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# Self-Efficacy and Self-Reported Functional Status in Coronary Heart Disease: A Six-Month Prospective Study

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*Objective:* We examine prospectively the role of specific forms of self-efficacy in the physical and role function for patients with coronary heart disease after controlling for the effects of anxiety and depression. *Methods:* A 6-month prospective cohort study was conducted after cardiac catheterization of 198 HMO members, demonstrating clinically significant coronary disease. Coronary disease severity was assessed through cardiac catheterization; physical function, role function, anxiety, depression, and self-efficacy were assessed through questionnaires. *Results:* The Cardiac Self-Efficacy Scale had two factors (maintain function and control symptoms) with high internal consistency and good convergent and discriminant validity. In multiple regression models, the self-efficacy scales significantly predicted physical function, social function, and family function after controlling for baseline function, baseline anxiety, and other significant correlates. *Conclusions:* Self-efficacy to maintain function and to control symptoms helps predict the physical function and role function, after accounting for coronary disease severity, anxiety, and depression in patients with clinically significant coronary disease. Interventions to improve self-efficacy may have a broader applicability in the heart disease population than previously appreciated. **Key words:** functional status, coronary heart disease, self-efficacy, anxiety.

CABG = coronary artery bypass grafting; PCTA = percutaneous transluminal angioplasty; CAD = coronary artery disease; LVEF = left-ventricular ejection fraction; SE-MF = self-efficacy maintain function; SE-CS = self-efficacy control symptoms; HAM-A = Hamilton Anxiety Scale; SF-36 = Medical Outcomes Study Short Form-36.

## INTRODUCTION

Cardiovascular disease is the most common cause of death, accounting for 46% of all deaths. Less well-known is the fact that cardiovascular disease is the main cause of activity limitation for 11.5% of the population, ranking behind only orthopedic impairments and arthritis (1). It is the leading cause for Social Security disability and hospital bed day use. In 1986, the $65 billion in indirect costs of cardiovascular disease related to lost activity and productivity exceeded direct medical costs (2). Although cardiovascular mortality has declined dramatically since the mid-1960s, neither the prevalence of CAD nor the disability associated with it have declined.

Few studies have been conducted of the determinants of disability in patients with CAD. Two recent studies have shown a weak relation between angiographic measures of CAD severity and functional capacity as measured by the Duke Activity Status Index (3) or by the Medical Outcomes Study SF-36 (4). In the latter study, the relation between the number of occluded coronaries and self-reported physical functional capacity was no stronger than the relation between social class and physical functional capacity in the latter study. When this sample was observed after cardiac catheterization, anxiety and depression at initial assessment were shown to predict physical function, activity interference, and role function in social and family domains up to 1 year later (5).

Another psychosocial factor shown to be important in cardiovascular risk factor reduction (6) and in cardiac rehabilitation (7) is self-efficacy. Self-efficacy has, for example, been shown to predict adherence to exercise regimens (8) and dietary recommendations (9). Efforts to decrease Type A behavior in the Recurrent Coronary Prevention Project produced increases in self-efficacy, as well as improvement in psychosocial outcomes (10). Self-efficacy is defined by Albert Bandura as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances. It is concerned not with the skills one has, but with judgments of what one can do with whatever skills one possesses" (11). Self-efficacy is distinguished from outcome expectancies, which concern the outcome of the act rather than performance of the act itself. It is also distinguished from more global psychological constructs traditionally measured by distress or personality scales. The relation between self-efficacy and anxiety or depression is complex. For example, self-efficacy may predict both those who gain in strength with training and who among those with strength gains also show improved mood (12). Trials to change coronary-relevant behaviors have not compared self-efficacy with anxiety and depression in terms of their relative influence on outcomes.

