

UC Irvine

UC Irvine Previously Published Works

Title

Comparison of prevalence of symptoms of depression, anxiety, and hostility in elderly patients with heart failure, myocardial infarction, and a coronary artery bypass graft.

Permalink

<https://escholarship.org/uc/item/9q84h42w>

Journal

Heart & lung : the journal of critical care, 39(5)

Authors

Dracup, KA
Moser, DK
Evangelista, LS
et al.

Publication Date

2010-09-01

Copyright Information

This work is made available under the terms of a Creative Commons Attribution License, available at <https://creativecommons.org/licenses/by/4.0/>

Peer reviewed

Comparison of prevalence of symptoms of depression, anxiety, and hostility in elderly patients with heart failure, myocardial infarction, and a coronary artery bypass graft

Debra K. Moser, DNSc, RN, FAAN,^a Kathleen Dracup, DNSc, RN,^b Lorraine S. Evangelista, PhD, RN,^c Cheryl Hoyt Zambroski, PhD, RN,^d Terry A. Lennie, PhD, RN,^a Misook L. Chung, PhD, RN,^a Lynn V. Doering, DNSc, RN,^c Cheryl Westlake, PhD, RN,^e and Seongkum Heo, PhD, RN^f

OBJECTIVE: This study sought to compare the prevalence of anxiety, depression, and hostility among 3 clinically diverse elderly cardiac patient cohorts and a reference group of healthy elders.

METHODS: This was a multicenter, comparative study. A total of 1167 individuals participated: 260 healthy elders, and 907 elderly cardiac patients who were at least 3 months past a hospitalization (478 heart-failure patients, 298 postmyocardial infarction patients, and 131 postcoronary artery bypass graft patients). Symptoms of anxiety, depression, and hostility were measured using the Multiple Affect Adjective Checklist.

RESULTS: The prevalence of anxiety, depression, and hostility was higher in patients in each of the cardiac patient groups than in the group of healthy elders. Almost three quarters of patients with heart failure reported experiencing symptoms of depression, and the heart-failure group manifested the greatest percentage of patients with depressive symptoms.

CONCLUSIONS: The high levels of emotional distress common in cardiac patients are not a function of aging, because healthy elders exhibit low levels of anxiety, depression, and hostility. (Heart Lung® 2010;39:378–385.)

Negative emotions (ie, depression, anxiety, and hostility) appear to be more common among cardiac patients than among healthy individuals. Whether this phenomenon is related to cardiac disease alone or to the older age of most cardiac patients is unclear. The incidence of cardiac disease increases dramatically with age.

From the ^aCollege of Nursing, University of Kentucky, Lexington, Kentucky; ^bSchool of Nursing, University of California at San Francisco, San Francisco, California; ^cSchool of Nursing, University of California at Los Angeles, Los Angeles, California; ^dSchool of Nursing, University of South Florida, Tampa, Florida; ^eSchool of Nursing, California State University, Fullerton, California; and ^fSchool of Nursing, Indiana University, Indianapolis, Indiana.

Corresponding author: Debra K. Moser, DNSc, RN, FAAN, College of Nursing, University of Kentucky, 527 College of Nursing, Lexington, KY 40536-0232. E-mail: dmoser@uky.edu

0147-9563/\$ - see front matter

© 2010 Elsevier Inc. All rights reserved.

doi:10.1016/j.hrtlng.2009.10.017

Although some researchers reported that aging is associated with a reduction in anxiety and depression levels,¹ others documented higher levels of negative emotions in the elderly.^{2,3} Higher rates of suicide are seen in the elderly, and the distinctive stresses of aging (eg, loss of friends and loved ones, and retirement) may contribute to substantially higher rates of emotional distress.⁴

This argument is not simply academic. Negative emotional states adversely and independently affect quality of life,⁵⁻⁷ adherence to recommended treatments,⁸⁻¹⁰ costs of care,^{11,12} and physical outcomes in patients with coronary heart disease and heart failure.¹³⁻²¹ The risks engendered by negative emotional states may be equal to, or greater than, those seen with traditional risk factors such as the presence of diabetes, smoking, elevated low-density lipoprotein, and the presence of comorbidities.^{5,19} Despite the

importance of negative emotional states to the quality of life, morbidity, and mortality of cardiac patients, clinicians still do not routinely assess for emotional distress as a significant risk factor.^{22,23} One major factor limiting the application by clinicians of evidence regarding negative emotional states is the perception that major confounding factors such as age obscure the impact of cardiac disease on emotional states. Thus, this study sought to determine the impact of cardiac disease on psychological adjustment by comparing the prevalence of depression, anxiety, and hostility in 3 elderly cardiac patient groups (ie, outpatients with heart failure, patients after a myocardial infarction, and patients after a coronary artery bypass graft) with that of a group of healthy elders.

