

Nicotine Dependence among Patients Examined in Emergency after a Suicide Attempt

Michel Lejoyeux^{1*}, Simone Guillermet¹, Enrique Casalino², Valérie Lequen¹, Florence Chalvin¹, Aymeric Petit¹ and Véronique Le Goanvic¹

¹Department of Psychiatry and Addictive Medicine, Bichat-Claude Bernard Hospital, AP-HP, Paris, France and Maison Blanche Hospital, Paris, France
²Emergency Ward, Bichat-Claude Bernard Hospital. AP-HP, Paris, France

Abstract

Background: To assess the prevalence of nicotine dependence in a population of patients examined following a suicide attempt and to compare suicide attempts with and without nicotine dependence.

Methods: 200 patients were examined in an emergency department after a suicide attempt. They answered the MAST and the Fagerström questionnaire, and the DSM-IV-TR criteria for alcohol and nicotine were checked. We also assessed socio-demographic characteristics, the mode of suicide attempt and level of sensation seeking.

Results: The prevalence of nicotine dependence was 57% among suicide attempters. Suicide attempters with nicotine dependence were more often men (42 vs. 12%, $p=0.001$), single (67 vs. 32%, $p=0.008$) and had taken alcohol before suicide. They were often multi-attempters (2.7 vs. 1 suicide attempt in their history) and had been more often hospitalized in psychiatry (1.9 vs. 0.6 hospitalization, $p<0.001$) than others. They drank more alcohol (3.7 vs. 0.7 drinks/day, $p<0.001$), presented more alcohol dependence and abuse (36 vs. 8%, $p<0.00001$) and had a higher level of sensation seeking. Factors associated to nicotine dependence were male gender, ingestion of alcohol before suicide attempt, number of previous suicide attempts and number of alcohol intoxication per week.

Conclusion: 57% of the patients examined after a suicide attempt present nicotine dependence. Emergency units may provide an opportunity to systematically identify a dependence disorder and to offer appropriate information and treatment.

Keywords: Addiction; Dependence; Alcohol; Nicotine; Suicide attempt; Emergency; Fagerström; Alcohol abuse; Alcohol dependence

Introduction

Cross sectional epidemiologic studies have reported an association between cigarette smoking and suicide of a magnitude similar to that of the association between smoking and coronary heart disease [1]. Few prospective studies showed a similar association, including a dose-dependent relationship between smoking and increased risk for suicide [2]. Relative rates of suicide in smokers stay elevated when adjusted to potential confounding factors such as income, race, previous myocardial infarction, diabetes, and alcohol intake. Smoking is also associated with an increased risk of suicide attempts in psychiatric patients: psychiatric patients who smoke have a 43% greater risk of experiencing mild to severe suicidal ideation, compared with non smokers [2].

Bolton et al. [3] identified risk factors for suicide attempts over a three-year follow-up. The adjusted odd ratio of nicotine dependence for suicide risk was 3.17. A longitudinal study [4] of young adults over a 10-year follow-up showed that current daily smoking, but not past smoking, predicted the occurrence of suicidal thoughts or attempt. This risk factor was independent of prior depression and other substance use disorders (adjusted odds ratio, 1.82; 95% confidence interval, 1.22-2.69). Additionally, current daily smoking, but not past smoking, predicted the subsequent occurrence of suicidal thoughts or attempt (adjusted odds ratio, 1.74; 95% confidence interval, 1.17-2.54) [4]. No study assessed systematically nicotine consumption and dependence in a population of suicide attempters.

Aim of the Study

In order to study the relation between suicidal behaviour and nicotine consumption, we investigated nicotine dependence in a population examined in an emergency ward after a suicide attempt. We addressed the two following questions:

- What is the prevalence of nicotine consumption among suicide attempters?
- Is there a difference between smoking and non-smoking suicide attempters in terms of socio-demographic characteristics, psychiatric history and personality disorders?

We raised the hypothesis that patients with nicotine dependence present more often another addictive disorder and more severe psychiatric disorders.

For this purpose we assessed a population of 190 consecutive suicide attempters examined in the emergency ward of Parisian hospital.

