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Sociodemographic and Clinical Factors Associated with Tobacco Use among Patients Treated at the Neuro-Psycho Pathological Centre of the University of Kinshasa, Democratic Republic of Congo (DRC)

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Abstract

Introduction: Tobacco smoking, a global epidemic driven by nicotine dependence, is closely linked to psychiatric disorders, exacerbating symptoms and complicating recovery. This study conducted at CNPP/UNIKIN aimed to determine the prevalence and associated factors of tobacco dependence among psychiatric patients. **Methods:** We conducted a cross-sectional analytical study from November 2023 to January 2024 (3 months). A convenience sample of 204 patients with psychiatric disorders treated at the CNPP during this period and using psychoactive substances was recruited. An ad-hoc questionnaire was used to collect sociodemographic data, tobacco use patterns, psychiatric comorbidities, motivations for continued use (Horn Test), and tobacco dependence (Fagerström Scale). Logistic regression was used to determine factors associated with tobacco dependence. We used binary logistic re-

gression and included variables with $p < 0.20$ from bivariate analysis in the multivariate model. Collinearity was assessed before final model selection. **Results:** One hundred and forty-six (71.6%) participants were regular tobacco smokers. The frequency of tobacco addiction was 63.7%. Acquired habit as a motivation for smoking (adjusted odds ratio [aOR], 2.13; 95% confidence interval [CI], 1.04 - 4.33) was identified as the only factor associated with tobacco addiction. **Conclusion:** This study highlights the close relationship between psychiatric disorders and tobacco use in this population, emphasizing the need for targeted interventions to address acquired habits in prevention and smoking cessation programs.

Keywords

Tobacco, Dependence, Psychiatric Disorders, Associated Factors, Kinshasa, CNPP

1. Introduction

Tobacco use is a major global public health issue. The World Health Organization (WHO) reports that tobacco kills half of its users, causing more than 8 million deaths annually. Among these deaths, more than 7 million are consumers or former consumers, and approximately 1.2 million are non-smokers exposed to second-hand smoke. More than 80% of the 1.3 billion smokers worldwide live in low- or middle-income countries [1] [2]. At the core of tobacco use is nicotine, a key component of tobacco that creates addiction. Nicotine acts on the central nervous system, creating reward and pleasure effects that reinforce consumption. This addictive substance plays a central role in maintaining smoking habits and complicates efforts to quit this harmful practice [3].

Psychiatric disorders are a major public health issue in Africa and the Democratic Republic of Congo (DRC). In Africa, it is estimated that between 5% and 7% of the population, or approximately 70 to 98 million people, suffer from psychiatric disorders [4]. The most common disorders in the population are depression, bipolar mood disorder (56%), schizophrenia (82%), anxiety disorders, and addictions [4]. Regarding the DRC, there are no reliable figures on the incidence of mental illnesses. However, according to the WHO, in 2019, nearly one billion people worldwide, including 14% of adolescents, were affected by a mental disorder. Unfortunately, the number of people with neuropsychiatric disorders increased significantly in 2020 due to the COVID-19 pandemic [2].

Epidemiological studies have shown that the prevalence of psychiatric disorders is higher among smokers than non-smokers. Moreover, the prevalence of smoking is two to three times higher among individuals with psychiatric disorders than in the general population [5]. The relationship between smoking and psychiatric disorders can be unidirectional (in one direction or the other) or bidirectional [5]. Patients with psychiatric disorders have more difficulty quitting smoking than

smokers without psychiatric pathology. These difficulties are one of the main reasons for the high prevalence of smoking in this population [5].

Africa, particularly the DRC, faces several challenges in managing this comorbidity. One of the main challenges is the lack of adequate infrastructure for the treatment of psychiatric disorders. Additionally, the aggressive marketing of the tobacco industry contributes to the increase in tobacco use, particularly among young people. Furthermore, the illicit tobacco trade in the DRC leads to a significant loss of tax revenue that could be used to improve mental health infrastructure.

