Cigarette smoking among psychiatric patients in Brazil

Tabagismo entre pacientes psiquiátricos no Brasil

Tabaquismo entre los pacientes psiquiátricos en Brasil

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Abstract

The aim of this study was to estimate tobacco smoking prevalence among psychiatric patients attended in care facilities in Brazil and assess associated factors. A cross-sectional multicenter study was conducted of psychiatric patients (N = 2,475) selected from 26 care facilities. Current and ex-smokers were compared to those who had never smoked. Odds ratios were estimated using logistic regression. The current and past smoking prevalence rates were 52.7% and 18.9%, respectively. Being male, aged 40 years or over, drug and alcohol use, unprotected sex and a history of physical violence were factors associated with both current and past smoking, while a low education level (≤ 8 years of schooling), history of homelessness, not practicing a religion, current or previous psychiatric hospitalization, and main psychiatric diagnosis substance use disorders, were factors only associated with current smoking. Tobacco smoking prevalence among this population was high and was higher than the rate in the general population. Appropriate interventions and smoking prevention policies should be incorporated into mental health services.

Smoking; Mental Health; Risk Factors

Resumo

O objetivo do estudo foi estimar a prevalência e os fatores associados com o tabagismo entre pacientes psiquiátricos no Brasil. Estudo multicêntrico de corte transversal foi conduzido com 2.475 pacientes com transtorno mental, selecionados de 26 serviços. Fumantes e ex-fumantes foram comparados com aqueles que nunca fumaram. Odds ratios foram estimados por meio de regressão logística. As prevalências de fumantes e ex-fumantes foram 52,7% e 18,9%, respectivamente. Sexo masculino, idade 40+ anos, uso de drogas e álcool, prática de sexo desprotegido e histórico de agressão física estiveram associados tanto com fumantes quanto com ex-fumantes. Já a escolaridade ≤ 8 anos, história de ter morado na rua, não ter prática religiosa, internação psiquiátrica atual ou anterior, e transtorno por uso de substâncias como diagnóstico psiquiátrico principal foram associados somente ao tabagismo atual. A prevalência de tabagismo nessa população foi alta e maior do que para a população geral brasileira. Políticas de intervenção e prevenção do tabagismo devem ser adotadas pelos serviços de saúde mental.

Hábito de Fumar; Saúde Mental; Fatores de Risco

Introduction

Tobacco smoking remains a serious public health problem worldwide and, although its magnitude and relative impact vary among different populations, it is considered the main avoidable cause of death in a number of countries [1]. Smoking is a major contributing factor to excess mortality and morbidity from cardiovascular diseases among patients with severe mental illness [2,3]. Excess mortality due to smoking has also been shown among patients with other diseases, such as HIV. A study in Denmark indicated that mortality due to smoking is greater than mortality attributable to HIV among people with HIV/AIDS, showing that the number of life years lost due HIV was 5.1, compared to 12.3 because of smoking [4].

It has been repeatedly shown that smoking prevalence among psychiatric populations is higher than among the general population. The prevalence of current smoking among people with mental illness is higher than in the general population in the USA (34.8% and 28.5%, respectively) [5], Canada (46.8% and 14%, respectively) [6], and Australia (31.2% and 18.7%, respectively) [7]. In Australia, a study showed that prevalence is higher among patients with severe mental illness than in people with general mental illness (51.2% and 26.4%, respectively) [7], while in Canada smoking prevalence was 51.8% in patients with schizophrenia compared to 39.2% among those with mood disorder or anxiety [6]. A more recent study of a nationally representative probability sample of 9,282 people in the USA showed that adults affected by a mental disorder in the past 12 months smoked almost twice as much as adults without mental disorders [8].

A dose-response relationship has been observed between the number of psychiatric diagnoses and smoking [5], showing that prevalence is highest among individuals with four or more psychiatric diagnoses. Also, smokers in the USA that experienced high levels of psychological distress smoked more cigarettes per day and smoking rates varied according to type of mental disorder. Smoking prevalence was 21.3% among those with no mental disorder compared to 37.8% in people with anxiety disorders, 45.1% in those with mood disorders, and 63.6% among adults with substance use disorders [8].

Although there are few publications on smoking among patients with mental illness in Brazil, evidence suggests that smoking prevalence is higher among this group than in the general population: population based studies show that smoking prevalence was 21% in Pelotas (State of Rio Grande do Sul) [9] and 19% in Campinas (State of São Paulo) [10], while among patients with severe psychiatric illness in São Paulo it was 59% [11], almost three times higher.

