Patients With Depression Are Less Likely to Follow Recommendations to Reduce Cardiac Risk During Recovery From a Myocardial Infarction

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Background: Patients with depression are at greater risk of cardiac death in the first few months after a myocardial infarction (MI). This study was performed to determine whether depression affects adherence to recommendations intended to reduce the risk of cardiac events after an MI.

Methods: All consenting patients admitted to a university-affiliated teaching hospital during an 18-month period were interviewed 3 to 5 days following an acute MI using the Beck Depression Inventory to assess symptoms of depression and using the Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders, Revised Third Edition, to determine the presence of major depression and/or dysthymia. Accessible survivors (n = 204; 116 men and 88 women) were interviewed by telephone 4 months later using the Medical Outcomes Study Specific Adherence Scale to measure self-reported adherence to recommendations to modify cardiac risk.

Results: Patients who were found in the hospital to have symptoms of at least mild to moderate depression (Beck Depression Inventory score ≥10, n = 35 [17.2%]) or to have major depression and/or dysthymia (n = 31 [15.2%]) reported lower adherence to a low-fat diet, regular exercise, reducing stress, and increasing social support 4 months later. Those with major depression and/or dysthymia also reported taking medications as prescribed less often than those without major depression and/or dysthymia. Diabetic patients with major depression and/or dysthymia were less likely to follow a diet for patients with diabetes than diabetic patients without depression.

Conclusions: Patients with depression following an acute MI are less likely to adhere to recommended behavior and lifestyle changes intended to reduce the risk of subsequent cardiac events. This finding could explain why depression in the hospital is related to long-term prognosis in patients recovering from an MI.

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PATIENTS AND METHODS

PATIENTS

The study was approved by the Institutional Review Board of the Johns Hopkins Bayview Medical Center, Baltimore, Md. During an 18-month period, all patients admitted with a diagnosis of acute MI were approached for psychological assessment if they: (1) had no major problems with cognition, (2) were stable enough to complete the interview within the first 5 days after the MI, and (3) were not transferred to another facility or did not die within the first 48 hours after the MI. If a patient was admitted more than once for a diagnosis of acute MI during the study period, only data from the first accessible admission were used. Criteria for an acute MI were considered as 2 or more of the following: typical ischemic chest pain lasting 20 minutes or longer, presence of new pathologic Q waves on the electrocardiogram, a peak creatine phosphokinase (CPK) level greater than 1.5 times normal, or a CPK MB value greater than 10 ng/mL with a simultaneous CPK value exceeding the normal limit. As part of usual care, patients were counseled to appropriately modify their disease- and patient-specific cardiac risks. All patients received advice to follow a low-fat, low-cholesterol, low-sodium diet; exercise regularly; reduce stress; take medications as prescribed; carry sublingual nitroglycerin (and/or inhalers if needed); and increase social support. In addition, current smokers were advised to stop and diabetic patients were advised to follow a diet for patients with diabetes and to check their blood glucose level.

Baseline clinical and demographic variables were determined by review of the patients’ hospital records and computerized medical records by investigators (R.C.Z. and D.E.B.) who were blind to the results of the psychological evaluation at the time of the medical record review. Hyperlipidemia was defined by past history, use of lipid-lowering medications, or a cholesterol level of 6.2 mmol/L or more (≥240 mg/dL) on admission to the hospital. Patients were considered to have a history of coronary artery disease if they had a previously documented MI, a typical history of angina with a positive exercise test result, or angiographically documented stenosis of 50% or more.

ASSESSMENTS

Patients were interviewed as part of their usual care 3 to 5 days following an acute MI using the BDI to assess for symptoms of depression and using the Structured Clinical Interview for DSM-III-R (SCID) to determine the presence of current or lifetime mood disorder. The BDI is a self-report instrument that has been used in the early post-MI period, with BDI scores of 10 or greater indicating symptoms of at least mild to moderate depression. The SCID is a standard method for diagnosing current syndromes and lifetime history of psychiatric disorders using criteria specified in the American Psychiatric Association’s DSM-III-R. Current major depression or bipolar disorder (symptoms within the month before the MI) and/or current dysthymia (symptoms within the 2 years immediately before the MI) were diagnosed by DSM-III-R criteria using the SCID. Past mood disorder was diagnosed if DSM-III-R criteria were met at any point during the patient’s adult life before the month before the MI (for depression) or the 2 years before the MI (for dysthymia) and did not represent a continuation into a current mood disorder. The BDI and the SCID were used in this study since previous studies indicate that the syndrome of major depression and symptoms of at least mild to moderate depression are associated with increased post-MI mortality.

