

Persistent High Smoking Prevalence in a Swiss Psychiatric Hospital between 2001 and 2020 despite Smoking Bans and Perspectives for Further Necessary Interventions

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Abstract

Smoking, as a major risk factor for non-communicable diseases (NCD), led the World Health Organization (WHO) to recommend measures to decrease tobacco consumption. Declines were observed for the general population in western countries. The present work is a naturalistic observational study which assessed tobacco use on 4 independent occasions for patients and staff in a Swiss public psychiatric hospital between 2001 and 2020. High smoking prevalence was observed, varying between 31% and 39% for staff and 66% and 74% for patients. Despite the implementation of a partial and later a total indoor smoking ban, data showed no decline of cigarette consumption between 2005 and 2020 among patients. These observations are in line with literature showing high smoking rates and no trend of a decline for people presenting with mental health disorders. This study controlled for substance use disorder (SUD), known to be related to higher nicotine dependence, and showed that smoking was not associated with psychiatric diagnosis (mood or psychotic disorders). These elements lead to recommend a global approach using smoking cessation strategies designed for all patients receiving mental health care. Although the alarming state of the tobacco epidemic for these persons is known and evidence-based strategies for smoking cessation exist, implementation of interventions to reduce smoking within mental health settings remains sorely lacking. This paper summarizes smoking cessation interventions that should be used in psychiatry and puts forward the necessity to develop strategies for the large group of not (yet) motivated to quit smokers. Tobacco consumption is a modifiable behavior and changes in mental healthcare routines should allow important health related benefits for smo-

kers presenting with psychic disorders.

Keywords

Naturalistic Observational Study, Psychiatric Hospital, Psychopathology, Smoking Cessation, Smoking Prevalence for Staff and Inpatients

1. Introduction

Tobacco consumption is a well-known world-wide major health risk factor. Its prevalence is not similarly distributed across the population, as a large proportion of smokers come from those presenting with psychological distress or belonging to socially disadvantaged population subgroups. Literature has repeatedly underlined the very high smoking rates within patients presenting with mental health disorders, frequently found to be 2 to 3 times higher than for the general population (de Oliveira et al., 2020; Smith et al., 2020). As smoking is a multi-determined behaviour, explaining the reasons for this difference is complex. One hypothesis is that the same factors influencing smoking exist in all populations, yet are more frequently encountered in psychiatric populations, such as low socio-economic status (Garrett et al., 2019) and environmental influences with exposure to high numbers of smokers that patients encounter in their everyday lives. Another hypothesis is that specific factors related to psychological functioning increase smoking in persons with mental health disorders, such as typical diagnostic features i.e. loss of interest in life in depressive disorders, or interactions between smoking and lowering of plasmatic levels of antipsychotic medications in patients treated for a psychotic disorder, thus reducing side-effects of medication (Pal & Balhara, 2016). In co-occurring psychiatric and substance (other than nicotine) related diagnoses, smoking is particularly frequent (Farrell et al., 2001; Adan & Benaiges, 2016). Common mechanisms of addiction in substance-use disorders (SUD) concerning different drug classes including nicotine (Lima et al., 2020; Pierce & Kumaresan, 2006) is an explanatory hypothesis, as cigarettes contain dependency inducing psychoactive components, in particular nicotine. Besides these elements it is also usually accepted that a “psychiatric culture” (a commonly used denomination) which doesn’t foster smoking cessation exists in care management of patients presenting with mental health problems (Prochaska, 2011; Sheals et al., 2016). Put together, all these elements contribute to elevated smoking rates in persons presenting with psychiatric disorders.

Following WHO tobacco control recommendations, during the last decennia smoking declined in most Western countries (World Health Organization, 2019). In this context a challenging issue concerns the question if these declines over time observed in the general population are equally observed for patients with severe mental disorders. Many studies concluded that the trends to de-

crease smoking in general populations were not observed for patients with psychiatric diagnoses (Steinberg et al., 2015; Cook et al., 2014). For example, a large study in the USA on nearly 92,000 participants showed that smoking quitting rates of people with serious psychological distress (SPD) were approximately half of those without SPD and that quitting rates did not change for those with SPD between 2008 and 2016 whereas they increased for those without SPD (Streck et al., 2020). Less frequently, data showed a decline in smoking rates both for those with and without psychiatric conditions (Richardson et al., 2019; Han et al., 2022).

This naturalistic study with repeated measures on 4 independent occasions between 2001 and 2020 for staff and patients in a public psychiatric hospital aimed to document smoking rates and exposure to tobacco smoke in this setting. We hypothesized that a reduction of smoking prevalence would be observed over time, in the context of the implementation of hospital smoking restrictions and societal changes towards smoking over this twenty-year period. In 2001, the major problem was severe indoor exposure to passive smoke. This issue, although still liable to improvements, became less predominant over time. After the introduction of smoking regulations, the quantity of smoke decreased indoors, but the number of smokers remained important and high rates of smoking persisted, outdoors. After the first assessment in 2001, further questions appeared concerning the high prevalence of smoking among patients, raising the question of the relationship between psychopathology and smoking. Recording diagnoses allowed to deepen this aspect, with analyses concentrating on the most frequent diagnostic groups (mood and psychotic disorders). Finally, the results of this study underline that it is necessary to add further means to achieve reduction of smoking. The present work reflects on how to approach this challenge, describing some basic smoking cessation strategies that can be provided by mental health professionals to complement the bans and help patients with mental health concerns to get access to smoke-cessation services so as to reduce rates of smokers in psychiatric services.

