Relationship of Mood Disturbance to Cigarette Smoking Status Among 252 Patients With a Current Mood Disorder

Christi A. Patten, Ph.D.; J. Christian Gillin, M.D.; Shahrokh Golshan, Ph.D.; Troy D. Wolter, M.S.; Mark Rapaport, M.D.; and John Kelsoe, M.D.

Background: The relationship between cigarette smoking and mood has received increasing attention. This retrospective study evaluated the relationship between mood disturbance and cigarette smoking status among patients with a current mood disorder. The association between level of nicotine dependence and severity of mood disturbance was also evaluated among current smokers.

Method: Retrospective data for 252 patients (63.5% male, 85.0% white) admitted for treatment of a mood disorder at the San Diego Veteran Affairs Mental Health Clinical Research Center between November 1988 and June 1997 were studied. All current cigarette smokers at admission (N = 126) were matched with nonsmokers (N = 126) on the primary DSM-IV Axis I mood disorder diagnosis, admission status (inpatient or outpatient), gender, age (± 5 years), and ethnicity. The Hamilton Rating Scale for Depression (HAM-D), the Beck Depression Inventory, and the Profile of Mood States (POMS) were administered to patients on admission. Conditional logistic regression analysis for matched sets with a backward elimination was used to identify factors independently predictive of current smoking status.

Results: A greater number of cups of coffee consumed per day (p = .002), a history of alcoholism (p = .004), and higher POMS fatigue subscale scores (p = .007) were predictive of current smoking status. Among current smokers, the HAM-D terminal insomnia item was positively associated with mean number of cigarettes smoked per day (p = .012).

Conclusion: Cigarette smoking should be addressed in the treatment of patients with a current mood disorder. Smokers experience greater levels of fatigue than nonsmokers. In addition, higher cigarette consumption levels are associated with mild-to-severe symptoms of terminal insomnia.

(J Clin Psychiatry 2001;62:319–324)

Received April 26, 2000; accepted Oct. 23, 2000. From the Nicotine Research Center and Department of Psychiatry and Psychology (Dr. Patten) and the Section of Biostatistics (Mr. Wolter), Mayo Clinic, Rochester, Minn.; the University of California, San Diego (Drs. Gillin, Golshan, Rapaport, and Kelsoe); and the Veterans Affairs Medical Center, (Drs. Gillin, Rapaport, and Kelsoe), San Diego, Calif.

Supported in part by grant 4RT-0301 from the California Tobacco Related Disease Research Program (Dr. Gillin), grant MH30914 from the National Institutes of Health to the UCSD Mental Health Clinical Research Center (Dr. Gillin), and grant R01 AA11890 from the National Institute on Alcohol Abuse and Alcoholism (Dr. Patten).

Presented in part at the second annual meeting of the Society for Research on Nicotine and Tobacco, March 1996, Washington, DC.

Reprint requests to: Christi A. Patten, Ph.D., Mayo Clinic, Nicotine Research Center, Colonial 3, 200 First St. SW, Rochester, MN 55905 (e-mail: patten.christi@mayo.edu).

The relationship between cigarette smoking and mood has been a focus of considerable attention. In general population and clinic-based studies, cigarette smokers report higher levels of negative affect and depressive symptoms compared with nonsmokers.[1–3] For example, several studies have linked cigarette smoking with poorer sleep[4–7] and fatigue.[5,7,8] Moreover, the number of cigarettes smoked per day has been positively associated with increased mood disturbance.[2,3] Another line of evidence on the relationship between mood and smoking indicates that individuals diagnosed with a mood disorder have a higher prevalence of smoking compared with the general population.[9] In particular, the co-occurrence of nicotine dependence and a lifetime history of major depressive disorder (MDD) is well documented.[10–13] Smokers with a history of MDD report higher levels of depression prior to smoking treatment than those without such a history.[14,15] No prior work has examined current mood symptoms as a function of smoking status among individuals seeking treatment for a current mood disorder.

