



Sociodemographic and Clinical Associations between Nicotine Dependence and Mental Illness

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Authors' contributions

This work was carried out in collaboration between all authors. Authors RMO, ACSJ, JLFS, ARFF designed the study. Author RMO did the data collection. Author ARFF coordinated the study. Author JLFS performed the statistical analysis. All authors read and approved the final manuscript.

Research Article

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ABSTRACT

Aims: To compare sociodemographic and clinical variables with nicotine dependence among psychiatric patients, hospitalized in a psychiatric unit in a general hospital.

Methodology: This is an exploratory study, undertaken in Brazil between August 2010 and February 2012, with 96 hospitalized carriers of mental disorders who were smokers. The socio-demographic and clinical data was obtained using the "Instrument for Identification of Smokers in a Psychiatric Unit in a General Hospital – ISPU", devised by the researchers for the present study. The degree of nicotine dependence was obtained by the "Fagerström Test for Nicotine Dependence" (FTND). The data was subjected to descriptive and bivariate analysis.

Results: The majority of people with mental disorders (53.2%) had a high (29.2%) or very high (24%) degree of nicotine dependence. Higher degrees of dependence are associated with the schizophrenic, mood and personality disorders ($p=.01$), greater age ($p=.006$) and somatic comorbidities ($p=.048$). Moreover, there is a higher frequency of the very high degree of dependence among chronic patients and those with a greater

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number of hospitalizations.

Conclusion: Severity of nicotine dependence differs between patients with severe mental disorders (schizophrenia, mood and personality disorders) and other psychiatric patients. This study's results are in line with the current measures of restriction of smoking in the health services and in the valuing of psycho-social rehabilitation with the reinsertion of people with mental disorders into the community. In this perspective, the need for educative and preventive actions for people with mental disorders and for the population in general, as well as for the preparation of mental health professionals to care for patients with severe mental disorders who are dependent on nicotine, is strengthened.

Keywords: Schizophrenia; Smoking; psychiatric nursing; nicotine dependence.

1. INTRODUCTION

Nicotine dependence among people with mental disorders is more intense and frequent when compared to other groups of the population, as they tend to smoke more heavily and have greater difficulty in quitting the habit. Among those with bipolar disorder, it is estimated that approximately 70% are smokers and, among schizophrenics, 90% [1-6].

Among psychiatric patients, the schizophrenics present the most intense dependence on nicotine, which represents a challenge for the academics who have been trying, over the years, to explain this complex association, which involves biological, psychological, social, cultural and historical factors [1,3,7-11].

The high degree of nicotine dependence among psychiatric patients demands attention, because tobacco interferes in the pharmacological treatment, with worsening in the disorder's symptomatology; it makes the individuals in question vulnerable to other chronic illnesses, possibly causing further suffering and limitations; it is a risk factor for developing tardive dyskinesia, which explains its increasing association with the high rates of mortality, and it is associated with the greater occurrence of suicide [12-16].

In the face of the new measures restricting smoking in health services, mental health professionals are called to revise their position, especially in the care of patients with severe mental disorders, bearing in mind their high degree of nicotine dependence, which was previously accepted. Through the investigation of nicotine dependence among carriers of mental illness, this study may contribute to improve professional's conscience, care and attitudes.

In view of this, the present study aims to compare socio-demographic and clinical variables with the degree of nicotine dependence among psychiatric patients, hospitalized in a psychiatric unit in a general hospital.

2. METHODOLOGY

This exploratory, descriptive study was undertaken in a psychiatric unit in a public state general hospital in the state of São Paulo, Brazil. The institution is a center of excellence at the secondary and tertiary care levels, serving 62 municipalities. The unit has 18 places available for psychiatric inpatient treatment, with an average intake capacity of 15 patients

per day, and an average length of stay of 16 days. It receives, mainly, patients in their first episode or with any psychiatric disorders in acute phases.

Inclusion criteria were: diagnosis of mental disorders (DSM-IV-TR) and current tobacco use. Exclusion criteria: below 15 years of age; refusal to participate; mental retardation; users of alcohol and other drugs without other psychiatric disorders; and people who were unable to communicate during their hospitalization.

A probabilistic sample was selected from the subjects hospitalized in the psychiatric unit. Considering a probability (precision) of 95% and margin of error of 10%, the sample had to be comprised of 96 carriers of mental disorders who were also smokers. The simple random probabilistic method was used in the selection of these subjects. In this method all the subjects have the same probability to compose the sample. The subjects were selected independently (according to inclusion/exclusion criteria and according to the order of hospitalization) until the achievement of the sample number that had been determined.