2. Methods

The present work followed a naturalistic observation study design, smoking prevalence was assessed among patients and healthcare staff on 4 independent occasions (2001, 2005, 2009, 2020) in a public psychiatric hospital undergoing changes in smoking regulations.

2.1. Changes in Hospital Environment

During the 2001-2020 period in which the study took place, several important changes were introduced in the hospital. In 2000-2001 smoking was allowed in all parts of the wards, patients and staff regularly smoking indoors resulting in numerous complaints and leading to an evaluation of the situation with an assessment of smoking in 2001, and the implementation of a partial smoking ban

several months later in 2002, with one “smoking room” per unit (units having 15 - 25 beds) with a fume extractor. Smoking was not allowed in the other areas. In 2005 presence of smoke still gave rise to complaints as the management of “smoking rooms” was problematic and continued to result in much smoke in the units. The hospital introduced an indoor smoking ban in 2006. The “smoking rooms” were suppressed and smoking completely forbidden inside of the units. Since then, smokers (patients and staff) need to go outdoors to smoke. This regulation did not change since 2006.

Patients addressed to the hospital and presenting with SUDs were admitted to the general psychiatric units in the study periods in 2001, 2005 and 2009, but later a specialized SUD-unit was created. In 2020 this unit was not included in the study because it was attached to another service/administration.

2.2. Study Population and Design

In this naturalistic study, all hospitalized patients and healthcare professionals working in the wards were invited to participate with the aim to establish their respective smoking prevalence in the context of introduction of smoking restrictions. As both groups were liable to be influenced by similar societal changes in smoking behaviour and attitudes, comparison of both groups over a long period might show if similar trends appeared. Further, as the same instruments were used for both groups (patients and staff), and for all evaluations over time, study of smoking was based on data ensuring valid comparisons. To ensure similarity of contextual/societal influences on smoking, evaluations were proposed during the same periods of study for both groups. The timing of the four assessments was related to contextual elements in particular the hospital’s decisions to introduce smoking restrictions in 2002 and 2006. These decisions were taken on a global level, applying not only to mental healthcare units but also to all other medical units of the institution. The first 2001 assessment was decided in the context of complaints by patients and staff and aimed evaluation of the initial situation when smoking was allowed in all parts of the hospital. As it comprised patients with mental health disorders possibly presenting with lowered concentration capacities, this evaluation was conceived to be as short as possible and only included basic measures of cigarette consumption and socio-demographic variables. In 2002, several months after the first evaluation, a partial indoor smoking ban was introduced. When in 2005 further complaints about smoking were observed, a similar process was set up, with an assessment in 2005, four months before the total indoor smoking ban in 2006. This time, as the problem of cigarette use had been persisting, more variables were gathered in order to get insight into potential variables influencing smoking, such as income and diagnoses for patients. The third assessment in 2009 proposed the same variables as in 2005. As the research staff for this study was also clinical staff, priorities allowed no more opportunities to do further assessments until 2020. This fourth evaluation was performed as there still seemed to be important rates of smokers,

but it was not precisely known to what extent. After having introduced smoking bans since 2002, in 2020 the issue was less the passive exposure to environmental smoke than the presence of many severely dependent smokers in particular among patients, leading to discuss how to reduce smoking prevalence in this group.

Data were collected in the form of a survey for the staff. All mental healthcare professionals received a questionnaire at work (by mail in 2001 and on paper in an envelope on the other assessments) and were requested to return them anonymously. All patients entering the hospital were included in the study and patients were approached by the interviewer (principal author) after agreement of the patients' principal caregiver, confirming compatible psychiatric condition. They were proposed participation after the aim and methods of the study were explained, received an information sheet, and provided written consent before the beginning of the questionnaire during this interview. They were approached generally on the third day of hospital stay in order to have achieved some stabilisation of mental status. The material in the questionnaire was elaborated by the research team and included variables described further (see section "Study Variables"). Diagnostic information was collected from medical records in 2005, 2009 and 2020 but diagnoses were not recorded in 2001, as the aim then was only to assess smoking.

The studies were performed in line with the principles of the Declaration of Helsinki. Approvals were given by the appropriate Ethic Committee concerning participation of patients. Formally no approval was required for participation of staff (anonymous surveys, participants received a study information sheet and were free to return questionnaires or not, implying acceptance if returned), nevertheless the Ethics Committee was informed of this double design (patients/staff) when requesting approval for patients.

This study used a non probability sampling method in the form of purposive sampling, including the total population of staff and patients during a limited period. Participation was proposed to all health care professionals (nurses, psychiatrists, psychologists, social workers and other therapists) working in the hospital units of the Department of Psychiatry during the months of survey (November 2001, October 2005, October 2009, January 2020). All patients admitted to the psychiatric hospital during the study periods were proposed participation, if their clinical status was compatible (able to assist to an interview and understand the aims of the study) as evaluated by the medical and nursing teams, about 3 days after admission. Inclusion continued until a sample of about 100 patients was reached in 2001, to have comparable sample sizes with those achievable for staff, and larger samples (about 180 patients) for the 3 other years, as analyses with subdivision by diagnostic subgroups was planned. Patients were aged 18 - 65 years presenting with a broad range of psychiatric diagnoses, psychotic and mood disorders being the two largest categories.