Self-efficacy in coronary patients has been studied to determine its relevance to behaviors involved in coronary prevention or rehabilitation. In these studies, confidence to change specific targeted behaviors is assessed. The influence of self-efficacy on the general self-reported physical functional capacity of coronary patients has not been studied. We were interested in the role that self-efficacy plays in managing the challenges to functioning posed by coronary disease and its difficult to interpret symptoms. We, therefore, designed a questionnaire to help elucidate the role that self-efficacy plays in the translation of disease into symptoms and disability in the coronary population. The current study sought to test the following hypothesis: Self-efficacy for controlling coronary symptoms and maintaining function will help predict self-reported functional status 6 months later in outpatients with coronary artery disease after accounting for demographic factors, disease severity, and anxiety and depression.

## METHOD

### Patient Sample

Patients were recruited from Group Heath Cooperative of Puget Sound, a consumer-owned Health Maintenance Organization in Western Washington, and an affiliated Health Maintenance Organization in Eastern Washington, Group Health Northwest. Between December 1991 and February 1993, all Group Health Cooperative members aged 45 to 80 years undergoing elective cardiac catheter-

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ization for suspected coronary artery disease were screened for participation in the study. Inclusion criteria were: a) at least 50% occlusion of one major coronary vessel by angiography; b) treadmill stress test within the past year; c) coronary disease was the subject's most disabling disease; and d) the subject was ambulatory at the time of catheterization. Of 409 patients undergoing catheterization, 270 (66%) were eligible and 232 (86%) of those eligible provided consent and completed an extensive psychosocial interview. There were 111 subjects determined to be ineligible: 48 did not have at least 50% occlusion of a main coronary artery, 54 had not had a treadmill stress test in the past year, 5 had another disease more disabling than their CAD, 2 had catheterizations before valve replacement, 1 had an emergent catheterization, and one was not ambulatory. An additional 28 patients refused to participate in the study. Of the 270 eligible nonrefusing patients, some could not be interviewed for the following reasons: 17 could not be reached before catheterization, 13 agreed to be contacted in the hospital but refused to participate after their catheterization, 7 could not be interviewed for logistical reasons (eg, interviewer unavailable), and 1 had his catheterization procedure canceled. Data presented in this study concern the 194 subjects (85% of the original 232) who completed all assessments at baseline and 6 months later. The 38 patients who were lost to follow-up either refused the 6-month interview, refused to return the 6-month questionnaires, or disenrolled from Group Health Cooperative before completion of the 1-year follow-up period. Research procedures were approved by the Human Subjects Committees of the University of Washington, Group Health Cooperative of Puget Sound, and Group Health Northwest.

## Procedures

Potential subjects were contacted by phone before their scheduled cardiac catheterization by the study coordinator who described the study and obtained preliminary consent to meet with them in the hospital. If they consented, they were interviewed by a research nurse in their hospital room after their catheterization. These interviews included assessment of: a) sociodemographic characteristics including age, gender, education, and occupation (used to derive a Hollingshead-Redlich social class score (15)); b) physical functioning (9 items assessing difficulty with basic and intermediate activities of daily living, eg, "During the past month how much difficulty did you have walking one block or climbing one flight of stairs?", from Medical Outcomes Study SF-36 (18)); the physical function scale asks about the ability to perform daily activities ranging from mild to very strenuous exertion and was repeated 6 months later; c) Role Dysfunction in social and family/home domains using Sheehan's Disability Scales (13), which are single-item 11-point Likert scales validated for use in psychopharmacology studies (14) and in studies of chronic medical illness (15). Subjects are asked to rate from 0 to 10, "How much have your heart symptoms disrupted your social life (or family/home responsibilities)?"

Severity of depression and anxiety were measured with the Hamilton Rating Scales for Depression (20) and Anxiety (21). These 24-item and 14-item interviewer-administered scales are a psychiatric standard for the assessment of the current severity of depressive and anxiety symptoms. These interviewer-administered scales can correct for reporting bias that can affect self-report scales (22), allowing for more accurate characterization of psychiatric symptoms.