These challenges underscore the importance of studies like this one to inform policies and interventions aimed at reducing tobacco use and improving the management of psychiatric disorders, particularly in low-resource settings. To address this issue, this study aims to examine tobacco use habits and the factors associated with this use among patients treated at the CNPP/UNIKIN. To achieve this, we will:

- Determine the frequency of tobacco addiction among psychiatric patients;
- Identify the sociodemographic, clinical, and consumption pattern factors associated with tobacco addiction among psychiatric patients.

The analysis of these different aspects will allow for a better understanding of smoking and its factors among patients treated at the CNPP/UNIKIN, in order to develop targeted and appropriate public health actions, such as habit modification strategies.

This study specifically examines how sociodemographic, clinical factors and tobacco consumption patterns relate to dependence in a psychiatric population in Kinshasa.

2. Material and Methods

2.1. Participants and Procedure

A cross-sectional and analytical study was conducted over 3 months (from November 1, 2023, to January 31, 2024). A convenience sample of 204 psychiatric patients treated on an outpatient basis at the CNPP/UNIKIN and who used drugs was recruited. While convenience sampling was used due to logistical constraints, future studies should consider stratified random sampling to improve generalizability. Convenience sampling allowed for the recruitment of voluntary participants meeting predefined inclusion criteria, such as the presence of a confirmed psychiatric disorder, a history of current or past tobacco use, and follow-up at the centre during the study period. The main exclusion criteria were neurological pathologies, absence of tobacco use, and inability or refusal to participate in the survey. Diagnoses were confirmed by a psychiatrist using ICD-10 criteria. Inclusion required current or past tobacco use. Comorbid substance use was also assessed.

2.2. Measures

An ad-hoc questionnaire was used to collect numerous sociodemographic data, such as gender, age, marital status, education level, and income. This questionnaire

also collected detailed information on tobacco use habits, including age of initiation, initial circumstances, evolution of quantities and frequencies, as well as quit attempts. Additionally, it collected information on associated psychiatric comorbidities, such as the onset of disorders, previous episodes, and complications. Finally, the questionnaire assessed motivations for continued tobacco use using the Horn Scale, as well as the degree of tobacco dependence using the Fagerström Scale.

The Fagerström Scale, called the "Fagerström Test for Nicotine Dependence" (FTND), determines the degree of tobacco dependence. It consists of 6 items, with the first and fourth items scored from 0 to 3, while the others are scored from 0 to 1, for a total score out of 10 points. The categorisation of dependence based on scores is as follows: Very high dependence (score between 8 and 10), High dependence (score between 6 and 7), Moderate dependence (score of 5), Low dependence (score of 3 to 4), Very low dependence (score of 0 to 2) [6].

The Horn Scale (known as the Horn-Waingrow Scale), on the other hand, is used to explore motivations for continued tobacco use. It consists of 18 items, each scored from 1 to 5. Each motivation is explored by 3 items, with a total score ranging from 3 to 15. A score above 10 indicates a high level of motivation for the consideration in question. The 6 motivations assessed are as follows: stimulation, pleasure of the gesture, relaxation, anxiety-support, absolute need, and acquired habit [7]. The Horn Test thus estimates psychological dependence on cigarettes, taking into account smoking habits and the psychological factors that drive the individual to smoke.

These two tests are commonly used in research and clinical practice to help plan interventions aimed at helping smokers quit.

2.3. Statistical Analyses

Data were analysed using frequency measures for qualitative variables, as well as mean and standard deviation for quantitative variables following a normal distribution. For quantitative variables not following a normal distribution, we used the median and quartiles. The search for determinants of tobacco addiction was conducted using multivariate analysis with a logistic regression model. Variables with $p < 0.05$ in univariate analysis were included in the multivariate model to control for confounding factors. The adjusted odds ratio calculated allowed us to estimate the degree of association between tobacco addiction and the independent variables. A p-value < 0.05 was considered the threshold for statistical significance. Data analysis was performed using SPSS software (version 27.0; SPSS® Inc., Chicago, IL).