The intricate relationship between explanatory variables, including clinical, behavioral and sociodemographic factors, associated with higher smoking prevalence among patients with mental illness is still the subject of much research. An association has been found between smoking and severe mental illness (schizophrenia, bipolar disorders and other psychoses), markers for clinical severity (e.g. previous hospitalization) and substance use disorders [11,12,13,14,15]. However, the nature of these associations is not always clear. Sociodemographic factors such as male gender, older age, lower education, and not being married have also been identified. On the other hand, female and younger smokers had higher rates of mental disorders than male or older smokers, respectively [8]. Behavioral correlates of smoking, including alcohol and illicit drug use, are also more common among psychiatric patients [6,12,13,14,15,16].

Several studies indicate that psychiatric patients often "self-medicate" smoking as a form of relaxation and also to reduce anxiety and relieve some of the symptoms of the illness and the side effects of antipsychotic drugs [17,18]. All these effects are directly associated with nicotine and the dependence on this drug has been shown to be more intense among psychiatric patients than in the general population [19]. Despite evidence of the benefits of supporting the smoking cessation efforts of people with serious mental illness during hospital stays and beyond, quit rates are low and recurrence is high. Understanding the potential reasons for this situation is essential to improving the effectiveness of smoking cessation programs in psychiatric settings [20].

Most studies about smoking in psychiatric populations have been conducted in high income countries. In Brazil, the few studies that exist on smoking among psychiatric patients use small samples and are limited to one service or to patients with severe mental illness [11,21,22]. Thus, the aims of the present study were to estimate the prevalence of current and past tobacco smoking and assess associated factors among each group of a national representative sample of patients with chronic mental illness in public psychiatric facilities in Brazil. This study also assessed the association between severe mental illness and past and current smoking, adjusted for clinical, sociodemographic and behavioral factors.

Methods

Study sample

The sample was drawn from a national cross-sectional multicenter study conducted in Brazil in 2006 called the PESSOAS Project which examined 2,475 patients for HIV/AIDS risk behaviors and the prevalence of HIV and syphilis [23]. Adults receiving treatment in public psychiatric hospitals or public mental health outpatient clinics, known as Psychosocial Care Centers (CAPS, acronym in Portuguese), who were capable of providing written informed consent, and able to respond a face-to-face questionnaire were considered eligible for inclusion in the sample. CAPS that exclusively treated substance use disorders were excluded in order to avoid overrepresentation of selected risk behaviors and/or prevalence rates. Patients' capability to answer the questionnaire was assessed using a preliminary evaluation adapted from the *Mini Mental State Examination* (MMSE). A random selection of 11 hospitals and 15 CAPS was made which was proportional to the type of care, the five geographical regions of Brazil, and the distribution of reported AIDS cases at the time of data collection. A two-stage probability sampling frame was used. First, a random sample of facilities was taken which was proportional to the number of beds in the hospital stratum and number of registered patients in the CAPS stratum for each region. In the second stage, patients were selected using simple random sampling for each chosen facility [23]. Patients were included only if information on tobacco use was available (n = 2,461).

The project was approved by the Ethics Research Committee of the Federal University of Minas Gerais (COEP/UFMG, Etic 125/03) and the National Ethics Research Committee (CONEP 592/2006). Participation was voluntary and written informed consent was obtained.

Exposure and event measurements

Sociodemographic, clinical and behavioral data was obtained through face-to-face interviews using a semi-structured questionnaire, while psychiatric diagnoses were obtained from medical records. Questionnaires were previously tested for reliability and validity [24].

The dependent variable was tobacco smoking divided in three categories: current smokers, ex-smokers, and non-smokers. Current smokers were defined as those who reported smoking at least one regular or hand-rolled cigarette per day at the time of the interview. Ex-smokers were defined as those who used to smoke at least one regular or hand-rolled cigarette per day, but were not smokers at the time of the interview, regardless of the length of smoking period. Finally, non-smokers were individuals who had never smoked during their lifetime. Smoking behavior was analyzed using variables such as the age the individual began smoking, number of cigarettes smoked per day (overall and by psychiatric diagnoses), and smoking inside service settings.

