Original Research

Longitudinal Description and Prediction of Smoking Among Borderline Patients:

An 18-Year Follow-Up Study

Marcelo J. A. A. Brañas, MD; Frances R. Frankenburg, MD; Christina M. Temes, PhD; Garrett M. Fitzmaurice, ScD; and Mary C. Zanarini, EdD

Abstract

Objective: The objectives of this study were (1) to compare smoking between recovered and non-recovered patients with borderline personality disorder (BPD) over the course of 18 years and (2) to assess baseline predictors of tobacco use in patients with BPD.

Methods: A total of 264 borderline patients were interviewed concerning their smoking history beginning at the 6-year follow-up wave in a longitudinal study of the course of BPD (McLean Study of Adult Development) and reinterviewed at 2-year intervals over the next 18 years. Initial data collection of the larger study happened between June 1992 and December 1995, and the *DSM-III-R* and the Revised Diagnostic Interview for Borderlines (DIB-R) were used as the diagnostic instruments for BPD.

Results: Recovered patients had a 48% lower prevalence of smoking than non-recovered patients at 6-year follow-up (a significant difference; P=.01). Also, the rate of decline in smoking for the recovered group was 68% and was significantly faster (P=.008) than for the non-recovered group over the subsequent 18 years. Alcohol abuse or dependence (relative risk [RR]=1.22; 95% CI, 1.06–1.40; P=.005), lower levels of education (RR=1.28; 95% CI, 1.15–1.42;

P<.001), and higher levels of the defense mechanism of denial (RR=1.08; 95% Cl, 1.03–1.13; P=.002) were significant predictors of smoking in borderline patients in multivariate analyses.

Conclusions: Taken together, the results of this study suggest that recovery status was an important element in the prevalence of smoking among borderline patients over time. They also suggest that smoking was predicted by 3 factors: prior psychopathology, demographics, and psychological maturity.

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Author affiliations are listed at the end of this article.

obacco use is the leading preventable cause of disease, disability, and death in the United States.¹ Approximately 15% of adult Americans currently smoke cigarettes,² and each year over 480,000 deaths are related to smoking or exposure to second-hand smoke.¹ For those who suffer from psychiatric illness, the prevalence of smoking is even higher. Data from the 2016 National Survey on Drug Use and Health showed that 34.6% of adults with psychiatric disorders use tobacco compared to 23.3% of adults without a psychiatric illness.³ In severe mental illness, such as schizophrenia and bipolar disorder, the prevalence of smoking is even higher (ie, 59.1% and 46.4%, respectively).⁴

Consistent with these findings, patients with personality disorders have a high prevalence of smoking.^{5,6} In the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) study, the lifetime prevalence of

nicotine dependence in patients with borderline personality disorder (BPD) (n = 1,030) was 53.9%.⁷ This rate is 4.1 times greater than that in the general US population.⁸

Borderline personality disorder is characterized by marked instability in interpersonal relationships and self-image,⁹ and its psychopathology encompasses affective, cognitive, impulsive, and interpersonal symptoms.¹⁰ More specifically, dysphoric affects, such as anger and emptiness; cognitive symptoms, such as distrust of others and depersonalization; impulsivity, including self-harm and suicide attempts; and both dramatic interpersonal symptoms such as stormy relationships and more internal interpersonal symptoms such as intolerance of aloneness and abandonment concerns, are common in patients with BPD.

Among patients who have been diagnosed with BPD, rates of smoking appear to differ on the basis of symptom





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Clinical Points

- Recovered borderline personality disorder (BPD) patients had a lower prevalence of smoking than nonrecovered patients with BPD. For borderline patients who smoke, recovered status was associated with faster smoking cessation.
- A history of alcohol abuse or dependence was a significant predictor of smoking over time among patients with BPD.
- Lower levels of education and higher levels of the defense mechanism of denial also predicted smoking over time among patients with BPD.

remission and degree of psychosocial recovery. Previous work by our group found in a cross-sectional study at 6-year follow-up¹¹ that patients with BPD who had a remission of symptoms (ie, no longer met criteria for BPD for 2 years or more) were significantly less likely to report pack-per-day smoking than non-remitted subjects. A similar finding at the 10-year follow-up¹² was that patients who experienced a recovery from BPD (ie, concurrent symptomatic remission of BPD and good psychosocial functioning) were significantly less likely to smoke than never-recovered patients.

