

# Recognition of Depression in Patients Who Smoke

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**Background.** Depression is a common illness in family practice and is frequently missed by busy practitioners. Recent studies have suggested a relationship between smoking and depression in the general population. The purpose of this study is to determine whether a patient's smoking is related to the physician's recognition of a patient's depression. If so, smoking may serve as a cue used by physicians to recognize depression in their clinical decision-making process.

**Methods.** Adult patients presenting to the University of Oklahoma Family Practice Residency Clinic were screened for depression using the short form of the Beck Depression Inventory (BDI). After each patient visit, upper level residents or fellows completed response cards on which they recorded their assessment of the likelihood of a depression, their familiarity with the patient, and whether they had any knowledge of a depression history.

**Results.** The prevalence of depression as measured by the BDI among smokers ( $n = 232$ ) and nonsmokers ( $n = 472$ ) was 24.1% and 15.3%, respectively, a significant difference ( $P < .001$ ). Physicians identified depression at a significantly higher rate (75.0%) among depressed smokers than among depressed nonsmokers (48.6%) ( $P < .0001$ ). Smokers were 2.06 times as likely to be labeled depressed when controlling for the presence of a current depression, physician knowledge of a depression history, and physician familiarity with the patient ( $P < .0001$ , 95% CI = 1.44, 2.94).

**Conclusions.** Smoking may serve as a cue for the clinician in the recognition of depression. Further research is needed to determine how smoking or a related factor may be used by physicians to correctly identify depression.

**Key words.** Depressive disorder; smoking, diagnosis. *J Fam Pract* 1991; 33:255-258.

Although depression is a common illness, primary care practitioners frequently underrecognize this serious disorder.<sup>1-4</sup> Failure to diagnose depression can have serious implications because of the profound effect of depression on patient functioning and well-being<sup>5</sup> and days missed from work.<sup>6</sup>

Recent studies<sup>7,8</sup> have rekindled the debate over an association between smoking and depression. These works are based on studies of smoking and depression in the general population<sup>7,8</sup> and in psychiatric populations.<sup>9</sup> Not only is depression more prevalent among smokers in these studies; it has been suggested that smoking cessation is more difficult among depressed smokers.<sup>7,8</sup>

Although data on the prevalence of depression in smokers from the general population are useful, the prevalence of depression among smokers who present to the physician is more clinically relevant. Williamson's<sup>10</sup> study of clinical and demographic variables associated with

depression revealed that employment status and educational achievement were associated with higher depression scores. Smoking status was not a measured variable. Kessler and colleagues<sup>11</sup> studied factors that influence the diagnosis of mental disorders and found that reason for visit, psychiatric symptoms, and prior knowledge of the patient were significant predictors. Williamson concluded that efforts at improving recognition should focus on identifying common characteristics of depression that would focus physician attention on the possibility of depression.

The purposes of this study are to determine (1) whether an association exists between smoking and depression in a family practice population, and (2) whether smoking influences the recognition of depression by the physician.

## Methods

Subjects were recruited from consecutive consenting adults presenting to the University of Oklahoma Family Practice Residency Clinic. These patients were screened

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for depression with the short form of the Beck Depression Inventory (BDI) while in the reception area awaiting their visit. Front desk personnel asked each adult patient to complete a brief questionnaire when the patient registered on arrival to the clinic. Nursing personnel collected the completed patient questionnaire when the patient was escorted to the examination room. If the questionnaire was not completed at that time, the patient was allowed to complete the questionnaire in the examination room while waiting for the physician. To ensure that the physician was blinded to the BDI score, the nurse collected the form from the patient when the physician entered the examination room. Nursing personnel placed the completed questionnaire in a collection box at the nurses' station.

The short form of the BDI consists of 13 of the 21 items on the long form and has been shown to correlate well with the original long form of the BDI ( $r = .96$ ).<sup>12</sup> A cutoff score of 8 or higher has been found to correlate well with a moderate to severe depression and was used in this study. As a screening instrument, the BDI has shown a sensitivity of 0.79 and a specificity of 0.77 in detecting a major depressive disorder as classified in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-III-R) when the cutoff score for a moderate depression is used.<sup>13</sup> Information on smoking status consisted of a single item yes-no question: "Do you smoke?" No further information concerning smoking history was obtained. Other demographic data collected include age, marital status, employment status, and formal educational achievement.

