Effect of psychiatry liaison with general practitioners on depression severity in recently hospitalised cardiac patients: a randomised controlled trial

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ABSTRACT

Objective: To evaluate the effect on depressive symptoms in cardiac patients of patient-specific advice to general practitioners regarding management of comorbid depression.

Design and setting: A randomised controlled trial in four general hospitals in Adelaide, South Australia.

Participants: Patients ($n = 669$) admitted to cardiology units for a range of cardiovascular conditions who were screened and assessed as being depressed according to the Center for Epidemiological Studies Depression Scale (CES-D).

Intervention: Inpatient psychiatric review, followed by telephone case conferencing between specialist hospital staff and GPs to provide patient-specific information about the patient's depression and its management, educational material, and ongoing clinical support.

Main outcome measures: Level of depression severity at 12 months post-hospitalisation.

Results: On the basis of intention to treat, intervention patients had lower rates of moderate to severe depression (CES-D $\geqslant$ 27) after 12 months (25% v 35%, relative risk, 0.72; 95% CI, 0.54–0.96, number needed to treat for benefit, 11). The intervention was most effective in preventing progression from mild depression to moderate to severe depression. The multidisciplinary telephone case conferencing was difficult to implement and, in a post hoc analysis, brief phone advice from a psychiatrist was found to be effective.

Conclusions: Screening hospitalised cardiac patients for depression and providing targeted advice to their GPs reduces depression severity 12 months after hospitalisation.

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Cardiovascular disease and depression both have high prevalence and considerable impacts in terms of mortality and morbidity. The World Health Organization (WHO) estimates that, by 2020, cardiovascular disease and depression will be the two leading contributors to burden of disease in terms of disability-adjusted life years.[1] Furthermore, many people with cardiovascular conditions have significant co-existing depressive symptoms that may adversely affect outcome.[2-4] The risk of adverse outcomes in coronary heart disease increases in proportion to severity of depression — up to two-fold increased risk has been reported for minor depression, and major depression carries up to five times increased risk.[5,6]

Disappointing findings[7] have emerged recently from two randomised controlled trials, one examining the effect of sertraline (SADHART)[8] and the other psychotherapy (ENRICHD),[9] on reduction of depressive symptoms in post-myocardial infarction patients with major depression. Explanations for the modest reductions in depressive symptoms in these studies have stressed difficulties with delivering complex psychosocial interventions such as cognitive behaviour therapy[9] to patients with severe physical illness.

Given that only a minority of patients with cardiovascular disease who are depressed are treated for depression,[10] we were interested in discovering whether identifying comorbid depression and delivering a pragmatic primary-care-focused intervention could reduce depression severity in recently hospitalised cardiac patients. We reasoned that a simple intervention delivered by general practitioners, if effective, might have significant public health consequences. Our approach was consistent with findings that providing depression scale scores to GPs improves the recognition of depression,[11] and that treatment of depression in primary care can be improved by specific patient-focused consultations between GPs and psychiatrists providing management advice and feedback.[10,12,13] Provision of depression screening results alone is not sufficient to improve outcomes,[11] and as yet no intervention has been reported to be both effective in reducing comorbid depression in cardiac patients and easy to deliver in a primary care setting.

The Identifying Depression as a Comorbid Condition (IDACC)[14] randomised controlled trial used the Enhanced Primary Care (EPC) program introduced by the Australian government to reimburse GPs for participating in multidisciplinary case conferencing. The primary outcome measure was the level of depression at 12 months post-hospitalisation. Here, we report the results, on the basis of intention to treat, of the IDACC trial.

METHODS

Design

Our randomised controlled trial examined the effect on depressive symptoms of providing patient-specific psychiatric telephone advice to the GPs of patients who had been