The current study focused on the longitudinal course of smoking in borderline patients. This study had two aims. The first was to compare the prevalence of smoking reported by recovered versus non-recovered BPD patients over 18 years of prospective study. The second was to establish the best set of clinically meaningful predictors of smoking in patients with BPD.

METHODS

The current study was part of a multifaceted longitudinal study of the course of BPD—the McLean Study of Adult Development (MSAD). The methodology of this study, which was reviewed and approved by the McLean Hospital Institutional Review Board, has been described in detail elsewhere.¹⁰ Briefly, all patients were initially inpatients at McLean Hospital in Belmont, Massachusetts, and were interviewed between June 1992 and December 1995. Each patient was screened to determine that he or she was 18 to 35 years of age, had a known or estimated IQ of 71 or higher, and had no history or current symptomatology of schizophrenia, schizoaffective disorder, bipolar I disorder, or an organic condition that could cause serious psychiatric symptoms.

After the study procedures were explained during each subject's index admission, written informed consent was obtained. Each patient then met with a master's level interviewer blind to the patient's clinical diagnoses. Four semistructured interviews were administered: the Background Information Schedule (BIS),¹³ which assesses psychosocial functioning and treatment history; the Structured Clinical Interview for *DSM-III-R* Axis I Disorders (SCID-I)¹⁴; the Revised Diagnostic Interview for Borderlines (DIB-R)¹⁵; and the Diagnostic Interview for *DSM-III-R* Personality Disorders (DIPD-R).¹⁶ The interrater and test-retest reliability of the BIS^{17,18} and of the 3 diagnostic measures^{19,20} have all been found to be good-to-excellent.

At each 24-month-long follow-up wave, diagnostic information was reassessed via interview methods similar to the baseline procedures used by staff members blind to baseline diagnoses. After informed consent was obtained, the MSAD diagnostic battery was re-administered (a change version of the SCID-I pertaining to the past 2 years rather than lifetime at baseline, as well as the DIB-R and the DIPD-R). The Revised Borderline Follow-up Interview (BFI-R)²¹-the follow-up analog to the BISwas also administered. Good-to-excellent follow-up (within a generation of raters) and longitudinal (between generations of raters) interrater reliability was maintained throughout the course of the study for variables pertaining to psychosocial functioning and treatment use.^{17,18} Good-toexcellent interrater reliability was maintained throughout the study for both Axis I and Axis II diagnoses.^{19,20}

At the 6-year follow-up wave and each of the 9 subsequent follow-up waves, the Medical History and Services Utilization Interview (MHSUI)¹¹ was administered to all patients by a well-trained interviewer. The MHSUI assesses medical history and lifestyle issues related to physical health and health care utilization. Interviewers prompted participants to clarify their answers to MHSUI questions as needed. Medical diagnoses were not recorded unless they had been given to the subject by a physician.

The defensive style of each patient was measured by administering the Defense Style Questionnaire²²—a 91-item self-report measure that assesses the presence of both defensive styles and specific defense mechanisms. This measure has been found to be internally consistent and to have criterion validity.²²

To be considered recovered, a borderline subject had to be in remission from BPD, have at least one emotionally sustaining relationship with a close friend or life partner/spouse, and be able to work, go to school, or be a full-time unpaid carer consistently, competently, and on a full-time basis. Remission was defined as a patient no longer meeting either study criteria set for borderline personality disorder (DIB-R and *DSM-III-R*) for a period of 2 years or more.²³

Smoking was defined as consuming 20 (one pack) or more cigarettes daily for 12 months or more of the followup period. Tobacco abstinence was defined as at least half of each 2-year-long follow-up period without smoking. We selected our bivariate predictors of smoking based on our clinical experience and the literature. We selected 12 baseline (6-year) predictors, which included age,^{24,25} gender,^{24,25} percent time depressed in past month,^{24,25}

Table 1.