2.4. Ethical Considerations

The study was approved by the ethics committee of the School of Public Health at the University of Kinshasa under number ESP/CE/167/2023. Ethically, the rules of informed consent, confidentiality, absence of harm to participants, and collective benefit were rigorously applied.

3. Results

3.1. Tobacco Addiction

Among the sample of 204 patients, 146 (71.6%) were regular tobacco smokers. The mean tobacco dependence score, measured by the FTND (Fagerström Test for Nicotine Dependence), was 4.75 (standard deviation = 1.41). Ninety-three participants (63.7%) met the criteria defining moderate to severe tobacco dependence, in accordance with the indications in Table 1.

Table 1. Mean scores and frequency of moderate to severe tobacco dependence among participants.

Variables	Frequency or mean (SD)	Percentage or min-max
FTND Score (n = 146)	4.75 (1.41)	0.0 - 8.0
Moderate to severe tobacco addiction (n = 146)	93	63.7

SD, standard deviation; FTND, Fagerstrom Test for Nicotine Dependence.

3.2. Sociodemographic Characteristics of Participants

Table 2. Sociodemographic characteristics by dependence status.

Variable	Overall (n = 204)	Non-dependent	Dependent (n = 93)	p-value
Age (years)	32.1 ± 10.5	31.6 ± 9.27	32.8 ± 10.8	0.477
Sexe				0.996
Male	172 (84.3)	49 (36.3)	86 (63.7)	
Female	32 (15.7)	4 (36.4)	7 (63.6)	
Marital status				0.674
Unmarried	147 (72.1)	41 (39.0)	64 (61.0)	
married	36 (17.6)	8 (32.0)	17 (68.0)	
divorced	14 (6.9)	3 (23.1)	10 (76.9)	
widower	7 (3.4)	1 (33.3)	2 (66.7)	
Educational level				0.973
primary and secondary	160 (78.4)	44 (36.4)	16 (64.0)	
High School	44 (21.6)	9 (36.0)	77 (63.6)	
Gainfully employed				0.864
Yes	157 (770)	40 (36.7)	69 (63.3)	
No	47 (23.0)	13 (35.1)	24 (64.9)	
Source of income				0.630
Oneself	137 (67.2)	35 (35.0)	65 (65.0)	
Others	67 (32.8)	18 (39.1)	28 (60.9)	
Presence of legal issues				**0.025**
Yes	65 (31.9)	14 (25.0)	42 (75.0)	
No	139 (68.1)	39 (43.3)	51 (56.7)	

According to the data in Table 2, participants with moderate to severe tobacco dependence were more likely to encounter legal problems than those who were not dependent on tobacco (p = 0.025). However, the same table indicates that there was no statistically significant difference between dependent and non-dependent participants regarding other sociodemographic factors such as age, gender, marital status, education level, income source, and paid employment.

3.3. Clinical Characteristics of Participants

Table 3. Clinical characteristics by dependence status.

Variables	Overall (n = 204)	Dependent (n = 93)	Non-dependent (n = 53)	p-value
Insight				0.685
Good	200 (98.0)	52 (36.1)	92 (63.9)	
Bad	4 (2.0)	1 (50.0)	1 (50.0)	
Number of previous mental disorder episodes				0.630
Single episode	31 (15.5)	7 (31.8)	15 (68.2)	
Two or more episodes	169 (84.5)	45 (37.2)	76 (62.8)	
Age at first episode (years)	25.3 ± 8.50	23.5 ± 6.18	26.2 ± 9.07	0.062
Being on psychotropic treatment				0.927
Yes	181 (88.7)	47 (36.4)	82 (63.6)	
No	23 (11.3)	6 (35.3)	11 (64.7)	
Presence of family history of mental disorder				0.337
Yes	118 (57.8)	27 (32.9)	55 (67.1)	
No	86 (4.2)	26 (40.6)	38 (59.4)	
Similarity between the nature of psychiatric disorders in the family and that of the patient				0.309
Yes	113 (55.4)	25 (32.)	52 (67.5)	
No	91 (44.6)	28 (40.6)	41 (59.4)	
Rehabilitation during periods between crises				0.492
Yes	161 (78.9)	42 (37.8)	69 (62.2)	
No	43 (21.1)	11 (31.4)	24 (68.6)	
Change or cessation of the occupation following the disorder				0.273
Yes	164 (80.4)	46 (38.3)	74 (61.7)	
No	40 (19.6)	7 (26.9)	19 (73.1)	