Residents in their 2nd or 3rd year of training and fellows ( $n = 16$ ) were asked to complete a response card after each patient encounter. They did not have access to the patient questionnaire and thus were blinded to the BDI score. The patient's chart was available to them for review. Physicians assessed the likelihood of depression as "probably yes" or "probably no." In addition, they were asked whether they had any knowledge of a prior history of depression for each patient ("yes" or "no"), and how familiar they were with the patient ("new patient," "somewhat familiar," or "very familiar"). Physician response cards were collected in boxes at each dictation booth in the clinic and were matched to patient questionnaires by chart number at the end of each day.

Statistical analyses were performed using the Statistical Analysis System.<sup>14</sup> Chi-square tests were used to compare the prevalence of depression between smokers and nonsmokers as well as the rate of physician recognition of depression between smokers and nonsmokers. A stepwise multiple regression model was created to examine the relationship between the BDI score as the dependent variable, and age, marital status, employment status,

Table 1. Relationship Between Smoking Status and Depression as Measured by Beck Depression Inventory (BDI) ( $n = 704$ )

Current Smoking Status	Not Depressed		Total No. (%)
	Depressed No. (%) (BDI $\geq$ 8)	Depressed No. (%) (BDI < 8)	
Smoker	56 (24.1)	176 (75.9)	232 (100)
Nonsmoker	72 (15.3)	400 (84.7)	472 (100)
Total	128 (18.2)	576 (81.8)	704 (100)

$\chi^2 = 8.25$ ,  $df = 1$ ,  $P < .001$ .

Relative risk of depression in smokers, 1.92, 95% CI = 1.31, 2.81.

educational achievement, and smoking. To assess the influence of smoking on recognition of depression, the Cochran-Mantel-Haenszel test was used to control for three categorical variables: current depression, physician familiarity with the patient, and physician knowledge of prior depression.

## Results

Of the 885 patient questionnaires and physician response cards distributed, 704 (79.5%) were returned with complete data. Ninety-five patient questionnaires and 55 physician response cards were not returned. Thirty-one of those returned had incomplete or missing data on either the patient questionnaires or physician response cards and were excluded from analysis.

The relationship between smoking and depression is displayed in Table 1. The prevalence of depression in the total sample as determined by the BDI cutoff score of 8 was 18.2%. Current smokers comprised 32.9% of the total sample. The prevalence of depression in smokers, 24.1%, was significantly higher than the prevalence in nonsmokers, 15.3% ( $P < .001$ ).

To determine the relationship between the BDI score and smoking status, the patient's age, sex, educational achievement, marital and employment status, and smoking status were included in a stepwise multiple regression model with the BDI score as the dependent variable. Table 2 displays the results of this regression model. Patients who smoke had significantly higher BDI

Table 2. Multiple Regression Model: Effect of Patient Variables on Beck Depression Inventory Scores

Variable	Parameter Estimate	Standard Error	Partial $R^2$	P Value
Age	-.029	.014	.005	<.0476
Marital status	.558	.170	.009	<.0083
Education	-.315	.079	.022	<.0001
Employment	.508	.104	.067	<.0001
Smoking	1.552	.392	.035	<.0001

Model F value = 21.39,  $df = 5$ ,  $P < .001$ , model  $R^2 = .138$ .

Table 3. Physician Recognition of Depression in Smokers vs Nonsmokers

Recognized by Physician	Nonsmoker (n = 472)		Smoker (n = 232)	
	Depressed* No. (%)	Not Depressed† No. (%)	Depressed* No. (%)	Not Depressed† No. (%)
Yes	35 (48.6)	96 (24.0)	42 (75.0)	69 (39.2)
No	37 (51.4)	304 (76.0)	14 (25.0)	107 (60.8)
Total	72 (100)	400 (100)	56 (100)	176 (100)

Nonsmokers:  $\chi^2 = 18.43$ ,  $df = 1$ ,  $P < .001$ ; relative risk of physician recognition = 2.99, 95% CI = 1.82, 4.95.