The explanatory variables included in this analysis were divided into three categories: (a) sociodemographic (gender, age, skin color, schooling, family income in the last month, marital status, history of homelessness, and the practice of a religion); (b) clinical (treatment settings, main psychiatric diagnosis, previous psychiatric hospitalization, and other self-reported medical conditions); and, (c) behavioral (lifetime alcohol or illicit drug use, lifetime unsafe sex, having received or offered money or drugs for sex, lifetime physical and sexual violence). The cutoff point for family income was based on the Brazilian minimum wage at the time of the study (US$200). Those individuals who reported that they were single, separated, divorced and widowed were grouped as "unmarried". History of homelessness was defined as having lived on the street, in parks, or outdoor public spaces. Psychiatric diagnoses were undertaken by a psychiatrist and classified according to the International Classification of Diseases, 10th revision (ICD-10), a standard system adopted by the public health system in Brazil. Up to three main psychiatric diagnoses were recorded, and hierarchically categorized according to severity as follows: (1) psychotic disorders and depression with psychotic symptoms; (2) bipolar disorder; (3) depression; (4) anxiety; (5) substance use disorders; (6) others. Diagnoses of tobacco use were not recorded in the substance use disorder category. Other medical conditions were self-reported and were defined as having been diagnosed by a nonpsychiatric health professional. Lifetime alcohol or illicit drug use was defined as use of alcohol or any illicit drug, such as marijuana, cocaine, crack, hallucinogens, amphetamines, opiates, solvents. Lifetime unsafe sex was defined as not always using condoms in all practices. Lifetime physical and sexual violence were defined as having suffered any type of physical or sexual aggression, i.e., being forced to maintain an undesired sexual relationship, or having suffered sexual abuse.

Statistical analysis

Current smoking prevalence was estimated by dividing the number of participants who reported current smoking by the total number of

participants and past smoking prevalence was defined as the number of participants who used to smoke but were not current smokers, divided by the total number of participants.

Pearson's chi-square statistic and Student's t-statistic were used to assess statistical differences between proportions and means. The magnitude of association between the potential explanatory variables and smoking was estimated using the odds ratio (OR) with a 95% confidence interval (95%CI) and significance level of 0.05 for both the univariate and multivariate analyses. A multiple logistic regression was carried out to assess the independent effect of the explanatory factors on tobacco smoking separately comparing current smokers and ex-smokers to non-smokers. Multivariate modeling was carried out starting with a full model which included variables with a p-value of less than 0.20 in the univariate analysis and those with epidemiological relevance. Variables with a p-value of less than 0.05 were maintained in the final model. Model fit was assessed using the Hosmer-Lemeshow test. The software programs used were Paradox (Corel Corp., Ottawa, Canada) and SAS 9.0 (SAS Inst., Cary, USA).

Results

Descriptive characteristics

A total of 2,475 participants from the final sample of 2,763 patients, (90%) were interviewed. Ten percent of the sample (288) did not participate due to the following reasons: refusal (52%), patient was not located (19%), patient did not show up for interview (8%), not eligible (4%), and death (0.7%). No statistically significant difference was found between participants and non-participants with regard to age, sex, schooling and psychiatric diagnoses. Among the 2,475 participants initially interviewed, 14 did not answer the questions about smoking, resulting in a final analysis of 2,461 patients.

Table 1 presents demographic, clinical and behavioral characteristics. Most patients were female, aged 40 years or over, white, had a low education level, were unmarried, and practiced some type of religion. Eighteen percent of patients had a history of homelessness and 35.4% were from low income families (< US$ 200). More than half of the sample population were receiving treatment at a CAPS facility at the time of the interview, had a severe mental illness (psychoses and bipolar disorders), and a history of previous hospitalizations. At least 65% of substance use disorders were related to alcohol use. Similarly, most participants consumed alcohol, practiced unsafe sex, and had suffered physical violence. Forty-five percent reported at least one other medical condition: circulatory disorders (25%), digestive disorders (14%), respiratory disorders (14%), and endocrine system disorders (11%). Almost 30% received or offered money or drugs for sex, and 20% reported having suffered from sexual violence.