According to the data in Table 3, individuals with moderate to severe tobacco dependence did not show statistically significant differences compared to those who were not dependent regarding various clinical characteristics. These charac-

teristics include insight, the number of previous episodes of mental illness, age at first episode, use of psychotropic drugs, family history of mental disorders, similarity of psychiatric disorders between the patient and their family, participation in rehabilitation between crises, as well as job change or complete cessation of occupation due to health status.

3.4. Characteristics Related to the History of Tobacco Use by Participants According to Dependence Status

Compared to non-dependent participants, those with tobacco dependence more frequently reported that their motivation for smoking was related to seeking relaxation, anxiolysis, support, and an acquired habit. Other characteristics, such as the age at which they started smoking, smoking alone or in a group, smoking preceding psychiatric symptoms, legal problems related to tobacco use associated with one or more illicit substances, quit attempts, the phase of the illness where tobacco use was significant, seeking stimulation and pleasure of the gesture, as well as absolute need as a motivation, did not show significant differences between participants with and without moderate to severe tobacco dependence (Table 4).

Table 4. Characteristics of tobacco use habits among participants according to their dependence status.

Variables	Overall (n = 204)	Dependent (n = 93)	Non-dependent (n = 53)	p-value
Age at beginning of tobacco consumption (years)	21.1 ± 4.54	20.8 ± 4.30	21.3 ± 4.70	0.525
Mode of consumption				
Alone	95 (65.1%)	33 (34.7%)	62 (65.3%)	0.697
In a group	51 (34.9%)	19 (38.0%)	31 (62.0%)	
Tobacco use prior to onset of psychiatric disorder				
Yes	110 (75.3%)	37 (33.6%)	73 (66.4%)	0.322
No	36 (24.7%)	15 (42.9%)	20 (57.1%)	
Problems with police following tobacco consumption				
Yes	38 (26.0%)	11 (29.7%)	26 (70.3%)	0.367
No	108 (74.0%)	41 (38.0%)	67 (62.0%)	
Multiple drugs use				
Yes	108 (74.0%)	35 (32.7%)	72 (67.3%)	0.184
No	38 (26.0%)	17 (44.7%)	21 (55.3%)	
Attempts to stop tobacco consumption				
Yes	107 (73.3%)	41 (38.7%)	65 (61.3%)	0.244
No	39 (26.7%)	11 (28.2%)	28 (71.8%)	
Phase of illness where tobacco consumption is highest				
Acute-phase	22 (15.1%)	5 (23.8%)	16 (76.2%)	0.213
stabilization phase	124 (84.9%)	47 (37.9%)	77 (62.1%)	
Seeking stimulation as a motivation to smoke				
High level of seeking stimulation	131 (89.1%)	44 (83.0%)	86 (92.5%)	0.079
Low level of seeking stimulation	16 (10.9%)	9 (17.0%)	7 (7.5%)	

Continued

Pleasure of the gesture as a motivation to smoke				
High level of pleasure of the gesture	111 (75.5%)	36 (67.9%)	75 (80.6%)	0.083
Low level of pleasure of the gesture	36 (24.5%)	17 (32.1%)	18 (19.4%)	
Seeking relaxation as a motivation to smoke				
High level of seeking relaxation	111 (75.5%)	35 (66.0%)	76 (81.7%)	**0.033**
Low level of seeking relaxation	36 (24.5%)	18 (34.0%)	17 (18.3%)	
Seeking anxiolysis and support as a motivation to smoke				
High level of seeking anxiolysis and support	105 (71.4%)	33 (62.3%)	72 (77.4%)	**0.050**
Low level of seeking anxiolysis and support	42 (28.6%)	20 (37.7%)	2 (22.6%)	
Absolute need as a motivation to smoke				
High level of absolute need	120 (81.6%)	40 (75.5%)	79 (84.9%)	0.156
Low level of absolute need	27 (18.4%)	13 (24.5%)	14 (15.1%)	
Acquired habit as a motivation to smoke				
High level of acquired habit	75 (51.0%)	20 (37.7%)	55 (59.7%)	**0.013**
Low level of acquired habit	72 (49.0%)	33 (62.3%)	38 (40.9%)	