Self-medication models of nicotine dependence propose that the rewarding properties of nicotine may be especially reinforcing for individuals prone to mood disorders.[16,17] The basic model suggests that the multiple reinforcers and rapid action of nicotine allow it to be used by smokers as a coping response to stress and negative affect. In an assessment of smokers' motivations for smoking and level of nicotine dependence, currently depressed smokers demonstrated higher levels of nicotine

dependence and reported more negative affect reduction and stimulation while smoking than nondepressed smokers.[18] Additional studies indicate that depressed smokers report smoking to increase arousal and decrease negative affect.[19] Another line of evidence derives from studies of nonsmokers with current MDD in which transdermal administration of nicotine rapidly improved mood and sleep.[20–22] However, these individuals did not have a history of using nicotine behaviorally and physiologically. Alternatively, while acute administration of nicotine in smoking-naive individuals may improve mood, chronic administration of nicotine in an established smoker may lead to mood disturbance.[23] One study of adult smokers found that daily mood impairment occurred between cigarettes due to acute periods of nicotine withdrawal.[24] The precipitous nocturnal drop in blood nicotine levels during overnight abstinence from cigarettes may also contribute to sleep disturbance and negative mood symptoms associated with the nicotine withdrawal syndrome.[25,26]

This retrospective study evaluated the relationship between mood disturbance and cigarette smoking status among patients with a current mood disorder diagnosis. The association between level of nicotine dependence and mood disturbance was also evaluated among current smokers. We hypothesized that (1) mood disturbance would be predictive of current smoking status independent of other factors (e.g., history of alcoholism) and (2) among current smokers, level of nicotine dependence would be positively associated with severity of mood disturbance.

METHOD

Participants

The sample consisted of 252 patients admitted for treatment of a mood disorder at the Mental Health Clinical Research Center (CRC) at the San Diego Veterans Affairs Hospital between November 1988 and June 1997. The mean ± SD age of the patients was 44.9 ± 9.5 years (range, 23 to 74 years), 63.5% were male, and 85.0% were white. With respect to the primary DSM-III, DSM-III-R, or DSM-IV diagnosis, 57.1% were diagnosed with MDD, recurrent; 27.0% with MDD, single episode; and 15.9% with bipolar disorder.

Procedure

As part of the admission procedure, all patients underwent a medical and psychiatric history, a structured psychiatric interview (see Measures), a physical examination, and laboratory tests. Since the CRC is a clinical psychiatric program, all clinical data were presented to a diagnostic consensus meeting each week for a formal diagnosis. Patients with significant current medical, alcohol, or substance abuse disorders were excluded. Acceptance into the CRC program required willingness of the patient to participate in a research protocol.

All current cigarette smokers admitted to the CRC (N = 126) were matched with nonsmokers (former or never smokers) (N = 126) on the following characteristics assessed at admission: (1) primary Axis I mood disorder diagnosis, (2) admission status (inpatient or outpatient), (3) gender, (4) age (± 5 years), and (5) race/ethnicity.

Measures

The following data were obtained from all patients upon admission to the CRC:

Demographic, smoking, and alcohol history characteristics. Demographic data on ethnicity, gender, age, marital status, and educational level were assessed via the intake questionnaire. Current cigarette smoking status was assessed by a question that inquired if the patient currently smoked cigarettes. Non–current smokers were asked if they had ever smoked cigarettes. The extent of missing data on prior cigarette smoking did not permit classification of never versus former smoking status. Thus, non–current smokers (i.e., former or never smokers) were classified as nonsmokers. Current smokers were asked the number of years smoked, age first started smoking, and mean number of cigarettes smoked per day. Items on the intake questionnaire also assessed current alcohol use, including number of days the patient had consumed alcohol in an average month and number of drinks per average 24-hour period.