Current smokers comprised 52.7% (95%CI: 50.8-54.7) of the sample and 18.9% (95%CI: 17.4-20.4) were ex-smokers (Table 2). The average number of cigarettes smoked per day was higher among current smokers (mean = 15.6) than among ex-smokers (mean = 10.8) (t-test = 7.01; p < 0.001). With respect to current smokers, the average number of cigarettes smoked per day was higher among patients with substance use disorders (mean = 17.0) (F-statistic = 3.66; p = 0.03), however the same variation was not observed among ex-smokers (F-statistic = 1.15; p = 0.32). Finally, current smokers started smoking earlier (mean age = 15.9 years old) than ex-smokers (mean age = 17.3 years old) (t-test = -3.66; p < 0.001), and a high proportion of current smokers (80%) reported that they smoked inside the mental health facilities.

Univariate and multivariate analysis

Smoking prevalence was significantly higher (p < 0.05) among nonwhite, unmarried male participants, aged 40 years or over, with a low education level (≤ 8 years of schooling) and a history of homelessness. A significant negative association was found between smoking and practicing a religion (OR = 0.56). The prevalence of smoking was higher (p < 0.05) among hospitalized participants (OR = 2.75) with a more severe mental illness (psychoses and bipolar disorder) or substance use disorders, and among those individuals previously admitted to hospital for psychiatric treatment (OR = 2.56). Prevalence of current smoking was higher among individuals who used alcohol or illicit drugs, did not practice safe sex, had received/offered money/drugs for sex, and had suffered physical violence (Table 3).

The likelihood of being an ex-smoker was higher (p < 0.05) among nonwhite men, aged 40 years or over, with a low education level and history of homelessness. Univariate analysis showed a statistically significant association between past smoking and the following clinical and behavioral variables: previous psychiatric hospitalizations, other medical conditions, alcohol or illicit drug use, unsafe sex, exchange of money/drugs for sex and having suffered physical violence (Table 3).

Table 1

Descriptive characteristics of 2,461 psychiatric patients. PESSOAS Project, Brazil, 2006.

Characteristics	n *	%
Sociodemographic		
Gender (female)	1,269	51.6
Age (≥ 40 years)	1,346	54.7
Skin color (white)	1,265	51.8
Schooling (≤ 8 years)	1,976	81.7
Family income in the last month (≤ 1 minimum wage) **	556	35.4
Marital status (unmarried)	1,641	66.9
History of homelessness	443	18.2
Practicing a religion	1,355	55.2
Clinical		
Treatment settings		
Psychiatric hospital	895	36.4
CAPS	1,566	63.6
Main psychiatric diagnoses (ICD-10)		
Psychoses and bipolar disorders	1,397	56.8
Substance use disorders	173	7.0
Other diagnoses	891	36.2
Previous psychiatric hospitalization	1,212	54.5
Other self-reported medical conditions	1,105	45.3
Behavioral		
Lifetime alcohol use	1,587	64.9
Lifetime illicit drugs use	625	25.7
Lifetime unsafe sex ***	1,958	80.8
Received/Offered money/drugs for sex	650	29.4
Lifetime physical violence	1,423	58.0
Lifetime sexual violence	485	19.8

CAPS: Psychosocial Care Centers; ICD-10: International Classification of Disease, 10th revision.

* n (total) varies due to missing information;

** Minimum wage: US$200;

*** Not always using condoms in all practices.

Multivariate analysis (Table 4) showed a statistically significant independent association between current smoking and being male, being aged 40 years or over, having a low education level and history of homelessness, and not practicing a religion (p < 0.05). In addition, the likelihood of being a current smoker was higher with the presence of the clinical variables current and previous psychiatric hospitalization (OR = 1.63 and OR = 1.59, respectively), and when the main psychiatric diagnosis was substance use disorders (OR = 4.48). Finally, an independent association was found between current smoking and lifetime alcohol and illicit drug use, unsafe sex, and physical violence (p < 0.05). An independent association was found between past smoking (p < 0.05) and being male, being aged 40 years or over, lifetime alcohol and illicit drug use, unsafe sex and physical violence.

Discussion

Current smoking prevalence among the sample was high (53%). This rate is much higher than the rate among the general population of Brazil which in 1989 was 35%. This rate decreased in 2003 to 22%, followed by further decreases in 2008 and 2011 to 18% [25,26] and 15%, respectively [27]. It is probable that this clear downward trend in smoking prevalence is attributed to the recent implementation of stricter public smoking policies by the Brazilian government [28], including advertising restrictions, warning labels printed

Table 2

Selected smoking characteristics among 2,461 psychiatric patients. PESSOAS Project, Brazil, 2006.

