

ORIGINAL ARTICLE

Study of impulse control disorders among women presenting nicotine dependence

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Abstract

Objective. Impulse control disorders (ICDs) include intermittent explosive disorder, kleptomania, trichotillomania, pyromania and pathological gambling. Several studies have showed an association between ICDs and alcohol use disorders. The rate of co-occurrence ICDs and nicotine dependence has never been investigated. We thus assessed the frequency of all ICDs in a population of nicotine-dependent women compared to non-smoking women. We also checked criteria of two other impulsive behaviours, compulsive buying and bulimia. **Methods.** Five hundred consecutive patients were assessed by a general practitioner in Paris (France). One hundred and twenty-seven women presenting the DSM-IV-R criteria for nicotine dependence were included. They were compared to 127 women consulting the same practitioner but who did not smoke. Diagnosis of ICD (pyromania, kleptomania, trichotillomania, intermittent explosive disorder, pathological gambling) and of bulimia was based on DSM-IV criteria and a modified version of the Minnesota Impulsive Disorders Interview (MIDI). Diagnosis of compulsive buying was made with the McElroy et al. criteria and a specific questionnaire. Cigarette smoking was studied using the Fagerström questionnaire and the DSM-IV-R criteria for nicotine dependence. Alcohol use disorders were assessed with the DSM-IV-R criteria for dependence and the CAGE and the MAST questionnaires. **Results.** Thirteen patients presented trichotillomania, 22 explosive intermittent disorder and 12 pathological gambling. All these diagnoses were equally frequent in the nicotine-positive and nicotine-negative groups. We found no case of pyromania. Compulsive buying was the most frequent impulse control disorder. It was significantly more frequent in the nicotine-positive group than in the nicotine-negative group (58 vs. 39 cases, $P=0.01$). Scores of the compulsive buying scale were higher in the nicotine-positive group (4.07 vs. 2.9, $P=0.01$). None of the patients presented an association of two or more ICDs. Patients from the nicotine-positive group drunk higher quantities of alcohol each day, consumed alcohol more frequently each week and were more often intoxicated each week with alcohol. Their mean MAST scores of alcohol abuse disorders were higher. **Conclusion.** A total of 45.6% of the nicotine-dependent women presented compulsive buying and 23.6% bulimia. Compulsive buying was significantly more frequent among nicotine-dependent subjects than controls. Other impulse control disorders were as frequent among nicotine-dependent women as in controls. A total of 8.6% presented explosive intermittent disorder, 4.7% pathological gambling and 5% trichotillomania. Nicotine dependence in women was also associated with a higher level of alcohol consumption. These results indicate the possible need to systematically screen nicotine-dependent women, regardless of their motivation for consultation, for alcohol dependence, bulimia and compulsive buying.

Key Words: *Nicotine dependence, addiction, compulsive buying, pathological gambling, impulse control disorder*

Introduction

A heterogeneous group of disorders called impulse control disorders (ICD) has been differentiated in the DSM-IV-R classification. All these pathological conditions can be described as “behavioural addictions”. They are characterized by the repetitive occurrence of impulsive behaviour. They can be included in the “addictive spectrum” due to clinical characteristics in common with addictive gambling [1]. Clinical characteristics of ICD resembling addiction are: failure to resist an impulse, drive or

temptation to perform some act harmful to oneself and/or to others; an increasing sense of tension or excitement before acting out; a sense of pleasure, gratification, or release at the time of committing the act or shortly thereafter. Pathological behaviours included in the group of ICDs are intermittent explosive disorder, kleptomania, trichotillomania, pyromania and pathological gambling [2].

Several studies have assessed the association between dependence to alcohol or drugs and ICD. The incidence of pathological gambling in patients with alcohol dependence is substantially higher than

that in the general population. Compared with an incidence of 1.4% in a New York study of a general population, the prevalence of pathological gamblers among hospitalised substance abusers is reportedly 8–10 times this rate [3]. Lesieur and Heineman [4] studied pathological gambling among 100 alcohol/drug-dependent adolescent in-patients (average age 17 years). They found that 14% met diagnostic criteria for pathological gambling and an additional 14% had gambling-related problems.

