Special Feature

Quality of Life in Women Following Coronary Artery Bypass Graft Surgery

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The purpose of this study was to determine the effect of coronary artery bypass graft (CABG) surgery on the quality of life of women. Wilson and Cleary's conceptual model of health-related quality of life, which examines five major outcomes (biological variables, symptom status, functional status, general health perceptions, perceived quality of life), was used. Participants included 61 women who provided information by self-report questionnaires before and three months after surgery. The major findings of the study are that women had significantly improved quality of life ($p = .004$*) due to increased satisfaction with health and functioning (*$p < .001$*) at three months following CABG surgery. They experienced less angina (*$p < .001$*) and shortness of breath (*$p = .014$*), although fatigue was unrelieved for the majority of women. Psychological well being improved after surgery for most women (*$p < .001$*), with lower anxiety levels (*$p < .001$*), greater levels of well being (*$p = .021$*), feelings of health (*$p < .001$*) and vitality (*$p = .023$*). Women reported less use of emotive coping (*$p = .043$*), indicating less emotional distress. Nevertheless, 25% of the sample continued to experience severe psychological distress three months after surgery, indicating the need for continued follow-up.*

Improvement in quality of life is an expected outcome for persons undergoing CABG surgery. In the United States, more than 32% of CABG surgeries are performed on women (American Heart Association, 2001). A higher rate of morbidity and mortality has been reported for women following CABG surgery than for men. Older age, more comorbidities such as hypertension and diabetes, and smaller coronary arteries have been identified as reasons for the poorer outcomes observed in women after CABG surgery. In addition, late referral for surgery due to gender bias in the diagnosis and treatment of women with heart disease has been reported as another factor contributing to poorer outcomes (Hogue, Sundt, Barzilai, Schecthman, & Davila-Roman, 2001).

Relief of symptoms is expected after CABG surgery, which should improve the quality of life. Relief of angina has been well-documented for both men and women, however, it has been reported that women have less relief of this symptom when compared to men following surgery (Tan et al., 1999). Shortness of breath is often alleviated to a lesser extent for women than men immediately following CABG surgery (Kerestzes, Merritt, Holm, Penckofer, & Patel, 2003). Finally, fatigue has been reported as a symptom that persists for women following surgery (Moore, 1996).

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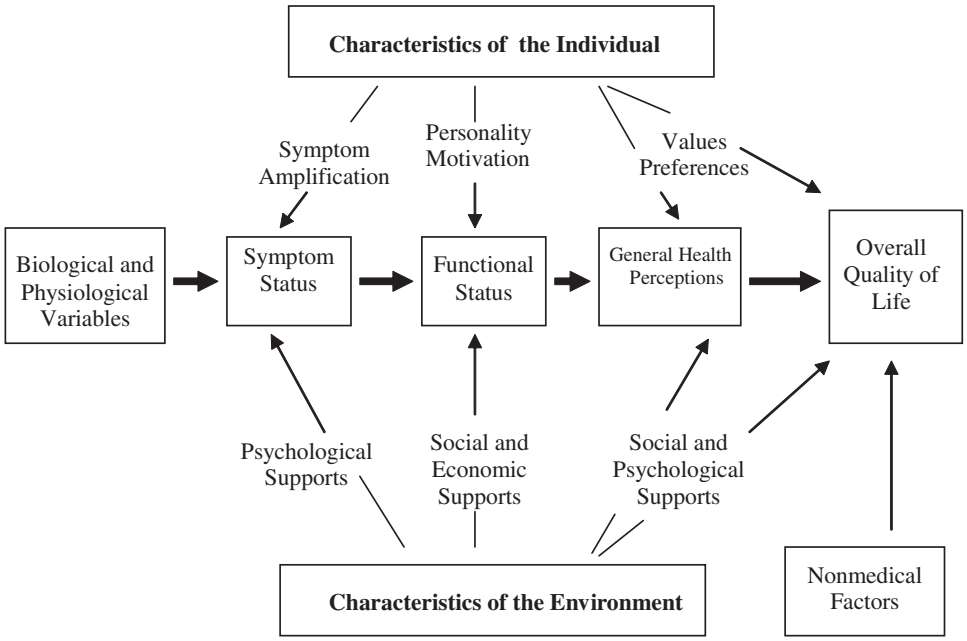

Figure 1. Wilson and Cleary's Model of Health Related Quality of Life
NOTE: From "Linking Clinical Variables With Health Related Quality of Life: A Conceptual Model of Patient Outcomes," by I. Wilson and P. Cleary, 1995, *JAMA*, *273*, p. 62. Copyright 1995 by the American Medical Association. Reprinted with permission.