All accessible patients were reassessed by telephone interview 4 months after admission to the hospital using the Medical Outcomes Study Specific Adherence Scale. The Medical Outcomes Study Specific Adherence Scale is a self-report questionnaire that was reformatted as a structured interview and modified to assess 10 adherence behaviors relevant for patients who have had an MI: (1) following a low-sodium diet, (2) following a low-fat and low-cholesterol diet, (3) taking medications as prescribed, (4) exercising regularly, (5) reducing stress, (6) carrying medical supplies (eg, sublingual nitroglycerin), (7) following a diet for patients with diabetes (for those with diabetes), (8) monitoring blood glucose level (for diabetic patients), (9) stopping smoking (for current smokers), and (10) increasing social support. Patients were asked to rate how often in the past 4 weeks they had performed, as recommended, the behaviors assessed by the Medical Outcomes Study Specific Adherence Scale, from 0 (none of the time) to 5 (all of the time).

STATISTICAL ANALYSIS

Individuals scoring 10 or greater on the BDI were compared with the group scoring below the cutoff (BDI score <10). Individuals with major depression and/or dysthymia, while hospitalized for an acute MI based on the SCID, were compared with those not meeting the criteria for major depression and/or dysthymia at that time. The relative risk statistic was used to investigate univariate relations between depression variables and demographic variables, indexes of MI severity, and comorbidity. This yielded information regarding the direction and strength of the relation between depression variables and the established risk factors. χ² Analyses were conducted to provide significance tests for those relations.

One-way multivariate analyses of variance (MANOVAs) were conducted on the 4-month adherence measures using the Pillais trace statistic. The independent variable in the first set of analyses was BDI score, dichotomized at 10. The independent variable in the second set of analyses was the presence of major depression and/or dysthymia based on the SCID. As recommended, separate MANOVAs were run analyzing adherence behaviors previously shown to be related to depression in patients with coronary artery disease (diet, exercise, and adherence to prescribed medications) and those not previously examined in this context (stress reduction, increasing social support, and carrying medical supplies). Specifically, the dependent variables in the first of 4 separate analyses for each of the previously described independent variables were self-reported adherence to: (1) following a low-sodium diet, (2) following a low-fat and low-cholesterol diet, (3) taking medications as prescribed, and (4) exercising regularly. The dependent variables in the second MANOVA were (1) reducing stress, (2) carrying medical supplies, and (3) increasing social support. The third MANOVA, in those identified as having diabetes, examined self-reported adherence to (1) following a diet for patients with diabetes and (2) monitoring blood glucose level. The final analysis of variance, in current smokers, examined self-reported adherence to smoking cessation. Bonferroni corrections for each pairwise comparison were done in follow-up analyses of variance. All values are presented as mean ± SD.
Major Depression, Dysthymia, or Both

Mood Disorder†§

Mood disorder indicates that major depression, dysthymia, or both were determined during the hospitalization.

‡Scores of 10 or greater indicate symptoms of at least mild to moderate depression.

†Data are given as percentage of patients.