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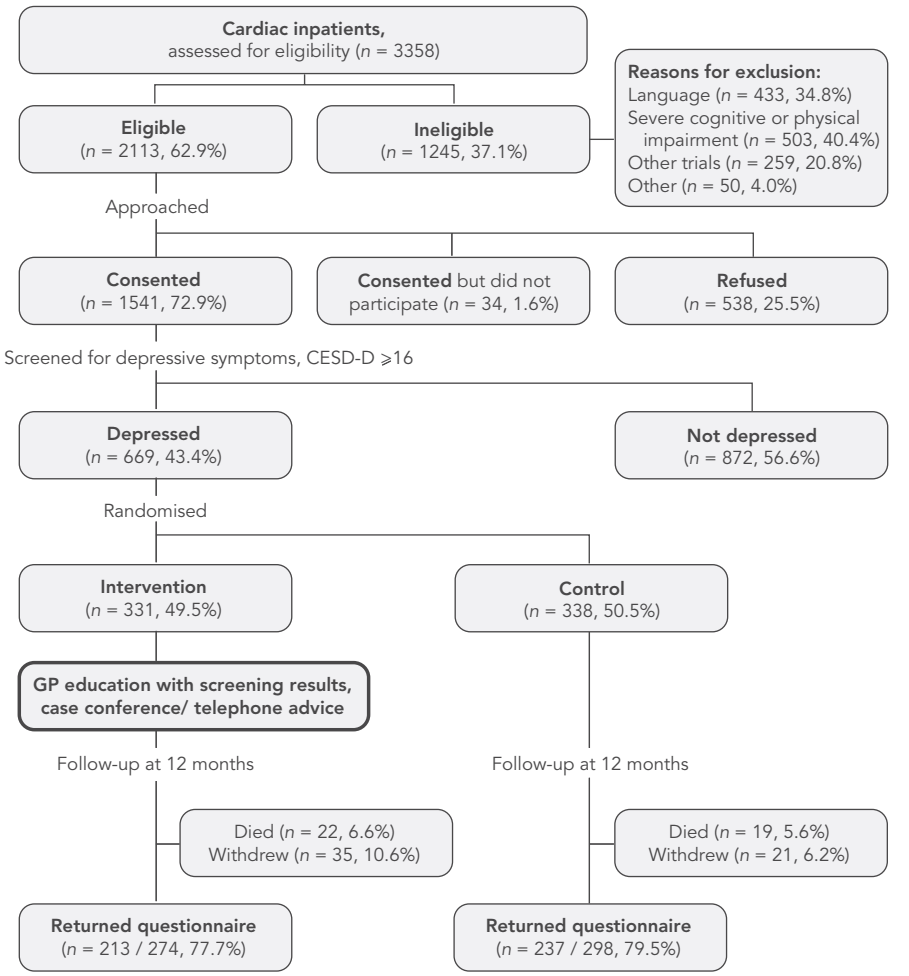
1 Flow of participants through the trial



hospitalised for a range of cardiac conditions, and who had been identified during hospitalisation as depressed. This intervention was compared with usual care.

The trial was part of the prospective IDACC study,[14,15] which monitored depression, quality of life and service utilisation in a cohort of recently discharged cardiac patients. The trial was conducted in four major public hospitals in Adelaide over 16 months from 1 August 2000 to 31 December 2001, with a 6-month extension in one hospital. Inclusion of this latter group updates study details previously reported.[14]

Study population

Patients aged between 18 and 84 years and admitted to cardiology units for myocardial infarction, unstable angina, arrhythmia, congestive heart failure, coronary artery bypass graft surgery or angioplasty were eligible for inclusion. Of 3358 patients assessed for eligibility, 1245 were excluded (Box 1). Of the 2113 assessed as eligible and approached, 538 refused to participate, resulting in a cohort of 1541, which represents a 73% consent rate (Box 1).

A comparison of consenters and non-consenters showed that non-consent was associated with being older ($P < 0.001$) and female ($P < 0.001$). There was no significant difference in consent rates by reason for admission. Project assistants usually approached patients on Day 2 or 3 of admission, and eligible consenting patients were screened for depressive symptoms using the Center for Epidemiological Studies Depression Scale (CES-D).[16] The CES-D has been widely used in cardiac[17,18] and older populations.[19] It has good face validity,[20] is quick and easy to administer and score, and has been recommended as suitable for use as a screening instrument for primary care patients.[19,21] Rates of depression reported using the CES-D are similar to those of coronary patients assessed by other self-report scales or clinical interview.[2] Consistent with previous research, cut-off scores of CES-D ⩾ 16 were used to determine depression "caseness" in this analysis, and depressed patients were further differentiated as having mild depression (CES-D 16–26), or moderate to severe depression (CES-D ⩾ 27).[18-20,22-25] The SF-36[26] was administered as a self-report measure of physical and mental health-related quality of life.