METHODS

In this multicenter, comparative study, data from 3 outpatient cohorts of community-dwelling cardiac patients and a group of community-dwelling elders without known cardiac disease were compared in terms of anxiety, depression, and hostility. A multicenter design was used to increase clinical diversity and heterogeneity in the sample, to enhance generalizability.

Participants

After approval by our respective Institutional Review Boards, cardiac patients were recruited from outpatient clinics at academic medical centers in the Western, Midwestern, and Southern United States, and a cohort of elders without cardiac disease was recruited from senior centers. All participants gave written, informed consent. Cardiac patients who met the following inclusion criteria were enrolled: (1) at least 3 months past a hospitalization; (2) community-dwelling; (3) age ≥ 60 years; (4) no cognitive impairment (ie, patients unable to converse appropriately or diagnosed with dementia or Alzheimer's disease); and (5) a confirmed diagnosis. Elders without cardiac disease were community-dwelling, had no cognitive impairments, were aged ≥ 60 years, and were free of known cardiac disease.

Measurement

Data on sociodemographic characteristics were collected from all participants by an interview and questionnaire. Clinical data were collected about patients by patient interview and medical-record review. Anxiety, depression, and hostility were measured in participants using the Multiple Affect Adjective Checklist.

Multiple affect adjective checklist. The Multiple Affect Adjective Checklist (MAACL) assesses states of anxiety, depression, and hostility.^{24,25} The MAACL is a set of 132 positive and negative adjectives representing each of the 3 emotional states, arranged in alphabetical order. Subjects read through the adjectives and check all those that reflect how they currently feel. The instrument is scored by calculating the number of negative adjectives checked, and the number of positive adjectives not checked. Higher scores indicate that a respondent has higher levels of the given emotion. Respondents receive separate scores for anxiety, depression, and hostility. Standard thresholds for anxiety, depression, and hostility were established at scores of 7, 11, and 7, respectively. This instrument measures the intensity of symptoms of anxiety, depression, and hostility, and is not used to render a clinical diagnosis. Nonetheless, this instrument was chosen for this project because of its clinical utility and ease of comparison among sites, and because dysphoric symptoms, even in the absence of a clinical diagnosis, were shown to exert a negative impact on outcomes.^{18,26} The MAACL has been used extensively in research, and its sensitivity, reliability, and validity were repeatedly demonstrated.^{24,25,27} Reliability was confirmed in this study with the calculation of Cronbach's α in each sample for each subscale of the MAACL. In each of the 4 groups and each of the 3 subscales, Cronbach's α was $>.85$.

Data analysis

Non-normally distributed data were transformed for a better approximation of normal distribution, using log transformations as needed. Data were pooled for all sites, because no differences in outcomes were evident among sites. Analysis of variance was used to compare mean anxiety, depression, and hostility scores among the cardiac-patient and healthy elder groups. This provided an unadjusted comparison of the means. We adjusted for baseline age, gender, ethnicity, marital status, educational level, and comorbidities, using subsequent analysis of covariance models. When a significant difference was found, post hoc testing using Bonferroni comparisons identified specific group differences. All analyses were conducted using SPSS software, release 13.0 (SPSS, Inc., Chicago, IL). All tests for statistical significance were 2-tailed, and $\alpha = .05$.

RESULTS

A total of 1167 individuals participated in this study: 907 cardiac patients, and 260 healthy elders. In the cardiac-patient group, 478 heart-failure

patients, 298 postmyocardial infarction patients, and 131 postcoronary artery bypass graft patients were enrolled. Given our age criterion for enrollment in the study, there were no differences in age among the 4 groups. As expected, however, given the typical cardiac profiles seen in the community, there were a number of differences in baseline characteristics among groups (Table I).

Group differences in anxiety, depression, and hostility scores

An examination of differences in anxiety, depression, and hostility scores among groups revealed significant group differences for each emotion (Table II). For anxiety, the 3 cardiac-patient groups were similar, and expressed significantly higher levels of anxiety than the healthy elders ($P = .001$), whose mean for anxiety was 40% lower than the normative threshold for anxiety. For depression, healthy elders expressed a mean level that was 8% below the threshold for depression, whereas the heart-failure group expressed a mean depression level that was significantly higher than for either of the other 2 cardiac patient groups ($P = .001$). Hostility levels were similar, and were highest in patients after a myocardial infarction and after a coronary artery bypass graft, compared with the healthy elder group, in whom hostility was lowest ($P = .001$), and 16% below the normative threshold.