Better functional status is another expectation for patients following CABG surgery. For women, improvements in functional outcomes have been reported (Cronin, Logsdon, & Miracle, 1997). Participation in exercise soon after CABG surgery has also been reported, however, maintenance of exercise is problematic for women (Moore, Ruland, Pashkow, & Blackburn, 1998). Some studies have shown that improvement in physical functioning and activity may be more difficult for women than men (King, 2001; Moore & Dolansky, 2001). Most recently, Vaccarino et al. (2003) reported that the improvement in physical functioning for women was half that of men following CABG surgery.

Researchers in a number of studies have also assessed the psychological outcomes following CABG surgery (for example, depression and emotional distress), which may affect quality of life and have a negative impact on prognosis after surgery. It has been reported that the improvement in mental health after CABG surgery is less in women than men (Vaccarino et al., 2003). This is significant since research has shown that depressed patients are more than twice as likely to have cardiac events one year following CABG surgery (Connerney, Shapiro, McLaughlin, Bagiella, & Sloan, 2001). And, although Denollet and Brutsaert (2001) reported that participation in cardiac rehabilitation may reduce emotional distress and cardiac mortality, a limitation of this study was that it was comprised entirely of men. More research on the psychological outcomes of women following CABG surgery is needed. All of these factors are important in evaluating outcomes for women. Nevertheless, although previous studies each measured some of the components of quality of life, no one study fully evaluated quality of life in a comprehensive manner. There have been studies on CABG surgical patients in which perceived quality of life, often measured as satisfaction with life, has been integrated with an assessment of symptoms or physical activity. However, few studies have included women, and, if they were included, they were only a small proportion.

The purpose of this study was to compare quality of life in women before and three months following CABG surgery, using a comprehensive model of quality of life outcomes developed by Wilson and Cleary (1995) (Figure 1). Wilson and Cleary's model of health-related quality of life (HRQOL) is composed primarily of five levels of patient outcomes. These levels include: (a) biological and physiological variables (for example, clinical variables such as medical diagnoses, laboratory tests, and physical exams), (b) symptom status (for example, physical, emotional, cognitive symptoms perceived by the patient), (c) functional status (physical, social, role, and psychological function), (d) health perceptions (a subjective rating that incorporates all of the health concepts preceding it), and (e) overall quality of life (subjective well-being assessed by how happy or satisfied someone is with life). Finally, characteristics of the individual (for example, values and patient preferences) as well as the environment (for example, social, economic, and psychological support) are recognized as contributing to general health perceptions and overall quality of life (Ferrans, 2004a; Wilson & Cleary, 1995). For this study, HRQOL was measured using the components of the Wilson and Cleary model (Table 1). The primary aims of the study were to (a) describe the HRQOL in

Table 1
Health-Related Quality of Life Variables

Wilson and Cleary Concepts	Study Variables
Biological & Physiological Variables	Age, Cardiac History, and Number of Bypasses
Symptom Status	Cardiac Symptoms and Psychological Well Being
Functional Status	Physical Activity
Characteristics of the Individual	Coping Style
Characteristics of the Environment	Social Support
General Health Perceptions	Overall Health
Overall Quality of Life	Satisfaction with Life

women having CABG surgery before and three months after surgery, and (b) measure changes in the HRQOL in women over this period of time. The research question was, *What changes in quality of life are there over time after CABG surgery*?

Method

Design

This was a descriptive, prospective study. Women completed questionnaires before and three months after surgery, since this is the time when most CABG surgical patients return to normal activity (Cronin et al., 1997; King, 2000).

Setting

The study was conducted at two Midwestern heart centers in the United States. The same surgical team performed cardiac surgery at both hospitals. Therefore, preoperative and postoperative protocols were the same at each site.

