Gender Differences in Distress and Depression Following Cardiac Surgery

Amy L. Ai,[1,2] **Daniel G. Saunders,**[1] **Christopher Peterson,**[1]
Ruth E. Dunkle,[1] **and Steven F. Bolling**[1]

This study examined the effects of physical health and other psychosocial variables on psychological distress and depression following coronary artery bypass graft surgery (CABG), with a focus on gender differences. Information regarding psychological distress one year following surgery was obtained from a sample of 151 patients (112 males, 39 females), who also provided retrospective information about noncardiac chronic conditions, preoperative socioeconomic variables, postoperative social support, and immediately post-CABG depression. Medical and surgical data and postoperative cardiac conditions were retrieved from computerized medical records. Structural equation modeling with LISREL showed that distress one year following surgery was predicted by the number of noncardiac chronic illnesses, controlling for immediately post-CABG depression. Gender had only an indirect effect on distress; women reported more chronic medical conditions than did men. Analysis also revealed an interaction between gender and income: higher income men and lower income women were most likely to report depression immediately following surgery.

KEY WORDS: gender difference; psychosocial adjustment; depression; coronary heart disease; coronary artery bypass graft surgery.

INTRODUCTION

This study addressed psychosocial adjustment in patients following coronary artery bypass graft surgery (CABG), with a focus on gender-re-

[1]University of Michigan, Ann Arbor, Michigan 48109-1285.
[2]Correspondence should be addressed to Amy L. Ai, University of Michigan, 1065 Frieze Building, Ann Arbor, Michigan 48109-1285.

lated presurgical predictors of outcome. The significance of the study lies in the vast impact of coronary vascular disease (CVD) in the United States, and the prevalence, costs, and trauma of CABG to the patient. CVD is the leading cause of premature death among American elderly men and women and the major reason for expensive hospital bed use and Social Security disability payments. CABG is the most frequently performed and costly operation in the United States. Over 407,000 procedures are performed annually at a cost of over 5 billion dollars (1992 hospital charges for two major surgical procedures for cardiovascular diseases, 1994; American Heart Association, 1994; Politser & Cunico, 1988). The long-term clinical efficacy of CABG has been impressive. However, persistent side effects, psychological and sexual problems, and other disturbances in social functioning may lower the quality of postoperative life to a level below that expected by patients (Folks, Blake, Freeman, & Sokol, 1989; Perski, Odlund, Rehanqvist, & Therorell, 1991; Venn et al., 1987).

Research on post-CABG psychosocial adjustment of women was scant until the 1990s, which limits the generalizability of results to women. Recent evidence shows that women who entered the pool of CABG candidates were more disadvantaged with respect to age, health condition, and economic and social resources (Hawthorne, 1993; Shumaker & Czajkowski, 1992). Female CABG patients tended to be older and to have had smaller distal coronary arteries than did men. They were more likely to have had poor cardiac conditions, diabetes, emergency surgery, and left main coronary artery disease. Operative death, perioperative infarction, lower potency rate, incomplete revascularization, significantly longer intensive-care-unit stay, and delayed symptom relief were also more common among women (Kahn et al., 1990; Penchofer & Holm, 1990; Vaviro, 1991; Weintraub, Wenger, Jones, Craver, & Guyton, 1993). After CABG, women were less physically active than were men (Stanton, Jenkins, Savageau, & Thruer, 1984). With respect to psychosocial adjustment, women scored significantly higher than men on anxiety and depression preoperatively (Sokol, Folks, David, Herrick, & Freeman, 1987). Research has also suggested that women may have worse psychological recovery after cardiac surgeries (Stanton, 1987). They were more likely to have special difficulties related to family structure and social roles and to need more social and emotional support (Hawthorne, 1993). The different sequelae for men and women thus call for innovative approaches to investigate gender differences in adjustment to CABG.