The percentage of cardiac patients in each group exceeding the threshold for anxiety was 37% to 44%, compared with only 17% among healthy elders (Fig 1). With regard to depression, 63% of heart-failure patients exceeded the threshold for depression, compared with 56% of postmyocardial infarction patients, 53% of postcoronary artery bypass graft patients, and only 33% of healthy elders. A total of 62% of postcoronary artery bypass graft patients, compared with 34% of healthy elders, exceeded the hostility threshold.

To control for sociodemographic or clinical factors that might also affect anxiety, depression, or hostility levels, we used analysis of covariance models, with age as the covariate to adjust for gender, marital status, ethnicity, educational level, presence of hypertension or diabetes, and medications used. Within this elderly sample, age did not affect the levels of anxiety, depression, or hostility in any model.

There were no interactions between group (ie, the 3 cardiac-patient groups and the healthy elder group) and gender, although there was a main effect of gender for anxiety ($P = .04$) and depression ($P = .03$), but not for hostility. Women expressed significantly greater levels of anxiety and depression than men in all 4 groups (Table III).

There was no education by group interaction, but there was a main effect of educational level.

Table I

Baseline sample characteristics

Characteristics	Healthy elders (n = 260)	Coronary artery bypass graft (n = 131)	Postmyocardial infarction (n = 298)	Heart failure (n = 478)	P
Age, mean \pm SD (y)	67.3 \pm 11.4	66.3 \pm 6.7	65.8 \pm 7.2	65.6 \pm 9.2	.078
Female (%)	78.0	6.1	13.4	25.8	.001
\leq High school (%)	33.7	31.7	39.4	33.6	.393
Married/ cohabitating (%)	50.4	100.0	100.0	66.4	.001
Ethnicity					.001
Caucasian	68.1	90.8	69.1	64.4	
African American	25.8	3.8	7.0	9.4	
Hispanic	.0	.0	3.7	7.5	
Other	6.2	5.3	7.7	8.8	
Hypertension (%)	55.8	29.6	35.7	51.5	.001
Diabetes (%)	16.1	14.9	12.2	38.1	.001
Left ventricular ejection fraction, mean \pm SD (%)	Not assessed	58.6 \pm 10.9	50.5 \pm 16.9	29.5 \pm 12.2	.001

Table II

Comparison of anxiety, depression, and hostility scores among 3 cardiac patient groups and healthy elderly group

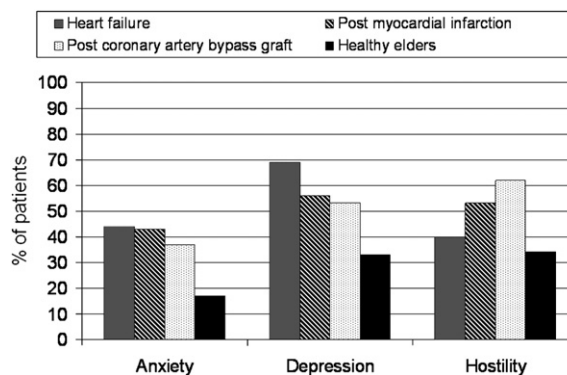
	Healthy elders (n = 260)	Coronary artery bypass graft (n = 131)	Postmyocardial infarction (n = 298)	Heart failure (n = 478)	P
Anxiety score, mean \pm SD (95% CI)	4.2 \pm 3.3 (3.8-4.6)	6.8 \pm 4.0 (6.1-7.5)	6.9 \pm 4.6 (6.4-7.4)	6.9 \pm 4.7 (6.3-7.4)	.001*
Depression score, mean \pm SD (95% CI)	10.2 \pm 6.3 (9.4-11.0)	13.0 \pm 5.5 (12.0-13.9)	12.6 \pm 6.5 (11.8-13.3)	14.2 \pm 7.6 (13.4-15.1)	.001†
Hostility score, mean \pm SD (95% CI)	6.3 \pm 3.5 (5.9-6.8)	8.5 \pm 4.1 (7.8-9.2)	8.2 \pm 4.3 (7.7-8.7)	6.9 \pm 4.3 (6.4-7.4)	.001‡

Higher scores indicate higher levels of anxiety, depression, or hostility.

*Post hoc Bonferroni comparisons revealed differences between healthy elderly group vs all other groups.