The study included 110 staff members in 2001, 104 in 2005, 155 in 2009 and

106 in 2020, with participation rates of resp. 39%, 53%, 72% and 59%. For patients, 91 were included in the study in 2001, 183 in 2005, 175 in 2009 and 179 in 2020, with participation rates of resp. 79%, 70%, 73% and 76%. Participation rates were calculated on subjects able and accepting to participate: of all patients admitted to hospital during the 4 periods of study, 43% participated, 15% refused, 9% were excluded because of their clinical status, 7% because of cognitive impairments, 3% because of language barriers and 23% were no more present in the units 3 days after admission.

2.3. Study Variables

Socio-demographic variables were registered, and data analysis concentrated on the variables: smoking status, heaviness of smoking and for patients, diagnoses, according to the following definitions. Data on exposure to smoke were not reported here as they did not fall into the aim of this study.

2.3.1. Smoking Status

The question “How many cigarettes per day did you smoke this week, on average?” was used to determine smoking status. A smoker had smoked at least 100 cigarettes lifetime, had used at least 1 cigarette per day during at least 6 months and was smoking at the period of study. A never smoker had smoked less than 100 cigarettes in lifetime. A former smoker had smoked at least 100 cigarettes in lifetime, with at least 1 cigarette per day during 6 months but was not smoking at the period of survey. An occasional smoker had smoked at least 100 cigarettes in lifetime but never smoked every day for a period of 6 months or more.

2.3.2. HSI Score

The Heaviness of Smoking Index (HSI) (Kozlowski et al., 1994) was calculated on the basis of two questions from the Fagerström Test for Nicotine Dependence: “How many cigarettes a day do you smoke?” (answers in four categories) and “How soon after you wake up do you smoke?” (four categories). As the study included patients with acute mental illness with for part of them limited concentration capacities, this short form was preferred to the longer Fagerström test.

2.3.3. Diagnoses

The International Statistical Classification of Diseases and Related Health Problems (ICD-10) (World Health Organization, 2004) diagnoses were retrieved from the hospital discharge letters. For analyses, diagnoses were grouped in 4 main categories : “Substance use” included all F10-F19 codes, “psychotic disorders” included F20-F29 codes, “mood disorders” corresponded to F30-39 codes, and all the remaining codes were included in “other diagnoses” (F40-F48, F50-F59, F60-69, F70-F79, F80-F89, F90-F99).

2.4. Statistics

This study presented descriptive statistics, with categorical variables described

by frequencies (n, %), differences between independent groups were tested with Pearson's chi-square test and Fisher's exact test in case of 4×4 tables. Ordinal and continuous variables were described by means (standard deviations) and medians (ranges), differences were tested using the Kruskal-Wallis and Mann-Whitney non-parametric tests. An unknown number of subjects were possibly present at several time-points (different years of study), violating the independence prerequisite, but an internal consensus (authors) estimated multiple participations as negligible. They were less than 3% for patients after examination of participants written consents but difficult to evaluate for staff as they sent back anonymous surveys, evaluated as maximum 20%.

For some socio-demographic variables that were not key variables and with no differences between years of study, comparisons were performed using statistics for independent samples or were presented using mean rates of several time-points. Statistics were computed in SPSS version 22 (IBM Corporation, Armonk, NY). All tests were two-tailed, with the significance threshold at 0.05.

3. Results

Results are presented in 3 parts: the first one describes socio-demographic variables for patients and healthcare staff and diagnostic variables for patients. The second part shows smoking status and heaviness of smoking for both groups. The third part analyses relationships between the preceding data (heaviness of smoking and status with socio-demographic and diagnostic variables).

3.1. Sample Description: Socio-Demographic and Diagnostic Variables

All variables were collected via identical questions for patients and staff. Income and diagnoses were not recorded for staff.

3.1.1. Patients: Socio-Demographic Variables

Gender, age, education and income showed similar distributions at the 4 years of study, differences between years not reaching significance (Pearson's chi square or Fischer's exact text: gender: $p = .44$; age: $p = .12$; education: $p = .10$ and income: $p = .12$).

As the samples were comparable for socio-demographic variables, mean rates were calculated for the 4 years of study (3 years available for income which was not recorded on 2001 because less variables were recorded this first year). Results: gender: 49.5% (n = 311) female, 50.5% (n = 317) male; age: 28.3% (n = 178) ≤ 30 years, 51.8% (n = 325) 31 - 50 years, 19.9% (n = 125) > 50 years; education: 36.5% (n = 225) basic, 39.4% (n = 243) some secondary education, 24.1% (n = 149) higher degree; income: 38.7% (n = 206) work or family, 61.3% (n = 326) disability pension or social aid. In summary, low percentages of patients had higher education and for the majority patients' income came from social aid.

3.1.2. Patients: Diagnostic Variables

At discharge, patients received one ICD-10 main diagnosis and often additional secondary diagnoses. According to year of study, between 40.2% and 42.3% received one (main) diagnosis, between 31.4% and 36.1% received two diagnoses and between 23.5% and 27.9% received more than 2 diagnoses. The number of diagnoses was not significantly different according to year of study.

Diagnoses were not recorded in 2001. The most frequent main diagnoses were psychotic and mood disorders (psychotic disorders: 30.1% in 2005; 25.7% in 2009; 37.4% in 2020 and respectively for mood disorders: 39.9%, 36.0% and 33.5%). For substance use disorders (SUDs) as main diagnosis, significant differences appeared between the 3 years of study, with lower proportions of “substance use disorders” (SUD) in 2020 than in 2009 and 2005 (Pearson’s chi square $p < .0001$) as compared to “other diagnoses”. Rates of SUD’s were 19.1% in 2005, 24% in 2009 and 5.6% in 2020; the category “other diagnoses” represented 10.9% in 2005, 14.3% in 2009 and 23.5% in 2020.