Table 1. Baseline Characteristics of 204 Patients With and Without Depression*

<table>
<thead>
<tr>
<th>Variable</th>
<th>All Patients†</th>
<th>BDI Score††</th>
<th>Relative Risk</th>
<th>95% CI</th>
<th>P</th>
<th>Mood Disorder§</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age ≥65 y</td>
<td></td>
<td>≥10 (n = 35)</td>
<td></td>
<td></td>
<td></td>
<td>Yes (n = 31)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt; 10 (n = 169)</td>
<td></td>
<td></td>
<td></td>
<td>No (n = 173)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male sex</td>
<td>56.9%</td>
<td>45.7%</td>
<td>59.2%</td>
<td>0.58</td>
<td>0.28-1.21</td>
<td>0.14</td>
</tr>
<tr>
<td>Current smoker</td>
<td>27.5%</td>
<td>31.4%</td>
<td>26.8%</td>
<td>1.25</td>
<td>0.57-2.76</td>
<td>0.58</td>
</tr>
<tr>
<td>Hypertension</td>
<td>63.9%</td>
<td>71.4%</td>
<td>62.3%</td>
<td>1.51</td>
<td>0.68-3.36</td>
<td>0.31</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>61.9%</td>
<td>68.6%</td>
<td>60.5%</td>
<td>1.43</td>
<td>0.66-3.10</td>
<td>0.37</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>30.4%</td>
<td>31.4%</td>
<td>30.4%</td>
<td>1.05</td>
<td>0.48-2.31</td>
<td>0.90</td>
</tr>
<tr>
<td>History of CAD</td>
<td>34.5%</td>
<td>37.1%</td>
<td>33.9%</td>
<td>1.15</td>
<td>0.54-2.45</td>
<td>0.72</td>
</tr>
<tr>
<td>Chronic lung disease</td>
<td>12.8%</td>
<td>5.7%</td>
<td>14.3%</td>
<td>0.36</td>
<td>0.08-1.62</td>
<td>0.17</td>
</tr>
<tr>
<td>Lives alone</td>
<td>17.6%</td>
<td>23.5%</td>
<td>16.4%</td>
<td>1.57</td>
<td>0.64-3.84</td>
<td>0.32</td>
</tr>
<tr>
<td>Killip class &gt; I</td>
<td>35.6%</td>
<td>31.4%</td>
<td>36.5%</td>
<td>0.80</td>
<td>0.36-1.74</td>
<td>0.57</td>
</tr>
<tr>
<td>LVEF &lt;35%</td>
<td>25.4%</td>
<td>36.7%</td>
<td>23.3%</td>
<td>1.90</td>
<td>0.83-4.35</td>
<td>0.12</td>
</tr>
<tr>
<td>CPK level ≥500 IU/L</td>
<td>54.5%</td>
<td>51.4%</td>
<td>55.1%</td>
<td>0.86</td>
<td>0.42-1.79</td>
<td>0.69</td>
</tr>
<tr>
<td>Current mood disorder</td>
<td>17.2%</td>
<td>53.3%</td>
<td>11.0%</td>
<td>10.35</td>
<td>4.32-24.83 &lt;.001</td>
<td>18.1%</td>
</tr>
<tr>
<td>BDI score ≥10</td>
<td>14.9%</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Past depression</td>
<td>15.5%</td>
<td>45.2%</td>
<td>10.5%</td>
<td>7.05</td>
<td>2.98-16.64 &lt;.001</td>
<td>13.7%</td>
</tr>
</tbody>
</table>

*BDI indicates Beck Depression Inventory; CI, confidence interval; CAD, coronary artery disease; LVEF, left ventricular ejection fraction; CPK, creatine phosphokinase; and ellipses, data not applicable.

BASELINE CHARACTERISTICS

A total of 696 patients were admitted to the hospital with an acute MI during the study period. A total of 276 patients meeting enrollment criteria provided informed consent and were interviewed during the initial hospitalization. Of these, 204 patients were accessible and completed the 4-month interview. The status of the remaining patients initially interviewed but not completing the 4-month assessment was as follows: 43 unreachable (29 of these were known to be alive), 18 known to have died, and 11 successfully contacted but refused to be interviewed. Records of those patients admitted to the hospital with an acute MI during the study period, but not meeting enrollment criteria or providing informed consent for this study (n = 420), revealed no differences compared with the study sample (n = 276) in any of the baseline characteristics described in Table 1. Nonparticipants were not contrasted with study subjects on left ventricular ejection fraction because this information was not available for more than 50% of the nonparticipants.