At 12 months post-hospitalisation, all patients were sent follow-up postal questionnaires. A follow-up rate of 78.4% was achieved in those not withdrawn or deceased at this time, with no significant difference between control and intervention groups.

Randomisation

Patients fulfilling criteria for depression caseness at baseline were centrally randomised into the trial on the basis of the GP caring for them. Patients randomised into the control arm of the trial received usual cardiac and non-cardiac care, both in the hospital and in the community. In all, 480 GPs were nominated by the 669 patients. Most GPs (75%) had only one patient participating in the IDACC study, with no significant difference between the intervention and control groups in the proportion of GPs with more than one trial patient.

Intervention

Intervention patients were referred to the psychiatric consultation liaison service for an in-hospital psychiatric consultation, and the cardiac rehabilitation nurse was notified. Patients were seen independently by the rehabilitation nurse and psychiatry liaison registrar, who received an initial training session from the chief investigators and ongoing supervision from the senior hospital consultation liaison psychiatrist.

Consultations followed routine practice, although the psychiatry registrar was required to complete a checklist[15] of any issues identified, which could be subsequently used as a basis for discussion with the GP. Consultations on average lasted 20–30 minutes.

The patient's depression screening scores and a copy of an evidence-based treatment guide developed for IDACC were sent to the patient's GP.[15] The treatment guide incorporated information about recognition of depression and treatment options (medication and cognitive behavioural therapy). The GP was invited to take part in a 15–30 minute telephone case conference with the attending psychiatric registrar and cardiac rehabilitation nurse.

Whenever the psychiatric registrar was unable to review the patient before discharge, or it was not logistically possible to organise a formal case conference, an alternative intervention was implemented. In lieu of the case conference, GPs were offered a one-to-one standardised 5–10 minute phone consultation with a designated psychiatrist (G S) who had not seen the patient. This telephone call centred on the GP's knowledge of the patient, the patient's depression scores, the IDACC guidelines for management of heart disease and depression in general practice, and suggestions for management. A critical component of either intervention was the opportunity for the GP to discuss, by telephone, the psychological state of their patient with a psychiatrist or psychiatric registrar, who provided management advice tailored to the specific patient.

Where neither form of telephone consultation could be delivered, the GP received, by post, the patient's depression rating scores and a copy of the management guidelines.

Sample size

To detect a 15% difference between the intervention and control groups with a spontaneous resolution of 50% of depressed cases[27] (χ^2 two-sided test with alpha of 0.05, and 80% power), we calculated that the sample size required was 183 in each arm, with level of moderate to severe depressive symptoms at 12 months after hospitalisation as a primary outcome measure.

Statistical analysis

Results were analysed on an intention-to-treat basis, with moderate to severe depression at 12 months as the primary outcome, using SPSS for Windows.[28] Mixed model analysis in SPSS was initially conducted to account for randomisation clustered by GP. The decision to analyse CES-D categories rather than CES-D scale scores was taken for three reasons:

- the CES-D categories of not depressed, mild depression and moderate to severe depression may be more meaningful to clinicians;
- evidence shows risk of adverse outcome is associated with both mild and moderate to severe CES-D categories;[17] and
- CES-D scores were not normally distributed.

We analysed outcomes at 12 months using χ^2 tests, and results are presented as relative risks (RR) with 95% confidence intervals. To determine clinical significance, we report the number needed to treat (NNT) to produce benefit in one patient, calculated as the inverse of the absolute risk difference. Unpaired *t* test comparisons of intervention versus control SF-36 scores were conducted. Post hoc χ^2 analysis was conducted between the outcomes of the control group and levels of the intervention actually delivered, with significance level adjusted using the Bonferroni method.

2 Depression severity measured by CES-D category

	Not depressed	Mild	Moderate to severe
Baseline*			
Intervention	—	187 (57%)	144 (44%)
Control	—	184 (54%)	154 (46%)
12 months†			
Intervention	86 (40%)	74 (35%)	53 (25%)
Control	93 (39%)	62 (26%)	82 (35%)

— Patients who were not depressed at baseline did not participate in this trial. * $\chi^2 = 0.29$, df = 1, $n = 669$, $P = 0.59$. † $\chi^2 = 6.30$, df = 2, $n = 450$, $P = 0.043$.