Standard clinical indices of cardiac disease severity were obtained from patients' cardiac testing records and hospital charts. Measures abstracted from the medical record included: the number of main vessels and branches occluded >70%, maximum percent stenosis in the left main or any of the three main coronary vessels, left ventricular ejection fraction by angiography, duration on treadmill during testing (according to Bruce protocol), amount of ST-segment depression achieved during treadmill testing, history of myocardial infarction, coronary artery bypass grafting, percutaneous transluminal coronary angioplasty, or atherectomy. Most coronary disease severity measures in the literature are validated in terms of their ability to predict mortality. For the current analyses, we use the number of four main coronary vessels stenosed >70% by angiography, because this showed the *strongest* relation to self-reported physical function of any angiographically derived measures in our previous study on this cohort (13). Various measures of coronary disease severity derived from coronary angiography were considered: the number of main coronaries stenosed >70% (or >90%), the presence of left main disease (>70% or >90%), the number of coronaries including branches occluded (>70% or >90%), maximum percent occlusion in a main coronary vessel, and maximum percent stenosis in any coronary vessel including branches. It is customary to treat stenosis of the left main coronary artery separately from that of the other three main coronary vessels, due to its greater effect on mortality. In our study, however, left main stenosis >70% ($N$ = 12) did not have an effect on physical function that was different from stenosis >70% of the other principal coronary arteries (LAD, circumflex, RCA). Stenosed vessels were, therefore, simply summed for statistical analyses. Four groups were formed: 0 vessels ($N$ = 22), 1 vessel ($N$ = 99), 2 vessels ($N$ = 74), 3 or 4 vessels ($N$ = 37).

LVEF derived from catheterization reports and amount of ST-depression derived from Bruce-protocol treadmill stress tests were also examined as disease severity measures, as described in our previous report (13). Only 60 subjects had abnormal LVEF (<50%). Paradoxically, these subjects had slightly *better* self-reported physical function than those with LVEF >50%. There were not enough subjects with LVEF <30% to test this group against the other subjects. Similarly, those subjects with the most (≥ 2 mm.) ST-segment depression (a measure of cardiac ischemia) on treadmill stress testing had *better* self-reported function than those with less ST-depression. This persisted even after correcting for age, sex, and percent target heart rate achieved.

A pharmacy-derived chronic disease score covering the 6 months before baseline was used as a covariate in these analyses to control for the effect of medical comorbidity on physical function (23). In previous studies, this chronic disease score has been shown to correlate highly with estimates by the primary physician of the severity of medical illness and mortality and hospitalizations over the following year.

The Cardiac Self-Efficacy Questionnaire consisted of 16 items. Patients were asked to rate their confidence with knowing or acting on each of the 16 statements on a 5-point Likert scale (0 = not at all confident, 1 = somewhat confident; 2 = moderately confident, 3 = very confident, and 4 = completely confident). Patients could also rate an item as nonapplicable. Three items were rated as nonapplicable by more than 25% of the sample and were omitted from additional analyses: "Lose weight (if you are overweight)"; "Stop smoking (if you do smoke)"; and "Change your diet (if your doctor recommended this)."

## Statistical Analyses

To examine the validity of the self-efficacy scales, we correlated the scales with the other study variables. To control the Type I error rate, only correlations significant at $p < .001$ were interpreted as statistically significant. To longitudinally determine the role of self-efficacy in predicting physical functioning (SF-36) and disability (Sheehan Family/Home and Social Interference scales), we built three multiple regression models. Our goal was to determine whether baseline SE scales would predict functioning and disability at a 6-month follow-up after controlling for baseline functioning and disability, significant demographic and distress scales, Tridimensional Personality Questionnaire (TPQ) personality scales, physical status, and Jenkins Self-Efficacy Scales. We had three outcomes assessed at 6-month follow-up: SF-36 physical functioning scale and the two Sheehan disability scales. In the first step, the baseline physical functioning or disability scale was forced into the equation. In the second step, all the other predictors were allowed to enter the model in a stepwise manner, with the exception of the SE-CS and

SE-MF scales. In the last step, the SE-CS and SE-MF scales were allowed to enter the model if they were statistically significant. At each step, the model was tested for statistical outliers (standardized residuals greater than 3.00), which were removed if necessary. Two outliers were removed from the Sheehan Social and Family/Home analyses. The final models contained baseline assessments and significant predictors.