In the context of psychiatric hospitalizations, nicotine dependence is a secondary diagnosis. Discharge letters summarizing patients’ ICD-10 diagnoses showed that usually diagnoses of nicotine dependence were not recorded. In 2005, of 114 smokers (smoking for at least 6 months daily) not one tobacco diagnoses was reported, in 2009, of 119 smokers, 9 diagnoses were encountered, and in 2020, of 98 smokers, 5 ICD-10 diagnoses of nicotine dependency were reported.

3.1.3. Healthcare Staff Members

There were no differences in distributions of gender, age or education between the 4 years of study (Pearson’s chi square or Fischer’s exact test: $p = .99$ for gender, $p = .15$ for age, $p = .20$ for education).

Mean rates calculated across the 4 years of study were: gender: 56.0% ($n = 262$) female, 44.0% ($n = 206$) male; age: 22.9% ($n = 107$) ≤ 30 , 57.4% ($n = 268$) 31 - 50, 19.7% ($n = 92$) > 50 and education: 7.3% ($n = 32$) some secondary education, 55.5% ($n = 244$) higher degree (professional school such as nursing: 55.5% ($n = 244$) or university (medical doctors, psychologists 37.3% ($n = 164$)). Some staff didn’t answer for education (missing $n = 35$).

3.1.4. Comparisons between Patients and Staff

Globally no significant differences were shown for gender and age (gender: Fischer’s exact test: $p = .20$ in 2001, $p = .11$ in 2005, $p = .32$ in 2009, $p = .90$ in 2020 and age: Pearson Chi-Square $p = .64$ in 2001, $p = .98$ in 2005, $p = .05$ in 2009, $p = .36$ in 2020). Education and income were not compared given structural differences between the samples.

3.2. Smoking Status and Heaviness of Smoking

Smoking status was dichotomized into smokers (regular + occasional smokers) and non-smokers (former + never smokers). Occasional smokers formed a minority of smokers (for patients: 2.3% in 2001, 5.6% in 2005, 1.2% in 2009, 9.2%

in 2020 and for staff: 7.7% in 2001, 7.9% in 2005, 5.4% in 2009 and 9.7% in 2020). For some patients ($n = 6$) it was not possible to determine smoker status because of unreliable answers (unreliability related to psychiatric status).

3.2.1. Patients

Rates of smokers (whole sample) for patients were 74.4% ($n = 64$) in 2001, 68.9% ($n = 124$) in 2005, 70.3% ($n = 121$) in 2009 and 65.5% ($n = 114$) in 2020. These rates describe a population presenting with both mental health and addictive disorders (MHA), as frequently encountered in literature.

Rates of smokers (excluding patients with SUD main diagnosis). The present study allowed detailed diagnosis since 2005. Patients presenting with SUDs as main diagnosis had rates of smokers as high as 90.9% in 2005, 92.5% in 2009 and 100% in 2020. As this represents a confounding factor in the analysis of smoking rates and as main diagnoses were differently distributed at the 3 available assessments because of institutional changes in 2020, smoker rates were recalculated without cases presenting with SUD as main diagnosis. Results then showed unchanged rates of smokers between 2005 (63.9% $n = 94$), 2009 (63.6% $n = 84$) and 2020 (63.6% $n = 105$) (Pearson's chi square $p = 1.0$) (all 2001 cases were excluded as no diagnoses were collected that year) (Table 1). Smoking cessation and smoking uptake also seemed stable with percentages of former smokers around 11% between 2005 and 2020 and percentages of never smokers around 25% (Table 1).

Heaviness of smoking index (HSI scores) (without SUD as main diagnosis) were mean 3.88 (SD 1.66) in 2005, 3.38 (SD 2.03) in 2009 and 3.21 (SD 1.62) in 2020. Medians were 4.00 (min 0 - max 6) in 2005, 4.00 (0 - 6) in 2009 and 3 (0 - 6) in 2020, suggesting a significant decrease (Kruskal-Wallis test $p = .04$).

3.2.2. Healthcare Staff

Smoking rates seemed stable between 2001 (38.5%, $n = 110$), 2005 (38.2%, $n = 104$) and 2009 (37.8%, $n = 155$) followed by an apparent decrease in 2020 (31.1%, $n = 106$), but statistical analysis did not allow to confirm that this change was significant (Pearson's chi square $p = .64$). Slight variations in rates of former smokers and never smokers according to year of study (Table 2) were not statistically significant (Pearson's chi square $p = .78$), not allowing to confirm changes in smoking cessation and smoking uptake rates.

Heaviness of smoking index (HSI scores) means varied between 1.81 (SD 1.50) and 2.23 (SD 1.62) between 2001 and 2020, with a median of 2 (observed range 0 - 5 in 2005 and 2009, 0 - 6 in 2020) and no significant difference between the 4 years of study (Kruskal-Wallis test $p = .58$).

3.2.3. Comparison between Patients and Staff

Smoking rates were significantly different and roughly the double for patients than for health care staff members at all years of study (Pearson Chi squares: $p < .0001$).

Table 1. Association between smoker status^a and year, with socio-demographic and clinical characteristics for patients without a SUD main diagnosis.