Methods

The study was reviewed and approved by the ethical board of the department. All patients, over 18 years of age, participated voluntarily in the study and provided written informed consent. To ensure confidentiality, all identifying data were removed and all records were kept locked. The study was conducted at Bichat-Claude Bernard hospital, a university hospital which receives medical, surgical and psychiatric emergencies from the northern districts of Paris (France).

***Corresponding author:** Michel Lejoyeux, Department of Psychiatry and Addictive Medicine, AP-HP, Bichat Claude Bernard Hospital, 75877 Paris Cedex 18, France, Tel: 33 1 40 25 82 62; Fax: 33 1 40 25 67 80; E-mail: michel.lejoyeux@bch.aphp.fr

Received September 16, 2013; **Accepted** January 24, 2014; **Published** January 31, 2014

Citation: Lejoyeux M, Guillermet S, Casalino E, Lequen V, Chalvin F, et al. (2014) Nicotine Dependence among Patients Examined in Emergency after a Suicide Attempt. J Addict Res Ther 5: 168. doi: [10.4172/2155-6105.1000168](https://doi.org/10.4172/2155-6105.1000168)

Copyright: © 2014 Lejoyeux M, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

The annual rate of medical emergencies is 400,000 visits. Among them, 20,000 visits correspond to “primary” psychiatric emergencies and 3,500 to a suicide attempt. The emergency ward is a 24-hour service. Half of the patients admitted at night to the emergency ward are kept under observation for 12 hours. They leave emergency in the morning after this period of observation. 70% of them are admitted between 9 am and 7 pm. 30% arrived in the emergency department at night and were still kept under observation in the morning.

Over a 6-month period (January to June 2010), we interviewed 200 consecutive suicide attempters from the emergency service, during day-time hours between 9 am and 7 pm. We did not pre-select the patients and the population of the study strictly reflects patients usually examined in the emergency ward. All patients were interviewed by the same psychologist (V.L.) trained in using the study instruments and in clinical aspects of suicidal behavior. Patients were assessed during their stay in the emergency ward and they were no longer intoxicated.

Socio-demographic characteristics, mode of the suicide attempt

In suicide attempts we included all consecutive cases of patients examined after deliberate self-poisoning or deliberate self-injury. In the latter group we included patients who had voluntarily inflicted lacerations, scarifications or wrist cutting upon themselves. Deliberate self-poisoning was defined according to criteria of the WHO Multicenter Study on Parasuicide [5]: an act with a nonfatal outcome in which an individual deliberately ingests a substance in excess of the prescribed or generally recognized therapeutic dosage. We compared demographic details (age, working status, marital status) through a specific and validated questionnaire [6].

Assessment of nicotine and alcohol use and dependence

Cigarette smoking was studied with the Fagerström questionnaire [7]. 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 general population [7]. In samples of cigarette smokers seeking treatment, mean scores range from 5.2 to 6.3 [7].

Patients answered the MAST (Michigan Alcohol Screening Test) [8]. The measure is a 25-item questionnaire designed to provide a rapid screening for lifetime alcohol-related problems and alcohol dependence. The quantity of drinks taken within a 24-hour period

during the previous week was assessed with a specific questionnaire previously published [9]- a drink being defined as the amount of alcohol found in 300 ml of beer, 100 ml of wine, or 25 ml of whisky. We noted the number of days per week in which drinking occurred in the month before the interview. Lastly, we assessed the number of acute alcohol intoxication occurring during the previous month. We finished this part of the assessment by checking the DSM-IV-TR criteria for alcohol and nicotine abuse and dependence.

Current psychiatric state, personality disorders and sensation seeking level

The psychiatric state was assessed with a structured psychiatric interview, the Mini International Neuropsychiatric Interview (MINI) [10]. Finally, all patients filled in the Zuckerman Sensation-seeking scale [11]. Since all of our patients were French-speaking, we used a French translation of the Sensation Seeking Scale [12]. This 72-item scale gives five scores: F1: general factor, F2: thrill and adventure seeking, F3: experience-seeking, F4: disinhibition, and F5: boredom susceptibility.