Characteristics	Current smokers			Ex-smokers		
	n	%	Mean (±SD)	n	%	Mean (±SD)
Total	1,298	52.7	-	465	18.9	-
Number of cigarettes smoked daily						
Overall	-	-	15.6 (11.9) *	-	-	10.8 (12.2) *
Psychoses and bipolar disorders	-	-	16.0 (12.2) **	-	-	10.1 (12.2) ***
Substance use disorders	-	-	17.0 (12.9) **	-	-	9.0 (7.7) ***
Other diagnoses	-	-	14.3 (10.7) **	-	-	11.9 (12.3) ***
Started smoking (age years)	-	-	15.9 (6.9) #	-	-	17.3 (7.0) #
Smoking inside the health facility	1,039	80.0	-	-	-	-

* t-test = 7.01; p < 0.001;
** F-statistics = 3.66; p = 0.03;
*** F-statistics =1.15; p = 0.32;
# t-test =-3.66; p < 0.001.

Table 3

Univariate analysis of smoking among 2,461 psychiatric patients. PESSOAS Project, Brazil, 2006.

Characteristics	Total *	Non-smokers (n = 698)		Current smokers (n = 1,298)				Ex-smokers (n = 465)			
		n **	%	n **	%	OR (95%CI) ***	p-value	n **	%	OR (95%CI) ***	p-value
Sociodemographic											
Gender											
Male	1,192	222	31.8	761	58.6	3.03 (2.50-3.69)	< 0.001	209	44.9	1.75 (1.37-2.23)	< 0.001
Female	1,269	476	68.2	537	41.4	1.00		256	55.1	1.00	
Age (years)											
≥ 40	1,346	319	45.7	764	58.9	1.70 (1.41-2.05)	< 0.001	263	56.6	1.55 (1.22-1.96)	< 0.001
< 40	1,114	379	54.3	533	41.1	1.00		202	43.4	1.00	
Skin color											
Non-white	1,178	295	42.7	658	51.1	1.40 (1.16-1.68)	< 0.001	225	48.6	1.27 (1.00-1.61)	0.048
White	1,265	396	57.3	631	48.9	1.00		238	51.4	1.00	
Schooling (years)											
≤ 8	1,976	502	73.7	1,114	87.0	2.38 (1.88-3.01)	< 0.001	360	79.1	1.35 (1.02-1.79)	0.037
> 8	441	179	26.3	167	13.0	1.00		95	20.9	1.00	
Family income in the last month (US$)											
≤ 200	556	152	33.5	290	37.2	1.18 (0.92-1.50)	0.191	114	33.9	1.02 (0.76-1.37)	0.895
> 200	1,014	302	66.5	490	62.8	1.00		222	66.1	1.00	
Marital status											
Unmarried	1,641	440	63.1	928	71.9	1.50 (1.23-1.82)	< 0.001	273	58.8	0.83 (0.66-1.06)	0.141
Married or in union	810	257	36.9	362	28.1	1.00		191	41.2	1.00	
History of homelessness											
Yes	443	53	7.7	324	25.2	4.07 (2.99-5.53)	< 0.001	66	14.4	2.02 (1.38-2.97)	< 0.001
No	1,992	639	92.3	960	74.8	1.00		393	85.6	1.00	

(continues)

Table 3 (continued)