	Smoker			Former Smoker			Never Smoker			p-value									
	2005	2009	2020	2005	2009	2020	2005	2009	2020										
	n %	n %	n %	n %	n %	n %	n %	n %	n %										
2005: n = 147 2009: n = 132 2020: n = 165																			
Total Sample																			
	94	63.9	84	63.6	105	63.6	16	10.9	15	11.4	19	11.5	37	25.2	33	25.0	41	24.8	^d p = 1.0
Gender																			
Female	45	62.5	44	61.1	56	61.5	7	9.7	7	9.7	7	7.7	20	27.8	21	29.2	28	30.8	^e 2005: <i>p</i> = .73; ^e 2009: <i>p</i> = .59; ^e 2020: <i>p</i> = .63
Male	49	65.3	40	66.7	49	66.2	9	12.0	8	13.3	12	16.2	17	22.7	12	20.0	13	17.6	
Age																			
≤30	22	64.7	22	64.7	43	71.7	5	14.7	2	5.9	1	1.7	7	20.6	10	29.4	16	26.7	^e 2005: <i>p</i> = .08;
31 - 50	58	69.9	49	67.1	47	64.4	8	9.6	5	6.8	10	13.7	17	20.5	19	26.0	16	21.9	^e 2009: <i>p</i> = .39;
>50	14	46.7	13	52.0	15	46.9	3	10.0	8	32.0	8	25.0	13	43.3	4	16.0	9	28.1	^e 2020: <i>p</i> = .06
Education ^b																			
Compulsory basic or less	41	65.1	24	63.2	38	71.7	7	11.1	2	5.3	4	7.5	15	23.8	12	31.6	11	20.8	
Some secondary education or apprenticeship	29	65.9	42	65.6	42	62.7	5	11.4	10	15.6	12	17.9	10	22.7	12	18.8	13	19.4	^e 2005: <i>p</i> = .83; ^e 2009: <i>p</i> = .87; ^e 2020: <i>p</i> = .16
Higher professional school or university degree	24	60.0	18	60.0	21	52.5	4	10.0	3	10.0	3	7.5	12	30.0	9	30.0	16	40.0	
Income ^c																			
Professional activity or family	23	48.9	30	57.7	38	54.3	5	10.6	9	17.3	7	10.0	19	40.4	13	25.0	25	35.7	^e 2005: <i>p</i> = .02; ^e 2009: <i>p</i> = .26; ^e 2020: <i>p</i> = .05
Disability pension or social aid	71	71.0	53	68.8	65	69.9	11	11.0	5	6.5	12	12.9	18	18.0	19	24.7	16	17.2	
Main Diagnosis																			
Psychotic disorders	30	55.6	27	60.0	40	60.6	11	20.4	7	15.6	9	13.6	13	24.1	11	24.4	17	25.8	
Mood disorders	48	65.8	40	64.5	36	61.0	2	2.7	7	11.3	7	11.9	23	31.5	15	24.2	16	27.1	^e 2005: <i>p</i> = .14; ^e 2009: <i>p</i> = .79; ^e 2020: <i>p</i> = .41
Other	16	80.0	17	68.0	29	72.5	3	15.0	1	4.0	3	7.5	1	5.0	7	28.0	8	20.0	

^aSmoker status: smoker (regular + occasional)/non-smoker (former + never); ^b2020: n = 160; ^c2009: n = 129; 2020 n = 163; ^dfrom χ^2 ; smoker status by year; ^efrom χ^2 ; ^ffrom Fisher's exact test.

Table 2. Association between smoker status^a and year with socio-demographic characteristics, for staff.

	Smoker				Former Smoker				Never Smoker				p-value												
	2001		2005		2009		2020		2001		2005			2009		2020									
	n	%	n	%	n	%	n	%	n	%	n	%		n	%	n	%								
2001: n = 110; 2005: n = 104; 2009: n = 155; 2020: n = 106																									
Total Sample																									
	40	38.5	34	38.2	56	37.8	32	31.1	24	23.1	23	25.8	42	28.4	19	28.2	40	38.5	32	36.0	50	33.8	42	40.8	^d p = .64
Gender ^b																									
Female	22	37.9	16	34.0	30	38.0	16	28.6	10	17.2	13	27.7	23	29.1	7	25.0	26	44.8	18	38.3	26	32.9	26	46.4	^e 2001: p = 1.0; 2005: p = .38; 2009: p = .86; 2020: p = .67
Male	18	39.1	17	43.6	26	40.0	16	34.0	14	30.4	10	25.6	17	26.2	12	31.9	14	30.4	12	30.8	22	33.8	16	34.0	
Age ^c																									
≤30	17	58.6	7	33.3	7	29.2	12	42.9	2	6.9	2	9.5	4	16.7	1	10.7	10	34.5	12	57.1	13	54.2	13	46.4	^f 2001: p = .02; 2005: p = .002; 2009: p = .05; 2020: p = .04
31 - 50	21	36.2	25	52.1	42	46.2	18	33.3	17	29.3	13	27.1	26	28.6	10	29.6	20	34.5	10	20.8	23	25.3	20	37.0	
>50	2	14.3	1	5.6	7	23.2	2	9.5	5	35.7	8	44.4	12	40.0	8	47.6	7	50.0	9	50.0	11	36.7	9	42.9	

^aSmoker status: smoker (regular + occasional)/non-smoker (former + never); ^b2001: n = 104; 2005: n = 86; 2009: n = 144; 2020: n = 103; ^c2001: n = 101; 2005: n = 87; 2009: n = 145; 2020: n = 103; ^dfrom χ^2 ; smoker status by year; ^efrom χ^2 ; ^ffrom Fisher's exact test.