Smokers:  $\chi^2 = 21.8$ ,  $df = 1$ ,  $P < .001$ ; relative risk of physician recognition = 4.65, 95% CI = 2.44, 8.88.

\*Beck Depression Inventory (BDI) score  $\geq 8$ .

†BDI < 8.

scores independent of their employment or marital status, educational achievement, or age. The parameter estimate valence for education indicates that patients with higher levels of education had lower BDI scores. The same is true for age: the older the patient, the lower the BDI score. Sex was not included in the table because it did not significantly contribute to the regression model.

This group of physicians correctly identified 77 (60.1%) of the 128 depressed patients on the physician response cards. The relationship between smoking status and physician recognition of depression is shown in Table 3. Physicians recognized depression at a significantly higher rate, 75.0%, among depressed smokers than among depressed nonsmokers, 48.6% ( $P < .002$ ). This increase in the rate of recognition of depression among smokers was accompanied by an increase in the number of false-positive diagnoses of depression among smokers (39.2%) when compared with nonsmokers (24.0%). In fact, patients who smoke were 2.06 times as likely to be labeled depressed when controlling for the presence of a current depression, a known history of depression, and physician familiarity with the patient (Cochran-Mantel-Haenzel test,  $\chi^2 = 15.68$ ,  $df = 1$ ,  $P < .0001$ , 95% CI = 1.44, 2.94).

## Discussion

The overall prevalence of depression in this population as determined by the BDI, 18.2%, is comparable to other studies using similar screening instruments in a primary care setting.<sup>15</sup> The relationship between smoking and depression seen in psychiatric patients and in community-based populations is present in this population of family practice patients as well. Even when controlling for age, marital and employment status, and educational achievement, all of which are variables that tend to influence smoking status and that have been shown to be associated with depression,<sup>9</sup> depression scores on the

BDI are higher among current smokers. Several theories to explain this relationship have been advanced, including a self-medication role for nicotine in relieving depressive symptoms, depressive symptoms brought on by chronic nicotine withdrawal, and common factors that may predispose a patient to both depression and nicotine addiction, such as low self-esteem or a genetic factor.<sup>16</sup> The data from this study are not adequate to explain the nature of the observed relationship between depression and smoking.

Several studies have shown that primary care providers underrecognize depression.<sup>1-4</sup> Even when asked to assess the likelihood of depression in a patient after each visit, this group of physicians correctly identified only 60.1% of depressed patients. Depressed patients who smoked were identified at a significantly higher rate than depressed nonsmokers. Unfortunately, much of the gain in correctly identifying depressed smokers came at the expense of incorrectly labeling smokers with low BDI scores as depressed. The increased number of false-positive diagnoses of depression among smokers suggests that a threshold approach to the diagnosis of depression may exist.<sup>17</sup> It is possible that smoking or a related factor may have lowered the threshold for diagnosing depression by this group of physicians. This hypothesis is supported by the finding that smoking increased the risk of being labeled depressed even when controlling for the presence of a current depression, physician familiarity with the patient, and physician knowledge of a depression history.

In the clinical decision making of most clinicians, cues are obtained quickly and hypotheses about possible diagnoses are generated early in the process of the encounter with the patient.<sup>18,19</sup> As cues are acquired and hypotheses generated, smoking status may elicit the hypothesis of depression as a diagnosis earlier in the encounter, or more often among current smokers.

Although the BDI has been shown to be a sensitive tool for detecting depression in a primary care population,<sup>13</sup> some patients in this study who were classified as depressed by the BDI may not have been clinically depressed. A clinical diagnosis of depression cannot be made from a depression inventory score. No literature could be found that uses the short-form BDI in primary care settings and examines physician recognition and treatment based on the BDI score.

The use of a depression questionnaire immediately before the encounter with the physician may have raised the patients' awareness of depressive symptoms and made them more likely to bring these symptoms to the attention of their physician. Some observer bias may also have been present since each physician was asked to assess the presence or absence of a depression after each encounter.