Characteristics	Total *	Non-smokers (n = 698)		Current smokers (n = 1,298)				Ex-smokers (n = 465)			
		n **	%	n **	%	OR (95%CI) ***	p-value	n **	%	OR (95%CI) ***	p-value
Sociodemographic											
Practicing a religion											
Yes	1,355	435	62.4	626	48.4	0.56 (0.47-0.68)	< 0.001	294	63.4	1.04 (0.82-1.33)	0.742
No	1,099	262	37.6	667	51.6	1.00		170	36.6	1.00	
Clinical											
Treatment setting											
Psychiatric hospital	895	172	24.6	614	47.3	2.75 (2.24-3.37)	< 0.001	109	23.4	0.94 (0.71-1.23)	0.639
CAPS	1,566	526	75.4	684	52.7	1.00		356	76.6	1.00	
Main psychiatric diagnoses (ICD-10)											
Psychoses and bipolar disorders	1,397	371	53.2	760	58.5	1.69 (1.39-2.05)	< 0.001	266	57.2	1.21 (0.95-1.54)	0.114
Substance use disorders	173	9	1.3	153	11.8	14.0 (7.05-27.9)	< 0.001	11	2.4	2.07 (0.84-5.08)	0.113
Other diagnoses	891	318	45.5	385	29.7	1.00		188	40.4	1.00	
Previous psychiatric hospitalization											
Yes	1,212	263	41.1	732	64.1	2.56 (2.10-3.12)	< 0.001	217	49.2	1.39 (1.09-1.77)	0.008
No	1,011	377	58.9	410	35.9	1.00		224	50.8	1.00	
Other self-reported medical condition											
Yes	1,105	321	46.3	543	42.3	0.85 (0.71-1.02)	0.085	241	52.3	1.27 (1.00-1.61)	0.047
No	1,333	372	53.7	741	57.7	1.00		220	47.7	1.00	
Behavioral											
Lifetime alcohol use											
Yes	1,587	293	42.5	951	73.6	3.78 (3.11-4.59)	< 0.001	343	74.1	3.87 (2.99-5.01)	< 0.001
No	858	397	57.5	341	26.4	1.00		120	25.9	1.00	
Lifetime illicit drugs use											
Yes	625	47	6.8	484	37.7	8.29 (6.04-11.3)	< 0.001	94	20.3	3.49 (2.40-5.06)	< 0.001
No	1,811	643	93.2	799	62.3	1.00		369	79.7	1.00	
Lifetime unsafe sex #											
Yes	1,958	495	72.2	1,071	83.9	2.02 (1.61-2.52)	< 0.001	392	85.2	2.22 (1.64-3.02)	< 0.001
No	464	191	27.8	205	16.1	1.00		68	14.8	1.00	
Received or offered money or drugs for sex											
Yes	650	81	13.7	458	38.6	3.97 (3.06-5.16)	< 0.001	111	25.9	2.21 (1.61-3.04)	< 0.001
No	1,558	512	86.3	729	61.4	1.00		317	74.1	1.00	
Lifetime physical violence											
Yes	1,423	317	45.7	824	63.7	2.08 (1.73-2.51)	< 0.001	282	60.7	1.83 (1.44-2.33)	< 0.001
No	1,030	377	54.3	470	36.3	1.00		183	39.3	1.00	
Lifetime sexual violence											
Yes	485	131	18.9	261	20.3	1.09 (0.86-1.38)	0.463	93	20.0	1.07 (0.80-1.45)	0.631
No	1,959	562	81.1	1,026	79.7	1.00		371	80.0	1.00	

95%CI: 95% confidence interval; OR: odds ratio.

* Total varies due to missing information;

** Distribution of explanatory variables among non-smokers, current smokers and ex-smokers;

*** OR and 95%CI separately comparing current smokers and ex-smokers groups with non-smokers;

Not always using condoms in all practices.

Table 4

Multivariate analysis of smoking among 2,461 psychiatric patients. PESSOAS Project, Brazil, 2006.

Characteristics	Current smokers *		Ex-smokers **	
	OR ***	95%CI	OR ***	95%CI
Gender (male)	1.70	1.30-2.22 #	1.50	1.14-1.98 ##
Age (40 + years)	2.54	1.97-3.27 #	2.14	1.62-2.82 #
Schooling (≤ 8 years)	1.93	1.42-2.63 #	-	-
History of homelessness	2.26	1.51-3.38 #	-	-
Practicing a religion	0.56	0.44-0.72 #	-	-
Treatment settings (psychiatric hospital)	1.63	1.23-2.16 #	-	-
Main psychiatric diagnosis (ICD-10)				
Psychoses and bipolar disorders	1.05	0.81-1.37		
Substance use disorders	4.48	1.95-10.31 #	-	-
Other diagnoses	1.00			
Previous psychiatric hospitalization	1.59	1.23-2.06 #	-	-
Lifetime alcohol use	2.05	1.59-2.65 #	3.30	2.49-4.37 #
Lifetime illicit drugs use	4.73	3.19-6.99 #	2.43	1.61-3.67 #
Lifetime unsafe sex ###	1.72	1.26-2.33 #	1.57	1.12-2.21 ##
Lifetime physical violence	1.39	1.09-1.79 ##	1.61	1.23-2.10 #

95%CI: 95% confidence interval; ICD-10: International Classification of Disease, 10th revision; OR: odds ratio.