Heaviness of smoking (HSI-scores) showed significantly higher scores for patients than for staff (Mann-Whitney test $p < .0001$ in 2005 and $p < .001$ in 2009 and 2020).

3.3. Smoking Status: Rates of Smokers According to Socio-Demographic and Diagnostic Variables

Analyses were performed controlling for diagnoses in particular SUD as main diagnosis or SUD as main or secondary diagnosis, as SUD is a confounding factor.

3.3.1. Patients

Analyses were performed on the 2005, 2009 and 2020 samples excluding those with SUD as main diagnosis.

For gender, age and education, proportions of smokers/non-smokers did not significantly differ at any of the years of study (**Table 1**). For age this might be related to a lack of statistical power (Pearson chi-square $p = .08$ in 2005, $p = .39$ in 2009, $p = .06$ in 2020). Regarding income, differences were found in two of the three years of study (in 2005 Pearson Chi-Square $p = .02$ and 2020 $p = .05$) with higher proportions of smokers among those receiving disability pension or social aid.

Comparison of patients with main diagnoses of psychotic, mood or other dis-

orders, showed no significant difference in rates of smokers/non-smokers (**Table 1**). Further details of smoker/former smoker/never smoker according to diagnosis are given in **Table 1**.

As about 60% of patients received more than one diagnosis, further analysis was performed also excluding cases with a secondary SUD diagnosis, for psychotic and mood disorders, which represent the largest categories. No association was found between diagnosis and smoker/non-smoker status (**Table 3**). Comparison within diagnosis with/without secondary SUDs showed significantly higher smoking rates for those with SUDs. (Fischer's exact test: 2005: $p = .007$; 2009: $p = .06$; 2020: $p = .07$ and for mood disorders: 2005: $p = .001$; 2009: $p = .04$; 2020: $p = .04$).

3.3.2. Healthcare Staff

Smoking status was not associated with gender (no significant differences at any year), possibly related to small sample sub-sizes, but was associated with age where the association was stronger (significant differences at all years: Pearson's chi squares between $p = .002$ and $p = .05$). Rates of non-smokers were highest in the >50 age group (between 77% and 94%) with former smokers and never smokers each representing about half of the non-smokers. In the youngest age group (≤ 30) never smokers represented about 3 to 4 times the number of former smokers (**Table 2**).

Table 3. Association between smoker status and psychiatric diagnosis for psychotic and mood disorders with no main or secondary SUD diagnosis.

		smoker ^a		non-smoker ^b		p-value ^c
		n	%	n	%	
2005 (n = 84)	Psychotic disorders	14	40.0	21	60.0	$p = .38$
	Mood disorders	25	51.0	24	49.0	
2009 (n = 75)	Psychotic disorders	14	48.3	15	51.7	$p = .64$
	Mood disorders	26	56.5	20	43.5	
2020 (n = 76)	Psychotic disorders	19	48.7	20	51.3	$p = .82$
	Mood disorders	17	45.9	20	54.1	

^aRegular + occasional smokers; ^bformer + never smokers; ^cfrom Fischer's exact test.

4. Discussion

This study has several limitations. Firstly, it followed a naturalistic design with punctual observations at different time-periods rather than a longitudinal design. Secondly, it lacked statistical power due to available sample sizes. Thirdly, smoking status assessment relied on self-report only, without laboratory verification. Fourthly, diagnoses were not recorded in 2001 and ICD-diagnoses were

collected from medical records but not confirmed by validated diagnostic instruments.

Providing a coherent, comprehensive and long-term perspective on tobacco use in a psychiatric facility, both by patients and staff, over a twenty-year period (2001-2020) and in real-world conditions is the main strength of our study. The four assessments reposed on stringent definitions of smoking (a smoker was a daily cigarette user for at least 6 months), used identical instruments and were realized by the same research team, in a difficult to access and understudied population. Paradoxically, people with mental health symptoms, although frequently smoking, are often excluded from studies on tobacco use.

Results of this study indicated higher rates of smokers among staff, compared with the general population in the same country (Switzerland) (respectively 39% and 33% in 2001, 38% and 30% in 2005, 38% and 27% in 2009, 31% and 25% in 2013) (Gmel et al., 2017). This is in line with the literature, which demonstrated a higher smoking prevalence among mental healthcare professionals, compared with professionals working in other medical specialties (odds of smoking: OR 2.58, 95% CI 2.14 - 3.12) (Virtanen et al., 2012). A profile including more health risk factors was described for psychiatric hospital staff, such as high alcohol use, physical inactivity, mental disorders and chronic somatic diseases (Virtanen et al., 2012). High smoking prevalence in staff working in psychiatric services is of concern not only because of increased health risks for themselves, but also because it may result in a lower motivation regarding the implementation of specific tobacco interventions for patients (Sarna et al., 2009; Pipe et al., 2009). Therefore, addressing smoking among professionals for example through smoking cessation support, and also systematically offering brief training programs including basics of smoking cessation and motivational interventions is doubly important (Sharma et al., 2018).