Fagerström Tolerance Questionnaire (FTQ). All patients were administered the 8-item FTQ,[27] a widely used measure of nicotine dependence. Scores can range from 0 to 11; a score of 6 or greater indicates higher levels of dependence.[28]

Psychiatric diagnoses. A research assistant administered the Structured Clinical Interview for DSM disorders (SCID),[29–31] by which patients were assessed using the American Psychiatric Association *Diagnostic and Statistical Manual of Mental Disorders* diagnostic criteria (DSM-III, DSM-III-R, or DSM-IV) available during the relevant time period. The research assistant recorded the primary Axis I disorder diagnosis and other diagnoses present on the intake questionnaire. This study considered the primary Axis I diagnosis; number of additional Axis I diagnoses; Axis I diagnoses of past (i.e., remitted) alcohol abuse/dependence; Axis I diagnoses of remitted nonalcohol, nonnicotine drug abuse/dependence; and the total number of Axis II and Axis III diagnoses.

Hamilton Rating Scale for Depression (HAM-D). The 24-item HAM-D,[32,33] an observer-rated measure of depression severity, was administered by a trained research assistant. Scores can range from 0 to 74; a cutoff score of ≥ 20 is indicative of clinical depression and scores of 10 or below are considered within the normal range.[34] In addition to the total score, 3 sleep disturbance

items assessing early, middle, and terminal insomnia were examined.

Beck Depression Inventory (BDI). The BDI[35] is a 21-item, self-administered questionnaire that was used as a self-report measure of depressive symptom severity. The BDI has established psychometric properties.[35] Total scores can range from 0 to 63; scores of 9 or below are considered within the normal range, 10 to 18 indicates mild-to-moderate depression, 19 to 29 indicates moderate-to-severe depression, and ≥ 30 indicates severe depression.

Profile of Mood States (POMS). The POMS[36] is a self-administered questionnaire consisting of seventy-three 5-point adjectives describing mood. The POMS consists of 8 subscales from which scores are computed: anger, confusion, depression, elation, fatigue, friendliness, tension, and vigor. Internal consistency and reliability of the subscales are high (α = 0.87–0.95).[36]

Statistical Analysis

Cigarette smoking status (current smoker, yes/no), Axis I diagnosis of remitted alcohol abuse/dependence (history of alcoholism, yes/no), and Axis I diagnosis of remitted drug abuse/dependence other than alcohol/nicotine (history of drug abuse/dependence, yes/no) were all classified as binary variables.

Patient characteristics assessed at admission were compared univariately for current smokers and nonsmokers using a 2-sample t test for continuous variables or a chi-square test for categorical variables. To determine factors independently predictive of current cigarette smoking status, we used a conditional logistic regression analysis for matched sets[37] with backward elimination. The independent variables examined in addition to mood disturbance (e.g., past history of alcoholism or drug abuse, coffee intake; see Table 1) were included because of their potential relationship to current smoking status and/or mood disturbance. The dependent variable was current cigarette smoking status. All variables with $p \leq .10$ from the univariate analysis were included in the original full model as potential independent predictors. In this logistic regression analysis, we included the one matching variable (age) that was not perfectly matched as an adjuster covariate. For each subsequent step, the most nonsignificant factor was removed until all remaining variables in the model were significant at the .010 level.

Among current smokers only, Pearson correlation coefficients were used to examine the relationships between the indicators of nicotine dependence (FTQ score, mean cigarettes smoked per day) with the BDI and HAM-D total scores and the POMS subscale scores. One-way analysis of variance was used to examine the relationship between the 3 HAM-D sleep disturbance items and indicators of nicotine dependence (FTQ score, mean cigarettes smoked per day).

RESULTS

Predictors of Current Smoking Status

Table 1 describes patient characteristics assessed at admission and presents their univariate association with current smoking status. Compared with nonsmokers, current smokers had significantly fewer years of education (mean = 14.1 vs. 14.7 years; p = .033), had more Axis I diagnoses in addition to the primary diagnosis (mean = 1.8 vs. 1.3 additional diagnoses; p = .026), were more likely to have a history of alcoholism (52% vs. 31%; p = .001), and reported drinking more cups of coffee per day (mean = 3.9 vs. 2.3 cups/day; p < .001). With respect to measures of mood disturbance, smokers reported significantly higher scores for the POMS subscales anger (p = .039), confusion (p = .017), depression (p = .012), fatigue (p = .022), and tension (p = .002). There was a trend (p = .058) for smokers to report higher scores on the BDI, but there was no difference between smokers and nonsmokers on the HAM-D total score or 3 sleep disturbance items.