The study was approved by the Research Ethics Committee (EERP/USP 1173/2010). It was authorized by the Marilia Clinical Hospital. The subjects signed two copies of the Terms of Free and Informed Consent (TFIC).

The socio-demographic and clinical data was obtained using the "Instrument for Identification of Smokers in a Psychiatric Unit in a General Hospital – ISPU", devised by the researchers for the present study with: socio-demographic information (age, sex, level of schooling, location of current residence, marital status, living arrangements, monthly family income and religion) and clinical information (principal medical diagnosis, as recorded in the subjects' medical records, start of illness, therapies, number of previous psychiatric hospitalizations, and co-morbidities).

The degree of nicotine dependence was obtained by the "Fagerström Test for Nicotine Dependence" (FTND) comprising six questions which allow the degree of dependence to be classified as very low, low, medium, high and very high. This test was chosen because it is one of the instruments most used around the world for evaluating smokers' dependence, as well as because of its ease of administration and the clarity of the form. The test has been validated in various countries, including Brazil, with a high degree of reliability (test-retest of 0.91 and Cronbach's α value of 0.64), which guarantees it the concept of being a standard test for evaluating nicotine dependence [17].

Data collection started in August 2010 and continued until February 2012, when the minimum number of respondents (n= 96) was reached. The principal medical diagnosis was collected from the subjects' medical records during diagnostic assessment of the present episode.

Subsequently the subjects were approached for an interview so as to apply the ISPU and FTND.

The data was tabulated in an Excel spreadsheet and transferred to Stata, version 10, for the analysis of the statistics. The descriptive analysis and the bivariate analysis were accomplished using Fisher's Exact Test and the Chi-squared Test, with a maximum probability of error (alpha) of 5%. The discussion of the results was based on the literature on the issue.

3. RESULTS

During the data collection period, 433 patients were hospitalized in the psychiatric unit. 163 (37.6%) were excluded, for the following reasons: 32 (19.6%) declined to participate; 35 (21.5%) had difficulty in communicating verbally, unawareness of their illness, dissociative disorder, persecutory symptoms, hostility or hetero-aggressivity; 38 (23.3%) were under 15 years of age; 18 (11%) had mental retardation; 40 (24.5%) abandoned their treatment without previous planning, left at their own request, or were transferred. In the period studied, there were no hospitalizations of users of alcohol and other drugs without other diagnosis of psychiatric disorders.

The initial sample, comprising 270 persons with mental disorders (62.4% of all hospitalizations during this period), were interviewed using the IPSU test. The 96 smokers also responded to the FTND, constituting the sample analyzed in the present study, slightly more than a third of the total.

It is important to note that there was a total of 128 hospitalizations of people with mental disorders who were smokers in this psychiatric unit. However, 32(25%) were re-hospitalizations of people already included in the research, which corresponds to an average of 1.3 hospitalizations per subject, during the period studied.

Although systematic monitoring was undertaken on the hospitalized patients, the exclusions – added to the re-hospitalizations and because a third of the total number of patients were smokers – resulted in the data collection taking an extensive period of time in order to obtain the minimum number of smokers to make up the sample.

3.1 Characterization of the Subjects

The principal socio-demographic characteristics of the 96 subjects of the study are shown in Table 1.

The 96 smokers' medical diagnoses, according to the DSM-IV-TR, were: delirium, dementia, and amnesic and other cognitive disorders (6.3%); schizophrenia, mood disorders and personality disorders (81.2%); anxiety disorders, dissociative disorders and adjustment disorders (5.2%); eating disorders (2.1%); disruptive behavior disorders (5.2%).

22 subjects (22.9%) had had the illness for less than 12 months, 27 (28.1%) had been ill for a period of time that ranged between 1 to 4 years, 23 (24%) between 5 and 10 years, and 24 (25%) had had the illness for 11 years or longer. The number of psychiatric hospitalizations varied between 0 and 32, but the highest concentration was among those who had no history of previous hospitalizations (41.7%).

Before the present hospitalization, nearly half of the subjects received only clinical therapy (44.8%), 31.3% received clinical therapy and other forms of therapy, and 24% mentioned receiving no therapy at all. The majority of the subjects had somatic comorbidities – cardiovascular, digestive, geniti-urinary, endocrine and respiratory (52.1%).