## RESULTS

### Sample

Sample characteristics are summarized in Table 1. Data presented in this study concern the 198 subjects (85% of the 232 evaluated at baseline) who completed all assessments at baseline and 6 months later. The 34 patients who were lost to follow-up either refused the 6-month interview, refused to return the 6-month questionnaires, or left Group Health Cooperative before completion of the 6-month follow-up period.

### Psychometric Properties of the Cardiac Self-efficacy Questionnaire

The 13 items in the Cardiac Self-efficacy Questionnaire with adequate response rates were subjected to a principal components analysis that yielded two orthogonal factors and explained 66.7% of the item variance. Table 2 presents the item content and their loadings on the factors. The first factor represented the confidence of the patients that they could control their symptoms. This factor accounted for 47.1% of the variance (eigenvalue = 6.13) and had eight items with primary loadings. The second factor represented the patients' confidence that they could maintain functioning. This factor explained 19.5% of the variance (eigenvalue = 2.54) and had five items with primary loadings. Using the results of this analysis, we created two self-efficacy scales by summing the responses to each set of items and dividing by the number of rated items: Controlling Symptoms (SE-CS, eight items) and Maintain Functioning (SE-MF, five items). Items that were rated nonapplicable were not used in the averages. To test the internal consistency reliability of the two scales, we computed Cronbach's $\alpha$ for each scale. The reliabilities were excellent: .90 for SE-CS and .87 for SE-MF. The scales were moderately correlated with each other ($r$ = .38).

**TABLE 1. Sample Characteristics ($N$ = 198)**

| Variable | Frequency | Percent |
|---|---|---|
| Age (yr) | | |
| 45–54 | 45 | 23 |
| 55–64 | 64 | 32 |
| 65–79 | 89 | 45 |
| Mean, 62.6 ± 8.9 | | |
| Gender | | |
| Male | 164 | 83 |
| Female | 34 | 17 |
| Education | | |
| >College | 34 | 17 |
| College | 93 | 47 |
| High school | 49 | 25 |
| <High school | 22 | 11 |
| Social class (Hollingshead-Redlich social position) | | |
| I | 8 | 4 |
| II | 39 | 20 |
| III | 84 | 43 |
| IV | 49 | 25 |
| V | 17 | 8 |
| Ethnicity | | |
| White | 191 | 97 |
| Black | 2 | 1 |
| Asian | 2 | 1 |
| Native American | 3 | 1 |
| Coronary occlusion (>70%) | | |
| 0 vessels | 18 | 10 |
| 1 vessel | 89 | 44 |
| 2 vessels | 63 | 32 |
| 3–4 vessels | 27 | 15 |
| LVEF | | |
| ≤50% | 60 | 30 |
| >50% | 138 | 70 |
| Coronary disease management during follow-up | | |
| Medical management | 140 | 71 |
| CABG | 34 | 17 |
| Angioplasty | 22 | 11 |
| Atherectomy | 2 | 1 |