The average age of the 204 patients who form the basis of this report was 64.3 ± 11.4 years. There were 116 men (56.9%) and 88 women (43.1%) (Table 1). Most had hypertension and hyperlipidemia. Patients with a BDI score of 10 or greater were more likely to have a current or a history of a mood disorder. Individuals with major depression and/or dysthymia were approximately 10 times more likely to have an elevated BDI score than those without major depression and/or dysthymia. The association of BDI score of 10 or greater with a history of depression appears to be due chiefly to those with a BDI score of 10 or greater who also have major depression and/or dysthymia. A history of depression was found in 56.3% of those with concomitant major depression and/or dysthymia and a BDI score of 10 or greater vs 11.8% of those with a BDI score of 10 or greater alone (P < .001).

Other than these differences, we detected no differences between depressed and nondepressed patients (using either the BDI or the SCID) for any other baseline variables. Most patients, regardless of depression status, had Killip class I infarcts, and the percentage of patients with a left ventricular ejection fraction of less than 35% was not significantly greater in those with depression compared with those without (P = .12 based on BDI; P = .87 based on SCID).

PREVALENCE OF IN-HOSPITAL DEPRESSION

Symptoms of mild to moderate depression (BDI score of ≥10) during the hospitalization for an acute MI were present in 35 (17.2%) of the 204 patients (Table 1). This was not different from the prevalence of a BDI score of 10 or greater in those who, at 4 months after discharge, either were unreachable (11 [25.6%] of 43 patients) or refused to be interviewed (2 [18.2%] of 11 patients). Of the 18 patients known to have died by 4 months, 7 (38.9%) had a BDI score of 10 or greater during the hospitalization (χ² = 4.3, P < .04 vs other groups). Major depression and/or dysthymia (based on the SCID) were observed in 31 (15.2%) of the 204 patients (Table 1); no patient had bipolar disorder. This was not different from the prevalence of major depression and/or dysthymia in those who were unreachable (9 [20.9%] of 43 patients).
or in those who refused to be interviewed (2 [18.2%] of 11 patients). Of the 18 patients known to have died by 4 months, 5 (27.8%) had major depression and/or dysthymia during the initial hospitalization (P=.14 vs other groups).

**SELF-REPORTED ADHERENCE BEHAVIORS AT 4 MONTHS IN PATIENTS WITH DEPRESSIVE SYMPTOMS**

Differences among those with a BDI score of 10 or greater vs those with a BDI score of less than 10 were observed for adherence behaviors in the first MANOVA (F4,194 = 2.69, P<.03) and in the second MANOVA (F3,156 = 3.38, P<.01) examining behavioral recommendations common to all patients (Table 2). Follow-up pairwise comparisons for the first and second MANOVAs found that patients with symptoms of at least mild to moderate depression had significantly lower adherence than those with a BDI score of less than 10 in following a low-fat and low-cholesterol diet (F1,197 = 3.82), exercising regularly (F1,197 = 6.88), reducing stress (F1,158 = 8.42), and increasing social support (F1,158 = 4.11). Patients with symptoms of at least mild to moderate depression did not differ from those with a BDI score of less than 10 in following a low-sodium diet, taking medications as prescribed, or carrying medical supplies. The total score (summation of scores in each of the individual categories) for the 7 adherence behaviors recommended to all patients was significantly lower in those with a BDI score of 10 or greater vs those with a BDI score of less than 10 (23.0±5.3 vs 26.1±5.3; F1,158 = 7.87).

There was a trend toward a significant difference in adherence to diabetes-specific behaviors among those with a BDI score of 10 or greater vs those with a BDI score of less than 10 (F2,30 = 3.04, P<.06). Diabetic patients (n=62) with a BDI score of 10 or greater reported marginally less success in following a diet for patients with diabetes than diabetic patients without depression (F1,61 = 4.37, P<.06) but did not differ from diabetic patients without depression for monitoring their blood glucose level. Current smokers (n=56) with a BDI score of 10 or greater did not differ from smokers with a BDI score of less than 10 for following recommendations to stop smoking.