For patients, rates of smokers were much higher, and smoking was more severe than for staff, confirming the existence of a gap between these groups. This replicates earlier findings of very high smoking prevalence for those presenting with mental health and substance use disorders. In particular in the present study, patients with a SUD main diagnosis had very high smoking rates (between 91% and 100%), but patients with other psychiatric main diagnoses also had elevated rates of smoking. We calculated smoking rates both on the total samples and samples of those without SUD as a main diagnosis, because both kinds of data are encountered in literature, depending on the settings (persons with main diagnosis of SUD may be included in general psychiatric services or not). After eliminating the confounding factor of dual diagnoses, no association was found between diagnoses (mood disorders/psychotic disorders) and smoker status. Socio-demographic associations with smoker status showed higher proportions of smokers among patients without professional activity receiving income from social aid, which is in line with the literature (Cooper et al., 2012; Montoya et al., 2005). These results suggest that the high smoking prevalence

among patients with psychological distress might be associated more with socioeconomic factors, as already reported elsewhere (Bartlem et al., 2015), than varying with specific psychiatric diagnoses. It has been shown that smoking prevalence increases with each additional form of disadvantage, such as unemployment, poverty, low education and serious psychological distress (Leventhal et al., 2019). In this context, and with the absence of association between diagnosis and smoking as shown in the present study, an approach using smoking cessation strategies or global health promotion incentives designed for all patients receiving mental health care independently of diagnoses can be recommended. This does not exclude differences in characteristics associated to smoking or smoking cessation according to diagnoses, but the high tobacco dependence in all categories requires large-scale basic tobacco-cessation interventions to be set up for all.

Evidence from literature shows decreases of smoking in the general population in western countries and the present results are compatible with such a trend for staff. However, data may not be totally comparable as literature reporting on trends shows figures for the general population whereas the present study focused on a specific subgroup of professionals. Furthermore, some variability between different high-income countries is also possible. In Switzerland, national regulations regarding tobacco control are comparatively less severe than for example in Scandinavian countries. In the present study, data sample sizes were small and the differences between 2001, 2005, 2009 with approx. 38% of smokers and 2020 with 31% were not statistically significant, not allowing to draw conclusions for staff. For patients, a remarkable stable rate of 64% of smokers between 2005 and 2020 highlighted the absence of any change in smoking prevalence. This is in line with literature showing no decline of prevalence between 2008 and 2017 among multi-disadvantaged smokers, e.g. cumulating 3 or more disadvantages, whereas a decline was observed for those with 0, 1 or 2 disadvantages (Leventhal et al., 2019). Public strategies leading to a reduction in smoking in the general population are probably insufficient to lead to declines in smoking rates among those with mental illness (Streck et al., 2020), as many patients hospitalized for mental health reasons cumulate 3 or more disadvantages. An additional difficulty in the present context is that NRT is not covered by health insurance in Switzerland.

Results nevertheless showed a slight decline in heaviness of smoking for patients, reflected in the HSI scores. This trend needs to be confirmed in the future. The naturalistic study design used didn't allow to further investigate hypothesis for this, but it would seem plausible that the changes introduced with smoking regulations (bans) might have induced the large number of heavy smokers to reduce consumption, as they did put constraints on the unlimited smoking encountered before. A previous work supported this assumption (Keizer et al., 2009). It is not clear to which extent smoking restrictions in hospitals as well as those present at the same time in an increasing number of places outside of hospitals may have reduced the amounts of cigarettes smoked. Smoking

uptake and cessation involve complex mechanisms and smoking restrictions represent only one of the multiple measures to decrease tobacco use in people with mental health conditions (World Health Organization, Regional Office for Europe, 2020). The observed decrease in heaviness of smoking finally didn't modify rates of smokers, underlining the necessity for additional interventions.

The present study confirmed results of literature demonstrating alarming high proportions of smokers in psychiatry with a large gap between these patients and staff or general population. However, the total absence of decrease in smoking prevalence for patients was more surprising, as there existed such a decrease in the society over the same time period, and as smoking bans had been introduced during this period. Further, smoking still seemed to be considered as “normal” for patients in a psychiatric hospital, not needing to be registered (Prochaska et al., 2004), as shown by the small number of ICD-10 nicotine dependency diagnoses. This is a constant finding also encountered elsewhere (Montoya et al., 2005). Neglecting to report tobacco use disorders, despite knowing about the high proportions of smokers within mental health patients and about related health risks, illustrates the great difficulty of addressing health concerns such as smoking within mental healthcare (Tran Luy et al., 2020; Roberts et al., 2013). To overcome this, combining several areas of intervention seems necessary. Existing barriers to provide stop-smoking assistance, resulting from a deeply rooted “psychiatric culture”, need to be actively deconstructed, such as numerous myths, for example that patients would be unable or unwilling to quit (Prochaska, 2011) or that cessation might worsen psychiatric condition (Kerr et al., 2013). Besides this, training of mental health professionals is fundamental. Psychiatrists are the physicians who provide the least stop-smoking interventions (Ziedonis et al., 2008; R  ther et al., 2014; Rogers & Wysota, 2019) and this could be partly related to lack of training and confidence to provide such interventions. Adequate training can increase this confidence (Christiansen et al., 2023).