Data analysis

For all parameters, comparisons were made between smoking and non-smoking suicide attempters. For continuous variables we used unpaired two-tailed Student t tests. For non-parametric data, differences in proportions were compared with the chi-square test. Possible predictive factors of the presence of nicotine dependence were identified with multinomial regression analysis. The group without nicotine dependence was chosen as reference category for regression analysis. We assessed with an ANCOVA test correlations between Fagerström scores and quantitative and qualitative parameters. All statistical tests were two-tailed and a p value of 0.05 or less was considered to be significant.

Results

The prevalence rate of current nicotine dependence among suicide attempters (SA) was 57%. All patients who smoked presented DSM-IV-TR criteria for nicotine dependence. Comparisons between SA with and without nicotine dependence significantly revealed (Table 1) that smokers were often men (42% vs. 12%), single (67% vs. 32%), who had taken alcohol before attempting to their life (57% vs. 43%). SA with nicotine dependence were often multi-attempters (2.7 vs. 1 suicide attempt in their history), and they had been more often hospitalized in

Variable	Nicotine + N=114	Nicotine - N=86	Statistics
Age (mean, SD)	34.1 (12)	38.7 (18)	student t=2.1, df=198, p=0.03
Sex (N and % of women)	78 (68%)	76 (88%)	$\chi^2 = 11$, df = 1, p=0.001
Single (N and %)	57 (67%)	27 (32%)	$\chi^2 = 6.9$, df = 1, p=0.008
Working (N and %)	62 (51%)	58 (48%)	$\chi^2 = 3.4$, df = 1, p=0.06
Mode of suicide attempt and psychiatric history			
Self-poisoning	104 (92%)	79 (92%)	$\chi^2 = 0.32$, df = 2, p = 0.85
Cutting	7 (6%)	4 (4.6%)	
Hanging	3 (2.6%)	3 (3.4%)	
Ingestion of alcohol before suicide attempt	65 (57%)	22 (43%)	$\chi^2 = 19.7$, df = 1, p 0.0000
Suicide attempt at home	91 (79%)	78 (90%)	$\chi^2 = 3.84$, df = 1, p 0.03
Suicide attempt in the evening or at night	64 (56%)	33 (38%)	$\chi^2 = 6.2$, df = 1, p 0.01
Number of previous suicide attempts	2.7 (5.4)	1 (1.5)	student t = -2.8, df=198, p=0.006
Number of previous hospitalisations in psychiatry	1.9 (3.1)	0.6 (1.8)	student t=-3.4, df=198, p<0.001

Table 1: Comparison of suicide attempts with and without nicotine consumption: Socio demographic characteristics and mode of suicide attempt.

psychiatric departments or facilities (1.9 vs. 0.6 hospitalization). They had more often committed suicide in the evening (between 5 pm and 8 pm) or at night (after 8 pm) (56% vs. 38%).

Nicotine dependence (Table 2) was strongly associated with alcohol consumption (3.7 vs. 0.7 drink of alcohol/day in the two groups) and 2.7 vs. 1.2 drinking days per week. Current alcohol abuse and dependence (36% vs. 8%) were more frequent among smokers and Michigan Alcohol Screening Test mean scores were higher among smokers (12.9 vs. 2.3).

Psychiatric diagnoses (Table 3) among SA were not different between smokers and non smokers. Lastly, smokers had higher score of sensation seeking. The difference was significant for the general factor (19.7 vs. 14.6) and for all sub-scores: disinhibition, danger and

adventure seeking, experience seeking and boredom avoidance.

Multinomial logistic regression (Table 4) identified four variables associated with nicotine dependence: male gender, ingestion of alcohol before SA, number of previous suicide attempts, number of alcohol intoxication per week. The most important factor was male gender and the less important was the number of alcohol drinks per day; 82% of the observations are classified by the model.

Given the number of potential covariates, we also performed an ANCOVA test with all quantitative and qualitative parameters. We identified three parameters significantly associated to Fagerström scores: number of smoking days by week ($t=15$, $p<0.001$); cigarettes by day $t=7.7$, $p<0.001$, alcohol abuse or dependence $t=2.4$, $p=0.001$.