* Hosmer-Lemeshow test: χ^2 = 11.7583; df = 8; p = 0.1623;

** Hosmer-Lemeshow test: χ^2 = 6.3996; df = 7; p = 0.4939;

*** Compared with non-smokers;

Statistical significance $p < 0.001$;

Statistical significance $p < 0.05$;

Not always using condoms in all practices.

on cigarette packs, and prohibition of indoor smoking in all public places [29]. In addition, the relatively high price of cigarettes in Brazil, considered the highest in the world, may also have contributed to this reduction [30]. Our results are corroborated by the findings of studies in high income countries that observed a higher rate of current smoking prevalence among patients with mental illnesses than in the general population [5,6,7].

However, it is important to note that the psychiatric patients from our sample did not start smoking earlier (mean age = 16 years) than the general population (13 to 15 years of age) [29]. Also, current smokers in our study reported smoking an average of 15.6 cigarettes per day, which is slightly higher than in the general population (mean = 13.3) [31]. This number is lower than in developed countries, such as Australia (17.0 cigarettes per day among individuals with a general mental illness and 21.4 per day in people with a severe mental illness) [7] and the USA (26.2 cigarettes per day among people with mental illness and 22.6 per day among the general population) [5]. Studies in Beijing (China) and Syracuse (USA) showed cigarette consumption rates of 20.1 and 21.6 cigarettes per day, respectively [15,16].

Several studies have found an association between smoking and the level of severity of mental illness [5,6,7,8,19]. Although no independent association was observed between smoking and more severe psychiatric diagnoses (psychoses and bipolar disorders), we found a strong independent association between smoking and substance use disorders. A similar association was found in a study of Swiss psychiatric inpatients [13].

The most likely explanation for the association between tobacco smoking and mental illness is that smoking follows the same pattern as other substance use disorders which are more common among people with a mental illness than in the general population. Suggested explanations for these associations include a common underlying vulnerability to both types of disorders, "self-medication" of substances to alleviate the side-effects of psychotropic medications, and the possibility that smoking increases the vulnerability to developing other mental disorders. Furthermore, one of the potential barriers to treating tobacco smoking among patients

with a mental illness is the strong correlation between smoking and the psychiatric diagnosis of substance use disorders, including the use of alcohol and illicit drugs.

Our study found an association between smoking and being currently hospitalized and having a history of previous psychiatric hospitalization, indicators of more severe forms of mental illness. A possible contributing factor to this situation is that smoking is still accepted in some psychiatric hospitals and professionals, who are often smokers themselves, allow patients to smoke inside the institution [32] and our study found that a high proportion of patients smoked inside the mental health facility. Although Brazilian legislation does not specifically mention psychiatric institutions current laws restrict exposure to tobacco smoke in public places, including hospitals in general [33]. Smoking policies differ from country to country, and although Brazilian government strategies to combat smoking have advanced in recent years [34], the country's laws are less comprehensive than in other countries such as Spain [35,36]. Mental health professionals' tolerance of patient smoking may contribute to the high rate of smoking in facilities, since smoking may serve as a tool for reducing anxiety, or a tradeoff for better adherence to treatment and less aggressive behavior [37,38,39]. In addition, smoking cessation programs are not part of psychiatric care in many services, despite evidence that the use of smoking cessation medications is safe for psychiatric populations.

As in other studies, an association was found between current smoking and several sociodemographic characteristics, including being male, older age, low education level [6,11,13,14,16], and history of homelessness [40,41], while a negative association was found between smoking and practicing a religion [42,43]. A low level of education may be considered a marker for low access to knowledge and understanding of the harmful effects of tobacco [16]. Practicing a religion may act as a protective factor for substance use [44] since it represents a potential social safety net that establishes values, restrictions or impositions on certain behaviors [42,43]. On the other hand, increased social vulnerability and the high prevalence of co-occurring substance use among homeless people with mental health disorders place this population at a higher risk of smoking. Excess mortality rates are higher among homeless people for all causes of death, especially cardiovascular, pulmonary and other smoking-related causes [40,41].