Shumaker and Czajkowski (1993) proposed that such effects may stem from gender differences in the general population. In both population-based and coronary heart disease-related studies, gender has been predictive of psychological disorders, especially depressive symptoms (Alfred & Ensel, 1983; Coulehan, Schulberg, Block, & Janosky, 1990; Culbertson,

1997; Green, Coeland, Dewey, & Sarma, 1992; Holahan, Moos, Holahan, & Brennan, 1995; Perugi, Musetti, Simonini, & Piagentini, 1990; Stanton, 1987). Alfred and Walter (1983), in a large-scale investigation, asserted that depression was socially structured. Later, Akiskal (1985) reviewed the research on a unified model of depressive symptoms in the 1970s to the 1980s. He argued that this illness would be better understood in terms of multiple stressors, mediating the effects of demographic factors, such as gender, social class, and age, and other psychosocial predictors. The emphasis on the social origin of depressive disorders was then replaced by the interplay of biological and psychological factors. In Coulehan et al.'s (1990) clinical research, the "depressive symptoms only" group was characterized by female gender and substantial medical morbidity. Stallones et al. (1990) explored the correlates of depressive symptoms among older U.S. adults. The determinants were identified as female gender, single marital status, poor self-reported assessment of health, illness behavior, and a low number of club/organization memberships. Although Akiskal's (1985) interactive view has found some support, few empirical studies have demonstrated the mediating role of illness between gender and psychological well-being following CABG.

To test these hypotheses, a survey was used to gather information from 151 patients one year following CABG, with a focus on gender differences on psychosocial adjustment. Psychosocial adjustment was operationalized as both psychological distress and depression. A multivariate statistical approach (LISREL 8) was used, because postoperative psychological problems tend to be multifactorial. In a recursive path model, our principal hypothesis was that current psychological distress (one year post-CABG) would be predicted primarily by gender-related presurgical variables, after controlling for the effects of depression immediately after surgery. We expected that women would be doing less well than men postoperatively, possibly because their medical and socioeconomic conditions were worse in the first place. Thus, in this model, the indirect effect of gender was examined simultaneously with possible mediators of gender and distress and/or other contributors to psychological outcome. Specifically, based on previous findings, we expected that poorer health conditions (preoperative general health and postoperative cardiac health) would be positively associated with post-CABG depression, while higher socioeconomic status (more education and income) would be negatively related to post-CABG depression (Green, Coeland, Dewey, & Sarma, 1992; Shumaker & Czajkowski, 1993; Verbrugge, 1989). The positive effect of an important variable, post-CABG social support, on adjustment was also assessed (Holahan, Moos, Holahan, & Brennan, 1995; Kulik & Mahler, 1993).

METHOD

Sample

The sample for this study was enlisted from the cardiac data registry at the University of Michigan Medical Center. Eligible candidates (aged 40 to 80 years) were 196 patients who were admitted for their first CABG only and discharged alive during January 1, 1993, to January 1, 1994, and had returned a 6-month follow-up questionnaire from the Department of Thoracic Surgery regarding their postoperative cardiac condition. For the present study, a second questionnaire was sent to these 196 patients in early 1995. Of these 196 patients, 151 patients (77%) completed the second questionnaire; two other patients had died, and four had moved. The final sample included 112 males (74%) and 39 females (26%). One hundred and forty seven were Caucasians (97%), three were Afro-Americans (2%), and one was Hispanic (1%). The average age at the time of surgery was 64.7 years ($SD = 8.8$). The average education was 13.3 years ($SD = 3.74$).

Procedure

Information was collected from three sources: (1) a computerized database from the Medical Center, which included surgical and medical information during hospitalization and demographic data, such as the patient's age, gender, date of operation, date of death, left ventricular ejection fraction (LVEF), and number of bypassed arteries; (2) the first questionnaire, completed at 6 months post-CABG, which provided cardiac information; and (3) the second questionnaire, sent 1 year after the surgery, which consisted of: (a) pre-CABG surgery background/socioeconomic information, (b) ongoing non-cardiac chronic illnesses (see **Measures**—*Health Conditions*), (c) perceived preoperative and current health, (d) perceived social support within 6 months following CABG surgery, and (e) post-CABG depression (the first month following CABG), and current general psychological distress (one year after surgery). Although a retrospective measure of postoperative depression and social support is not ideal due to possible recall bias, it was desirable to have a baseline estimate of dysphoria immediately following surgery for predicting the current distress.

Measures

Health Conditions

On the 6-month follow-up, cardiac complications were represented by symptoms, including self-ratings of cardiac condition, angina, fatigue, shortness of breath, swelling, congestive heart failure, irregular cardiac rhythm, and stroke. All items were coded as dichotomous variables from yes/no answers, except cardiac condition, which was graded on a 4-level scale of severity. In the second questionnaire, 15 principal medical conditions were assessed for noncardiac chronic illness, including some chronic disorders commonly seen on geriatric units. Patients were also requested to make a 5-level rating of health conditions, both preoperatively and at present. Left ventricular ejection fraction and bypass number were used as indicators of preoperative cardiac condition.