**SELF-REPORTED ADHERENCE BEHAVIORS IN PATIENTS WITH MAJOR DEPRESSION AND/OR DYSTHYMIA**

Differences among those with major depression and/or dysthymia compared with those without were observed for adherence behaviors in the first MANOVA (F4,194 = 2.69, P<.03) and in the second MANOVA (F3,156 = 3.38, P<.01) examining behaviors recommended to all patients (Table 3). Follow-up pairwise comparisons for these MANOVAs found that patients with major depression and/or dysthymia compared with those without had significantly lower adherence to recommendations to follow a low-fat and low-cholesterol diet (F1,197 = 6.41), take medications as prescribed (F1,197 = 4.82), exercise regularly (F1,197 = 4.77), reduce stress (F1,158 = 15.09), and increase social support (F1,158 = 8.88). Given the observation that there was a difference between groups for taking medications as prescribed, the medications prescribed for the treatment of cardiac disease were examined in those with and without major depression and/or dysthymia. There were no differences in the percentages of patients with and without major depression and/or dysthymia who were prescribed aspirin, lipid-lowering therapy, angiotensin-converting enzyme inhibitors, digoxin, or diuret-

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**Table 2. Adherence Behaviors in Those With and Without Symptoms of at Least Mild to Moderate Depression**

<table>
<thead>
<tr>
<th>MOSSAS Category</th>
<th>Mean ± SD BDI Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≥10</td>
</tr>
<tr>
<td>Low-sodium diet</td>
<td>4.1 ± 1.1</td>
</tr>
<tr>
<td>Low-fat diet</td>
<td>3.3 ± 1.3</td>
</tr>
<tr>
<td>Prescription medication</td>
<td>4.8 ± 0.7</td>
</tr>
<tr>
<td>Regular exercise</td>
<td>2.4 ± 1.9</td>
</tr>
<tr>
<td>Reduce stress</td>
<td>2.5 ± 1.4</td>
</tr>
<tr>
<td>Carry medical supplies‡</td>
<td>3.4 ± 2.3</td>
</tr>
<tr>
<td>Social support</td>
<td>2.6 ± 1.6</td>
</tr>
<tr>
<td>Diet for those with diabetes§</td>
<td>3.4 ± 1.3</td>
</tr>
<tr>
<td>Check blood glucose level§</td>
<td>3.6 ± 1.7</td>
</tr>
<tr>
<td>Stop smoking§</td>
<td>2.9 ± 1.7</td>
</tr>
<tr>
<td>Total score¶</td>
<td>23.3 ± 5.7</td>
</tr>
</tbody>
</table>

*MOSSAS indicates Medical Outcomes Study Specific Adherence Scale; BDI, Beck Depression Inventory.
†P values were obtained from follow-up analyses of variance as described in the “Statistical Analysis” subsection of the “Patients and Methods” section.
‡Medical supplies indicate sublingual nitroglycerin (and/or inhalers if needed).
§Only those with diabetes mellitus were included in these categories.
¶For the 7 adherence behaviors recommended to all patients.

**Table 3. Adherence Behaviors in Those With and Without Major Depression, Dysthymia, or Both**

<table>
<thead>
<tr>
<th>MOSSAS Category</th>
<th>Major Depression, Dysthymia, or Both</th>
<th>No Current Mood Disorder</th>
<th>P†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low-sodium diet</td>
<td>3.8 ± 1.2</td>
<td>4.0 ± 1.1</td>
<td>.54</td>
</tr>
<tr>
<td>Low-fat diet</td>
<td>3.1 ± 1.4</td>
<td>3.7 ± 1.2</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Prescription medication</td>
<td>4.6 ± 1.0</td>
<td>4.9 ± 0.6</td>
<td>&lt;.03</td>
</tr>
<tr>
<td>Regular exercise</td>
<td>2.5 ± 2.0</td>
<td>3.2 ± 1.7</td>
<td>&lt;.03</td>
</tr>
<tr>
<td>Reduce stress</td>
<td>2.2 ± 1.2</td>
<td>3.4 ± 1.4</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Carry medical supplies‡</td>
<td>3.2 ± 2.3</td>
<td>3.6 ± 2.2</td>
<td>.56</td>
</tr>
<tr>
<td>Social support</td>
<td>2.2 ± 1.4</td>
<td>3.3 ± 1.6</td>
<td>&lt;.003</td>
</tr>
<tr>
<td>Diet for those with diabetes§</td>
<td>2.9 ± 1.6</td>
<td>4.2 ± 0.8</td>
<td>&lt;.003</td>
</tr>
<tr>
<td>Check blood glucose level§</td>
<td>2.4 ± 2.5</td>
<td>3.4 ± 2.2</td>
<td>.15</td>
</tr>
<tr>
<td>Stop smoking§</td>
<td>2.5 ± 1.8</td>
<td>3.3 ± 2.0</td>
<td>.23</td>
</tr>
<tr>
<td>Total score¶</td>
<td>21.0 ± 7.0</td>
<td>26.2 ± 4.7</td>
<td>&lt;.002</td>
</tr>
</tbody>
</table>