Table 1. Socio-demographic characteristics of people with mental disorders who smoke, hospitalized in a psychiatric unit (n= 96)

| | Variables | n | % |
|---------------------|--------------------------------------|----------|----------|
| Sex | Female | 59 | 61.5 |
| Age group | Up to 29 years | 26 | 27.1 |
| | 30 to 49 years | 49 | 51.0 |
| | Over 50 years | 21 | 21.9 |
| Level of schooling | Elementary | 51 | 53.1 |
| | High School | 33 | 34.4 |
| | College | 12 | 12.5 |
| Area of residence | Urban | 88 | 91.7 |
| Marital status | Single | 42 | 43.8 |
| | Married | 32 | 33.3 |
| | Separated/divorced | 17 | 17.7 |
| | Widowed | 5 | 5.2 |
| Living arrangements | Live alone | 9 | 9.4 |
| | Without a partner, with other people | 48 | 50.0 |
| | Only with a companion | 8 | 8.3 |
| | With a companion and others | 31 | 32.3 |
| Occupation | Yes | 59 | 61.5 |
| Income | R\$ 600 | 28 | 29.2 |
| | R\$ 1000 | 23 | 24.0 |
| | R\$ 1800 | 27 | 28.1 |
| | > R\$ 1800 | 18 | 18.7 |
| Religion | Roman Catholic | 55 | 57.3 |
| | Evangelic | 23 | 24.0 |
| | Spiritualist | 6 | 6.2 |
| | Other | 3 | 3.1 |
| | Without religion | 9 | 9.4 |

3.2 Degree of Nicotine Dependence and Association between the Variables

Based on the sum of the points in the FTND, the 96 persons with mental illness were classified according to the degree of their dependence on nicotine: 33.4% had a degree of nicotine dependence which was 'low' or 'very low', and 13.5% had 'medium' degree of dependence. However, the data show a 'high' and 'very high' degree of dependence for the majority of the smokers (53.2%).

There is statistical evidence for an association between degree of nicotine dependence and age group (Fisher's exact test, $P = .006$). As age increases, the degree of dependence increases too. Among the younger smokers, (up to 29 years of age), subjects with a 'very low' degree of dependence predominate (30.8%), while among smokers aged from 30 to 49 years and 50 years or over, persons with mental disorders with a 'very high' degree of dependence (32.7%) and 'high' degree (38.1%) (respectively) predominate. It is among smokers aged between 30 and 49 that the highest proportion of 'very high' dependence occurs (32.7%) (Fig. 1).

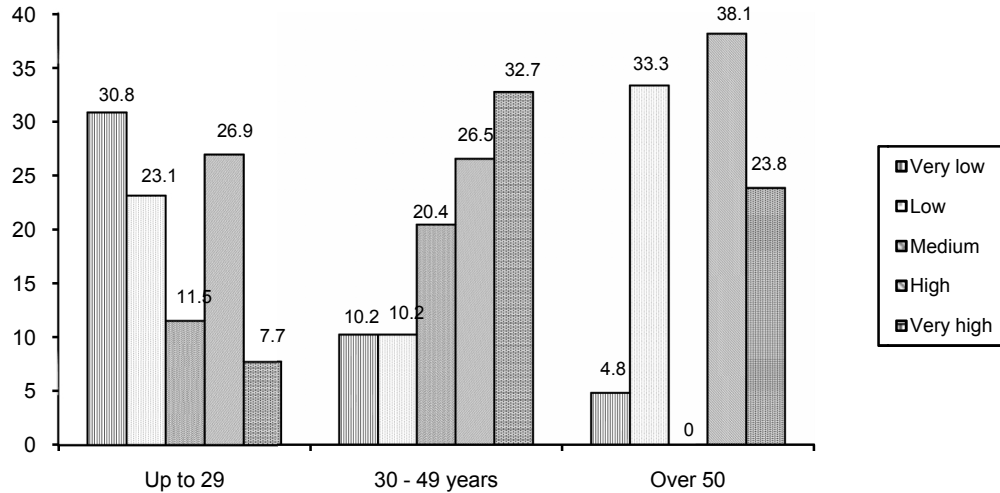


Fig. 1. Distribution (%) of people with mental disorders who smoke, according to their age group and dependence nicotine degree

Although there is no statistical evidence of an association between degree of nicotine dependence and the other socio-demographic variables, it may be observed that there is a greater proportion of people with a 'very high' degree of dependence among men (27%), those with higher education (50%), residents in urban areas (25%), single people (28.6%), living arrangements that do not include a partner but with other people (29.2%), the unemployed (35.1%), income over R\$ 1800 (33.3%), spiritualists (50%) and subjects who state that they do not practice their religion (60%).