Table 2 shows the multivariate results predicting smoking status using conditional logistic regression with backward elimination for matched sets. Greater number of cups of coffee per day (p = .002), a history of alcoholism (p = .004), and higher POMS fatigue subscale score (p = .007) were independently predictive of current smoking status.

Relationship Between Mood Disturbance and Nicotine Dependence Among Smokers

Among current smokers, no statistically significant correlations emerged between mean number of cigarettes smoked per day or FTQ score with BDI score, HAM-D total score, or the POMS subscale scores. When examining the 3 HAM-D sleep disturbance items in relation to the indicators of nicotine dependence, only terminal insomnia was significantly associated with mean number of cigarettes smoked per day (p = .012). The mean ± SD number of cigarettes smoked per day was 21.7 ± 12.4 for those with no symptoms, compared with 29.4 ± 12.6 for those with mild-to-moderate symptoms, and 28.6 ± 11.1 for those with strong-to-severe symptoms.

DISCUSSION

Two major findings emerged from this study. First, the POMS fatigue scale was found to be independently predictive of current smoking status, with current smokers reporting more fatigue than nonsmokers. Second, among current smokers, symptoms of HAM-D terminal insomnia were significantly and positively related to level of cigarette consumption. These findings are consistent with previous research among persons without a current mood disorder diagnosis.[5,7,8] Our study thus adds to the knowl-

Table 1. Patient Characteristics Assessed at Admission in Relation to Current Smoking Status

Characteristic[a]	N	Smokers	N	Nonsmokers	p Value[b]
Age, y	126	45.2 ± 9.6	126	44.6 ± 9.4	NS
Gender, % male	126	63.5	126	63.5	NS
Ethnicity, %	126		126		NS
White		84.9		85.7	
African American		5.6		5.6	
Hispanic		6.3		5.6	
Native American		1.6		1.6	
Other		1.6		1.6	
Education, y	125	14.1 ± 2.2	125	14.7 ± 2.3	.033
Marital status, %	126		126		NS
Not married/no partner		71.5		65.8	
Married, or with partner ≥ 1 y		28.5		34.2	
Diagnostic group, % inpatient	126	38.1	126	38.1	NS
Primary Axis I diagnosis, %	126		126		NS
Major depression, single episode		27.0		27.0	
Major depression, recurrent		57.1		57.1	
Bipolar disorder		15.9		15.9	
No. of additional Axis I diagnoses	126	1.8 ± 1.6	126	1.3 ± 1.6	.026
No. of Axis II diagnoses	126	0.1 ± 0.4	126	0.1 ± 0.4	NS
No. of Axis III diagnoses	124	0.9 ± 0.8	124	1.1 ± 1.0	NS
History of alcoholism, % yes	126	51.6	126	31.0	.001
History of drug abuse/dependence, % yes	126	30.2	126	19.0	.057
No. of days had drink in average mo	124	5.2 ± 8.2	119	4.7 ± 7.2	NS
No. of drinks per average 24-h period	123	1.7 ± 3.0	120	1.2 ± 1.7	NS
Cups of coffee/d	115	3.9 ± 2.5	101	2.3 ± 1.7	< .001
Cigarettes/d[c]	123	24.6 ± 11.9	...	...	...
Years smoked[c]	113	26.8 ± 11.5	...	...	...
Age started smoking, y[c]	121	18.0 ± 6.9	...	...	...
Fagerström Tolerance Questionnaire score[c]	120	5.7 ± 2.4	...	...	...
Beck Depression Inventory score	116	27.7 ± 10.3	117	25.0 ± 11.3	.058
Hamilton Rating Scale for Depression					
Total score	104	24.9 ± 8.8	107	23.4 ± 9.9	NS
Insomnia (early), %	105		106		NS
Absent		50.5		56.6	
Mild/moderate		16.2		11.3	
Strong/severe		33.3		32.1	
Insomnia (middle), %	105		106		NS
Absent		26.7		35.8	
Mild/moderate		21.9		24.5	
Strong/severe		51.4		39.6	
Insomnia (terminal), %	105		106		NS
Absent		54.3		62.3	
Mild/moderate		17.1		17.9	
Strong/severe		28.6		19.8	
Profile of Mood States subscale score					
Anger	116	16.5 ± 10.2	116	13.8 ± 9.7	.039
Confusion	116	16.8 ± 6.3	116	14.7 ± 6.7	.017
Depression	116	36.4 ± 14.6	116	31.3 ± 15.9	.012
Elation	116	3.0 ± 3.5	116	3.6 ± 4.2	NS
Fatigue	116	18.7 ± 7.1	116	16.4 ± 7.7	.022
Friendliness	116	15.2 ± 6.7	116	14.5 ± 7.0	NS
Tension	116	21.1 ± 8.4	116	17.5 ± 8.9	.002
Vigor	116	6.2 ± 5.0	116	6.8 ± 5.9	NS