Variable	Nicotine + N=114	Nicotine - N=86	Statistics
Cigarettes per day (mean, SD)	18 (11)	0	
Number of smoking days per Week (mean, SD)	6.7 (0.9)	0	
Fagerström score (mean, SD)	6.9 (2.1)	0.01 (0.1)	student $t=-30$, $df=198$, $p<0.0001$
Drinks of alcohol/day	3.4 (4.3)	0.7 (1.3)	student $t=5.5$, $df=198$, $p<0.0001$
Drinking days/week	2.7 (2.8)	1.2 (2.3)	student $t=4.1$, $df=198$, $p<0.0001$
Alcohol intoxication/month	1 (1.9)	0.1 (0.4)	student $t=4.3$, $df=198$, $p<0.0001$
Diagnostic of alcohol abuse	36 (31%)	8 (9%)	$\chi^2=14.1$, $\delta\phi=1$, $\pi<0.0000$
Diagnostic of alcohol dependence	37 (32%)	6 (7%)	$\chi^2=18.5$, $\delta\phi=1$, $\pi<0.0000$
Alcohol abuse or dependence	42 (36%)	7 (8%)	$\chi^2=21.8$, $\delta\phi=1$, $\pi<0.0000$
MAST score	12.9 (15)	2.3 (6.3)	student $t=-6$, $df=198$, $p<0.00001$

Table 2: Comparison of suicide attempts with and without nicotine consumption: nicotine and alcohol consumption and dependence.

Variable	Nicotine + N=114	Nicotine - N=86	Statistics
Psychiatric diagnostic			
Generalized anxiety disorder	6 (5%)	11 (12%)	$\chi^2=23.1$, $df=10$, $p=0.4$
Major depression	49 (42%)	43 (50%)	
Post traumatic stress disorder	15 (13%)	8 (9%)	
Social phobia	1 (0.8%)	1 (1.1%)	
Alcohol dependence	42 (36%)	7 (8%)	
Drug dependence	5 (4.3%)	0 (0%)	
Schizophrenia	6 (5.2%)	4 (4.6%)	
Mania	5 (4.3%)	1 (1.1%)	
Obsessive compulsive dis.	0 (0%)	1 (1.1%)	
Agoraphobia	2 (1.7%)	1 (1.1%)	
No diagnosis	10 (8%)	15 (17%)	
Sensation seeking			
General factor	19.7 (5.6)	14.6 (7.2)	student $t=-5.7$, $df=198$, $p<0.0001$
Disinhibition	4.4 (2.3)	2.5 (2.2)	student $t=-7.4$, $df=198$, $p<0.0001$
Danger adventure seeking	5.8 (2.7)	4.4 (3.1)	student $t=-3.2$, $df=198$, $p=0.001$
Experience	5.4 (1.9)	4.8 (2.1)	student $t=-2.2$, $df=198$, $p=0.02$
Boredom avoidance	3.5 (1.9)	2.8 (1.9)	student $t=-2.6$, $df=198$, $p=0.008$

Table 3: Comparison of suicide attempts with and without nicotine consumption: psychiatric disorders and personality dimensions.

Variable	Odd ratio	95 % confidence interval	p value
Male gender	1.94	0.7-4.8	$p=0.15$
Alcohol before SA	1.53	0.68-3.45	$p=0.2$
Number of previous SA	1.26	1.05-1.5	$p=0.01$
Alcohol intoxication/week	1.12	0.7-1.7	$p=0.6$
Drinks/day	1.1	0.9-1.4	$p=0.12$
Sensation seeking	1.08	1.02-1.15	$p=0.003$

Reference category: suicide attempt with nicotine dependence, Likelihood ratio $\chi^2=73$, $df=9$, $p<0.0001$, 82 % of the observations are classified by the model.

Table 4: Multinomial logistic regression of factors explaining nicotine dependence among suicide attempters.

Discussion

Limitations of the study

A limitation that warrants discussion pertains to the cross sectional design of our study which precludes any causal interference regarding nicotine dependence and suicide attempt. Previous works proposed potential explanations for the causal link between suicide and nicotine. First, it may be mediated through the central effects of nicotine. Second, depressed smokers may find it particularly difficult to quit smoking. Third, other factors, including low self esteem and alcohol and substance misuse, may predispose to both smoking and suicide [4]. Another important limitation of our study is due to the absence of a comparison group of controls who did not commit suicide attempt. We found a prevalence rate of 57% for nicotine dependence among suicide attempters. We do not know what proportion of non suicide attempters have nicotine dependence.