†Post hoc Bonferroni comparisons revealed differences between heart failure and myocardial infarction, and between healthy elderly group vs all other groups.

‡Post hoc Bonferroni comparisons revealed differences between healthy elders vs myocardial infarction and coronary artery bypass, and between heart failure vs myocardial infarction and coronary artery bypass.

**Fig 1** Percentage of patients in each group exceeding published threshold for anxiety, depression, and hostility.

Individuals in each group with only high school or less education reported experiencing significantly higher levels of anxiety ($P = .001$), depression ($P = .001$), and hostility ($P = .006$) than those who had attended at least some college (Fig 2). In this sample, there was no interaction or main effect of marital status, ethnicity/race, hypertension, diabetes, or medications used on levels of anxiety, depression, or hostility.

DISCUSSION

Our findings demonstrate that the higher levels of emotional distress seen in older cardiac patients are not a function of aging, but are directly associated with cardiac disease. Patients with heart failure and patients after a myocardial infarction and after a coronary artery bypass graft exhibited substantially higher levels of anxiety and depression than did a group of healthy elders. Hostility levels were higher in postmyocardial infarction and postcoronary artery bypass graft patients than in healthy elders who were similar to heart-failure patients. In the healthy elders, mean levels of each emotion were well below the normative threshold for distress, whereas they were above the threshold for patients in each of the 3 distinct cardiac groups. Thus, aging does not account for the higher levels of emotional distress seen in cardiac patients.

Our findings demonstrated that of the sociodemographic and clinical variables considered, only gender and educational status affected levels of anxiety, depression, or hostility, and they did so in a consistent fashion among groups. Those with a high school education or less manifested higher levels of psychological distress than did those with at least some college education. Educational attainment is often considered a surrogate for socioeconomic

Table III

Comparison of anxiety, depression, and hostility scores according to gender among 3 cardiac patient groups and healthy elderly group

	Healthy elders (n = 260)	Coronary artery bypass graft (n = 131)	Postmyocardial infarction (n = 298)	Heart failure (n = 478)	P
Anxiety score, Women mean \pm SD	4.4 \pm 3.4	7.6 \pm 4.1	8.5 \pm 4.6	7.2 \pm 4.8	.028*
Men	3.6 \pm 3.0	6.8 \pm 4.0	6.6 \pm 4.5	6.7 \pm 4.5	
Depression score, Women mean \pm SD	10.4 \pm 6.6	15.0 \pm 4.5	14.1 \pm 6.4	15.0 \pm 7.5	.037*
Men	9.1 \pm 5.3	12.8 \pm 5.6	12.4 \pm 6.5	13.9 \pm 7.7	
Hostility score, Women mean \pm SD	6.4 \pm 3.5	9.0 \pm 3.1	8.8 \pm 3.9	6.2 \pm 4.0	.616†
Men	5.8 \pm 3.7	8.5 \pm 4.2	8.1 \pm 4.4	7.2 \pm 4.4	

Higher scores indicate higher levels of anxiety, depression, or hostility.

*Main effect of gender; no group by gender interaction.

†No interaction of group by gender, and no gender main effect.

status, which is associated strongly and inversely with poor cardiac outcomes.^{28,29} This relationship is driven not only by the poorer health habits and higher levels of cardiac risk factors seen in individuals of lower educational attainment, but by the chronic stresses of lower socioeconomic status,³⁰ often manifested as depression, anxiety, or hostility.

We also noted that women reported higher levels of anxiety and depression in all groups than did men. We and others previously reported on this phenomenon.^{5,31,32} In each cardiac-patient group in this study, women consistently reported levels in excess of the thresholds for anxiety or depression. Given the consistency with the finding that women experience higher levels of psychological distress, future research should explore the relationship between poorer cardiac outcomes among women and higher levels of anxiety and depression. Even though women's levels of depression were higher than men's, in each male cardiac-patient group, the mean level of depression was also higher than the threshold for depression.

Our data indicate that the majority of patients after a myocardial infarction, after a coronary artery bypass, and with heart failure have depressive symptoms, that about 40% of these cardiac patients experience anxiety, and that hostility is apparent in about half of these patients. These levels of depression are consistent with those reported in the literature when considering the combined prevalence of clinical diagnoses and symptoms of psychological distress.³³ Neither anxiety nor hostility have been studied in sufficient depth to provide reliable estimates of prevalence.