[a]Values shown as mean ± SD unless specified as percentages.
[b]p Value from a 2-sample t test for continuous variables or a chi-square test for categorical variables comparing smokers versus nonsmokers.
[c]For current cigarette smokers only.

edge of the relationship between smoking and mood in a sample of patients with a current mood disorder.

Cigarette smoking should be addressed in the treatment of patients with a mood disorder. Stopping smoking may help patients to increase their alertness and arousal and to decrease symptoms of early morning awakening. On the other hand, it is likely that the physiologic and psychological distress of nicotine withdrawal may affect the overall clinical status and recovery of a patient with a mood disorder. Many of the signs and symptoms of nicotine withdrawal are similar to those of a major depressive episode, including dysphoric or depressed mood, insomnia, irritability, anxiety, and difficulty concentrating.[38] The various signs and symptoms begin within 24 hours of stopping smoking and peak within 48 hours.[38] Most of these symptoms abate within approximately 2 weeks.

Table 2. Significant Multivariate Predictors of Current Cigarette Smoking[a]

Predictor Variable	Risk Ratio Estimate	95% CI	p Value[b]
Cups of coffee/d[c]	1.41	1.14 to 1.75	.002
History of alcoholism			.004
Yes	6.09	1.79 to 20.65	
No	1.00		
Profile of Mood States fatigue subscale score[c,d]	1.63	1.15 to 2.32	.007

[a]Abbreviation: CI = confidence interval.
[b]p Value from a conditional logistic regression analysis for matched sets using a backward elimination procedure. All variables with p ≤ .10 from Table 1 were included in the original full model. Age was included as a covariate. A risk ratio of 1.00 indicates the reference group. Only 196 observations were used in this analysis due to missing data for some variables.
[c]Included in the model as a continuous variable.
[d]Risk ratio corresponds to a 5-unit increase in fatigue score.

Smokers could be offered pharmacologic interventions such as nicotine replacement therapy to attenuate withdrawal. Moreover, studies of smokers with MDD who are seeking treatment for smoking cessation indicate that only a small proportion (1%–7%) experience an increase in depressive symptoms during stop attempts.[39–41] Interestingly, in a placebo-controlled nicotine patch trial conducted among smokers with current MDD, we observed a general trend for mood ratings to improve rather than worsen during smoking abstinence.[42] While these findings are encouraging, further work is needed to study the effects of nicotine withdrawal on the clinical course of patients treated for a current mood disorder.

The general lack of association between measures of mood with smoking status in this study was somewhat surprising in light of prior investigations indicating that smokers report more depressive symptoms and negative mood than nonsmokers.[1–3] However, it is important to note that associations between smoking status and mood disturbance may have been masked by the fact that all patients had a current mood disorder and were seeking treatment for their symptoms. For both smokers and nonsmokers, the symptoms were in the clinical range of severity; thus, there may be a ceiling on how much smoking could exacerbate mood in patients with MDD or bipolar disorder. It is also possible that differences in symptoms may be present for smokers and nonsmokers in the general population who are unable or unwilling to seek treatment for their depression or other mood disorder. Moreover, in contrast to many studies, we assessed the smoking and mood relationship independent of other factors that were univariately associated with smoking, including a past history of alcoholism, coffee consumption, additional Axis I diagnoses, and lower levels of education.