Psychosocial Adjustment

General distress and depression were measured with the Symptom Checklist-90-R (Derogatis, 1977). This instrument was designed to detect symptoms in a broad spectrum of individuals, from apparently "normal" people to various types of medical patients. Test-retest correlation coefficients for the subscales of this measure range from .78 to .90, and internal consistency alpha coefficients from .77 to .90. We used the total SCL-90-R score as a measure of current general distress (Rief & Fichter, 1992). The depression subscale was used additionally in a separated set of question as the postoperative depression index during the month following CABG. The overall measure of general distress was used only once, i.e., at the current month, in order to limit the length of the second questionnaire. Only raw scores were used for analyses.

Social Support

Social support was measured by the Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet, Dahlem, Zimet, & Farley, 1988). The MSPSS is a self-report instrument evaluating subjective assessment of social support. Three sources of support are measured through three subscales (family, friends, and significant others) with a higher score corresponding to higher support.

Finally, an open-ended question invited free comments from patients.

Data Analysis

Effects of gender-related variables were computed through *t*-tests, ANOVAs, and regression analyses. Structural equation modeling was used to compute maximum-likelihood solutions for the principal hypothesis (Jöreskog & Sörbom, 1993). A correlation matrix of input variables was employed to obtain standardized path coefficients (beta coefficients). The total and indirect effects and the *t*-value of each exogenous variable were also calculated. Because the hypothetical model specified the direction of predictive effects, one-tailed probability levels were used to indicate the significance of each path coefficient. The evaluation of model fit used cross fit indices and comparative fit indices, such as the goodness-of-fit index (GFI), the adjusted goodness-of-fit index (AGFI), root-mean-square residual (RMR), normed fit index (NFI), and comparative fit index (CFI), as well as critical N (CN) as recommended (Roykov, Tomer, & Nesselroade, 1991).

RESULTS

Psychosocial Adjustment and the Path Model

The distribution of raw scores of depression in the first month following CABG (DEP1) and general distress 1 year later (DIS) were slightly skewed to the right and flatter than the normal bell-shaped curve. To meet the normality assumption for a LISREL model, log transformed scores were computed. Multiple logistic regressions indicated that there was no significant difference between patients who had returned or not returned the two questionnaires in terms of age, gender, race, and surgical/cardiac conditions (except death rate). A paired *t*-test showed reduced current depression (DEP2: mean = .4352, SD = .373) in comparison to that in the month following CABG (DEP1: mean = .6228, SD = .412) (t = 9.7, p < .00005).

Table I presents the correlation matrix of the major variables in the path model using maximum likelihood estimation generated by the LISREL 8 software (Jöreskog & Sörbom, 1993). As can be seen, women were disadvantaged relative to men. They had more chronic noncardiac conditions, earned a lower income, and reported more depression immediately following surgery. A LISREL model was then computed to investigate the inter-relationships among these major variables. Each path coefficient and its *t*-values, model fit indices, and structural equations of the model can be found in Fig. 1. For each path shown in this model, a parameter is an

Table I. Correlation Matrix among Variables in the Path Model ($n = 151$)

	1.	2.	3.	4.	5.	6.
1. Other illness	1.00					
2. Post-CABG depression	0.46***	1.00				
3. Current distress	0.54***	0.81***	1.00			
4. Gender	0.32***	0.17*	0.15	1.00		
5. Education	0.02	-0.06	-0.06	-0.14	1.00	
6. Income above $35,000	-0.15	0.01	-0.01	-0.37***	0.45***	1.00

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. Gender: male equals 0; female equals 1.