Sample

Criteria for participation included the following: women who were scheduled for CABG surgery and were able to read and write English. Women were excluded if they were scheduled for other cardiovascular procedures such as valve replacements or carotid endarterectomies at the time of surgery.

Of those women who met the criteria ($n = 111$), 69% ($n = 76$) agreed to participate. Reasons for not participating included ill health 29% ($n = 10$), family member refusal 20% ($n = 7$), nervous/anxious 17% ($n = 6$), too busy or not enough time 11% ($n = 5$), other 9% ($n = 3$), don't want to think about surgery 6% ($n = 2$), length of questionnaire 6% ($n = 2$) and depressed prior to surgery 3% ($n = 1$). Two women provided incomplete data. Therefore, 74 women comprised the initial study group. Of these, 82% ($n = 61$) continued to participate at three months following surgery. Of those who were unable to participate postoperatively, the following reasons were noted: patient or family member refusal (7%, $n = 5$), ill health (7%, $n = 5$), death (3%, $n = 2$), and admission for depression (1%; $n = 1$).

Sixty-one women, ranging in age from 39 to 83 years ($M = 65.13$, $SD = 9.94$), participated at both time points. Most of the women were White (92%, $n = 56$), at least high school educated (72%, $n = 44$), not employed (79%, $n = 48$), and either married (67%, $n = 41$) or widowed (25%, $n = 15$).

Strong cardiac risk profiles were evident in women prior to surgery. Eighty-three percent ($n = 49$) had positive family histories for heart disease, 72% ($n = 44$) had hypertension, 26% ($n = 16$) had diabetes, 56% ($n = 34$) had cholesterol levels greater than 220 mg/dl, and 54% ($n = 33$) had a positive history of smoking. Almost all women were postmenopausal (97%, $n = 59$). Overall, the sample had significant heart disease. Twenty percent ($n = 12$) were in intensive care before surgery. Women had histories of heart disease that were variable, ranging from less than one year to as long as 20 years. Almost half (48%, $n = 29$) had a previous myocardial infarction (MI). Nine (15%) of the women had previous heart surgery with eight of these for CABG surgery. The number of diseased vessels (including occluded grafts) prior to surgery ranged from as few as one to as many as seven ($M = 3.53$, $SD = 1.11$), with most women having a triple CABG at the time of surgery ($M = 3.41$, $SD = .84$).

Procedures

The study was approved by the hospital institutional review boards and procedures followed were in accordance with the ethical standards of the institutions. Subjects were identified from a surgical list of patients scheduled for cardiothoracic procedures. All women (CABG surgical patients) were contacted in person or by telephone to determine their willingness to participate. The instruments were placed in a booklet. Informed consent was obtained. Hospitalized subjects completed the booklet before surgery. Nonhospitalized subjects were mailed the booklet before surgery and they returned it in a prepaid envelope or brought it to the hospital on the day before surgery. Health history data were obtained from the chart and/or the patient. A booklet with the same format was mailed three months after surgery. A phone call one to two weeks prior to the postoperative mailing reminded participants that a questionnaire would be coming.

Instruments

Concepts from the Wilson and Cleary (1995) model with corresponding study variables are presented in Table 1.

Symptom Status

For measurement of cardiac symptoms, the presence of each of the following symptoms was assessed by a *yes* or *no* response both preoperatively and postoperatively: (a) heart discomfort defined as pain or pressure in the chest and/or arms and often referred to as angina, (b) shortness of breath, and (c) tiredness or fatigue. These questions are typically used to assess cardiac symptoms when conducting a clinical exam.

The Psychological General Well Being Index (PGWBI) was used to evaluate six intrapersonal states—anxiety, depressed mood, positive well being, self-control, general health, and vitality—and their effect on subjective well-being or distress. There are 22 items, and the total score range for the PGWBI is 0 to 110 (Dupuy, 1984). The following categories for the PGWBI have been generated using United States national reference standards: positive well-being (scores 73 to 110), moderate distress (scores 61 to 72), and severe distress (scores 0 to 60) (McDowell & Newell, 1987). Internal consistency and validity have been established (Dupuy, 1984; Ware, Johnston, Davies-Avery, & Brook, 1979). For this study, Cronbach's alpha reliability of the PGWBI was .94 preoperatively and .97 postoperatively.