The results are limited by the lack of biochemical verification of smoking status. However, studies indicate that there is good agreement between self-report and biochemical indices of smoking among individuals who are not attempting to stop smoking.[43] In addition, the generalizability of the results are somewhat limited because the patients in this study were not randomly sampled from the population of individuals with mood disorders. Relatedly, since our patient population was biased toward general good physical health and the absence of current alcohol or substance abuse, our findings may not apply to patient populations with significant comorbidity. Nevertheless, many of our patients had a past history of alcoholism. Future studies could include depressed women, who are less likely than men to have a history of alcoholism, or other patients without comorbid conditions. Furthermore, consistent with our study design, smokers and nonsmokers were matched on the primary Axis I diagnosis. Research is needed to determine whether there are differences in mood disturbance between smokers and nonsmokers among the different subtypes of mood disorder patients (e.g., melancholic, atypical, bipolar).

REFERENCES

1. Anda RF, Williamson DF, Escobedo LG, et al. Depression and the dynamics of smoking: a national perspective. JAMA 1990;12:1541–1545
2. Payne TJ, Stetson B, Stevens V, et al. The impact of cigarette smoking on headache activity in headache patients. Headache 1991;31:329–332
3. Tamburrino MB, Lynch DJ, Nagel RW, et al. Screening women in family practice settings: association between depression and smoking cigarettes. Fam Pract Res J 1994;14:333–337
4. Janson C, Gislason T, De Backer W, et al. Prevalence of sleep disturbances among young adults in three European countries. Sleep 1995;18:589–597
5. Phillips BA, Danner FJ. Cigarette smoking and sleep disturbance. Arch Intern Med 1995;155:734–737
6. Soldatos CR, Kales JD, Scharf MB, et al. Cigarette smoking associated with sleep difficulty. Science 1980;207:551–553
7. Wetter DW, Young TB. The relation between cigarette smoking and sleep disturbance. Prev Med 1994;23:328–334
8. Lexcen FJ, Hicks RA. Does cigarette smoking increase sleep problems? Percept Mot Skills 1993;77:16–18
9. Hughes JR, Hatsukami DK, Mitchell JE, et al. Prevalence of smoking among psychiatric outpatients. Am J Psychiatry 1986;143:993–997
10. Breslau N, Peterson E, Schultz L, et al. Major depression and stages of smoking. Arch Gen Psychiatry 1998;55:161–166
11. Carton S, Jouvent R, Widlocher D. Nicotine dependence and motives for smoking in depression. J Subst Abuse 1994;6:67–76
12. D'Mello DA, Flanagan C. Seasons and depression: the influence of cigarette smoking. Addict Behav 1996;21:671–674
13. Glassman AH, Helzer JE, Covey LS, et al. Smoking, smoking cessation, and major depression. JAMA 1990;264:1546–1549
14. Dalack GW, Glassman AH, Rivelli S, et al. Mood, major depression, and fluoxetine response in cigarette smokers. Am J Psychiatry 1995;152: 398–403
15. Hayford KE, Patten CA, Rummans TA, et al. Efficacy of bupropion for smoking cessation in smokers with a former history of major depression or alcoholism. Br J Psychiatry 1999;174:173–178
16. Carmody TP. Affect regulation, nicotine addiction, and smoking cessation. J Psychoactive Drugs 1989;21:331–342
17. Gilbert DG, Gilbert BO. Personality, psychopathology, and nicotine response as mediators of the genetics of smoking. Behav Genet 1995;25: 133–147
18. Lerman C, Audrain J, Orleans CT, et al. Investigation of mechanisms linking depressed mood to nicotine dependence. Addict Behav 1996;21:9–19
19. Kinnunen T, Doherty K, Militello FS, et al. Depression and smoking cessation: characteristics of depressed smokers and effects of nicotine replacement. J Consult Clin Psychol 1996;64:791–798
20. Salin-Pascual RJ, de la Fuente JR, Galicia-Polo L, et al. Effects of transdermal nicotine on mood and sleep in nonsmoking major depressed patients. Psychopharmacology 1995;121:476–479