The high levels of depression, anxiety, and hostility in these older cardiac-patient samples are of

concern for a number of reasons. First, both greater age and negative emotions predict short-term and long-term morbidity and mortality among patients with heart failure, a coronary artery bypass graft, and a myocardial infarction.^{5,6,13,16-18,21,34-42} The combined impact of increasing age and negative emotions substantially increases the risk faced by elderly cardiac patients for poor quality of life, recurrent cardiac events, and increased mortality. Under these circumstances, it is imperative that clinicians recognize and appropriately manage negative emotions in their cardiac patients.

Second, emotional distress is modifiable, but only if it is recognized and treated. Although anxiety or depression will diminish in some cases without treatment, investigators documented poor resolutions of either condition over the long term.^{10,43} In current clinical practice, the recognition and treatment of psychological distress are extremely poor, even when levels are as high as they are in the current patient sample.^{22,23,43} A number of reasons may account for the under-recognition and under-treatment of dysphoric states.^{19,33} Many clinicians think that emotional distress after a cardiac event is a normal response to illness that will resolve with time. Others fail to appreciate the extent of the problem, or believe that they will easily recognize serious emotional distress in their patients when it is present, despite evidence to the contrary.^{22,23} Finally, healthcare providers exhibit a general lack of knowledge regarding the appropriate assessment and treatment of emotional distress. Many clinicians believe that assessment is too difficult, and that treatment options are few.

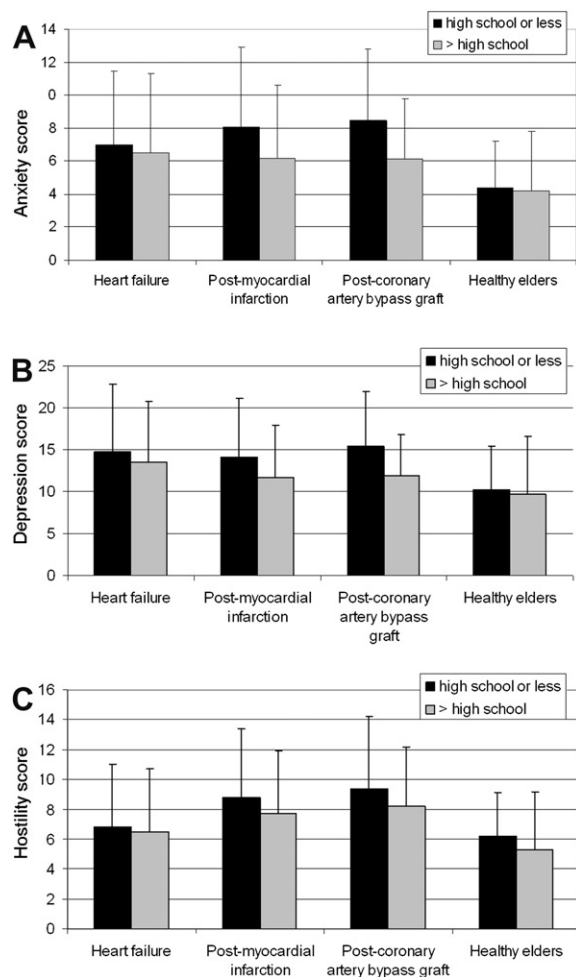


Fig 2 Anxiety (A), depression (B), and hostility (C) levels in each group compared according to level of education. Individuals in each group with only high school or less education reported experiencing significantly higher levels of anxiety ($P = .001$), depression ($P = .001$), and hostility ($P = .006$) than those who had attended at least some college.

Third, emotional distress, and particularly anxiety and depression, can be easily assessed in the clinical setting by nonpsychiatrists, and effective nonpharmacologic and pharmacologic treatments exist.^{19,33,44} Despite the notable failure of some large-scale intervention trials to demonstrate a significant impact on outcomes,⁴⁵ other trials demonstrated that reducing emotional distress with nonpharmacologic interventions can reduce mortality,⁴⁶ particularly in the subset of patients with high distress.⁴⁷ The pharmacologic management of depression and anxiety is effective and safe in the elderly,⁴⁸ when medications appropriate for cardiac patients (eg, selective serotonin reuptake inhibitors) are used judiciously.

Limitations

This study had some potential limitations. We assessed for severity of symptoms in 3 dysphoric states (anxiety, depression, and hostility), but we did not make clinical diagnoses. However, evidence indicates that even symptoms of anxiety and depression are of major importance in predicting poor outcomes in cardiac patients.^{5,18,49}

Some sociodemographic differences were evident between the healthy elderly group and the cardiac-patient groups, and were unavoidable, given the demographics typical of healthy elders. These differences had the potential to affect our findings. There were significantly more women in the healthy elderly group than in any of the cardiac-patient groups, but given the higher levels of anxiety seen in all groups among women, this probably resulted in an overestimation of levels of psychological distress in the healthy elderly group. The end result of this bias would be to decrease the differences between healthy elders and cardiac-patient groups. Thus the differences in psychological distress between healthy elders and cardiac patients are likely even more dramatic than we have shown here.

