8 (0.4–1.6)
Severity				
No disorder	1.0	1.0	1.0	1.0
Mild	**2.9 (1.9–4.4)**	**3.2 (1.6–6.2)**	**3.0 (2.0–4.5)**	**3.2 (1.6–6.3)**
Moderate	**3.4 (2.2–5.3)**	**2.9 (1.4–5.8)**	**3.5 (2.3–5.5)**	**3.0 (1.5–6.0)**
Severe	**6.4 (4.0–10.2)**	**7.0 (3.4–14.2)**	**6.6 (4.1–10.5)**	**7.1 (3.5–14.5)**
Contextual variables				
Socio-economic inequality (Gini)[c]			1.0 (1.0–1.0)	1.1 (0.6–1.9)
Median income[d]			1.0 (1.0–1.0)	1.0 (1.0–1.0)
Homicide rate[e]			1.1 (0.9–1.3)	1.2 (0.9–1.5)
MHS density[f]			1.0 (1.0–1.0)	1.0 (1.0–1.0)
GM density[g]			2.7 (0.8–9.6)	1.0 (1.0–1.0)

MHS, mental health specialty service; GM, general medical service; FP, fractional polynomials.

*Data are given as odds ratio (OR) and 95% confidence interval (95% CI). **Bold face** indicates significant association at $p < 0.05$.

†Model 2: Logistic multilevel analyses controlled for contextual variables considering non-independence of individual observations.

[a]FP terms for model 1 were (−1) for any treatment and (−2) for minimally adequate treatment (MAT), and for model 2 were (−1) for any treatment and (−2) for MAT.

[b]FP terms for model 1 were (log) for any treatment and (−0.5) for MAT, and for model 2 were (log) for any treatment and (−0.5) for MAT.

[c]FP terms were (−2) for any treatment and (3) for MAT.

[d]FP terms were (3) for any treatment and (3) for MAT.

[e]FP terms were (3) for any treatment and (3) for MAT.

[f]FP terms were (log) for any treatment and (0.5) for MAT.

[g]FP terms were (−2) for any treatment and (3) for MAT.

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Lasebikan, 2006), direct comparisons should be avoided, due to organisation of the HC system of each country. This persistent scenario in LAC suggests that the HC resources for mental disorders are misallocated and must be restructured.

The São Paulo metropolitan area is a heterogeneous region with large socio-economic disparity and profound inequality in HC access. Most people who obtained access for treatment represent a small proportion of affluent population who could afford the specialty care out-of-pocket. Socio-economic disadvantaged population has lower aggregate of income and education than wealthier people, leading to higher unmet need for treatment among the specific groups of people (Hart, 1971). Misunderstandings and beliefs on treatment-related harms among less educated people also can be attributable to stigma factors that discourage access to service for mental disorders (Roy-Byrne *et al.* 2009).

Previously, we found significant relationship between some individual characteristics (possession of health insurance and education) and contextual factor (high-income inequality) with the access to regular physician (Chiavegatto Filho *et al.* 2015). Likewise, illness severity was associated with the likelihood of receiving psychotropic medication (Campanha *et al.* 2015).

The insufficient resources are possibly misallocated when over one-third of all HC visits in São Paulo are consumed by people without an active disorder. This skewed allocation of visits suggests that effective distribution and financing of existing resources or reorganisation of services are necessary. However, these findings are similar in the USA and Europe (Alonso *et al.* 2004; Wang *et al.* 2005; Mack *et al.* 2014, Bruffaerts *et al.* 2015), where respondents with lifetime disorders and without apparent disorders (subthreshold symptoms or disorders not assessed) might be using services for preventive purpose.

In line with the literature (Wang *et al.* 2005; Borges *et al.* 2006; Alonso *et al.* 2007; Mack *et al.* 2014, Bruffaerts *et al.* 2015), only 40.5% of treatments in our study has met minimal requirement of treatment appropriateness. Patient issues (e.g., poorer compliance/adherence with managements) and provider features (e.g., opposing demands, insufficient reimbursements and unqualified personnel) may contribute for treatment inadequacy.

Among prevalent classes of mental problem, highly distressing panic disorder motivated greater help-seeking behaviour in comparison with specific phobias. Analogously, the likelihood of treatment for depression was associated with severity (Endicott *et al.* 1976), as well as perceived poor health, functional disability and reduced quality of life (Herrman *et al.* 2002; Hämäläinen *et al.* 2008). Conversely, prejudice and disbelief on treatment effectiveness for substance use disorders may have reduced perceived need for treatment: addictive problems are often deemed as of criminal or social nature rather than of medical concern. Therefore, matching the specificity of treatment modalities is critical to cater the differential service use across disorders in the upcoming Brazilian health system.