As presented in Table 2, the majority of the individuals with schizophrenia (60.6%), mood (57.7%) and personality disorders (58.3%) have a 'high' or 'very high' degree of dependence. Among the delirium, dementia, and amnesic and other cognitive disorders, there is a greater proportion of smokers with a 'very low' degree of dependence (33.2%), while among the anxiety, dissociative and adjustment disorders there is a higher proportion of subjects whose degree of dependence is 'medium' (80%). Among the eating disorders, there is equivalence of proportion between 'very low' and 'low' degrees of dependence, each with 50%. The majority of smokers with disruptive behavior disorders have 'very low' and 'low' degrees of dependency (60%), although 40% have a 'very high' degree.

Fisher's exact test indicates that when considered as a set, the categories schizophrenia, mood and personality disorders are distinct from the others ($p = .01$). Among these subjects, one can observe a greater concentration of individuals with high and very high degrees of dependence on nicotine (59%).

Table 2. Distribution (%) of people with mental disorders who smoke, according to medical diagnosis and degree of nicotine dependence

| Medical diagnosis (DSM-IV-TR) | Degree of nicotine dependence (%) | | | | | Total |
|---|-----------------------------------|------|--------|------|-----------|-------|
| | Very low | Low | Medium | High | Very high | |
| Delirium, dementia, and amnesic and other cognitive disorders (n=6) | 33.2 | 16.7 | 16.7 | 16.7 | 16.7 | 100 |
| Schizophrenia and other psychotic disorders (n= 33) | 9.1 | 24.2 | 6.1 | 30.3 | 30.3 | 100 |
| Mood disorders (n= 33) | 18.2 | 12.0 | 12.1 | 33.4 | 24.3 | 100 |
| Anxiety disorders, dissociative disorders and adjustment disorders (n= 5) | | | 80.0 | 20.0 | | 100 |
| Eating disorders (n= 2) | 50.0 | 50.0 | | | | 100 |
| Personality disorders (n= 12) | | 25.0 | 16.7 | 41.6 | 16.7 | 100 |
| Disruptive behavior disorders (n= 5) | 40.0 | 20.0 | | | 40.0 | 100 |
| Total (n= 96) | 14.6 | 18.8 | 13.5 | 29.1 | 24 | 100 |

There is no statistical evidence of association between time since diagnosis and degree of nicotine dependence (Fisher's exact test, $P = .47$), but it may be observed that subjects with more than ten years since diagnosis (37.5%) predominate among smokers with a 'very high' level of dependence, while those with up to 12 months since diagnosis (27.3%) predominate among smokers with a 'very low' degree of dependence.

There is no statistical evidence of association between the degree of nicotine dependence and therapies (Fisher's exact test, $P = .58$) or the number of previous psychiatric hospitalizations ($\chi^2= 20.7232$, $P= .19$), however it may be observed that the highest proportions of smokers with 'very high' degrees of dependence occur among subjects without other forms of therapy (26.1%) and among those with three (40%) and four or more hospitalizations (37%). Smokers with a 'very low' degree of dependence (25%) predominate among subjects with no previous history of hospitalization.

The somatic comorbidities are more frequent among smokers with 'high' (32%) and 'very high' degrees of dependence (30%) and less frequent among smokers with 'medium' (4%) and 'very low' degrees of dependence (12%) (Table 3). This association is confirmed by the Fisher's exact test ($P = .048$).

Table 3. Distribution of people with mental disorders who smoke, according to degree of nicotine dependence and somatic comorbidities

| Degree of nicotine dependence | Comorbidities | | | Total n (%) |
|-------------------------------|---------------|-----------|------------------|-------------|
| | Yes n (%) | No n (%) | Don't know n (%) | |
| Very low | 6 (12.0) | 7 (15.9) | 1 (50.0) | 14 (14.6) |
| Low | 11 (22.0) | 7 (15.9) | | 18 (18.8) |
| Medium | 2 (4.0) | 11 (25.0) | | 13 (13.5) |
| High | 16 (32.0) | 11 (25.0) | 1 (50.0) | 28 (29.2) |
| Very high | 15 (30.0) | 8 (18.2) | | 23 (23.9) |
| Total | 50 (52.1) | 44 (45.8) | 2 (2.1) | 96 (100) |

4. DISCUSSION

The hypothesis that the degree of nicotine dependence is higher among patients with severe mental disorders (schizophrenia, mood and personality disorders) compared to other psychiatric patients is confirmed in this study.