**TABLE 2. Factor Analysis of the Cardiac Self-Efficacy Questionnaire Items**

| Self Efficacy Questionnaire Items | Item Factor Loadings | |
|---|---|---|
| | Control symptoms | Maintain functioning |
| How confident are you that you know or can: | | |
| Control your chest pain by changing your activity levels | .88 | .19 |
| Control your breathlessness by changing your activity levels | .83 | .10 |
| Control your chest pain by taking your medications | .82 | .26 |
| Control your breathlessness by taking your medications | .82 | .26 |
| When you should call or visit your doctor about your heart disease | .81 | .08 |
| How to make your doctor understand your concerns about your heart | .76 | .16 |
| How to take your cardiac medications | .67 | .04 |
| How much physical activity is good for you | .63 | .28 |
| Maintain your usual social activities | .06 | .92 |
| Maintain your usual activities at home with your family | .21 | .90 |
| Maintain your usual activities at work | .12 | .88 |
| Maintain your sexual relationship with your spouse | .18 | .74 |
| Get regular aerobic exercise (work up a sweat and increase your heart rate) | .21 | .61 |

### Convergent and Discriminant Validity of the Cardiac Self-Efficacy Questionnaire

To examine the validity of the SE-CS and SE-MF scales, we examined correlations of these scales with patient demographics, physical status, physical functioning, disability, distress, personality, and Jenkins Self-Efficacy Scales. We expected weak correlations with demographic items and stronger correlations with distress and disability measures. For example, in previous studies of cardiac patients, the Jenkins Self-Efficacy Scales have been shown to be reliable, valid, and predictive of physical activity (16). See Table 3 for correlations. Due to the number of correlations, only correlations with $p$ values less than .001 will be discussed as significant. The other $p$ values are included for descriptive purposes only. The SE scales were relatively unrelated to

**TABLE 3. Correlations of the Self-Efficacy Scale Scores with Demographics, Personality, Jenkins Self-Efficacy Scales, Physical Status and Functioning, and Sheehan Disability Ratings**

| | Correlations with the Cardiac Self-Efficacy Scales | |
|---|---|---|
| | Control symptoms | Maintain functioning |
| Demographics | | |
| Gender | −.10 | −.14 |
| Age | .04 | −.19** |
| Education | −.03 | .15* |
| Disease status | | |
| Chronic disease score | .01 | −.08 |
| Number of 4 main vessels stenosed | .08 | −.02 |
| Surgical management | −.01 | −.17* |
| Physical functioning | | |
| Baseline MOS | .20** | .40*** |
| 6-mo MOS | .15* | .29*** |
| Sheehan disability scales: | | |
| Baseline interference with social functioning | −.14* | −.22** |
| 6-mo interference with social functioning | −.18** | −.33*** |
| Baseline interference with family relations | −.22** | −.43*** |
| 6-mo interference with family relations | −.27*** | −.32*** |
| Distress | | |
| Hamilton Depression Rating Scale | −.25*** | −.36*** |
| Hamilton Anxiety Rating Scale | −.26*** | −.36*** |
| TPQ personality scales | | |
| Harm-avoidance | −.28*** | −.29*** |
| Reward dependence | .08 | .11 |
| Novelty seeking | .03 | .05 |
| Jenkins self-efficacy scales | | |
| Role | −.24** | −.29*** |
| Work | −.21* | −.30*** |

* $p < .05$; ** $p < .01$; *** $p < .001$.

demographics and physical status. Personality was assessed using the TPQ, a validated measure, which gives scores on harm avoidance, reward dependence, and novelty seeking (17). Both SE scales were significantly related only to the Harm Avoidance subscale of the TPQ (considered similar to the neuroticism subscale of other personality measures) (18). Patients with more self-efficacy had lower harm-avoidance scores. Distress was significantly related to both SE scales. Patients with more self-efficacy were rated as significantly less depressed and anxious cross-sectionally.

The SE-MF scale was significantly related to both baseline and 6-month physical functioning. Patients with more self-efficacy reported better physical functioning. This relationship did not hold for the SE-CS scale. The results for the disability scales were not as straightforward. The SE-CS scale was only significantly related to the 6-month interference with family/home. More self-efficacy was predictive of less disability at 6-month follow-up. For the SE-MF scale, 6-month interference with social activities and both baseline and 6-month follow-up disability with respect to family and home were significant: More disability was associated with less self-efficacy. The SE-MF scale was significantly related to both Jenkin's Self-Efficacy Scales, whereas the SE-CS scale was not. This stronger relation between the Jenkins and SE-MF scale is expected, inasmuch as the Jenkins scales ask about confidence to maintain activities in various domains.