Prevalence rate of nicotine dependence

The first observation of our study is that a majority of SA (57%) examined in the emergency ward present nicotine dependence. Since no other study to our knowledge performed a systematic assessment of nicotine dependence among SA, our observed rates cannot be compared with those of other research. Our results, however, corroborate those from studies in general population which showed that nicotine dependence is associated with an increased risk of suicide attempt (adjusted odd ration of 1.78 in the Yaworski et al. [13] study and 3.17 in the Bolton et al. [3] study).

Association of alcohol and nicotine dependence

The second observation of our work is the association between nicotine and alcohol dependence. SA who smokes are significantly more often dependent of alcohol. This observation corroborates results from previous studies on these two dependence disorders. Among adolescents, alcohol-related problems are a risk factor for future smoking [14]. Epidemiological studies in general population also found alcohol and nicotine dependence disorders to be associated [3]. This observation incites to systematically assess alcohol use disorders when examining a SA who smokes.

Profile of patients at risk for nicotine dependence among suicide attempters

With a multinomial logistic regression we identified a profile of SA at risk for nicotine dependence. A typical patient with nicotine dependence is a man who took alcohol before attempting to his life and who presents in his history one or more suicide attempts. The level of sensation seeking did not appear as a significant risk factor for nicotine dependence. We found however a higher level of sensation seeking among smokers than among non-smokers. We can only suggest that SA who smokes are more impulsive since they present more suicide attempts in their history and have higher scores of sensation seeking. This impact of disinhibition would need to be confirmed by prospective studies and by cross sectional studies including more patients.

Application of the results in clinical practice

The frequent association between suicide attempts and nicotine dependence is not enough taken into account during the assessment and treatment of these patients. Suicide attempts are made by patients who may deny their dependence and do not ask for any specific treatment of their addiction. None of the patients in our sample had asked for a treatment or advice on their nicotine or alcohol consumption.

Patients must directly be asked about their relation to alcohol, and if the diagnosis of abuse or dependence is established, addictive disorders and coexisting psychiatric disorders must be established. None of the patients identified as nicotine dependent had asked for specific help in the domain of addiction before being diagnosed by our systematic assessment. If they had not been assessed, they would have left the emergency ward with no treatment or information on the possibilities for help. A stay in the emergency ward provides the only opportunity to receive information [15] and to begin to benefit from adequate treatment. Moreover, the assessment of nicotine dependence or alcohol misuse enables an earlier diagnosis among patients who do not yet have medical, social or psychiatric complications of their addiction.

According to the causal model linking suicide risk to nicotine dependence, treatment of this addiction could be a way to reduce the risk of a new hospitalization. Current daily smoking, but not past smoking, predicts the subsequent occurrence of suicidal thoughts or attempt, independent of prior depression and substance use disorders (adjusted odds ratio, 1.82; 95% confidence interval, 1.22-2.69) [4]. Additionally, current daily smoking, but not past smoking, predicts the subsequent occurrence of suicidal thoughts or attempt.

The emergency ward is a good place to initiate a treatment for addictive disorders. If the question of addiction is not assessed and treated in the emergency ward, it will not, in most cases be diagnosed and treated later [16]. A study conducted among 1,000 people showed that a 10-min intervention in an emergency room produces significant results. After 3 months, the authors established that a reduction in drinks consumption by 33% among usual and light drinkers and by 64% among occasional and heavy drinkers had occurred [17]. A stay in the emergency ward can be seen as a 'teachable moment' (Lejoyeux et al.), which is the one point in time when the nicotine dependent or alcohol abuser patient may realize addiction is the source of his difficulties. Until now, SA are not systematically asked about their nicotine consumption or dependence. Our observations thus incite to systematically assess nicotine dependence in the emergency ward when a patient is examined after a suicide attempt and to propose a treatment if the diagnosis is confirmed.