Prevalence Rates (n) of Smoking Reported by Recovered Versus Non-Recovered Borderline Patients Over 18 Years of Prospective Follow-Up^a

		Follow-Up, y								
Borderline Patient Group	6	8	10	12	14	16	18	20	22	24
Recovered	37.3 (56/150)	39.0 (57/146)	38.9 (56/144)	33.6 (48/143)	35.0 (49/140)	33.8 (46/136)	29.3 (39/133)	27.3 (36/132)	23.3 (30/129)	24.2 (30/124)
Non-Recovered	56.1 (64/114)	53.2 (58/109)	56.2 (59/105)	56.4 (57/101)	56.1 (55/98)	55.8 (53/95)	52.2 (48/92)	50.0 (45/90)	49.4 (42/85)	46.3 (38/82)
Regression Analysis Variable	I	R	Rob	ust SE		Ζ	PV	alue	95	% CI
Group	0.	52	0.	13	-2	.59	.01		0.32	-0.85
Time	0.78		0.13		-1.50		.13		0.57-1.08	
Interaction of group and time	0.	41	0.	14	-2	.65	.008		0.21	-0.79
^a Prevalence values are shown Abbreviation: RR = relative ris	n as % (n). k									

percent time anxious in past month,^{24,25} alcohol abuse/ dependence,²⁵ drug abuse/dependence,^{24,25} obesity,²⁶ years of education,^{24,27} income,^{24,27} socioeconomic status (SES),²⁷ receiving social security disability income (SSDI),²⁸ and higher levels of denial (mechanism of defense)²⁹ to represent possible risk factors for smoking.

Obesity was defined as having a body mass index (BMI) of 30 kg/m² or higher.³⁰ BMI was calculated for all patients using their self-reported weight and height at the 6-year follow-up. Alcohol and drug use was evaluated using the SCID-I. Percentage of time depressed and anxious were measured with the Dysphoric Affect Scale (DAS),³¹ a 50-item self-report instrument that assesses affects and cognitions typical of borderline patients and has been found to show good retest reliability and internal consistency. Age, gender, years of education, income, SES, and SSDI were determined using information from the BFI-R.

Statistical Analyses

All analyses were performed using Stata statistical software (version 16.1; Stata Corporation; College Station, Texas). A log-linear regression model, estimated by generalized estimating equations (GEEs), was used in longitudinal analyses of the prevalence of smoking in subjects with BPD, with recovery status (recovered versus non-recovered) and time as main effects of interest. The analysis also included a test of recovery status-by-time interaction to assess whether the pattern of change in prevalence differed between these two groups. The use of GEEs appropriately accounts for the correlation among the repeated binary assessments of smoking over the 18 years of study. The results of these regression analyses are reported in terms of exponentiated coefficients that have interpretations in terms of relative risks (RRs) and their 95% confidence intervals (CIs).

In addition, we used log-linear regression models, estimated by GEEs, to assess bivariate and multivariate predictors of smoking over time. To select the most salient subset of factors that are predictive of smoking, we entered all the significant (P < .05, 2-tailed) variables from the bivariate analyses simultaneously and followed a backward deletion procedure until all variables remaining were statistically significant at 2-tailed P < .01. The results of these analyses are reported in terms of RRs and their 95% CIs. Categorical bivariate data are reported as percent (n) and dimensional data as mean (SD).

RESULTS

Subjects

The sample and its diagnostic characteristics at the 6-year follow-up (the baseline assessment of smoking in this particular study) have been described elsewhere.¹¹ Briefly, we interviewed 264 borderline patients at 6-year follow-up, of whom 80.7% (n = 213) were women and 87.5% (n = 231) were White. Their mean (SD) age was 33.0 (5.9) years, and the mean (SD) SES was 3.4 (1.4) (for which 1 = highest and 5 = lowest).³² In terms of recovery status, 150 patients were recovered and 114 patients were non-recovered over the 18 years that smoking was assessed. Thirty-one patients died between 6-year and 24-year follow-ups, and 27 were lost to follow-up. Thus, we had a follow-up rate of 88% (n = 206/233)of surviving patients (8 died by suicide and 23 died of other causes) by the time of the 24-year follow-up. Also, both groups (recovered vs never-recovered BPD patients) were very similar in terms of race and sex.33

Prevalence and Predictors

Table 1 details the prevalence rates of smoking for recovered and non-recovered borderline patients over 18 years of prospective study. The results of the regression analyses can be interpreted in terms of RRs between groups (based on recovery status) and smoking rates over time. The relative risk of 0.52 for recovery status indicates that patients who attained a recovery from BPD were 48% (or $[1-0.52] \times 100\%$) significantly less

Table 2.