The associations between current and past smoking and behavioral characteristics, such as alcohol and drug use, unsafe sex, and lifetime physical violence, are consistent with findings of other studies [8,12,39] and are of particular concern. Unsafe sex and lifetime physical violence reflect the vulnerability context of this population which can also influence substance use [45,46]. As pointed out by Chartier et al. [47], smoking and other health risk behaviors, such as alcohol use and number of sexual partners, may be mediator factors related to childhood physical abuse and mental health problems. A more recent study also found that childhood physical abuse was associated with ever smoking among both males and females [48]. Anda et al. [49] suggest that smokers use nicotine's psychoactive effects to cope with the negative emotional, neurobiological and social effects of adverse experiences. They also note that individuals with adverse childhood experiences suffer from problems with affection, socialization and self-esteem. These problems may increase their susceptibility to peer pressure and tobacco marketing [49,50]. These associations suggest the need to incorporate approaches to treating alcohol/drug use and strategies for promoting safer sexual behavior and preventing violence into mental health care [12].

The risk profiles of current smokers and ex-smokers produced by our analysis contain factors that were statistically associated by both models, in the same direction and magnitude, including: being male, older age, alcohol or illicit drug use, having suffered physical violence, and the practice of unsafe sex. However, the psychiatric variables current and previous hospitalization and substance use disorders, and low education level, history of homelessness and not practicing a religion were associated only with current smoking. Although these associations are complex, these factors may act as barriers to stopping smoking or triggers of smoking initiation. The high rate of smoking prevalence and the correlates found in our study are consonant with stigma, discrimination, and the increased social and behavioral vulnerabilities of psychiatric patients. In addition, the lack of smoking cessation programs and tolerance of smoking in mental health facilities potentially reinforce smoking behavior.

The cross-sectional design of this study limits its capacity to establish direct causality and, although they are consistent with the literature, the associations observed are only indicators of potential direct causal effect. Data was limited to the psychiatric diagnoses registered in medical records and no direct information was available on psychiatric symptoms. In addition, the exclusion of patients unable to answer the questionnaires and outpatient services which exclusively treated alcohol and substance addiction may

have led to an underestimation of prevalence and correlates.

Furthermore, the large confidence interval for substance use disorders may be due to the small number of subjects in this category.

Finally, our definition of the variable ex-smoker may have caused overlaps with the current smoker group, leading to a potential underestimation of associations. However, there is no reason to believe that estimates are in anyway biased. It is also important to emphasize the reasonable to good reliability of the data and the fact that this investigation is unique, since it is the only study to date to use a nationally representative sample of psychiatric populations attended in care facilities in Brazil. Nevertheless, future studies should be conducted in order to address these limitations.

In conclusion, intervention measures, such as screening, treatment and tobacco smoking prevention programs should be urgently incorporated into mental health services on a routine basis. It is also essential to develop actions that focus on the training and education of mental health professionals involved with direct care and implement comprehensive smoke-free policies in care facilities. More research, including qualitative studies, is needed to better understand the determinants of smoking and explore possible interventions to facilitate and maintain smoking cessation among psychiatric patients attended in care facilities in Brazil.

Resumen

El objetivo del estudio fue estimar la prevalencia y los factores asociados con el tabaquismo entre los pacientes psiquiátricos en Brasil. Un estudio transversal multicéntrico fue realizado en 2.475 pacientes con trastorno mental, seleccionados de 26 servicios de salud. Los fumadores y los exfumadores fueron comparados con aquellos que nunca habían fumado. Las odds ratios se calcularon mediante regresión logística. La prevalencia de fumadores y ex fumadores fue un 52,7% y un 18,9%, respectivamente. Hombre, edad 40+ años, uso de las drogas y alcohol, sexo sin protección, e historia de agresión física se asociaron con fumadores y ex fumadores. Escolaridad ≤ 8 años, estar sin hogar, no practicar ninguna religión, hospitalización psiquiátrica actual o anterior, y trastornos por uso de sustancias, así como el diagnóstico psiquiátrico primario, se asociaron únicamente con el tabaquismo actual. La prevalencia de tabaquismo en esta población fue alta y superior a la de la población general de Brasil. Se deben adoptar políticas de intervención y prevención del tabaquismo por parte de los servicios de salud mental.

Hábito de Fumar; Salud Mental; Factores de Riesgo

Contributors

F. C. R. Barros contributed to study conception, data analysis and interpretation, statistical analysis and writing of the manuscript. A. P. S. Melo, F. Cournos, M. L. Cherchiglia and E. R. M. Peixoto contributed to data analysis, and interpretation and revision of the manuscript. M. D. C. Guimarães was responsible for study conception, design and implementation, statistical analysis, data analysis and interpretation, and writing the final version of the manuscript for submission.

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