3.5. Factors Associated with Tobacco Dependence among Participants

In Table 5, we find the results of univariate and multivariate analyses. Univariate analysis revealed that two elements were associated with moderate to severe tobacco dependence: seeking relaxation as a motivation to smoke and acquired habit. In multivariate analysis, only acquired habit as a motivation to smoke was significantly associated with moderate to severe tobacco dependence (aOR = 2.13, 95% CI: 1.04 - 4.33, p = 0.037). Seeking relaxation lost significance after adjusting for confounders (Table 5).

Table 5. Univariate and multivariate logistic regression of characteristics associated with tobacco addiction.

Variable	Univariate analysis		Multivariate analysis	
	p-value	OR (95% CI)	p-value	aOR (95% CI)
Presence of legal issues				
No		1		
Yes	0.369	1.45 (0.65 - 3.24)		
Seeking relaxation as a motivation to smoke				
Low level		1		
High level	**0.035**	2.29 (1.06 - 4.99)	0.106	1.93 (0.87 - 4.30)
Seeking anxiolysis and support as a motivation to smoke				
Low level		1		
High level	0.052	2.95 (0.99 - 4.35)		
Acquired habit as a motivation to smoke				
Low level		1		
High level	**0.014**	2.39 (1.20 - 4.77)	**0.037**	2.13 (1.04 - 4.33)

4. Discussion

4.1. Tobacco Addiction

This high rate of tobacco dependence among psychiatric patients aligns with international findings. Studies in similar African contexts report comparable or higher rates of tobacco use in schizophrenia and mood disorders (e.g., 65 - 85%) [8].

4.2. Tobacco and Legal Issues, Absence of Sociodemographic Distinction

Our study also revealed a significant association between moderate to severe tobacco dependence and legal problems. However, no significant differences were observed regarding other variables such as age, gender, marital status, education level, and employment. This result is consistent with previous studies that have also established links between substance use (including tobacco) and deviant behaviours or legal problems. For example, a 2009 study showed that individuals dependent on nicotine are more likely to engage in criminal behaviour and encounter legal problems [9]. The correlation between legal problems and tobacco dependence may indicate underlying factors such as stress, personality disorders, or unfavourable socioeconomic conditions that warrant particular attention. The absence of significant differences in other sociodemographic factors is consistent with some studies indicating the transversality of tobacco dependence across different demographic groups without marked distinction by age, gender, or economic status [10] [11].

4.3. Complexity of Interactions between Tobacco Dependence and Clinical Characteristics in Psychiatric Patients

Our results indicate that there is no statistically significant difference between participants with moderate to severe tobacco dependence and those who are not dependent regarding various clinical characteristics. For example, insight, often associated with treatment adherence and mental illness management, does not appear to be affected by tobacco dependence. The onset of mental disorders may be influenced by various genetic and environmental factors, and tobacco use may often begin after the onset of these disorders. Additionally, family history, a well-established risk factor for mental illness, is not influenced by tobacco use. Severe mental illness can lead to occupational disability, and tobacco dependence does not appear to influence this factor. These findings are consistent with several previous studies that have also shown that the clinical characteristics of patients with severe mental disorders are not significantly influenced by tobacco use [12] [13].