CONCLUSIONS

The emotional distress seen in elderly cardiac patients is not a function of aging, because healthy elders, even those with hypertension and diabetes, have low levels of anxiety, depression, and hostility. Women and those of lower educational attainment are particularly at risk for psychological distress. Patients with heart failure exhibit the highest levels of depression, whereas heart-failure and postmyocardial infarction patients experience the highest levels of anxiety, and patients after a coronary artery bypass exhibit the highest levels of hostility. These findings add to the burgeoning literature demonstrating the increased prevalence of negative emotions in cardiac patients, dispel the notion that negative emotions in elderly cardiac patients are a function of aging, and call for more aggressive assessment and management of psychological distress.

This project was supported in part by Center Grant 1P20NR010679 from the National Institute of Nursing Research at the National Institutes of Health. The contents of this article are solely the responsibility of the authors, and do not necessarily represent the official views of the National Institute of Nursing Research or the National Institutes of Health. Funding was also provided by a National American Heart Association Established Investigator Award and by Western Division American Heart Association grant NCR 133-09.

REFERENCES

- Jorm AF. Does old age reduce the risk of anxiety and depression? A review of epidemiological studies across the adult life span. *Psychol Med* 2000;30:11-22.
- Miller DK, Malmstrom TK, Joshi S, Andresen EM, Morley JE, Wolinsky FD. Clinically relevant levels of depressive symptoms in community-dwelling middle-aged African Americans. *J Am Geriatr Soc* 2004;52:741-8.
- Barefoot JC, Mortensen EL, Helms MJ, Avlund K, Schroll M. A longitudinal study of gender differences in depressive symptoms from age 50 to 80. *Psychol Aging* 2001;16:342-5.
- Juurlink DN, Herrmann N, Szalai JP, Kopp A, Redelmeier DA. Medical illness and the risk of suicide in the elderly. *Arch Intern Med* 2004;164:1179-84.
- Mallik S, Krumholz HM, Lin ZQ, Kasl SV, Mattera JA, Roumain SA, et al. Patients with depressive symptoms have lower health status benefits after coronary artery bypass surgery. *Circulation* 2005;111:271-7.
- Rumsfeld JS, Havranek E, Masoudi FA, Peterson ED, Jones P, Tooley JF, et al. Depressive symptoms are the strongest predictors of short-term declines in health status in patients with heart failure. *J Am Coll Cardiol* 2003;42:1811-7.
- Rumsfeld JS, Magid DJ, Plomondon ME, Sales AE, Grunwald GK, Every NR, et al. History of depression, angina, and quality of life after acute coronary syndromes. *Am Heart J* 2003;145:493-9.
- Ziegelstein RC, Fauerbach JA, Stevens SS, Romanelli J, Richter DP, Bush DE. Patients with depression are less likely to follow recommendations to reduce cardiac risk during recovery from a myocardial infarction. *Arch Intern Med* 2000;160:1818-23.
- DiMatteo MR, Lepper HS, Croghan TW. Depression is a risk factor for noncompliance with medical treatment: meta-analysis of the effects of anxiety and depression on patient adherence. *Arch Intern Med* 2000;160:2101-7.
- Mayou RA, Gill D, Thompson DR, Day A, Hicks N, Volmink J, et al. Depression and anxiety as predictors of outcome after myocardial infarction. *Psychosom Med* 2000;62:212-9.
- Frasure-Smith N, Lesperance F, Gravel G, Masson A, Juneau M, Talajic M, et al. Depression and health-care costs during the first year following myocardial infarction. *J Psychosom Res* 2000;48:471-8.
- Sullivan M, Simon G, Spertus J, Russo J. Depression-related costs in heart failure care. *Arch Intern Med* 2002;162:1860-6.
- Chaput LA, Adams SH, Simon JA, Blumenthal RS, Vittinghoff E, Lin F, et al. Hostility predicts recurrent events among postmenopausal women with coronary heart disease. *Am J Epidemiol* 2002;156:1092-9.
- Strik JJ, Lousberg R, Cheriex EC, Honig A. One year cumulative incidence of depression following myocardial infarction and impact on cardiac outcome. *J Psychosom Res* 2004;56:59-66.
- Barth J, Schumacher M, Herrmann-Lingen C. Depression as a risk factor for mortality in patients with coronary heart disease: a meta-analysis. *Psychosom Med* 2004;66:802-13.
- Strik JJ, Denollet J, Lousberg R, Honig A. Comparing symptoms of depression and anxiety as predictors of cardiac events and increased health care consumption after myocardial infarction. *J Am Coll Cardiol* 2003;42:1801-7.