Schizophrenia's symptoms are among the most severe in psychiatry, involving distortion of the thought processes and contents, alteration of sensory perception, cognitive impairment, affective impoverishment, anhedonia and psychomotor difficulties. Smoking tobacco can influence their presentation and intensity [18-20].

These symptoms are experienced as profoundly debilitating and cause suffering, as they involve the loss of self-control and of contact with reality, with consequences for the individual's different spheres of life, from the most simple daily activities through to social and work life, interpersonal relationships and family ties [18,20-25].

The most debilitating symptoms of schizophrenia, with a direct impact on the daily life of the affected person, are the negative symptoms (anhedonia, affective dullness, impairment of the cognitive functions – memory, attention and concentration –, psychomotor slowing, language impairment). The experience of these symptoms, added to the overload resulting from the disorder, are important factors among schizophrenics in starting and maintaining a smoking habit [26-27].

In neurobiological terms, the negative symptoms occur due to the reduction in dopaminergic activity in the pre-frontal cortex. When nicotine binds to its receptors, it contributes to reversing the frontal hypoactivity. As a consequence, the negative symptoms are mitigated, with the smoking habit functioning as self-medication [7,28-33].

It may be that, having once tried smoking and experienced the relief of the symptoms, the schizophrenic makes more intense use of cigarettes, which contributes to the development of a high degree of dependence on nicotine and to greater difficulty in smoking cessation.

The role of smoking in the negative symptoms may explain the higher proportion of smokers, and the more intense degree of dependency, among the subjects who have had the illness for longer, as it is recognized that in chronic schizophrenics, the negative symptoms are manifested more intensely [19-20].

The self-medication effects of smoking do not occur only in relation to the negative and cognitive symptoms. The relief of anxiety and the improvement of mood are recognized as being among the principal reasons that people with mental illnesses continue smoking (29,34-36).

From another perspective, the subjects recognize the self-medication effect as temporary, which explains in part why they smoke in greater quantities, which contributes to the development of more intense dependence on nicotine [37].

Another effect of self-medication has to do with sensory hyperstimulation, common among schizophrenics, due to their difficulty in filtering out external stimuli. Considering that the hallucinations may occur as a result of the greater perception of these stimuli, it is believed that the reduction of this perception – afforded by the nicotine – may be associated with the reduction in the hallucinatory experiences [12,19,28,31,38-39].

In spite of the apparent benefits of smoking in the relief of sensory hyper stimulation and its indirect consequence of reducing the hallucinations, smoking can aggravate the positive symptoms of schizophrenia (delusions, hallucinations, alterations in speech with increase in productivity, psychomotor agitation) by means of a different mechanism. It is believed that these symptoms occur due to the increase in the activity of the dopaminergic system in the mesolimbic region of the central nervous system. When the nicotine bonds to its receptors located in this region, an additional stimulus occurs to the dopaminergic activity, intensifying the production of symptoms [19,31,40].

In addition to the effect which self-medicating with tobacco has on some symptoms of schizophrenia, one also has to consider the relief which it brings from the side-effects of psychiatric medications.

It is common knowledge that the anti-psychotic medications – especially first-generation ones (typical antipsychotics), cause severe and debilitating side-effects, such as akathisia and Parkinsonism. When the psychiatric patient notices that increasing his or her use of cigarettes reduces the occurrence of the adverse reactions, he or she finds in the tobacco not only the satisfaction of the physiological need of the nicotine dependence, but also a means of controlling these reactions.

The finding in this study that a higher number of psychiatric hospitalizations is found among those with a higher degree of nicotine dependence may be explained in part by tobacco's interference in the medication therapy, as has been found in other studies which also showed a higher number of episodes among smokers and greater severity of the mental disorders [28,33,41]. The greater number of hospitalizations among subjects with a higher degree of dependence may also be influenced by age, given that the older subjects are those who have had the mental illness for longer, which may explain the higher number of hospitalizations among them. In the same way, the older subjects have been smokers for longer, which influence the more intense degree of dependence on nicotine among them. The principal biological factors explaining the higher degree of nicotine dependence among schizophrenics may be associated, therefore, with self-medicating for the psychiatric symptoms, reduction of the medications' side-effects, and obtaining a greater quantity of nicotine per cigarette smoked.