Funding and ethical approval

The IDACC project was funded by the South Australian Department of Health, partly through grants provided by the Australian National Mental Health Strategy.

Ethical approval was obtained from the respective local hospital Human Research Ethics Committees.

RESULTS

Overall, 669 (43.4%) participants were classified as depressed according to our criterion of CES-D ≥ 16 and were randomised to the trial (intervention, 331; usual care, 338). Although patients were randomised on the basis of the GP caring for them, only 52 of the 248 intervention group GPs and 67 of the 232 control group GPs had more than one patient in the study. Clustering by GP was not accounted for in the analyses as no intra-class correlation was detected in a mixed model analysis, and the covariance parameter (GP) was found to be redundant.

At baseline, 44% of the intervention group were classified as having moderate to severe depression (CES-D mean score, 35.5; standard deviation [SD], 7.0) and 56% as having mild depression (CES-D, 20.3; SD, 3.0). Forty-six per cent of the control group were classified as having moderate to severe depression (CES-D, 34.7; SD, 6.4) at baseline, with 54% in the mild depression category (CES-D, 20.5; SD, 3.2). Sixty-two per cent of study participants were males. About 52% of patients were admitted with unstable angina and 20% with myocardial infarction. More than 65% of patients stated that they had a past history of heart disease and 37% had a history of depression, anxiety or stress. At baseline, there was no difference between the intervention and control groups on any variable.

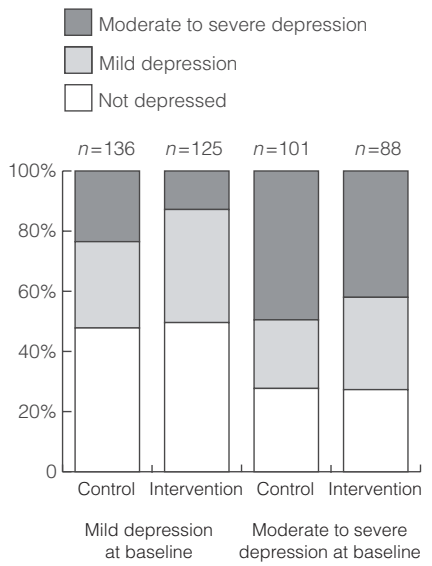
At 12 months, 41 patients had died, with no significant difference in numbers in the intervention arm or the control arm, or the baseline depression level within these groups. A further 56 subjects had withdrawn by 12 months (intervention, 35; control, 21), with no difference in their baseline depression level. Of the remaining 572 patients, 450 (78.4%) returned questionnaires at 12 months. Overall, patients who did not return the 12-month questionnaire were more likely to be younger ($P < 0.001$); divorced or separated ($P < 0.001$); or current smokers ($P < 0.001$); but did not differ on their baseline level of depression.

Comparing CES-D depression categories between the intervention and control arms showed a significant intervention effect at 12 months post-hospitalisation (Box 2). Adjusted standardised residuals revealed that patients in the intervention group were less likely to have moderate to severe depression at 12 months, compared with controls (RR, 0.72; 95% CI, 0.54–0.96; NNT, 11; 95% CI, 6–81).

Further analyses found that the intervention resulted in a significant reduction in the proportion of moderately to severely depressed patients only in those who had mild depression at baseline ($\chi^2 = 5.043$; df = 1; $n = 450$; $P = 0.025$) (Box 3).

To assess whether differences in depression severity at 12 months were related to differences in physical health status, we

3 Depression at 12 months by depression status at baseline



analysed the SF-36 physical health subscale at baseline and 12 months. There was no significant difference between the control and intervention groups in self-reported physical health (physical health summary scores were 34.3 and 33.1, respectively, at baseline, 37.6 and 36.7 at 12 months).

Overall, in 24% of intervention patients the full intervention with an EPC case conference was delivered. "Telephone advice" was provided for 39.9% and the "GP education only" intervention was provided in 36% of cases. Although not randomly allocated, no difference was found between baseline characteristics of patients in the control group and the three forms of the intervention delivered. When the three forms of the intervention were compared (post hoc) with the control group, only the psychiatrist telephone call led to a significant reduction in the proportion of patients with moderate to severe depression (CES-D $\geq$27, 19% v 35%; RR, 0.55; 95% CI, 0.33–0.86).