21. Salin-Pascual RJ, Drucker-Colin R. A novel effect of nicotine on mood and sleep in major depression. Neuroreport 1998;9:57–60
22. Salin-Pascual RJ, Rosas M, Jimenez-Genchi A, et al. Antidepressant effect of transdermal nicotine patches in nonsmoking patients with major depression. J Clin Psychiatry 1996;57:387–389
23. Choi WS, Patten CA, Gillin JC, et al. Cigarette smoking predicts development of depressive symptoms among US adolescents. Ann Behav Med 1997;19:42–50
24. Parrott AC. Stress modulation over the day in cigarette smokers. Addiction 1995;90:233–244
25. Benowitz NL, Kuyt F, Jacob P. Circadian blood nicotine concentrations during cigarette smoking. Clin Pharmacol Ther 1982;32:758–764
26. Hatsukami DK, Hughes JR, Pickens RW. Blood nicotine, smoke exposure and tobacco withdrawal symptoms. Addict Behav 1985;10:413–417
27. Fagerström KO. Measuring degree of physical dependence to tobacco smoking with reference to individualization of treatment. Addict Behav 1978;3:235–241
28. Fagerström KO, Schneider NG. Measuring nicotine dependence: a review of the Fagerström Tolerance Questionnaire. J Behav Med 1989;12: 159–182
29. Spitzer RL, William JBW. Structured Clinical Interview for DSM-III. New York, NY: New York State Psychiatric Institute; 1983
30. Spitzer RL, Williams JBW, Gibbon M, et al. User's Guide for the Structured Clinical Interview for DSM-III-R: SCID. Washington, DC: American Psychiatric Press; 1990
31. First MB, Spitzer RL, Gibbon M, et al. Structured Clinical Interview for DSM-IV Axis I Disorders-Patient Edition (SCID-I/P), version 2.0. New York, NY: Biometric Research, New York State Psychiatric Institute; 1995
32. Hamilton M. Development of a rating scale for primary depressive illness. Br J Soc Clin Psychol 1967;6:278–296
33. Garside RF. The comparative value of types of rating scales. Br J Clin Pharmacol 1976;3:61–67
34. Cleary R, Guy W. Factor analysis of the Hamilton Depression Scale. Drugs Exp Clin Res 1967;1:115–120
35. Beck AT, Steer RA. Manual for the Beck Depression Inventory. Washington, DC: Harcourt Brace Jovanovich; 1987
36. McNair DM, Lorr A, Droppleman LF. Manual for the Profile of Mood States. San Diego, Calif: Educational and Industrial Testing Service; 1971
37. Breslow NE, Day NE. Statistical Methods in Cancer Research: The Analysis of Case-Control Studies, vol 1. Lyon, France: International Agency for Research on Cancer; 1980. IARC Scientific Publications; No. 32
38. Hughes JR, Gust SW, Skoog K, et al. Symptoms of tobacco withdrawal: a replication and extension. Arch Gen Psychiatry 1991;48:52–59
39. Borrelli B, Niaura R, Keuthen NJ, et al. Development of major depressive disorder during smoking-cessation treatment. J Clin Psychiatry 1996;57: 534–538
40. Covey LS, Glassman AH, Stetner F. Major depression following smoking cessation. Am J Psychiatry 1997;154:263–265
41. Patten CA, Rummans TA, Croghan IT, et al. Development of depression during placebo-controlled trials of bupropion for smoking cessation: case reports. J Clin Psychiatry 1999;60:436–441
42. Thorsteinsson HS, Gillin JC, Patten CA, et al. The effects of transdermal nicotine for smoking cessation on depressive symptoms in patients with major depression. Neuropsychopharmacology 2001;24:350–358
43. Velicer WF, Prochaska JO, Rossi JS, et al. Assessing outcome in smoking cessation studies. Psychol Bull 1992;111:23–41