- Frasure-Smith N, Lesperance F, Gravel G, Masson A, Juneau M, Bourassa MG. Long-term survival differences among low-anxious, high-anxious and repressive copers enrolled in the Montreal heart attack readjustment trial. *Psychosom Med* 2002;64:571-9.
- Lesperance F, Frasure-Smith N, Talajic M, Bourassa MG. Five-year risk of cardiac mortality in relation to initial severity and one-year changes in depression symptoms after myocardial infarction. *Circulation* 2002;105:1049-53.
- Rozanski A, Blumenthal JA, Davidson KW, Saab PG, Kubzansky L. The epidemiology, pathophysiology, and management of psychosocial risk factors in cardiac practice: the emerging field of behavioral cardiology. *J Am Coll Cardiol* 2005;45:637-51.
- Vaccarino V, Kasl SV, Abramson J, Krumholz HM. Depressive symptoms and risk of functional decline and death in patients with heart failure. *J Am Coll Cardiol* 2001;38:199-205.
- Matthews KA, Gump BB, Harris KF, Haney TL, Barefoot JC. Hostile behaviors predict cardiovascular mortality among men enrolled in the Multiple Risk Factor Intervention Trial. *Circulation* 2004;109:66-70.
- O'Brien JL, Moser DK, Riegel B, Frazier SK, Garvin BJ, Kim KA. Comparison of anxiety assessments between clinicians and patients with acute myocardial infarction in cardiac critical care units. *Am J Crit Care* 2001;10:97-103.
- Ziegelstein RC, Kim SY, Kao D, Fauerbach JA, Thombs BD, McCann U, et al. Can doctors and nurses recognize depression in patients hospitalized with an acute myocardial infarction in the absence of formal screening? *Psychosom Med* 2005;67:393-7.
- Zuckerman M, Lubin B. Manual for the Multiple Affect Adjective Checklist. San Diego, CA: Educational and Industrial Testing Service; 1965.
- Lubin B, Zuckerman M, Woodward L. Bibliography for the Multiple Affect Adjective Check List. San Diego, CA: Educational and Industrial Testing Services; 1985.
- Moser DK, Dracup K. Is anxiety early after myocardial infarction associated with subsequent ischemic and arrhythmic events? *Psychosom Med* 1996;58:395-401.
- Jacobsen BS, Munro BH, Broton DA. Comparison of original and revised scoring systems for the Multiple Affect Adjective Check List. *Nurs Res* 1996;45:57-60.
- Gonzalez MA, Rodriguez Artalejo F, Calero JR. Relationship between socioeconomic status and ischaemic heart disease in cohort and case-control studies: 1960-1993. *Int J Epidemiol* 1998;27:350-8.
- Philbin EF, Dec GW, Jenkins PL, DiSalvo TG. Socioeconomic status as an independent risk factor for hospital readmission for heart failure. *Am J Cardiol* 2001;87:1367-71.
- Marmot MG, Bosma H, Hemingway H, Brunner E, Stansfeld S. Contribution of job control and other risk factors to social variations in coronary heart disease incidence. *Lancet* 1997;350:235-9.
- Moser DK, Dracup K, McKinley S, Yamasaki K, Kim C-J, Riegel B, et al. An international perspective on gender differences in anxiety early after acute myocardial infarction. *Psychosom Med* 2003;65:511-6.
- Gottlieb SS, Khatta M, Friedmann E, Einbinder L, Katzen S, Baker B, et al. The influence of age, gender, and race on the prevalence of depression in heart failure patients. *J Am Coll Cardiol* 2004;43:1542-9.
- Dobbels F, De Geest S, Vanhees L, Schepens K, Fagard R, Vanhaecke J. Depression and the heart: a systematic overview of definition, measurement, consequences and treatment of depression in cardiovascular disease. *Eur J Cardiovasc Nurs* 2002;1:45-55.
- Albert CM, Chae CU, Rexrode KM, Manson JE, Kawachi I. Phobic anxiety and risk of coronary heart disease and sudden cardiac death among women. *Circulation* 2005;111:480-7.
- Gustafsson F, Torp-Pedersen C, Seibaek M, Burchardt H, Kober L. Effect of age on short and long-term mortality in patients admitted to hospital with congestive heart failure. *Eur Heart J* 2004;25:1711-7.
- Faris R, Purcell H, Henein MY, Coats AJ. Clinical depression is common and significantly associated with reduced survival in patients with non-ischaemic heart failure. *Eur J Heart Fail* 2002;4:541-51.
- Junger J, Schellberg D, Muller-Tasch T, Raupp G, Zugck C, Haunstetter A, et al. Depression increasingly predicts mortality in the course of congestive heart failure. *Eur J Heart Fail* 2005;7:261-7.
- Ariyo AA, Haan M, Tangen CM, Rutledge JC, Cushman M, Dobs A, et al. Depressive symptoms and risks of coronary heart disease and mortality in elderly Americans. *Cardiovascular*