STRUCTURAL EQUATIONS:
DIS= .21OI + .71DEPI
DEP = .48OI + .15IN - .14ED
OI = .32GE (T-VALUES ARE IN PARENTHESES)

GOODNESS OF FIT INDEX
X2 (6) = 4.30 (P = .64)
GFI = .99
AGFI = 0.97
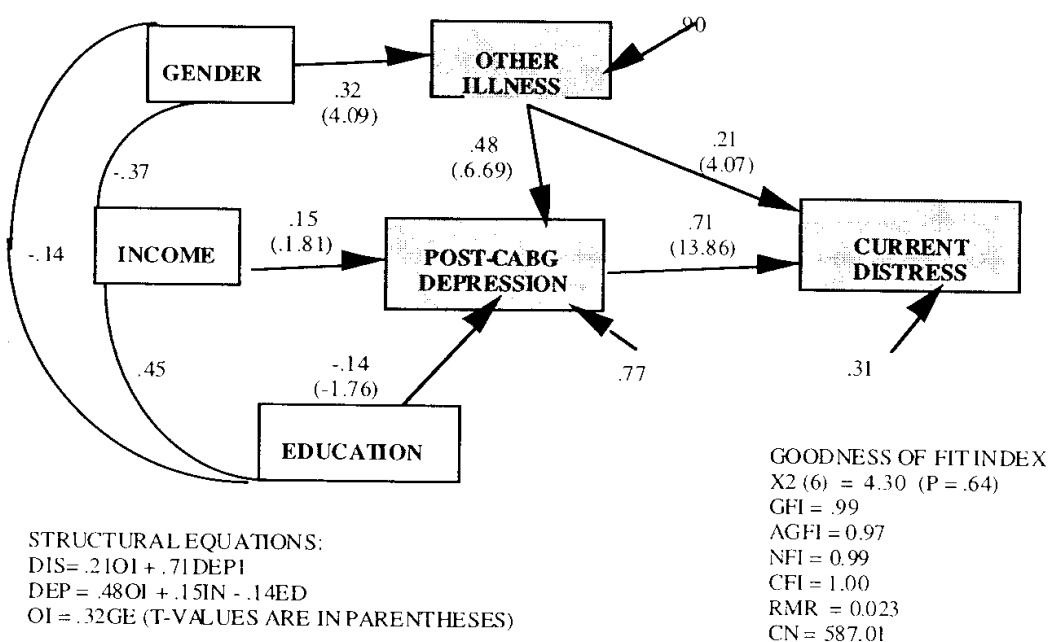NFI = 0.99
CFI = 1.00
RMR = 0.023
CN = 587.01

Fig. 1. The gender-difference path model with presurgical-variables predicting current distress. Note. DEP = post-CABG depression, DIS = current general distress, OI = the number of other chronic illnesses, IN = income, ED = education, and GE = gender. Gender: male equals 0; female equals 1.

endogenous variable if shown in a darker box, and it is an exogenous variable if shown in a lighter box. A straight line with a single headed arrow between boxes represents a direct effect; the associated path coefficient (b) and t-value (one-tailed test) are also shown. A curved line between boxes represents a bivariate association; the correlation (r) is also shown.

A single-headed arrow toward an endogenous variable represents a random disturbance. Equations with path coefficients are displayed in the left-side lower corner of Fig. 1; Model fit indices are in the right-side lower corner of Fig. 1, suggesting a reasonably good fit of this model. The squared multiple correlation for this model showed that 69% of current distress was explained. Only significant paths and important paths in our hypothesis are depicted.

Consistent with our principal hypothesis, current psychological distress (1 year post-CABG) was predicted by a gender-related presurgical variable. As specified by the model, general distress was determined by the number of noncardiac chronic illnesses ($b = .21, t = 4.07$), controlling for the effect of the first-month post-CABG depression ($b = .71, t = 13.86$). As can be noticed, gender was the only predictor of the number of other illnesses ($b = .32, t = 4.09$). Although bivariate analyses showed a link between gender and post-CABG depression (see Table I), the structural equation model (see Fig. 1) did not support a direct effect of gender. Our model suggested that gender's influence on depression was indirect, and mediated through noncardiac conditions. A partial correlation, controlling for education and income, showed that the number of other illnesses alone accounted for 22.5% of variation of post-CABG depression.

None of the other variables examined had direct effects on general distress, including pre-CABG cardiac conditions and symptoms at the 6-months, age, marital status, employment, and post-CABG social support, as well as preoperative self-health rating. As Fig. 1 shows, education and preoperative income had opposite effects on depression immediately following surgery. The direct effect of education on post-CABG depression was negative ($b = -.14, t = -1.76$), whereas the direct effect of income was positive ($b = .15, t = 1.81$). These relationships were not significant in the bivariate model (Table I), because of the suppression effects caused by the correlation between income and education.