*Data are given as mean ± SD unless otherwise indicated. MOSSAS indicates Medical Outcomes Study Specific Adherence Scale.
†P values were obtained from follow-up analyses of variance as described in the “Statistical Analysis” subsection of the “Patients and Methods” section.
‡Medical supplies indicate sublingual nitroglycerin (and/or inhalers if needed).
§Only those with diabetes mellitus were included in these categories.
¶For the 7 adherence behaviors recommended to all patients.
ics. Individuals with major depression and/or dysthy-
mia were less likely to be prescribed a β-blocker at hospital
discharge compared with those without major depres-
sion and/or dysthy mia (72.4% vs 87.9%; P < .03).

Patients with major depression and/or dysthy mia did
not differ from those without on adherence to recom-
mandations to follow a low-sodium diet or to carry med-
cal supplies. The total score (summation of scores in each
of the individual categories) for the 7 adherence behav-
iors recommended to all patients was significantly lower
in those with major depression and/or dysthy mia com-
pared with those without (20.6±5.1 vs 26.1±5.1; 
F1,158 = 22.69, P < .001).

Major depression and/or dysthy mia were found
to be independent predictors of poor adherence to
diabetes-specific behaviors among those with diabetes
(F1,62 = 6.96, P < .002). Diabetic patients (n = 62) with
major depression and/or dysthy mia reported signifi-
cantly less success in following a diet for patients with
diabetes than those without major depression and/or
dysthy mia (F1,62 = 14.45, P < .001). There was no dif-
ference between groups for monitoring blood glucose
level. Current smokers (n = 56) with major depression
and/or dysthy mia did not differ from smokers without
a mood disorder for following recommendations to
stop smoking.

**COMMENT**

The present study shows that patients who are de-
pressed during the hospitalization for an acute MI re-
port greater difficulty adhering to behavior and lifestyle
recommendations intended to reduce the risk of subse-
quent cardiac events. When interviewed 4 months after
the MI, patients with symptoms of at least mild to mod-
erate depression (BDI score of ≥10) or with major de-
pression and/or dysthy mia (as determined by the SCID)
during the hospitalization reported adhering less often
to a low-fat diet, regular exercise, stress reduction, and
regularly socializing than did nondepressed patients. Di-
abetic patients with depression were marginally less likely
to report following a diet for patients with diabetes than
diabetic patients without depression. Similarly, com-
pared with those without major depression and/or dys-
thymia, those individuals with major depression and/or
dysthy mia at the time of hospitalization reported being
less likely 4 months later to take medications as pre-
scribed. This last finding cannot be explained by dif-
fences in medications prescribed for the treatment of their
cardiac condition, since those with major depression
and/or dysthy mia were not prescribed more cardiac medi-
cations than those without major depression and/or dys-
thymia. This poorer adherence to recommendations to
reduce cardiac risk may explain why depression in the
hospital is related to a worse long-term prognosis in pa-
tients recovering from an MI.2,3