We previously studied [5] the prevalence of all ICDs in a sample of alcohol-dependent patients hospitalised for detoxification. The population studied included 79 patients who all met DSM-IV criteria for alcohol dependence disorder. Mean age of the sample was 43.1 (SD 9.2, range 22–66). The population consisted of 48 men (60%) and 31 women (40%). Thirty-two (40%) of them were married, or living maritally. Thirty patients (37.9%) met criteria for both impulse control disorders and alcohol dependence. This group included 19 cases of intermittent explosive disorder, seven cases of pathological gambling, three cases of kleptomania, one case of trichotillomania. No patient had pyromania. None of the patients had another co-occurring substance abuse disorder other than alcohol dependence.

The present study was undertaken to pursue the analysis of behavioural dependence among patients presenting chemical addiction. We focused our work on the relation between nicotine dependence and impulse control disorders, since this association had never been previously studied. We tried to determine the prevalence of all ICDs in a sample of smokers dependent on nicotine compared to non-smokers. We checked two other repetitive impulsive behaviours that can be included in the spectrum of “behavioural addiction” [6]: compulsive buying and bulimia. We also assessed alcohol consumption and alcohol dependence [7], which are often associated with nicotine use. Lastly, we assessed anxiety and depression, which are also highly associated with nicotine use and ICDs [7]. Prevalence rates of ICDs are different in men and women [6]. Pathological gambling is more frequent in men and compulsive buying more frequent in women. We tried to control this parameter by limiting the study to women. Smokers and non-smoker patients were all women consulting the same general practitioner.

Methods

Five hundred consecutive women consulting their general practitioner for routine examination were screened. All of them consulted the same general practitioner working in Paris. No consultation corresponded to an emergency. In most cases, patients

consulted for an infectious disease (rhinitis or flu syndrome) or follow-up of a contraceptive treatment. We systematically asked them about their smoking habits. The period of inclusion lasted 3 months from January to March 2005. We did not pre-select the patients and the population strictly reflected the population of subjects consulting their general practitioner for routine consultations. The initial assessment took place, for all patients, in the waiting room before the medical visit. All patients participated voluntarily in the study. An informed and written consent form was obtained from each of them. Two groups were compared for all analyses: patients presenting nicotine dependence (127 cases) and controls free from nicotine dependence (127 subjects). Non-smoking and smoking women came from the same initial sample. The two groups of women were matched for age. To ensure confidentiality, all identifying data were removed and all records locked. The results were gathered from direct interviews conducted by the same researcher (LK). Patients participated voluntarily in the study. Our work did not implicate a change in the treatment of patients or in the clinical examination of patients. A written informed consent was obtained for all patients. After being fully informed, 30 women refused to participate.

Assessment of impulse control disorders

Diagnosis of ICDs (pyromania, kleptomania, trichotillomania, intermittent explosive disorder, pathological gambling) and of bulimia was based on DSM-IV criteria and a modified version of the Minnesota Impulsive Disorders Interview (MIDI) [8]. The MIDI is a 36-item semi-structured interview developed at the University of Minnesota. It includes separate screening modules diagnosing ICDs. To diagnose patients with true repetitive compulsive buying and not merely episodic impulsive buying, we used two clinical measurements; the McElroy et al. criteria [1] and a specific questionnaire [5]. Our questionnaire was especially designed for the assessment of compulsive buying. It allows for the assessment of the behaviour itself and its consequences. Nineteen items (questions with yes or no answers) represent major basic features of compulsive buying. These dimensions are: impulsivity, urges to shop and buy, emotions typically felt before, during and after purchasing, post-purchase guilt and regret, degree of implication of short-term gratification, tangible consequences of buying, avoidance strategies. Diagnosis criteria, according to McElroy et al. [1], are simultaneous presence of repetitive and impulsive buying behaviour, euphoria or excitation before purchasing, post-purchase guilt, and negative consequences of buying.

Assessment of nicotine and alcohol use and dependence

Cigarette smoking was studied with the Fagerström questionnaire [9]. This test is designed to provide a measure of nicotine dependence related to cigarette smoking. It contains four yes–no and two multiple-choice questions. The average score in randomly selected smokers is approximately 4–4.5. In samples of cigarette smokers seeking treatment, mean scores are from 5.2 to 6.3. DSM-IV-R criteria for nicotine dependence were also checked in all patients from the nicotine-positive and -negative groups.

All patients answered the Michigan Alcoholism Screening Test (MAST) [10] in order to quantify the severity of alcohol dependence. Patients also passed the CAGE (Cut- Annoyed-Guilty-Eye Opener) questionnaire [11]. Item responses of the CAGE are scored 0 or 1. A total score of 2 or more is considered clinically significant. In addition, the criteria of dependence and abuse of opiates, marijuana and stimulants were checked. The quantity of drinks taken within a 24-hour period during the last week was assessed (a drink being defined as the amount of alcohol found in 300 ml of beer, 100 ml of wine, or 25 ml of whisky). The number of days per week in which drinking occurred in the month before the interview was also quantified.