Functional Status

Functional status was assessed by specific and general measurements of physical activity. The Specific Activity Scale developed by Goldman and colleagues (Goldman, Hashimoto, Cook, & Loscalzo, 1981) was used to measure the ability to perform 31 specific activities such as personal care, housework, job, and recreational activities without cardiac symptoms (chest pain, fatigue, or shortness of breath). Subjects were then placed in a functional class from I to IV based upon the metabolic equivalents (METS) associated with the highest activity they were able to perform without symptoms. The functional classes were based on the following guidelines: Class I = patient can perform to completion any activity requiring ≥ 7 METS; Class II = patient can perform to completion any activity ≥ 5 METS, but does not or cannot perform to completion activities requiring ≥ 7 METS; Class III = patient can perform to completion any activity ≥ 2 METS but does not or cannot perform to completion any activities requiring ≥ 5 METS; and Class IV = cannot or does not perform any activities requiring ≥ 2 METS. The reliability and validity for this tool has been established (Goldman et al., 1981).

Participation in general physical activity was assessed by three questions. The first question asked subjects about their usual exercise program. They had to select one choice from the following responses: (a) no exercise program; (b) unstructured exercise program (exercise less than three times per week, for example, occasional walks, swimming, or golfing); (c) structured exercise program (exercise three times per week or more, for example, bicycling, jogging, swimming, or aerobics); or (d) participation in a cardiac rehabilitation program. These categories have been used to measure changes in physical activity in CABG patients (Penckofer & Llewellyn, 1989). Finally, subjects were also asked two additional questions regarding physical activity. First, they had to rate their usual level of activity on a Likert scale from 1 (*not active at all*) to 6 (*very active*). Second, they had to compare this usual level of activity to other women their own age again on a Likert scale from 1 (*less active*) to 6 (*more active*). Participants understood the physical activity questions and had no difficulty in selecting responses.

Characteristics of the Individual

The 40-item Jalowiec Coping Scale was used to assess 40 coping behaviors in terms of frequency of dealing with stress and tension. These coping behaviors are grouped into three coping styles: confrontive, emotive, and palliative. Previous research has reported established reliability and validity of this tool (Jalowiec, 1988; Jalowiec, Murphy, & Powers, 1984). For this study, Cronbach's reliability was .81 preoperatively and .86 postoperatively.

Characteristics of the Environment

The Powers and Miller Support Scale measured satisfaction as well as importance of nine areas of life that address social support. Scores are calculated for total social support as well as three domains: emotional, informational, and tangible. The higher the score, the more support perceived by the individual. Internal consistency reliability has been previously reported (Finnis, 1988). For this study, Cronbach's alpha was .89 preoperatively and .95 postoperatively.

General Health Perceptions

This was assessed by a single item asking, "How is your overall health at the present time?" This 10-point Likert scale ranging from 1 (*very poor*) to 10 (*very good*) was administered at both time points. Single item indicators of well-being such as this have been reported to be reliable (test-retest of about .70) and valid (self-rated health levels formed strongest predictors of life satisfaction) (McDowell & Newell, 1987).

Overall Quality of Life

The Ferrans and Powers Quality of Life Index (QLI, Cardiac Version) was used to assess satisfaction with life (Ferrans & Powers, 1985, 1992). The instrument measures satisfaction as well as importance of 37 areas of life that have an impact on quality of life. Satisfaction ratings were weighted by importance ratings to compute scores. Scores were calculated for the QLI overall and four domains: health and functioning, social and economic, psychological/spiritual, and family. For all five scores (possible range: 0 to 30), the higher the score, the better the quality of life. More than 100 published studies have reported using the QLI, and reliability and validity are well-established (Ferrans, 2004b). For this study, Cronbach's alpha reliability of the QLI was .91 preoperatively and .95 postoperatively.