Basically, the same cessation techniques are proposed for people presenting with psychological issues and for other smokers. These include 5A's algorithm (Tobacco Use and Dependence Guideline Panel, 2008), behavioral therapy, treatment with nicotine replacement (NRT) or with prescriptions of Varenicline or Bupropion. Highest efficacy is achieved when combining one of these treatments such as NRT with a behavioral intervention (Bani-Yaghoub et al., 2018; Evins et al., 2015). For patients requiring mental health care, adaptations have been recommended, such as more support, no-smoke friendly environments and easy to access interventions with longer and/or more frequent counseling (Schroeder & Morris, 2010; R  ther et al., 2014). Effects of changes in smoking behavior may influence the metabolism of psychiatric treatments in particular of antipsychotics but also of some antidepressants, requiring close monitoring of plasma levels to avoid toxic levels after some days of stopping smoking (Taylor et al., 2015). But on the whole it is safe to lead mental health patients to stop smoking, as NRT may be widely used with very few contraindications and the EAGLES study (Anthenelli et al., 2016) showed that Varenicline can be pre-

scribed to these smokers. Moreover, it is not necessary for the patient to be totally asymptomatic, smoking cessation can be initiated when the patient is in relatively stable psycho-social conditions and with no major changes in treatment, even if some residual psychiatric symptoms may be present.

Evidence-based strategies are largely used in stop-smoking centers for the general population, but only rarely proposed in psychiatric settings, although mental health care centers seem to be perceived by these smokers as more facilitating to smoking cessation as smoking cessation services for the whole population (Taylor et al., 2021b). This might be related to shortcomings of the integration between tobacco cessation support and mental health care. Focusing on deconstructing barrier beliefs, providing basic training and systematically recording smoking status should facilitate this integration. The expertise of mental health specialists, already used to work and form therapeutic alliances with patients presenting with psychological disorders, can bring valuable support in smoking cessation by enhancing motivation, management of mood and withdrawal symptoms among which anxiety/depression, searching alternative coping to smoking, offering support after an unsuccessful cessation attempt. Symptoms related to cessation and those related to a psychiatric affection may be difficult to distinguish (anxiety, depression, restlessness and other withdrawal symptoms can stem from one or another or both causes) and it is important for professionals to be able to establish their cause, so as to offer adequate interventions. Psychotherapeutic techniques in particular cognitive behavioral therapy (CBT) is a well established intervention for smoking cessation and is most efficacious when combined with pharmacotherapy (Cather et al., 2017; Lightfoot et al., 2020). The growing evidence of diminution of anxiety, depression and stress after smoking cessation (Taylor et al., 2021a) needs to be more largely acknowledged and put forward in smoking cessation programs. It has been stated that “there is no clear reason why mental illness and tobacco addiction cannot be treated simultaneously” (Taylor et al., 2021b). Delaying intervention on tobacco because of an existing psychiatric disorder not only increases the difficulty to quit as nicotine dependency grows over time, but also extends unnecessarily a serious health hazard for the smoker.

When observing the paucity of tobacco related interventions offered in psychiatry, beyond the aspects previously cited which should lead to improvements, a doubt still remains about if besides evidence based smoking cessation approaches and trained professionals, supplementary strategies might be needed to decrease rates of smokers among patients presenting with psychological disorders. A study showed that training primary health care providers in cessation medication issues did not alone have an effect on abstinence of tobacco smokers with serious mental illness, but that when combined with community health worker support, Varenicline use and abstinence rates doubled (Evins et al., 2023). This illustrates the importance of additional professionals working with the physician to motivate and offer additional support to smokers with mental health concerns. These persons usually face several other difficulties besides to-

bacco use and benefit from tailored follow-ups concerning smoking. Also, given that these smokers have greater difficulties in quitting than other smokers (Ziedonis et al., 2008), and show more apprehension to make a quit attempt, approaches seeking to go beyond the model which focuses on patients willing to stop seem unavoidable. This implies targeting the very large group of smokers not (yet) willing to quit smoking (Bani-Yaghoub et al., 2018). For example by proposing not only stricto sensu cessation interventions but also temporary smoking abstinence (Keizer et al., 2020) or practice quit attempts (Carpenter, 2011; Cox et al., 2022), which allow to enhance self-efficacy and motivation to quit. Other strategies allowing to include smokers unmotivated or ambivalent about cessation include opt-out procedures. Opt-out care can double engagement in tobacco treatment and increase quit rates (Richter et al., 2023). All these strategies could attract smokers not really ready to quit or those never having considered it previously, and allow a preparation period to quitting or a triggering event leading to cessation. Offering attractive programs with tailored tobacco and mental health support and treatment, being proactive (Japuntich et al., 2020), using holistic approaches for recovery (Cocks et al., 2019) and putting efforts to involve all smokers whatever their motivational status should hopefully help evolving towards a new “mental health culture”. Efforts needed to change existing functioning are particularly great to address inertia (Pipe, 2021) and require strengthening of institutional support in psychiatric departments. Consolidating norms that include living without smoke, both for staff and patients, should be a leading topic in mental health facilities. And this would need to apply to all, even the indecisive or unmotivated to quit smokers.

More research is needed for smokers with psychiatric disorders, an understudied group, on developments using new technologies such as electronic cigarettes which have shown interesting results in the general population. These would apply to heavy and long-term smokers, not having succeeded to stop with the conventional methods (Hartmann-Boyce et al., 2022). It is not yet clear if such devices could facilitate a transition period to cessation or represent a long-term harm-reduction strategy. Consequences on cigarette smoking of actual developments of nicotine products with numerous forms of electronic cigarettes or heat not burn tobacco are not yet known. But that the cigarette smoking of persons with psychological distress will continue to represent a challenge seems evident. They form part of the population and diminishing the global smoking prevalence will need to focus on them.

Data Availability

The data underlying this article are publicly accessible on Zenodo with the DOI: 10.5281/zenodo.8223603.

Conflicts of Interest

The authors report no conflicts of interest regarding the publication of this paper.

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