Compared to other psychiatric patients, schizophrenics obtain more nicotine per cigarette smoked. This occurs due to the higher number of puffs per cigarette and the shorter time interval between them. Schizophrenics' smoking pattern differs not only in relation to the puffs, but also because they usually smoke the cigarette right to the end, and because some subjects have the practice of smoking cigarette butts; it is recognized that the highest concentration of nicotine is retained in the cigarette filter. All this contributes to obtaining more nicotine and a consequent worsening of dependence on it [41-44].

It follows that to evaluate the severity of the degree of nicotine dependence in schizophrenics, it is not enough to consider merely the number of cigarettes smoked, as the different pattern of smoking (more puffs) means that even smoking the same number of cigarettes as other people, they obtain more nicotine.

The subjects with the highest degree of nicotine dependence are those with somatic comorbidities, probably due to the larger number of cigarettes smoked and the greater proportion obtained of their composites. According to the author, death among schizophrenic

smokers due to cardiac complications is twelve times higher than among those who do not smoke [45].

The biological explanations for the higher nicotine dependence among schizophrenics are well-established in the scientific literature, with their understanding being of fundamental importance in planning care. However, knowledge of the biological factors in isolation is not enough to explain this phenomenon's complexity; for that, a wider discussion is necessary, covering psychological, historical and cultural aspects.

Among the historical and cultural aspects, one that stands out is the influence of psychiatric institutions, which for many years used the cigarette as an instrument for care, to control the patients' behavior, facilitate the relationships and incentivize compliance with the therapeutic activities [46-48]. This practice, which is still encountered nowadays, contributed to the cigarette taking the place of listening and acceptance in the health services' daily routine. In exchange for the cigarette, the professionals succeeded, over the years, in circumventing the conflicts and difficulties of living and working alongside the mentally ill – with the establishment of the therapeutic relationship taking second place.

In considering the Brazilian context, it may be noticed that the psychiatric hospitalizations may have an important role in the high frequency of smokers in the psychiatric population, as schizophrenia – at the same time as it has the highest degree of nicotine dependence – is the disorder which has the highest number of hospitalizations. A consultation of the database of the Unified Health Service of the Brazilian State Health Service – DATASUS - showed that in 2011, the greatest number of psychiatric hospitalizations (34.8%) was due to “Schizophrenia and other psychotic disorders”, being the disorder with the third-longest average hospital stay [49].

Among the psychological aspects, one can consider the feeling of control and safety which the cigarette gives the psychiatric patient, which explains why many smokers feel relieved simply to have a cigarette in hand, recognizing it as a companion and refuge from problems. Thus, from a psychological perspective, one can understand that the motivations of the seriously mentally-ill patient for smoking also contribute to the intense need for the cigarette and, consequently, to the development of greater nicotine dependence (29,31,37,50-52).

The limitations caused by the symptoms of severe mental disorders, their repercussions on the individual's different aspects of life, and the relief which nicotine brings for some of these symptoms, influence how the psychiatric patient thinks of smoking. One severe consequence of severe mental disorders is the feeling of loss of control over one's life. When the psychiatric patient notices that, with the help of the cigarette, he or she can control the anxiety, the production of negative symptoms and the side-effects of the medications, he or she finds in the cigarette a new way of being in the world. For somebody who has had their life changed by the limitations of such a severe and incapacitating disorder, being able to feel in control of the situation and of decisions (what one feels, and how strongly) is a source of relief.

5. CONCLUSION

The seriousness of nicotine dependence differs between patients with severe mental disorders (schizophrenia, mood and personality disorders) and people with other disorders. For the patients with severe mental disorders, the degree of dependence is more intense.

The high degree of dependence on nicotine is associated with greater age and the presence of somatic comorbidities.

This study's results are in line with the current measures of restriction of smoking in the health services and in the valuing of psycho-social rehabilitation with the reinsertion of people with mental disorders into the community. From this perspective, the need for educational and preventive actions for the mentally-ill and for the population in general is strengthened, as is the need for mental health professionals to be prepared for the care of patient with severe mental disorder who are dependent on nicotine.

CONSENT

The subjects signed two copies of the Terms of Free and Informed Consent (TFIC).

ETHICAL APPROVAL

All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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