Baseline (6-Year Follow-Up) Predictors of Smoking in Borderline Personality Disorder Patients

Predictor	% (n)	Mean (SD)	RR	Ζ	Р	95% CI
Age		32.99 (5.84)	1.01	1.80	.071	0.99–1.02
Female	80.68 (213)		0.95	-0.69	.493	0.84-1.09
% Time depressed		40.39 (30.13)	1.00	2.39	.017	1.00-1.01
% Time anxious		40.92 (30.08)	1.00	3.06	.002	1.00-1.01
Alcohol abuse/dependence	11.36 (30)		1.32	3.51	<.001	1.13–1.53
Drug abuse/dependence	12.88 (34)		1.24	2.94	.003	1.07-1.43
Obesity	28.03 (74)		1.09	1.39	.165	0.97-1.22
≤ 14 years of education	42.42 (112)		1.38	6.38	<.001	1.25–1.53
Lower-income (< \$20,000)	44.32 (117)		1.15	2.55	.011	1.03–1.27
Socioeconomic status (SES) [1 = highest and 5 = lowest]		3.40 (1.45)	1.09	4.85	<.001	1.05–1.12
Social Security Disability Income (SSDI)	46.59 (123)		1.24	4.06	<.001	1.12–1.37
Higher level of defense of denial		3.97 (1.00)	1.12	4.64	<.001	1.07–1.18
Abbreviation: RR=relative risk.						

Table 3.

Significant Multivariate Baseline Predictors of Smoking for Borderline Personality Disorder Patients

Predictor	RR	SE	Ζ	Р	95% CI
History of alcohol abuse/dependence	1.22	0.09	2.79	.005	1.06-1.40
≤ 14 years of education	1.28	0.07	4.52	<.001	1.15–1.42
Defense mechanism of denial	1.08	0.03	3.07	.002	1.03-1.13

Abbreviation: RR = relative risk.

likely than non-recovered subjects to smoke at the initial 6-year follow-up assessment (P = .01). The relative risk of 0.78 for time indicates that the relative change from 6-year to 24-year follow-up resulted in an approximately 22% (or $[1-0.78] \times 100\%$) non-significant decline in the prevalence of smoking for non-recovered borderline subjects (P = .13). In contrast, the significant interaction between recovery status and time of 0.41 indicates that the relative decline from 6-year to 24-year follow-up was approximately 68% (or $[1-(0.41 \times 0.78)] \times 100\%$) for recovered borderline subjects. That is, the decline in smoking prevalence for recovered borderline patients was steeper than that for non-recovered patients (P = .008).

Table 2 presents the bivariate analysis of the 12 selected predictors of smoking among borderline patients across all follow-up periods. The following 9 variables from 6-year follow-up were found to be significant bivariate predictors of smoking over time: percent time depressed over the past month, percent time anxious over the past month, alcohol abuse/dependence, drug abuse/dependence, years of education, income, SES, Social Security Disability Income status, and higher levels of the defense mechanism of denial. Table 3 shows that 3 of these variables were found to be significant predictors of smoking in the multivariate analysis: history of alcohol abuse or dependence, having 14 years of education or less, and the presence of higher levels of the defense mechanism of denial.

DISCUSSION

Three important findings emerged from this study. First, recovered borderline patients were significantly less likely to smoke at the baseline of the study (6-year follow-up) than non-recovered patients with BPD. The latter group had rates of smoking similar to those who are affected by other serious psychiatric illnesses, such as schizophrenia and bipolar disorder.⁴ At the 6-year follow-up wave, 56.1% of the non-recovered BPD patients reported smoking.