- Health Study Collaborative Research Group. *Circulation* 2000;102:1773-9.
39. Schulz R, Beach SR, Ives DG, Martire LM, Ariyo AA, Kop WJ. Association between depression and mortality in older adults: the Cardiovascular Health Study. *Arch Intern Med* 2000;160:1761-8.
 40. Jiang W, Kuchibhatla M, Cuffe MS, Christopher EJ, Alexander JD, Clary GL, et al. Prognostic value of anxiety and depression in patients with chronic heart failure. *Circulation* 2004;110:3452-6.
 41. Martinez-Selles M, Garcia Robles JA, Prieto L, Dominguez Munoz M, Frades E. Heart failure in the elderly: age-related differences in clinical profile and mortality. *Int J Cardiol* 2005;102:55-60.
 42. Rich MW, McSherry F, Williford WO, Yusuf S. Effect of age on mortality, hospitalizations and response to digoxin in patients with heart failure: the DIG Study. *J Am Coll Cardiol* 2001;38:806-13.
 43. Grace SL, Abbey SE, Irvine J, Shnek ZM, Stewart DE. Prospective examination of anxiety persistence and its relationship to cardiac symptoms and recurrent cardiac events. *Psychother Psychosom* 2004;73:344-52.
 44. Konstam V, Moser DK, De Jong MJ. Depression and anxiety in heart failure. *J Card Fail* 2005;11:455-63.
 45. Berkman LF, Blumenthal J, Burg M, Carney RM, Catellier D, Cowan MJ, 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 (ENRICH) Randomized Trial. *JAMA* 2003;289:3106-16.
 46. Denollet J, Brutsaert DL. Reducing emotional distress improves prognosis in coronary heart disease: 9-year mortality in a clinical trial of rehabilitation. *Circulation* 2001;104:2018-23.
 47. Cossette S, Frasare-Smith N, Lesperance F. Clinical implications of a reduction in psychological distress on cardiac prognosis in patients participating in a psychosocial intervention program. *Psychosom Med* 2001;63:257-66.
 48. Cervera-Enguix S, Baca-Baldomero E, Garcia-Calvo C, Prieto-Lopez R. Depression in primary care: effectiveness of venlafaxine extended-release in elderly patients; observational study. *Arch Gerontol Geriatr* 2004;38:271-80.
 49. Bush DE, Ziegelstein RC, Tayback M, Richter D, Stevens S, Zahalsky H, et al. Even minimal symptoms of depression increase mortality risk after acute myocardial infarction. *Am J Cardiol* 2001;88:337-41.

Access to *Heart and Lung: The Journal of Acute and Critical Care Online*
is reserved for individual subscribers!

Full-text access to *Heart & Lung: The Journal of Acute and Critical Care Online* is available for individual subscribers. To activate your individual online subscription, please visit *Heart & Lung: The Journal of Acute and Critical Care Online*, point your browser to <http://www.heartandlung.org>, follow the prompts to **activate your online access**, and follow the instructions. To activate your account, you will need your subscriber account number, which you can find on your mailing label (*note*: the number of digits in your subscriber account number varies from 6 to 10). See the example in which the subscriber account number has been circled:

Sample mailing label

This is your subscription
account number

*****3-DIGIT 055
SJ P1
FEB00 J065 C: 1 (1234567-89) U 05/00 Q: 1
J. H. DOE
531 MAIN ST
CENTER CITY, NY 10001-001

Personal subscriptions to *Heart & Lung: The Journal of Acute and Critical Care Online* are for individual use only and may not be transferred. Use of *Heart & Lung: The Journal of Acute and Critical Care Online* is subject to agreement to the terms and conditions as indicated online.