DISCUSSION

Given the high prevalence of depression in patients with cardiovascular disease and the increasing recognition of the negative effect of depression on outcome, simple and effective strategies for treating cardiac patients with depression are required. This trial has demonstrated a clinically meaningful reduction in depression severity in cardiac patients 12 months after hospitalisation. Importantly, the effect was most evident in reducing the proportion of patients with moderate to severe depression, the form of depression most likely to lead to adverse health outcomes. Our results suggest that the intervention prevented mild depression from developing into moderate to severe depression. The lower proportion of patients with moderate to severe depression in the intervention group was unlikely to be related to any differences in physical health as there were no differences in the SF-36 physical subscale between the groups at either baseline or 12 months. It is noteworthy that the substantial reduction of depression severity was achieved with a relatively simple GP-mediated intervention. As such, the intervention may be more easily and cheaply implemented than the more complex therapy-based interventions tested in the ENRICHD study.[9]

The intervention had little effect on the proportion of patients classified as not depressed at 12 months. Further, the intervention did not appear to be effective in reducing depression severity in patients who had moderate to severe depression at baseline. It may be that this group of patients require more intensive support than that provided by the IDACC GP-focused intervention. Of note, a multivariate analysis of the overall prospective IDACC cohort demonstrated that severity of baseline depressive symptoms was a powerful predictor of persistent depression in cardiac patients.[29]

Even with substantial infrastructure supporting the project, in-patient visits by psychiatry liaison and the cardiac rehabilitation nurse, followed by multidisciplinary EPC case conferences, were logistically complex and difficult to implement. Interestingly, post hoc analysis indicated that EPC case conferencing may not be the most effective way to liaise with GPs. The alternative intervention involving a telephone call from a psychiatrist to the GP was not only easier to implement, particularly within the general hospital, but also effective in reducing depression severity in the GP's patients compared with the control group. This finding requires further prospective evaluation.

There were several limitations to our study. Although overall consent rates were high, the patients not returning questionnaires at 12 months were more likely to be younger, divorced or separated, and smokers. We do not know what management plans for depression were actually delivered by individual GPs. Further analysis of the data, including analysis of comparative rates of antidepressant prescription and service utilisation data (collected during the IDACC project), may elucidate which aspects of the intervention were most important in reducing depression severity.

We consider our findings are important and have implications for improving care for cardiac patients with comorbid depression. Both depression and cardiovascular disease have high prevalence, and depression remains underdiagnosed and undertreated in this population. Our findings may provide a different approach to the practice of consultation liaison psychiatry in the contemporary general hospital, where care is increasingly orientated to brief stays for investigations and procedures. Such an approach would involve screening of patients known to be at high risk of psychological distress (eg, cardiac in-patients), and subsequently providing targeted support to the GPs for patients identified as being at risk of adverse outcomes.

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COMPETING INTERESTS

None identified.

REFERENCES

1 Murray CJL, Lopez AD. The global burden of disease: a comprehensive assessment of mortality and disability from diseases, injuries and risk factors in 1990 and projected to 2020. Cambridge, Mass: Harvard University Press on behalf of the World Health Organization and the World Bank, 1996: 375.

2 Frasure-Smith N, Lesperance F, Talajic M. Depression following myocardial infarction. Impact on 6-month survival. *JAMA* 1993; 270: 1819-1825.

3 Jiang W, Alexander J, Christopher E, et al. Relationship of depression to increased risk of mortality and rehospitalization in patients with congestive heart failure. *Arch Intern Med* 2001; 161: 1849-1856.