It is recommended that adequate treatment of common mental disorders be preferentially allocated to GM sectors (Thornicroft *et al.* 2010). Direct-to-consumer advertising on mental health of potential attendees and awareness programme to primary care professionals should be encouraged to escalate the demand (Thornicroft & Tansella, 2002).

Limitations

Before extending the reported results to LAC or to Brazil as a whole, some limitations should bear in mind. First, the current survey disregards homeless and institutionalised individuals. Further omission is that the estimates did not include all DSM-IV disorders, e.g. impulse control disorders, non-affective psychosis and cognitive decline. Hence, some respondents in treatment classified as not having an active disorder may have met the criteria for a DSM-IV disorder not evaluated. Probably, the reported results herein relate to most of the population, since excluded people are minor percentage of the sample.

Second, around 10% of Brazilian population lives in São Paulo, with high concentration of HC professionals and facilities. However, large proportion of migrants lives in some neighbourhoods of high socio-economic disparities. Inequalities and barriers of access were not satisfactorily depicted in this heterogeneous population (Andrade *et al.* 2014).

Third, non-response might underestimate the unmet need for treatment in observational studies. For instance, information bias such as systematic recall failure, conscious non-reporting, self-reported treatment use, error in the diagnostic evaluation, higher refusal rate by people with mental disorders than those without an active disorder could lead to inaccurate estimate of the association between psychopathology and unmet need. Conversely, selection bias was controlled through random sampling and weighting procedures, mitigating the effect of deliberate participation. These characteristics might be related to either the exposure or outcome under investigation. While low service utilisation among cases of substance disorder might reflect low prevalence (due to non-disclosure), the scarceness of specialised HC facilities also hampers conclusive interpretation. Therefore, the reported estimates should be viewed as a conservative rate of service use.

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Finally, the need for treatment based on persistence of disorders was not fully established in the current survey (Andersen, 1995; Kessler *et al.* 2008). Possibly, many untreated or inadequately treated disorders are self-limiting or milder conditions. The relationship between disorder chronicity (e.g., lifetime disorders) and treatment adequacy can identify groups of individual most in need of treatment.

Comments

The current report indicated that high demand for treatment is largely unmet in this Brazilian metropolitan area. The co-existence of a decentralised public health system jointly with providers of private insurance seems to spark off the service provision. Bulky proportion of mental health services undertaken by private sector in Brazilian health system must be amended to community mental health organisation for securing the right to treatment for all population. Hierarchical and coordinated health system delivery with intersectorial use of health service focusing on GM sector for treatment of mental disorders, outreach programmes, and brief community-based treatment packages are some priorities for restructuring health delivery. Initiatives to overcome access barriers include the expansion of the Primary Care Programs (e.g., Family Health Programme and specialised community health facilities) and the establishment of minimal number of HC personnel (e.g., 'More Doctors' programme). Since societal and attitudinal variables also present impact on the rates of unmet need, educational campaigns may be as important as expanding the services.

Supplementary Material

The supplementary material for this article can be found at http://dx.doi.org/10.1017/S2045796016000202.

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Conflict of Interest

The authors have read the journal's policy and have the following conflicts: The main coordination centre activities, at Harvard University, were supported by the United States National Institutes of Mental Health (R01MH070884), the John D. and Catherine T. MacArthur Foundation, the Pfizer Foundation, the US Public Health Service (R13-MH066849, R01-MH069864 and R01 DA016558), the Fogarty International Center (FIRCA R03-TW006481), the Pan American Health Organization, the Eli Lilly and Company Foundation, Ortho-McNeil Pharmaceutical, Inc., GlaxoSmithKline, Bristol-Myers Squibb and Shire. The authors confirm that this does not alter their adherence to *Epidemiology and Psychiatric Sciences* policies on sharing data and materials.

Author Contributions

YPW, MCV and LHA conceived and designed the experiments; YPW, MCV and LHA performed the experiments;

YPW, ADPCF and LHA analysed the data; YPW, ADPCF, AMC, AMM, MAM, MC, MCV and LHA wrote the paper; and MCV and LHA created the databank.

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