Table 2
Health-Related Quality of Life Characteristics of Study Participants by Time Period

	Before Surgery	After Surgery	p-Value
Cardiac Symptoms (%)			
Angina	72	28	< .001
Shortness of Breath	75	53	.014
Fatigue	95	84	ns
Psychological Well Being (*M*, *SD*)			
Overall Well Being	66.05 ± 17.08	73.52 ± 19.10	< .001
Anxiety	14.14 ± 5.25	16.89 ± 5.04	< .001
Depression	11.13 ± 2.91	11.38 ± 3.28	ns
Well Being	11.46 ± 3.75	12.47 ± 4.06	.021
Control	11.77 ± 2.57	11.91 ± 2.32	ns
General Health	6.89 ± 3.16	8.85 ± 3.07	< .001
Vitality	10.66 ± 4.05	12.03 ± 3.62	.023
Physical Activity (%)			
Specific Activity:			ns
Class I	28	28	
Class II	32	32	
Class III	38	40	
Class IV	2	0	
Usual Exercise:			< .001
None	44	18	
Unstructured	41	33	
Structured	13	15	
Cardiac Rehabilitation	2	34	
Coping Style (*M*, *SD*)			
Total Coping	2.64 ± .40	2.57 ± .43	ns
Confrontive	3.09 ± .70	3.03 ± .70	ns
Emotive	2.20 ± .59	2.06 ± .56	.043
Palliative	2.58 ± .52	2.53 ± .58	ns
Social Support (*M*, *SD*)			
Overall Support	24.79 ± 4.38	22.08 ± 5.85	.001
Emotional	25.28 ± 5.00	22.14 ± 6.87	.002
Informational	25.58 ± 4.74	22.14 ± 6.94	< .001
Tangible	23.48 ± 4.93	22.00 ± 5.70	ns
Overall Health (*M*, *SD*)	4.88 ± 2.56	7.00 ± 2.12	< .001
Satisfaction with Life (*M*, *SD*)			
Overall Quality of Life	21.37 ± 4.34	22.74 ± 4.64	.004
Health and Functioning	18.26 ± 6.16	21.11 ± 5.81	< .001
Social and Economic	23.70 ± 4.14	23.93 ± 4.59	ns
Psychological/Spiritual	23.45 ± 4.55	23.52 ± 5.27	ns
Family	24.63 ± 5.35	25.61 ± 4.79	ns

NOTE: ns = not significant

Data Analysis

Data were analyzed using SPSS statistical software package. Descriptive statistics, chi-square, and analysis of variance (ANOVA) were used to describe and compare differences over time. Multivariate analysis of variance (MANOVA) was used to determine differences over time in multiple subscales. This was then followed by univariate analyses to isolate subscale differences.

Findings

Symptom Status

Cardiac symptoms for both time periods are presented in Table 2. The frequency of angina reported by women decreased significantly from the preoperative to the postoperative period (χ^2 [1] = 22.16, $p < .001$). Similarly, the frequency of shortness of breath decreased significantly following sur-

gery (χ^2 [1] = 6.01, p = .014). Although there was a decrease in the incidence of fatigue after surgery, it was not statistically significant (χ^2 [1] = 3.10, p = .078).

Findings from the PGWBI and the subscales are presented in Table 2. Women reported improved psychological well being at three months after surgery (F [1, 55] = 16.40, p < .001). There was a significant time effect when all subscales were considered simultaneously (F [6, 50] = 6.98, p < .001). Further analyses indicated that women had less anxiety (F [1, 55] = 24.00, p < .001), improved well-being (F [1, 55] = 5.67, p = .021), better health (F [1, 55] = 26.00, p < .001), and more vitality (F [1, 55] = 5.51, p = .023) after surgery. Although scores on depressed mood and control were slightly higher following surgery, indicating less depression and more control, they were not statistically significant. In terms of the well-being categories, there were significant differences (χ^2 [2] = 6.26, p = .043). There was an increase in positive well-being (preoperative = 37%, postoperative = 61%), and a decrease in both moderate (preoperative = 27%, postoperative = 14%) and severe distress (preoperative = 36%, postoperative = 25%).