These results corroborate the conclusions of several previous studies showing that the clinical characteristics of patients with severe mental disorders are not significantly influenced by tobacco use. For example, in schizophrenic patients, insight is related to the severity of the illness rather than tobacco use [14]. The frequency of episodes of mental illness and the use of psychotropic drugs are pri-

marily influenced by the nature and severity of the illness, rather than factors such as tobacco use [15].

These results highlight that, although tobacco dependence is associated with certain problematic behaviours, it does not necessarily affect the fundamental clinical characteristics of mental disorders.

4.4. Specific Motivations Driving Tobacco Use

Our study identified that seeking relaxation, anxiolysis and support, as well as acquired habit, are significantly higher motivations among dependent smokers. Other motivations did not show significant differences.

These results confirm that the mode of tobacco consumption is often influenced by social and cultural factors rather than the level of dependence. The search for relaxation is particularly high among dependents, with tobacco often used to manage stress and anxiety [16]. Similarly, anxiolysis and the search for psychological support are common motivations among dependent smokers [16] [17]. Acquired habit, a significantly higher motivation among dependents, becomes more entrenched over time, making dependence more difficult to overcome [18]. These observations are consistent with several previous studies that have explored motivations and behaviours related to tobacco use [19] [20].

4.5. Factors Associated with Tobacco Dependence

Although several factors were identified as significantly associated with tobacco dependence in univariate analysis, only one factor remained significant in multivariate analysis: acquired habit as a motivation to smoke. Seeking relaxation, although associated with tobacco dependence in univariate analysis ($p = 0.035$, OR = 2.29, 95% CI = 1.06 - 4.99), lost its statistical significance in multivariate analysis ($p = 0.106$, aOR = 1.93, 95% CI = 0.87 - 4.30). This may be explained by the influence of other confounding variables not accounted for in the univariate analysis (16). Seeking anxiolysis and support is also close to statistical significance in univariate analysis ($p = 0.052$, OR = 2.95, 95% CI = 0.99 - 4.35) but is not included in the final multivariate analysis, likely due to moderating or mediating factors [20]. Acquired habit as a motivation to smoke is significantly associated with tobacco dependence ($p = 0.014$, OR = 2.39, 95% CI = 1.20 - 4.77) in univariate analysis and remains significantly associated with tobacco dependence ($p = 0.037$, aOR = 2.13, 95% CI = 1.04 - 4.33) in multivariate analysis. This means that acquired habit is an important and well-documented risk factor for the development and persistence of tobacco dependence. Habits are often reinforced by repetitive behaviours and social contexts, making dependence more difficult to overcome [18]. The results of this study are in line with several previous studies on motivations and habits related to tobacco use. Zvolensky *et al.* showed that stress and anxiety management are common motivations among smokers, but their direct link to dependence may be complicated by other factors such as tolerance and physical dependence [16]. The literature highlights that acquired habits are major predictors

of tobacco dependence. Chaiton *et al.* demonstrated that habits acquired at a young age are particularly difficult to change and are strongly associated with persistent tobacco dependence [18].

The study's limitations include its cross-sectional design, reliance on self-report, and convenience sampling, which may limit generalizability. Future studies should employ longitudinal designs and more representative sampling to confirm these findings.

5. Conclusions

This study conducted at the CNPP in Kinshasa revealed a high prevalence of tobacco use among psychiatric patients, with 71.6% of the 204 surveyed patients being regular smokers. Tobacco dependence, measured by the FTND score, is significant among these patients, as 63.7% of them presented moderate to severe dependence. The results show that psychiatric patients with moderate to severe tobacco dependence do not differ significantly from non-dependent patients in terms of sociodemographic or clinical characteristics, except for legal problems. On the other hand, their motivation to smoke is often related to seeking relaxation and acquired habits. Among the many factors explored, acquired habit was found to be the only factor significantly associated with moderate to severe dependence according to multivariate analysis.

This study highlights the importance of targeting modifiable habits such as acquired routine smoking. Practical interventions may include cognitive-behavioral therapy (CBT), group-based cessation programs, and community-based peer support. These should be adapted to the psychiatric context in Kinshasa.

Conflicts of Interest

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

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