Post Hoc Analyses of Gender-Related Socioeconomic Status and Interaction of Gender and Income

Additional analyses of gender and age differences revealed a more complex picture of the relationships among several physical and psychosocial parameters. Descriptive data showed that women outnumbered men on both the total number (female mean $= 4.36$, male mean $= 2.78, t = 4.08. p < .0001$) and frequencies of most chronic illnesses. A series of chi-square tests was performed to determine the effects of these discrete categories (Table II). Women outnumbered men on the total number and the

frequency of almost all non-cardiac chronic illnesses (except sprains or strains, Parkinsonism, and cancer). Significant differences were found for three organic disorders (arthritis, hypertension, and diabetes) and one functional disorder (insomnia) (see Table II). The gender difference for another functional problem, headaches, was not significant. Table II also shows gender differences on the four chronic disorders stratified by age above and below 65 years. For the three organic problems, gender differences showed similar patterns in two age groups (below and above 65), especially for arthritis and diabetes. The nonsignificant differences on hypertension were perhaps due to the effect of smaller sample sizes in stratification.

Further, analyses for age and gender effects on three major socioeconomic variables showed that there were significant age effects on income and full-time employment, and a marginal difference in college education. Not surprisingly, patients aged 65 or above (Medicare recipients) had lower income (below \$35,000), less full-time employment, and less college education. However, the age difference in income were more evident among men than women. Of 57 men below 65 years of age, 64.9% were in the higher income bracket, in comparison with 38.2% of the 55 men over the age of 65. Of 39 women, on the other hand, only 4 (10.3%) reported income above \$35,000, including 3 (17.6%) aged below 65 and 1 (4.5%) aged above 65. A regression analysis indicated that income above \$35,000 was predicted by being male and married, by more education, and by full-time employment. Hence, the age influence on income was apparently accounted for by other predictors. Further chi-square analyses were performed to determine the effects of gender on marital status and full-time employment. Only widow status, but not other marital conditions, was associated with

Table II. Comparison of Gender and Age Differences on Noncardiac Illnesses

Variable	Gender Not Stratified by Age			Gender Stratified by Age	
	Male	Female	χ^2	Age	χ^2
Arthritis	29%	62%	13.47****	<65	4.13*
				>65	8.73***
Insomnia	41%	64%	6.16*	<65	1.18
				>65	5.68*
Hypertension	35%	54%	4.37*	<65	2.18
				>65	2.48
Diabetes	14%	39%	10.18***	<65	5.29*
				>65	6.00*

Note. $n = 151$, $df = 1$, * $p < .05$, ** $p < .01$, *** $p < .005$, **** $p < .001$.

Table III. ANOVA for Interaction of Gender and Income Above $20,000 in
Post-CABG Depression

Source of Variation	Sum of Squares	df	Mean Square	F
Covariate				
Number of other illnesses	4.425	1	4.425	33.744***
Main effects	.250	2	.125	.954
Gender	.158	1	.158	1.207
Income	.063	1	.063	.481
Interaction (2-way)				
Gender by income	.985	1	.985	7.513**

Note. $n = 151$, $*p < .05$, $**p < .01$, $***p***$.

gender. The results indicated that gender strongly predicted widow status ($\chi^2 = 15.81$, $p < .00007$), and this was mainly due to the higher number of widows among women older than 65 ($\chi^2 = 13.96$, $p < .00019$). Of 151 patients, 12.6% fell in the category of widow status; 63.2% of them were widows, and the rest were widowers. Eleven of 12 widows and 6 of 7 widowers were above 65 years of age. A gender difference in full-time employment was also seen ($\chi^2 = 4.91$, $p < .026$).

Finally, an ANOVA was performed to test the interaction effect of gender and income in depression scores with the number of other illnesses as a covariate. An income level above $20,000 was used because there were only 4 women who had income above $35,000. Of 112 men, 88 (78.6%) reported income above $20,000 in comparison with 22 (56.4%) of 39 women. Table III presents the results which shows a significant interaction of gender and income above $20,000. Men who had higher income were more depressed than men who were poor. In contrast, higher depression scores were found among women with less income than women who were wealthier.