Anxiety and depression

Anxiety and depression were assessed using the Hamilton Anxiety and Hamilton Depression Scales. The Hamilton Anxiety Rating Scale (HARS) [12] provides an overall measure of global anxiety, including psychic (cognitive) and somatic symptoms. The measure consists of 14 items that assess anxious mood, tension, fear, insomnia, intellectual (cognitive) symptoms, depressed mood, behaviour at interview, somatic (sensory) symptoms, cardiovascular symptoms, respiratory symptoms, gastrointestinal symptoms, genitourinary symptoms, autonomic symptoms, and somatic (muscular) symptoms. The Hamilton Rating Scale for Depression (Ham-D) [13] is designed to measure the severity of depressive symptoms in patients with primary depressive illness. It can also be used, as in our study, in non-psychiatric patients. The Ham-D is a checklist of items that are ranked on a scale of 0–4 or 0–2. Items

with quantifiable severity are scored 0–4; 4 indicates the greatest severity.

Statistical analysis

Patients presenting nicotine dependence or not were compared for all parameters. Comparisons for continuous variables were made using unpaired two-tailed *t*-tests. For non-parametric data, differences in proportions were compared with the χ^2 -test. Statistical significance was determined at the 0.05 level of confidence. We studied correlation between continuous parameters with the Spearman correlation test.

Results

Diagnosis of nicotine dependence was checked in 500 patients visiting their general practitioner and 127 cases of nicotine dependence were included. All patients screened for nicotine dependence (nicotine-positive) agreed to answer other questionnaires on behavioural addiction, alcohol consumption, anxiety and depression. Non-smoking controls (nicotine-negative) were paired for sex and age.

Socio-demographic and medical characteristics

Age was equivalent in the two groups (nicotine-positive and -negative). No difference was found in unemployment rates and education level between the two groups (Table I). Proportion of patients receiving antidepressants or benzodiazepines and of patients undergoing psychotherapy were also equivalent in the two groups.

Prevalence of impulse control disorders

Thirteen patients presented trichotillomania, 22 explosive intermittent disorder and 12 pathological gambling (Table II). All these diagnoses were equally frequent in the nicotine-positive and -negative groups. We found no case of pyromania. None of the patients presented an association of two or more ICDs. Compulsive buying was the most frequent impulse control disorder. It was significantly more frequent in the nicotine-positive group than in the nicotine-negative group (58 vs. 39 cases, $P=0.01$). Scores of the compulsive buying scale were higher in the nicotine-positive group (4.07 vs. 2.9, $P=0.01$).

Table I. Socio-demographic characteristics and treatments received among nicotine-dependent patients and controls.

	Nicotine-positive	Nicotine-negative	All patients
Number of patients	127	127	254
Mean age (SD)	41.8 (13.5)	42.8 (13.8)	42.3 (13.6)
Married (<i>N</i> and %)	79 (62.7%)	88 (69%)	167 (66%)
University educated (<i>N</i> and %)	79 (62%)	72 (57%)	151 (59%)
Unemployed (<i>N</i> and %)	11 (8.6%)	5 (3.9%)	16 (6.3%)
Treated with antidepressants or anxiolytics (<i>N</i> and %)	20 (15.75%)	19 (15%)	39 (15.3%)
Actual psychotherapy (<i>N</i> and %)	30 (23%)	23 (18%)	53 (20.8%)

Table II. Prevalence of impulsive control disorders, compulsive buying and bulimia among nicotine-dependent patients and controls.

	Nicotine-positive	Nicotine-negative	All patients
Number of patients	127	127	254
Trichotillomania (N and %)	8 (6.3%)	5 (4%)	13 (5.1%)
Explosive intermittent disorder (N and %)	13 (10.2%)	9 (7%)	22 (8.6%)
Kleptomania (N and %)	3 (2.3%)	2 (1.5%)	5 (2%)
Pyromania (N and %)	0	0	0
Pathological gambling (N and %)	8 (6.3%)	4 (3.1%)	12 (4.7%)
Bulimia (N and %)	30 (23.6%)	20 (15.7%)	50 (19.6%)
Compulsive buying (N and %)	58 (45.6%)	39 (30.7%)	97 (38.1%) ^a
Score of compulsive buying (mean and SD)	4.07 (3.7)	2.9 (3.2)	3.5 (3.4) ^b

Differences statistically significant between the nicotine-positive and -negative groups: ^a $\chi^2 = 6.02$, $df = 1$, $P = 0.01$; ^bStudent $t = 6.159$, $df = 1$, $P = 0.01$.