Conclusion

Nicotine dependence is a frequent and often under recognized form of addiction among suicide attempters. Patients examined in an emergency ward after a suicide attempt, are particularly likely to present nicotine dependence. This addictive disorder is present in 57 % of cases. The typical patient dependent on nicotine is a male, also dependent of alcohol, presenting a history of previous suicide attempts and a high level of sensation seeking. Systematic assessment and recognition of nicotine dependence must be performed during his stay in the emergency ward. Emergency units may provide an opportunity to offer information and treatment for these frequent addictive disorders. Further prospective studies are needed to confirm the impact of nicotine dependence and other addictive disorders on the risk of suicidal behaviour.

References

1. Angst J, Clayton PJ (1998) Personality, smoking and suicide: a prospective study. *J Affect Disord* 51: 55-62.
2. Malone KM, Waternaux C, Haas GL, Cooper TB, Li S, et al. (2003) Cigarette smoking, suicidal behavior, and serotonin function in major psychiatric disorders. *Am J Psychiatry* 160: 773-779.
3. Bolton JM, Pagura J, Enns MW, Grant B, Sareen J (2010) A population-based longitudinal study of risk factors for suicide attempts in major depressive disorder. *J Psychiatr Res* 44: 817-826.
4. Breslau N, Schultz LR, Johnson EO, Peterson EL, Davis GC (2005) Smoking

- and the risk of suicidal behavior: a prospective study of a community sample. *Arch Gen Psychiatry* 62: 328-334.
5. Schmidtke A, Bille-Brahe U, DeLeo D, Kerkhof A, Bjerke T, et al. (1996) Attempted suicide in Europe: rates, trends and sociodemographic characteristics of suicide attempters during the period 1989-1992. Results of the WHO/EURO Multicentre Study on Parasuicide. *Acta Psychiatr Scand* 93: 327-338.
 6. Saliou V, Fichelle A, McLoughlin M, Thauvin I, Lejoyeux M (2005) Psychiatric disorders among patients admitted to a French medical emergency service. *Gen Hosp Psychiatry* 27: 263-268.
 7. Fagerstrom KO, Schneider NG (1989) Measuring nicotine dependence: a review of the Fagerstrom Tolerance Questionnaire. *J Behav Med* 12: 159-182.
 8. Selzer ML (1971) The Michigan Alcoholism Screening Test : the quest for a new diagnostic instrument. *American Journal of Psychiatry* 127:89-95.
 9. Lejoyeux M, Huet F, Claudon M, Fichelle A, Casalino E, et al. (2008) Characteristics of suicide attempts preceded by alcohol consumption. *Arch Suicide Res* 12: 30-38.
 10. Sheehan DV, Lecrubier Y, Harnett Sheehan K, Amorim P, Janavs J, et al. (1997) The validity of the Mini International Neuropsychiatric Interview (MINI) according to the SCID-P and its reliability. *European Journal of Psychiatry* 12: 232-241.
 11. Zuckerman M, Eysenck S, Eysenck HJ (1978) Sensation seeking in England and America: cross-cultural, age, and sex comparisons. *J Consult Clin Psychol* 46: 139-149.
 12. Carton S, Lacour C, Jouvent R, Widlöcher D (1990) Le concept de recherche de sensations: traduction et validation de l'échelle de Zuckerman. *Psychiatrie Psychobiologie* 5: 39-44.
 13. Yaworski D, Robinson J, Sareen J, Bolton JM (2011) The relation between nicotine dependence and suicide attempts in the general population. *Can J Psychiatry* 56: 161-170.
 14. Dierker L, Selya A, Piasecki T, Rose J, Mermelstein R (2013) Alcohol problems as a signal for sensitivity to nicotine dependence and future smoking. *Drug Alcohol Depend* 132: 688-693.
 15. Mello MJ, Nirenberg TD, Longabaugh R, Woolard R, Minugh A, et al. (2005) Emergency department brief motivational interventions for alcohol with motor vehicle crash patients. *Ann Emerg Med* 45: 620-625.
 16. Lejoyeux M, Gastal D, Bergeret A, Casalino E, Lequen V, et al. (2012) Alcohol use disorders among patients examined in emergency departments after a suicide attempt. *Eur Addict Res* 18: 26-33.
 17. Bernstein E, Bernstein J, Levenson S (1997) Project ASSERT: an ED-based intervention to increase access to primary care, preventive services, and the substance abuse treatment system. *Ann Emerg Med* 30: 181-189.