DISCUSSION

The present study investigated psychosocial adjustment of post-CABG patients during the year following surgery. In contrast to typical reports of more depressive symptoms among women, the present study did not support a direct effect of gender on post-CABG depression and general distress. Rather, the effect of gender on adjustment was mediated through noncardiac physical conditions. In this sample, women were more likely to

experience postoperative depression and distress due to their overall poor health and other factors. In other words, the sicker the patient preoperatively, due to other chronic illnesses, the more likely that CABG surgery will be followed by depression and distress. To some extent, this investigation has provided an empirical test of Shumaker and Czajkowski's (1993) hypothesis. The study also provides evidence for Akiskal's (1985) model of depression with mediating factors, without denying Alfred and Walter's (1983) social perspective.

The pattern among gender, health problems, and postoperative depression found here lends little support to conventional interpretations of gender differences in psychological symptoms, such as biases in reporting, diagnosis, and help-seeking (Turner & Avison, 1989). The results suggest that the higher level of female depression following surgery is due neither to biological sex nor to sociocultural tolerance for females' complaints. Yet, it may reveal a real vulnerability relative to substantial problems faced by CABG women. Pajer (1995) highlighted the association of psychiatric illness and medical co-morbidity with female depression as well as hormonal changes as a trigger in this course. Previous research has also documented a correlation between self-reported depression and biological markers among female patients (Maes, de Ruyter, & Suy, 1988). Long-standing health issues may alter the body's psychoneuroendocrine and psychobiochemical responses differentially among men and women. These conditions could lead to the observed gender differences in affective disorders resulting from exposure to stressful events and negative social experiences, such as heart surgery.

In this investigation, while socioeconomic factors are related to post-CABG depression, the effects of education and income were in opposite directions. Particularly, the role of income in psychological distress in the LISREL model was not anticipated in our hypothesis. Further analyses found some explanations for the unexpected relationship between income and adjustment. Consistent with most other studies, the majority of this sample was white, male, and married. Thus the opposite effect of education and income on depression may reflect a basic pattern for men. CABG surgery is a critical decision that is likely to induce stress into the patient's daily life. Given the age range of the sample and the traditional male role in society, surgery has potential of posing a challenge to the sense of control in a primarily male group. As shown in patients' open comments, some of them went on disability or left their full-time job right after CABG. Such a step implies multiple losses with respect to economic resources, self-esteem, co-worker friendship, social status, and the ability to provide family support. Additionally, age differences in income were considerably more evident among men than women. This implies that the loss of income above

the age of 65 or after retirement was more severe for male patients. The association of higher income with depression level thus suggests that economic loss was especially likely for the pre-CABG financially better-off, male group. Within this group, the buffering effect of education may only protect the subgroup with a related professional job that was less likely affected by surgery. For those with less education and non-professional jobs, postoperative unemployment seemed more likely to occur. However, this hypothesis needs to be tested by a future study.

The ANOVA analyses did not find a positive association between post-CABG depression and higher income among women. The female group as a whole was older and less healthy, had less college education and full-time employment, and was more likely to be widowed. These problems appeared not to be those of the CABG population per se, but rather to be rooted in problems of the general population (Rice, 1989). In the elderly female population, poverty is disproportionately high, which further limits their resources and choices. Chronic illnesses also cause disability and require more care. Thus, a higher threat from a major cardiac surgery for lower income women was apparent, given their lower economic resources, greater needs for emotional support, and frequent absence of caregiving providers under such a critical circumstance. Although CABG repairs their hearts, the lasting impact on the related issues may not be fixed as easily and may lead to prolonged distress postoperatively. Considering the age group of this sample, it is also likely that the income of women was primarily generated from their husbands' earnings or from investments. The loss of income after the surgery was thus less likely for higher income women than for men. In such a case, the influence of economic loss on depression and distress of these women may be relatively less than that of wealthier men. Alternatively, wealthier women may have more resources for hiring care-providers. Further study is needed to explore this possible interactive effect of gender and income.

Several limitations of the present study should be noticed. First, the retrospective measure of post-CABG depression was not ideal, thus our conclusion is not definite and needs confirmation through a prospective design. Second, the assessment of post-CABG depression in the first month may be affected by recall bias. In particular, patients with a higher level of current scores were likely to score their post-CABG depression at a higher level. Thus the correlation between current distress and the controlled variable, post-CABG depression, is very likely to be elevated. Accordingly, the effect of the other predictor (the number of chronic conditions) may be suppressed to a lower level than the true value in the equation. On the other hand, a high path coefficient between depression scores across time was basically consistent with previous findings of the chronic depres-

sion following cardiac events. Up to 95% of post-MI patients at 6 months and 70% at 1 year remain depressed (Ladwig et al., 1994; Schleifer et al., 1989; Stern, Pascale, & Ackerman, 1977). Third, the sample size was relatively small, especially for women, making multiple group analyses impossible. If the sample had more women to allow an analysis with two parallel LISREL models for men and women separately, perhaps the signs of relationship between income and post-CABG depression would have been in the opposite direction. Finally, the findings of this study should be replicated with other patient populations, especially a sample with more ethnic groups, and should be compared with possible alternative models.