4 Connerney I, Shapiro PA, McLaughlin JS, et al. Relation between depression after coronary artery bypass surgery and 12-month outcome: a prospective study. *Lancet* 2001; 358: 1766-1771.
5 Bunker SJ, Colquhoun DM, Esler MD, et al. "Stress" and coronary heart disease: psychosocial risk factors. *Med J Aust* 2003; 178: 272-276.
6 Glassman AH, Shapiro PA. Depression and the course of coronary artery disease. *Am J Psychiatry* 1998; 155: 4-11.
7 Sheps DS, Freedland KE, Golden RN, McMahon RP. ENRICHD and SADHART: implications for future biobehavioral intervention efforts. *Psychosom Med* 2003; 65: 1-2.
8 Glassman AH, O'Connor CM, Califf RM, et al. Sertraline treatment of major depression in patients with acute MI or unstable angina. *JAMA* 2002; 288: 701-709.
9 Berkman LF, Blumenthal J, Burg M, et al. Effects of treating depression and low perceived social support on clinical events after myocardial infarction: the Enhancing Recovery in Coronary Heart Disease Patients (ENRICHD) Randomized Trial. *JAMA* 2003; 289: 3106-3116.
10 Carney RM, Jaffe AS. Treatment of depression following acute myocardial infarction. *JAMA* 2002; 288: 750-751.
11 Gilbody SM, House AO, Sheldon TA. Routinely administered questionnaires for depression and anxiety: systematic review. *BMJ* 2001; 322: 406-409.
12 Simon GE, VonKorff M, Rutter C, Wagner E. Randomised trial of monitoring, feedback, and management of care by telephone to improve treatment of depression in primary care. *BMJ* 2000; 320: 550-554.
13 Katon W, Von Korff M, Lin E, et al. Collaborative management to achieve treatment guidelines. Impact on depression in primary care. *JAMA* 1995; 273: 1026-1031.
14 Cheok F, Schrader G, Banham D, et al. Identification, course, and treatment of depression after admission for a cardiac condition: rationale and patient characteristics for the Identifying Depression As a Comorbid Condition (IDACC) project. *Am Heart J* 2003; 146: 978-984.
15 Identifying depression as a comorbid condition (IDACC) [website]. Available at: idacc.healthbase.info/ (accessed Feb 2005).
16 Radloff L. The CES-D scale: a self-report depression scale for research in the general population. *Appl Psychol Measurement* 1977; 1: 385-401.
17 Penninx BW, Beekman AT, Honig A, et al. Depression and cardiac mortality: results from a community-based longitudinal study. *Arch Gen Psychiatry* 2001; 58: 221-227.
18 Blumenthal JA, Lett HS, Babyak MA, et al. Depression as a risk factor for mortality after coronary artery bypass surgery. *Lancet* 2003; 362: 604-609.
19 Zich JM, Attkisson CC, Greenfield TK. Screening for depression in primary care clinics: the CES-D and the BDI. *Int J Psychiatry Med* 1990; 20: 259-277.
20 Ensel W. Measuring depression: the CES-D scale. In: Lin N, Dean A, Ensel W, editors. Social support, life events and depression. New York: Academic Press, 1986.
21 Strik JJ, Honig A, Lousberg R, et al. Clinical correlates of depression following myocardial infarction. *Int J Psychiatry Med* 2001; 31: 255-264.
22 Logsdon MC, McBride AB, Birkimer JC. Social support and postpartum depression. *Res Nurs Health* 1994; 17: 449-457.
23 Klinkman MS, Coyne JC, Gallo S, Schwenk TL. Can case-finding instruments be used to improve physician detection of depression in primary care? *Arch Fam Med* 1997; 6: 567-573.
24 Geisser ME, Roth RS, Robinson ME. Assessing depression among persons with chronic pain using the Center for Epidemiological Studies-Depression Scale and the Beck Depression Inventory: a comparative analysis. *Clin J Pain* 1997; 13: 163-170.
25 Brummett BH, Babyak MA, Barefoot JC, et al. Social support and hostility as predictors of depressive symptoms in cardiac patients one month after hospitalization: a prospective study. *Psychosom Med* 1998; 60: 707-713.
26 Ware JE, Sherbourne CD. The MOS 36-Item Short-Form Health Survey (SF-36). *Med Care* 1992; 30: 473-483.
27 Schleifer SJ, Macari-Hinson MM, Coyle DA, et al. The nature and course of depression following myocardial infarction. *Arch Intern Med* 1989; 149: 1785-1789.
28 SPSS for Windows [computer program]. Version 11.0. Chicago, Ill: SPSS Inc, 2001.
29 Schrader GD, Cheok F, Hordacre AL, Guiver N. Predictors of depression three months after cardiac hospitalization. *Psychosom Med* 2004; 66: 514-520.

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