## Regression Results

Table 4 contains the regression results. As hypothesized, the self-efficacy scales significantly predicted all three outcomes after controlling for baseline assessment and other significant predictors.

The model for the 6-month follow-up SF-36 physical functioning scale was significant [$F(3,147) = 23.25, p < .001$, $R^2 = .32$] and contained three predictors: baseline physical functioning, HAM-A, and SE-MF. No other variables approached statistical significance. Patients with better functioning at the 6-month follow-up initially had better functioning, less anxiety, and reported more self-efficacy with respect to maintaining functioning. Baseline SF-36 physical functioning differed between SE-MF groups defined by their reported levels of self-efficacy (none, $N = 15$; somewhat, $N = 27$; moderately, $N = 80$; very, $N = 72$) [$F(3,147) = 9.01, p < .001$] after controlling for baseline HAM-A. Six-month physical functioning was also statistically significant among groups defined by baseline self-efficacy [ $F(3,147) = 3.25$, $p < .02$] after controlling for baseline HAM-A and baseline physical functioning.

The model for the 6-month Sheehan interference in social activities was significant [$F(4,145) = 19.26, p < .001, R^2 = .35$] and contained four predictors: baseline interference, HAM-A, education level, and the SE-MF scale. Patients who reported more interference at the 6-month follow-up reported more baseline interference and anxiety, and less self-efficacy. In addition, they were more likely not to be college educated.

**TABLE 4. Regression Results**

| Outcomes | 6-Month | | | | | |
|---|---|---|---|---|---|---|
| | SF-36 physical functioning | | Interference in social activities | | Interference in family relations | |
| | $\beta$[a] | Wald's [b] | $\beta$ | Wald's $t$ | $\beta$ | Wald's $t$ |
| Baseline assessment of the outcome | .20 | 2.70** | .31 | 4.31*** | .15 | 1.81 |
| Hamilton Anxiety Rating Scale | −.28 | −3.66** | .19 | 2.47** | .34 | 4.21*** |
| Education | | | −.22 | −3.17** | | |
| Maintain functioning self-efficacy | .25 | 3.25** | −.18 | −2.45** | | |
| Control symptoms self-efficacy | | | | | −.16 | −1.99* |

* $p < .05$; ** $p < .01$; *** $p < .001$.
[a] Standardized regression coefficient.
[b] Significance test for the independent contribution of the $\beta$ to the model.

Baseline Sheehan Social Disability scores did not differ between the SE-MF groups (defined as above) after controlling for HAM-A [$F(3,146) = 1.54$]. However, 6-month social disability did differ between the groups [$F(3,146) = 3.15, p < .03$) after controlling for baseline HAM-A and baseline social disability.

The model for the 6-month Sheehan interference in family/home was significant [$F(3,136) = 12.83, p < .001, R^2 = .22$] and contained two significant predictors: HAM-A and the SE-CS scale. The baseline interference scale was not a significant predictor of 6-month family/home functioning. Patients who reported more interference at the 6-month follow-up were more anxious at baseline and reported less self-efficacy in controlling their symptoms. Baseline Family Disability did not differ between the SE-CS groups (somewhat, $N = 30$; moderately, $N = 76$; very, $N = 71$; no subject reported "none" for this form of self-efficacy, so only three categories are presented) when the HAM-A score was used as a covariate [$F(2,137) = 1.60$]. However, 6-month Family Disability did significantly differ between the SE-CS groups [$F(2,137) = 4.58, p < .02$] after controlling for baseline HAM-A and baseline Family Disability.