In sum, the present study is generally consistent with previous reports of women's special problems in the CABG population. The results also suggest the fundamental influence of presurgical factors on post-CABG psychosocial adjustment and important gender and age differences. This implies that mood changes following CABG are not entirely attributable to the aftermath of the surgical procedure. The patterns found here show a differential psychosocial outcome of a medical procedure by gender. The interaction of gender and income further highlights the different issues faced by male and female patients, which implies that gender-sensitive intervention strategies are necessary. Finally, these findings underscore the need for examination of psychosocial well-being, especially among female, older, and sicker populations, within a multidisciplinary perspective.

ACKNOWLEDGMENT

REFERENCES

1992 hospital charges for two major surgical procedures for cardiovascular diseases. Part I: Coronary artery bypass grafts. (1994). *Statistical Bulletin/Metropolitan Insurance Companies, 75,* 12-20, 28.

Akiskal, H.S. (1985). Interaction of biologic and psychological factors in the origin of depressive disorders. World Psychiatric Association Regional Symposium: New perspectives in psychiatric research (Helsinki, Finland). *Acta Psychiatrica Scandinavica, 71,* 131-139.

Alfred, D., & Ensel, W.M. (1983). Socially structured depression in men and women. *Research in Community & Mental Health, 3*, 113-139.

American Heart Association (1994). *Heart and stroke facts: 1994 Supplement*, AHA, Dallas, TX.

Coulehan, J.L., Schulberg, H.C., Block, M.R., & Janosky, J.E. (1990). Depressive symptomatology and medical co-morbidity in a primary care clinic. *International Journal of Psychiatry and Medicine, 20*, 335-347.

Culbertson, F.M. (1997). Depression and gender. *The American Psychologist, 52*, 25-31.

Derogatis, L.R. (1977). *SCL-90 administration, scoring & procedure manual-I for the (revised) version*. Baltimore: Johns Hopkins University School of Medicine.

Folks, D. G., Blake, D. J., Freeman, A. M., & Sokol, R. S. (1989). Persistent depression in coronary bypass patients reporting sexual maladjustment. *Psychosomatics, 29*, 387-391.

Green, B.H., Coeland, J.R., Dewey, M.E., & Sarma, V. (1992). Risk factors for depression in elderly people: A prospective study. *Acta Psychiatrica Scendinavica, 86*, 213-217.

Hawthorne, M. H. (1993). Women recovering from coronary artery bypass surgery. *Scholarly Inquiry for Nursing Practice, 7*, 223-244.

Holahan, C.J., Moos, R.H., Holahan, C.K., & Brennan, P.L. (1995). Social support, coping, and depressive symptoms in a late-middle-aged sample of patients reporting cardiac illness. *Health Psychology, 14*, 152-163.

Jöreskog, K., & Sörbom, D. (1993). *LISREL 8: Structural Equation Modeling with the SMIPLIS Command Language*. Chicago: Scientific Software International, Inc.

Kahn, S.S., Nessim, S., Gray, R., Czer, L.S., Chaux. A., & Martloff, J. (1990). Increased mortality of women in coronary artery bypass surgery: Evidence for referral bias. *Annals of Internal Medicine, 112*, 561-567.

Kulik, J. A., & Mahler, H. I. (1993). Emotional support as a moderator of adjustment and compliance after coronary artery bypass surgery: A longitudinal study. *Journal of Behavioral Medicine, 16*, 45-63.

Ladwig, K.H., Roll, G., Breithardt, G., et al. (1994). Post-Infarction depression and incomplete recovery 6 months after acute myocardial infarction. *Lancet, 343*, 20-23.

Maes, M., de Ruyter, M., & Suy, E. (1988). Sex-related differences in the relationships between self-rated depression and biological markers. *Journal of Affective Disorders, 15*, 119-125.