Functional Status

Physical activity measures are presented in Table 2. There was no difference between time periods in their ability to resume their specific activities (χ^2 [3] = 1.02, p = .796). The distribution of women in each of the MET classes was similar in the preoperative and postoperative period. Most women reported being in Class II (less than 4 METs) for both time periods. This is consistent with the finding that there was no difference between patients' perceived level of usual activity preoperatively (M = 3.80, SD = 1.25) and postoperatively (M = 3.95, SD = 1.12) (t [60] = –1.00, p = .321). However, the type of usual exercise program reported by these subjects was significantly different (χ^2 [3] = 25.53, p < .001). Almost half of subjects (49%) reported participation in some type of structured exercise program or a cardiac rehabilitation program following surgery (Table 2). In addition, their perceived usual level of activity when compared to other women their age was slightly greater after surgery (M = 3.95, SD = 1.21) as compared to before surgery (M = 3.46, SD = 1.44) (t [58] = – 2.55, p = .013).

Characteristics of the Individual

Types of coping styles used at each time period are presented in Table 2. There was no change in total coping over time (F [1, 57] = 2.48, p = .121). There was no significant time effect when all subscales were considered simultaneously (F [3, 55] = 1.63, p = .194). However, univariate analyses demonstrated significantly lower emotive coping scores postoperatively (F [1, 57] = 4.28, p = .043). Therefore, although there was no change in total coping over time, there was less use of emotive coping at three months after surgery.

Characteristics of the Environment

Findings regarding types of social support are presented in Table 2. Patients reported decreased social support following surgery (F [1, 49] = 12.13, p = .001). There was a significant time effect when all subscales were considered simultaneously (F [3, 47] = 4.83, p = .005). Univariate analyses indicated that both emotional (F [1, 49] = 10.23, p = .002) and informational supports (F [1, 49] = 14.04, p < .001) significantly decreased at three months following surgery.

General Health Perceptions

Ratings of health in general increased significantly at three months after surgery compared to before surgery (Table 2) (t [56] = – 5.94, p < .001).

Overall Quality of Life

Findings for the total score and the subscales of the QLI are presented in Table 2. Total quality of life scores improved significantly after surgery (F [1, 56] = 9.12, p = .004). There was also a significant effect for time when all subscales were considered simultaneously (F [4, 52] = 7.19, p < .001). Although the scores increased for all of the subscales after surgery, the change was significant only for the health and functioning subscale (F [1, 55] = 19.01, p < .001). For descriptive purposes, item means were examined to identify aspects of life that were most dissatisfying to women before and after surgery. The lowest item means (indicating greater dissatisfaction) were chest pain, health, amount of energy for everyday activities, and the changes in their life because of a heart problem. After surgery, the aspects of life causing the greatest dissatisfaction, based on item means, were the amount of stress in their lives, the ability to travel on vacations, and amount of energy for everyday activities.

Discussion

This study provided a comprehensive evaluation of quality of life for 61 women who had CABG surgery, guided by Wilson and Cleary's (1995) model for HRQOL. Women in this study reported a significantly improved quality of life 3 months after surgery. This was due to fewer cardiac symptoms, improved psychological well-being, less anxiety and use of emotive coping, increased participation in exercise programs, better perceived general health, and increased satisfaction with life. In addition, women reported the greatest dissatisfaction with health-related aspects before surgery (chest pain, health, amount of energy for everyday activities, and the changes in their life because of a heart problem). Following surgery, however, dissatisfaction was related to aspects of their life that were primarily not health related (the amount of stress, ability to travel, and amount of energy).

Although they experienced a better quality of life, many of the women in this study still continued to experience cardiac

related symptoms. Surgery did result in general improvement in the incidence of angina. However, half of the sample (53%) still continued to experience dyspnea three months after surgery, which was a larger proportion than that reported in other studies (45% and 37% respectively) (Kerestzes et al., 2003; King, 2000). Fatigue was another symptom that persisted after surgery, with 84% continuing to experience it three months after surgery. This percentage was substantially higher than the 25% previously reported for women three months postoperatively (Moore, 1996), yet consistent with another study that reported a rate of 85% at this time point (Kerestzes et al.). The reason for the high prevalence of symptoms after surgery in our study could be attributed to two factors. First, 15% of the subjects had undergone cardiac surgery in the past, increasing their likelihood for a more complicated recovery. Second, almost one third of the women in the study had diabetes, and recent evidence indicates that diabetes is an independent risk factor associated with greater morbidity and mortality following cardiac surgery (Bucerius et al., 2003). The implications are that women should be monitored during the recovery period and encouraged to report their symptoms. They also should be advised that, although symptoms may decrease following surgery, it may not be realistic to expect a complete recovery within three months, particularly if they have a significant preoperative morbidity.