Patterns of alcohol and nicotine consumption and use disorders

Unsurprisingly, patients from the nicotine-positive group smoke more cigarettes (14 vs. 0 cigarettes, $df = 1$, $P < 0.001$), smoked more often (6.5 days per week vs. 0 per day, $df = 1$, $P < 0.001$) and had higher Fagerström scores (6 vs. 0, $df = 1$, $P < 0.001$) than those from the nicotine-negative group. Patients from the nicotine-positive group also drank higher quantities of alcohol each day (2.1 vs. 1 drink, $df = 1$, $P < 0.001$), consumed alcohol more often each week (2.1 vs. 1 day, $df = 1$, $P < 0.001$) and were more often intoxicated with alcohol (0.1 vs. 0, $df = 1$, $P = 0.005$). Their mean MAST scores were higher (2.9 vs. 0.4, $df = 1$, $P < 0.001$). Scores of the CAGE (0.2 vs. 0.15) were not significantly different between the two groups.

Scores of anxiety and depression

Scores of the Hamilton Anxiety and Depression scale were not different in the two groups. Smokers were neither more depressed nor more anxious than controls. Hamilton Anxiety score was, however, significantly correlated, in the nicotine-positive group, to the number of cigarettes smoked each

day ($r = 0.3$, $df = 125$, $P < 0.001$). Hamilton Depression score was also correlated, in the nicotine-positive group, to the number of cigarettes smoked each day ($r = 0.25$, $df = 125$, $P = 0.003$).

Discussion

The discussion of our results is limited by the small number of patients assessed. Interpretation of the results is also limited by the fact that this study was limited to women. ICDs like pyromania are more frequent in men. This disorder was not present in our population. Another ICD more frequent in men is pathological gambling. The prevalence of pathological gambling could have been higher if our population had also included men. Since our work was focused on buying behaviour, we decided to limit it to women. It is well established that compulsive buying is significantly more frequent in women [14].

Our study is the first to systematically assess all impulse control disorders in a population of smokers compared to non-smokers. We used structured interviews to assess impulse control disorders and compulsive buying. We found a frequency of 20.4% for all ICDs. The global prevalence of ICDs was not significantly different in the nicotine-positive and

Table III. Nicotine and alcohol consumption and scores of anxiety and depression among patients from the nicotine-positive and -negative groups.

	Nicotine-positive	Nicotine-negative	All patients
Number of patients	127	127	254
Number of drinks per day (Mean, SD)	1.3 (1.4)	0.7 (1.2) ^a	1 (1.3)
Number of drinking days per week (Mean, SD)	2.1 (2.3)	1 (1.5) ^b	1.5 (2)
Number of alcohol intoxications per week (Mean, SD)	0.1 (0.4)	0 (0) ^c	0.05 (0.3)
CAGE scores (Mean, SD)	0.275 (0.7)	0.15 (0.5)	0.68 (0.1)
MAST scores (Mean, SD)	2.9 (6.7)	0.4 (0.9) ^d	5 (1)
Number of cigarettes per day (Mean, SD)	14 (8.6)	0 (0) ^e	7 (9.3)
Number of smoking days per week (Mean, SD)	6.5 (1.4)	0 (0) ^f	3.2 (3.4)
Fagerström score (Mean, SD)	6 (2)	0 (0) ^g	3 (3.3)
Hamilton Anxiety scores (Mean, SD)	8.2 (3.8)	7.9 (3.8)	8 (3.8)
Hamilton Depression scores (Mean, SD)	3.8 (3)	3.7 (2.9)	3.7 (2.9)

^aDifference statistically significant, Student $t = 9.5$, $df = 1$, $P = 0.002$; ^bStudent $t = 21.7$, $df = 1$, $P < 0.001$; ^cStudent $t = 7.9$, $df = 1$, $P = 0.005$; ^dStudent $t = 17.4$, $df = 1$, $P < 0.0001$; ^eStudent $t = 331$, $df = 1$, $P < 0.001$; ^fStudent $t = 2554$, $df = 1$, $P < 0.0001$; ^gStudent $t = 1121$, $df = 1$, $P < 0.0001$.