Pajer, K. (1995). New strategies in the treatment of depression in women. 147th Annual Meeting of the American Psychiatric Association: Special challenges and strategies in the treatment of anxiety and mood disorders (1994, Philadelphia, Pennsylvania). *Journal of Clinical Psychiatry, 56, (Suppl.2)*, 30-37.

Penckofer, S.M., & Holm, K. (1990). Women undergoing coronary artery bypass surgery: Physiological and psychosocial perspective. *Cardiovascular Nursing, 26*, 13-18.

Perski, A., Odlund, S.G., Rehanqvist, N., & Therorell, T. (1991). The quality of life one year after by-pass operation. *Abstracts of International Symposium on Quality of Life after Open Heart Surgery* (p. 19). Antwerp, May 1991.

Perugi, G., Musetti, L., Simonini, E., & Piagentini, F. (1990). Gender-mediated clinical features of depressive illness: The importance of temperamental differences. *British Journal of Psychiatry, 157*, 835-841.

Politser, P., & Cunico, E. (1988). *Socio-economic factbook for surgery 1988*. Chicago: American College of Surgeons.

Rice, D.P. (1989). Long-term care for the elderly. In M. Ozawa (Ed.), *Women's live cycle and economic insecurity*. New York: Greenwood.

Rief, W., & Fichter, M. (1992). The Symptom CheckList SCL-90-R and its ability to discriminate between dysthymia, anxiety disorders, and anorexia nervosa. *Psychopathology, 25*, 128-138.

Roykov, R., Tomer, A., & Nesselroade, J.R. (1991). Reporting structural equation modeling results in psychology and aging: Some Proposed guidelines. *Psychology and Aging, 6*, 499-503.

Schleifer, S.J., Macari-Hinson, M.M., Coyle, D.A., et al. (1989). The nature and course of depression following myocardial infarction. *Archive Internal Medicine, 149*, 1785-1789.

Shumaker, S.A., & Czajkowski, S.M. (1993). A review of health-related quality-of-life and psychosocial factors in women with cardiovascular disease. *Annals of Behavioral Medicine, 15,* 149-155.

Sokol, R. S., Folks, D.G., David G., Herrick, R. W., & Freeman, A. M. (1987). Psychiatric outcome in men and women after coronary bypass surgery. *Psychosomatics, 28,* 11-16.

Stallones, L., Marx, M.B., Martin, B., & Garrity, T.F. (1990). Prevalence and correlates of depressive symptoms among older U.S. adults. *American Journal of Preventive Medicine, 6,* 295-303.

Stanton, B.A. (1987). Psychosocial aspects of coronary heart disease in women: Implications and expectations for rehabilitation. In E.D. Eaker, B. Packard, N.K. Wenger, et al (Eds.), *Coronary Heart Disease in Women.* New York: Haymarket Douma Inc.

Stanton, B.A., Jenkins, C.D., Savageau, J.A., & Thruer, R.L. (1984). Functional benefits following coronary artery bypass graft surgery. *The Annals of Thoracic Surgery, 37,* 286-290.

Stern, M.J., Pascale, L., & Ackerman, A. (1977). Life adjustment post-myocardial infarction: determining predictive variables. *Archive Internal Medicine, 137,* 1680-1685.

Turner, R.J., & Avison, W.R. (1989). Gender and depression Assessing exposure and vulnerability to life events in a chronically strained population. *Journal of Nervous and Mental Disease, 177,* 443-455.

Vaviro, F.F. (1991). Women with coronary heart disease. *Cardiovascular Nursing, 27,* 31-35.

Venn, G., Klinger, L., Smith, P., Treasure, T. Newman, S., Harrison, M., & Ell, P. (1987). Neuropsychological sequelae of bypasses twelve months after coronary artery surgery. *British Heart Journal, 57,* 565.

Verbrugge, L.M. (1989). The twain meet: Empirical explanations of sex differences in health and mortality. *Journal of Health and Social behavior, 30,* 282-304.

Weintraub, W.S., Wenger, N.K., Jones, E.L., Craver, J.M., & Guyton, R.A. (1993). Changing clinical characteristics of coronary surgery patients. Differences between men and women. *Circulation, 88,* II79-86.

Zimet, G.D., Dahlem, N.W., Zimet, S.G., & Farley, G.K. (1988). The Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment, 52,* 30-41.