Physician knowledge of what to assess may have generated a high rate of false-positive findings. It may also account for the relatively high rate of overall recognition of depression among this group of physicians when compared with other studies.<sup>20,21</sup> These results may not be easily generalized to clinicians more experienced than the residents and fellows in this study.

Finally, the level of depression necessary to produce functional impairment is not well established, especially with regard to the BDI score, although recent work<sup>5,6</sup> suggests that even patients with a minor depressive disorder who do not meet strict DSM-III-R criteria for a major depressive disorder are functionally impaired and thus may benefit from intervention.

Further studies are needed to identify and interpret cues used by physicians in diagnosing depression. Once identified, these cues might be taught so that the accuracy of depression recognition is improved. In the meantime, perhaps clinicians should consider the possibility of depression earlier in patients who smoke, especially patients with coexisting symptoms suggestive of depression.

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#### References

1. Wells KB, Hays RD, Burnam A, et al. Detection of depressive disorder for patients receiving prepaid or fee-for-service care: results from the medical outcomes study. *JAMA* 1989; 262:3298-3302.
2. Block M, Schulberg HC, Coulehan JC, et al. Diagnosing depression among new patients in ambulatory training settings. *J Am Bd Fam Pract* 1988; 1:91-7.
3. Schulberg HC, Saul M, McClelland M, et al. Assessing depression in primary care medical and psychiatric practice. *Arch Gen Psychiatry* 1985; 42:1164-70.
4. Diamond EL, Fepting R, Gage L. Estimating the prevalence of depression in family practice using variant methods. *J Fam Pract* 1987; 24:267-73.
5. Wells KB, Stewart A, Hays RD, et al. The functioning and well-being of depressed patients: results from the medical outcomes study. *JAMA* 1989; 262:914-9.
6. Broadhead WE, Blazer DG, George LK, Tse CK. Depression disability days, and days lost from work in a prospective epidemiologic survey. *JAMA* 1990; 264:2524-8.
7. Anda RF, Williamson DF, Escobedo LG, et al. Depression and the dynamics of smoking. *JAMA* 1990; 264:1541-5.
8. Glassman AH, Helzer JE, Covey LS, et al. Smoking, smoking cessation, and major depression. *JAMA* 1990; 264:1546-9.
9. Hughes JR, Hatsukami DK, Mitchell JE, Dahlgren LA. Prevalence of smoking among psychiatric outpatients. *Am J Psychiatry* 1986; 143:993-7.
10. Williamson HA. Clinical and demographic factors associated with high levels of depression symptoms. *Fam Med* 1989; 21:428-32.
11. Kessler LG, Amick BC, Thompson J. Factors influencing the diagnosis of mental disorder among primary care patients. *Med Care* 1985; 23:50-62.
12. Beck AT, Beck RW. Screening depressed patients in family practice: a rapid technique. *Postgrad Med* 1972; 52:81-5.
13. Nielson AC, Williams TA. Depression in ambulatory medical patients: prevalence by self-report questionnaire and recognition by nonpsychiatric physicians. *Arch Gen Psychiatry* 1980; 37:999-1004.
14. SAS Program Manual. Cary, NC: SAS Institute, 1985.
15. Katon W. The epidemiology of depression in medical care. *Int J Psychiatry Med* 1987; 17:93-111.
16. Carmody TP. Affect regulation, nicotine addiction and smoking cessation. *J Psychoactive Drugs* 1989; 21:331-42.
17. Pauker SG, Kassirer JP. The threshold approach to clinical decision-making. *N Engl J Med* 1980; 302:1109-16.
18. Barrows HS, Norman GR, Heufeld VR, et al. The clinical reasoning of randomly selected physicians in general medical practice. *Clin Invest Med* 1982; 5:49.
19. Sackett DL, Haynes RB, Tugwell P. *Clinical epidemiology: a basic science for clinical medicine*. Boston: Little, Brown, and Company, 1985:12-15.
20. Sellar RH, Blascovich J, Lenkei E. Influence of stereotypes in the diagnosis of depression by family practice residents. *J Fam Pract* 1981; 12:849-54.
21. Jencks S. Recognition of mental distress and diagnosis of mental disorder in primary care. *JAMA* 1985; 253:1903-7.