Table IV. Study of correlation (Spearman test) between quantitative parameters.

	Age	Drinks/day	Drinking days/week	Alcohol intoxication/week	Cigarettes/day	Fagerström score	MAST score	Hamilton Anxiety score	Hamilton Depression score	Compulsive buying score
Age	–									
Drinks/day	0.02	0.02	0.14	–0.07	0.05	–0.04	0.03	0.08	0.25	–0.14
Drinking days/week	0.14	–	0.55	0.20	0.16	0.15	0.26	–0.05	0	0.08
Alcohol intoxication/week	–0.07	0.55	–	0.22	0.25	0.25	0.29	0.04	–0.02	0.11
Cigarettes/day	0.05	0.20	0.22	–	0.28	0.22	0.52	0.11	0.13	0.02
Fagerström score	–0.04	0.16	0.25	0.28	–	0.87	0.30	0.16	0.15	0.16
MAST score	0.03	0.15	0.25	0.22	0.87	–	0.28	0.12	0.12	0.19
Hamilton Anxiety score	0.08	0.26	0.29	0.52	0.30	0.28	–	0.11	0.21	0.11
Hamilton Depression score	0.25	–0.05	0.04	0.11	0.16	0.12	0.11	–	0.43	0.32
Compulsive buying score	–0.14	0.08	0.11	0.02	0.15	0.12	0.21	0.43	0.19	–
					0.16	0.19	0.11	0.32	0.19	

Correlation presented in bold are statistically significant $P < 0.05$.

–negative groups. This prevalence rate is lower than those found in a population of alcohol-dependent men. Lesieur and Heinemann [4] found a prevalence of 14% of gamblers among alcoholics.

The most frequent "typical" ICD was intermittent explosive disorder. Two other disorders related to ICDs appeared more frequently than typical ICDs: bulimia and compulsive buying. Compulsive buying was the sole impulsive behaviour significantly more frequent in the nicotine-positive group. It can be suggested that smoking and compulsive buying may correspond to equivalent counter-depressive or addictive behaviours, easy to access, especially frequent in women. This observation is corroborated by the fact that the compulsive buying score was significantly correlated to the number of cigarettes smoked each day and to the Fagerström score. This initial observation, however, needs to be confirmed on larger populations of patients, including both men and women. Our work confirmed a classical association between alcohol consumption, alcohol abuse and nicotine dependence [7]. Patients who were smoking had a higher level of alcohol consumption. Amounts of alcohol and nicotine consumed were significantly correlated.

Women from the smoking and non-smoking groups had equivalent levels of depression and anxiety. Scores of Hamilton Anxiety and Depression Scale were not different. This result does not corroborate the association more frequent among women between cigarette smoking and a higher level of anxiety and depression. Killen et al. [15] recently examined the prevalence of major depression in a population of smokers undergoing treatment for nicotine dependence. A total of 21% of females reported an history of major depression and 1% (all female) experienced onset of depression during the treatment. This discrepancy between our results and data from the literature can be explained by the limited size of our population. In addition, women included in our study did not consult their practitioner for help to quit smoking. None of them were trying to reduce their nicotine consumption. Association between depression and cigarette smoking is more frequent in women who enter into a detoxification programme and in patients recently weaned from nicotine.

Conclusion

Our data confirm the frequency of the association between bulimia, compulsive buying and nicotine dependence. A total of 45.6% of the nicotine-dependent women presented compulsive buying and 23.6% bulimia. Compulsive buying was significantly more frequent among nicotine-dependent women than controls. Other impulse control disorders were as frequent among nicotine-dependent women as in controls. A total of 8.6% presented

explosive intermittent disorder, 4.7% pathological gambling and 5% trichotillomania. Nicotine dependence in women was also associated with a higher level of alcohol consumption. These results indicate the possible need to screen nicotine-dependent women for alcohol dependence, bulimia and compulsive buying.

Key points

- Impulse control disorders are characterized by the repetitive occurrence of impulsive behaviour
- We noted the frequency of the association between bulimia, compulsive buying and nicotine dependence
- A total of 30.7% of nicotine-dependent women present compulsive buying and 23.6% bulimia
- Nicotine dependence in women is also associated with a higher level of alcohol consumption
- Our results indicate the possible need to systematically screen nicotine-dependent women for alcohol dependence, bulimia and compulsive buying

Statement of interest

The authors have no conflict of interest with any commercial or other associations in connection with the submitted article.

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