The second finding is that the recovered BPD patients had a significant decrease in smoking over the follow-up period. Additionally, the rate of decline was significantly different between groups. For recovered patients, the rate of decline was faster than for non-recovered patients (68% vs 22%).

Many factors may have played a role in the lower prevalence of smoking and its faster decline over time in recovered patients compared to non-recovered BPD patients. First, tobacco smoking rates universally declined in the US during the past decades,^{34,35} influenced by many factors, including mass media antismoking campaigns, availability of smoking cessation interventions, and increased taxation/pricing of tobacco.^{36–40} Recovered BPD patients may have been more likely to be exposed to some of these social pressures to quit smoking (eg, workplace smoking bans) due to their vocational and social status.^{41,42}

Recovered patients with BPD exhibit healthier behaviors and are in better health than non-recovered patients, likely influencing this difference in smoking rates.¹² Previous research from our group has demonstrated that non-recovered BPD patients in comparison to recovered patients have higher prevalence of several serious medical conditions (eg, obesity, osteoarthritis, diabetes, urinary incontinence), poor health-related behaviors (eg, lack of regular exercise), costly medical services utilization, and poor sleep quality.^{12,43–46} Also, BPD patients who demonstrated poorer health indicators over time are more likely to report adverse psychological outcomes (eg, dissociation and self-mutilation) and poorer social and vocational functioning,⁴⁷ suggesting a dynamic relationship between psychosocial functioning and physical health. Additionally, non-recovered BPD patients are more likely to die prematurely (by any cause) than recovered patients.⁴⁸

The third main finding of this study is that 3 variables predicted smoking in our borderline sample over time in multivariate analysis: alcohol abuse or dependence, 14 years of education or less, and higher levels of the defense mechanism of denial. The co-occurrence of addictive behaviors in those with BPD is often observed in both clinical and general populations.^{49,50} Approximately 75% of borderline patients receive a lifetime substance use disorder diagnosis.⁵⁰ Also, it is quite common for individuals to be dependent on more than one substance, especially when they are legally sold. Moreover, several studies have shown a strong connection between alcohol abuse and nicotine dependence.^{25,51–53} There are many putative reasons why these two addictive behaviors tend to come together, such as common genetic predisposition and cross-tolerance of both substances.^{54,55} The latter occurs when one drug induces tolerance to another. Additionally, alcohol may disinhibit the restraint to smoke, and tobacco could be used to counteract the depressant effects of alcohol, possibly explaining why people tend to use both in the same situations.⁵⁶ For the clinician, it is important to be aware of this association since alcohol use can precipitate smoking relapse.⁵⁶ Furthermore, data show that smoking cessation also aids in decreasing the likelihood of relapse among those with alcohol use disorder, with craving for one substance after using the other being one of the main reasons.⁵⁷

Regarding education, our finding is consistent with research findings that less education is associated with several negative health-related outcomes, such as smoking, alcohol abuse or dependence, and the presence of chronic illness.^{2,58,59} In a study based on US mortality data from 2001, Jemal and colleagues⁶⁰ found that 44% of all deaths in that year could have been avoided if all the population had experienced the mortality rates of college graduates. Lower levels of education may be associated with smoking, as patients with BPD with 14 years of education or less may more rarely come across public health warnings concerning smoking. They may see a primary care provider less frequently than people with more education and not get a physician's warning about the dangers of smoking. In addition, they may be more likely to work and live among people who smoke, and this reinforces the idea that smoking is acceptable.

Psychoeducation is a very crucial part of the treatment of borderline patients and is capable of reducing BPD symptoms.^{61,62} Information about the prevalence of

Posting of this PDF is not permitted. | For reprints or permissions, contact permissions@psychiatrist.com. | © 2023 Physicians Postgraduate Press, Inc. smoking in BPD and its health consequences and explaining which treatments are available for tobacco addiction can enhance psychoeducation strategies that already exist. Information about habit reversal and medications for nicotine addiction also can be useful.