## DISCUSSION

This study demonstrates that two specific forms of self-efficacy have an enduring effect over 6 months on self-reported physical, social, and family function in patients with coronary heart disease. Furthermore, it demonstrates that this effect is significant even after controlling for distress (anxiety and depression symptoms). The Cardiac Self-Efficacy Scale demonstrated excellent internal consistency for the "maintain function" and "control symptoms" subscales. It also showed good discriminant and convergent validity when associations with dissimilar and similar scales was examined. Previous studies of self-efficacy in heart disease have focused on compliance with risk factor modification or exercise training. This is the first study to examine prospectively the effects of self-efficacy on the general capacity of patients with heart disease to function in their daily lives.

This study suggests a study testing educational or cognitive-behavioral interventions for patients with coronary disease that aim to increase confidence at maintaining activity and controlling symptoms. This study could test whether these interventions have broader application than current programs of risk factor modification and cardiac rehabilitation that are directed to those who have had a myocardial infarction.

We studied a group with angiographically significant coronary disease. This group is at risk, not only for death and myocardial infarction, but for functional decline. The functional decline that is associated with other chronic diseases of aging has been shown to be linked with self-efficacy. Physical self-efficacy has been cross-sectionally correlated with general physical performance in the elderly (19). Older adults with high self-efficacy for health behaviors have less risky health behaviors and better health (20). A trial of cognitive-behavioral treatment for rheumatoid arthritis showed that the magnitude of improvement in the intervention group was correlated with the degree of self-efficacy enhancement (21). Exercise programs for those with chronic diseases may not only improve physical condition, but provide an important boost to self-efficacy concerning exercise that, itself, reduces disability (22). Success at reduction in mortality from heart disease means that strategies for reducing disability from this chronic disease will become more important in the near future. Studies are needed to determine whether self-efficacy is a critical intervening variable in the disablement process.

There are several limitations to the present study. First, additional work is needed to confirm the validity of the Cardiac Self-Efficacy measure used. Factor structure, internal consistency, and discriminant and convergent validity need to be demonstrated on an independent sample. Second, the relationship between self-efficacy to maintain function and self-efficacy to control symptoms remains unclear. We hypothesized that symptom severity mediates the effect of disease on physical function and role function. We, therefore, expected that self-efficacy to maintain function would have a more powerful and direct effect on function than self-efficacy to control symptoms. This expectation was borne out in the cases of physical function and social function, but not family function. It is unclear why self-efficacy to maintain function would be more relevant to physical and social role function, whereas self-efficacy to control symptoms would be more relevant to family role function. Third, although our trial provides prospective evidence of the importance of self-efficacy for self-reported functional capacity, it does not prove its causal importance. An experimental design is necessary to demonstrate a causal role for self-efficacy. A randomized trial of a psycho-educational intervention with the specific goal of increasing confidence in self-management (as has proven effective in arthritis) (23) would provide a stronger causal demonstration and a better estimate of the magnitude of effect.

Concern for public health dictates a need for additional study of modifiable determinants of cardiovascular disability. There has been scant attention to the role of psychosocial factors in cardiovascular disability; most studies of psychosocial factors in heart disease have focused on their mortality effects. But as fewer die and more are living longer with heart disease, we need to learn how to better manage this chronic disease. Successful aging requires adaptation to aversive symptoms of chronic disease and maintenance of positive health habits, if function is to be preserved. We need to understand more precisely the appropriate psychosocial targets in coronary disease and which patients should be considered for augmented psychosocial services. Such information should provide valuable guidance for health care organizations to develop chronic disease management programs.

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We are saddened to announce the deaths of the following APS members within the past year:

Sidney Cobb MD, MPH • John M. Grant MD • James P. Henry MD, PhD • Harold I. Kaplan MD • Zbignew J. Lipowski MD • Isadore C. Sharon MD • Benjamin Spock MD • Timothy C. Toomey, PhD • Bernard Zuger, MD