The combined prevalence of major depression and/or
dysthy mia based on the SCID in this study is similar to
the prevalence of major depression alone based on the
results of the National Institute of Mental Health Diag-
nostic Interview Schedule in a previous study of pa-
tients in the early post-MI period. While this suggests the
possibility that mood disorder is less prevalent in our
population, we adhered to the 2-week duration and im-
pairment criteria for major depression specified in the
DSM-III-R, whereas other researchers shortened the
2-week criterion period and omitted the impairment cri-
terion altogether. Approximately 20% of all patients in-
terviewed during the initial hospitalization had symp-
toms of at least mild to moderate depression based on
the BDI. In contrast, Frasure-Smith et al noted elevated
BDI scores in approximately 30% of their patients. The
lower rate of depressive symptoms in our study may at
least in part be explained by differences in patient popu-
lations. In the present study, patients requiring coro-
nary intervention in the first 48 hours were not as-
essed, since they required transfer to another facility for
corony angioplasty or bypass surgery. Although the
medical records of those unavailable for this study indi-
cate no significant differences for age, sex, infarct size,
history of MI, or the presence of diabetes mellitus, it is
possible that elevated BDI scores were more prevalent in
patients in need of urgent coronary intervention. An-
other possible difference between the present study and
that of Frasure-Smith et al may relate to the prevalence
of previous depression in the patient samples. In their
population, 27.5% of the patients reported at least 1 epi-
sode of major depression before the index MI. In con-
trast, the combined prevalence of past major depression
or past dysthy mia was only 15.3% in the present study.
Since our study clearly shows that patients with a BDI
score of 10 or greater are more likely to have a history of
depression than those with a BDI score of less than 10,
it is possible that differences in the prevalence of a psy-
chiatric history may explain the observed differences in
in-hospital BDI scores. In addition, other factors that may
affect the prevalence of depression, such as educational
level and socioeconomic status, may differ between the
patient samples studied.

Depression has been associated with poor adher-
ence in patients without cardiac disease6-9 and in pa-
tients with coronary heart disease.10-12 Patients with a re-
cent MI who dropped out of a recommended cardiac
rehabilitation program were found to be more de-
pressed, anxious, hypochondriacal, and socially intro-
verted at enrollment than those who participated for the
prescribed duration of therapy.12 Depression, poor mo-
tivation, and poor body image during a hospitalization
for unstable angina or acute MI were all inversely re-
ated to smoking cessation and increasing exercise ac-
tivity 1 year later.11 In another study, elderly patients
with depression who had coronary artery disease ad-
hered less often to prescribed aspirin therapy than pa-
tients without depression.

In summary, patients who are depressed and who
exhibit more difficulty following recommendations in-
tended to reduce their risk of subsequent cardiac events
may be readily identified during a hospitalization for an
acute MI. Since depression in the hospital is related to
long-term prognosis in patients recovering from an MI
our study, in combination with findings from previous
investigations, suggests that therapies targeted at treat-
ing depression or at enhancing compliance may im-
prove the post-MI prognosis in this high-risk popula-
tions. However, our study has several possible limitations. Since the method of providing recommendations intended to reduce the risk of a subsequent cardiac event was not standardized, the strength of these recommendations may have been influenced by specific patient characteristics or psychosocial status. Further investigation is needed to determine the effect of different presentation conditions and of the content and timing of recommendations on adherence behavior. Adherence to recommended risk-reducing behaviors was measured by self-report and was not independently verified. The validity of self-report data may be influenced by a more negative description of self in depressed patients, although the negative response bias observed in depressed subjects often coincides more with reality than does the self-report of nondepressed subjects. Nevertheless, the possible confounding effect of self-report data must be considered in this study. It is also possible that the presence of other medical conditions influenced the complexity of prescribed treatment regimens in the 2 groups. Some of the patients who were initially examined died or were lost to follow-up by the time adherence behavior was assessed at 4 months. The results of this study might have been different if information available on adherence behavior in these individuals. Finally, this study used telephone interviews to determine adherence. Findings from telephone interviews may not always correspond to the findings obtained by in-person interviews, and it is possible that the results of this study may have been different if the Medical Outcomes Study Specific Adherence Scale had been administered in person. However, good to excellent agreement between telephone and in-person interviews on scores on the Medical Outcomes Study Short-Form Health Survey and medication compliance were found in a recent study.

Although the relation between nonadherence and mortality may be ascribed to the survival benefit of recommended lifestyle and behavior changes or prescribed medications, adherence behavior per se may relate to coronary heart disease outcomes. In the Coronary Drug Project Research Group study of clofibrate in patients with coronary heart disease and in the Beta-Blocker Heart Attack Trial, nonadherence to either active drug or placebo was associated with decreased survival in patients with coronary disease. Further study is needed to determine whether treatments focused on depression per se or on compliance-enhancing interventions will improve the prognosis in patients recovering from an MI.

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