Higher levels of denial also predicted smoking in our sample. This finding is consistent with the results of another study that investigated the presence of denial and smoking. Peretti-Watel et al²⁹ examined a random sample of 3,820 French citizens, of whom 26% reported tobacco use. Most of these participants reported knowing that tobacco use can cause cancer. However, a large proportion of them stated that this habit could cause cancer only for those who smoke more than they do or for a longer duration than their exposure, thus minimizing the risk of their own behavior despite acknowledging the more global risk of smoking.

In previous research by our group, particular types of defenses were found to be used less frequently over time among patients with BPD.63 However, among immature defensive styles, denial exhibited a lower decline over time of only 5%.63 Knowing this beforehand, clinicians working with BPD patients can allocate more time to address resistance toward smoking cessation and accepting one's own behavior as elevating risk for negative health outcomes. Motivational interviewing techniques have been shown to aid in this regard⁶⁴ and include being alert for nonverbal signs of resistance (eg, the patient seeming distracted, interrupting, crossing arms) that suggest less readiness for change. Other techniques, such as rolling with patient ambivalence, pointing out discrepancies between current behaviors and goals, and taking a nonjudgmental and empathetic stance, can be helpful in improving smoking cessation outcomes.65

Behaviors like smoking may be fruitful targets for intervention among patients with BPD. Patients with BPD make up a substantial percentage of individuals in psychiatric settings.⁶⁶ This population is affected by a broad range of physical illnesses, and non-recovered patients have even poorer health-related behaviors, morbidity, and mortality in general.^{12,43–46,48} While many treatments are initially focused on psychiatric symptom reduction, it is important for clinicians to be aware of and address important health behaviors that can contribute to risk for physical morbidity and mortality. Additionally, the diagnosis of BPD now has been validated in adolescents,⁶⁷ allowing for even earlier psychoeducation and interventions to address specific health behaviors, such as smoking and substance abuse, before they lead to detrimental outcomes.

Limitations of this study include the fact that all BPD subjects were seriously ill inpatients at the start of the study. Also, the majority of patients were in treatment in the community over time. More specifically, they were taking psychotropic medications and were in individual therapy during the follow-up periods.^{68,69} Therefore, it is difficult to know if these results would generalize to a less impaired sample of BPD patients or individuals who were not in treatment as usual in the community. Another limitation is that the majority of the sample is female and White, which represents the demographics of the site's inpatient units at the time. Thus, the results cannot be completely generalized to males and other races or ethnicities. Finally, our definition of smoking (ie, smoking a pack of cigarettes per day for 12 months or more) may have been more stringent than other definitions. Thus, our results over time may be different from those of other longitudinal studies that began with a less stringent definition of smoking.

In conclusion, it was found that recovery status is associated with a lower prevalence of smoking among borderline patients. In addition, it was also found that prior alcohol abuse or dependence, lower levels of education, and the defense mechanism of denial predicted smoking in BPD. Taken together, our 3 multivariate predictors of smoking relate to a relatively poor adult adaptation. More specifically, it may be that a person with a low level of education may rely on limited information to make decisions regarding smoking. In addition, alcohol abuse also involves a certain degree of denial regarding physical health consequences, as does the frequent use of the defense mechanism of denial.

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Author Affiliations: Laboratory for the Study of Adult Development, McLean Hospital, Belmont, Massachusetts (Brañas, Frankenburg, Zanarini); Adolescent BPD Outpatient Program, University of Sao Paulo, Sao Paulo, Brazil (Brañas); Department of Psychiatry, Boston University School of Medicine, Boston, Massachusetts (Frankenburg); Massachusetts General Hospital, Boston, Massachusetts (Temes); Department of Psychiatry, Harvard Medical School, Boston, Massachusetts (Temes, Fitzmaurice, Zanarini); Laboratory for Psychiatric Biostatistics, McLean Hospital, Belmont, Massachusetts (Temes, Fitzmaurice).

Corresponding Author: Marcelo J. A. A. Brañas, MD, Adolescent BPD Outpatient Program, Psychiatric Institute, University of Sao Paulo, 785 Dr Ovidio Pires de Campos Street, Sao Paulo, SP, Brazil, 05403-903 (marcelo.branas@usp.br).

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