Long term improvements in psychological well-being have been previously reported for CABG patients five years after surgery with the PGWBI (Herlitz et al., 2000). Using the same instrument, most of the women in our study experienced an improvement in psychological well-being in a much shorter period of time. In addition, the women reported significantly less anxiety and use of emotive coping after surgery. Emotive coping methods are used to express emotions caused by a situation and allow for ventilation of feelings (Jalowiec, 1988). The women may have used emotive coping to deal with the stress and uncertainty related to surgery. The fact that women used emotive coping less after surgery indicates a decrease in emotional distress. They also reported receiving less emotional support after surgery, which may be related to the fact that their need for emotional support was decreased.

Not all women experienced improvement in psychological well-being in that 25% continued to score in the severely distressed category after surgery. For these women, psychological follow-up would be indicated. Because reduction in emotional distress has been reported to improve the prognosis in individuals with heart disease (Denollet & Brutsaert, 2001), screening for psychological distress should be considered for routine evaluation before and after surgery.

Regarding activity, homemaking tasks were the primary activities performed by the women before and after surgery. There was no change in the ability to perform these normal activities without symptoms after surgery. This was not surprising, since 84% and 53% of women continued to experience fatigue and dyspnea respectively. However, there was an increase in participation in both structured exercise and cardiac rehabilitation programs 3 months following surgery.

Conclusions

Significant improvements in perceived health in general and overall satisfaction with life were found after surgery. Based on the Wilson and Cleary (1995) model, these changes would be expected since there were improvements in symptoms and functional status that are characterized as directly influencing perceived health and overall quality of life. Also consistent with the model was the finding that the increase in life satisfaction was primarily due to an improvement in health and functioning.

In conclusion, although quality of life improved after CABG surgery for women participating in the study, a substantial proportion of participants continued to express cardiac-related symptoms and psychological distress three months after surgery. For clinicians in hospitals and outpatient settings, awareness regarding the physical as well as psychological effects of CABG on women is essential. An assessment of this information to develop plans of care that are individualized for the woman and her family promises to help improve her recovery, quality of life, and prognosis for the future.

References

American Heart Association. (2001). *2002 Heart and stroke statistical update*. Dallas, TX: American Heart Association.

Bucerius, J., Gummert, J. F., Walther, T., Doll, N., Falk, V., Onnasch, J.F., et al. (2003). Impact of diabetes mellitus on cardiac surgery outcome. *Thoracic & Cardiovascular Surgeon*, *51*(1), 11-16.

Connerney, I., Shapiro, P., McLaughlin, J., Bagiella, E., & Sloan, R. (2001). Relation between depression after coronary artery bypass surgery and 12-month outcome: A prospective study. *Lancet*, *358*, 1766-1771.

Cronin, S., Logsdon, C., & Miracle, V. (1997). Psychosocial and functional outcomes in women after coronary artery bypass surgery. *Critical Care Nurse*, *17*(2), 19-24.

Denollet, J., & Brutsaert, D. (2001). Reducing emotional distress improves prognosis in coronary heart disease: 9 year mortality in a clinical trial of rehabilitation. *Circulation*, *104*, 2018-2023.

Dupuy, H. (1984). The psychological general well-being index. In N. Wenger, M. Mattson, C. Furberg, & J. Elinson (Eds.), *Assessment of quality of life in clinical trials of cardiovascular therapies* (pp. 170-183, 353-356). New York: LeJacq.

Ferrans, C. E. (2004a). Definitions and conceptual models of quality of life. In J. Lipscomb, C. C. Gotay, & C. Snyder (Eds.), *Outcomes assessment in cancer: Measures, methods, and applications* (pp. 14-30). Cambridge, United Kingdom: Cambridge University Press.

Ferrans, C. E. (2004b). *Quality of life index*. Retrieved July 31, 2004, from www.uic.edu/orgs/qli/

Ferrans, C., & Powers, M. (1985). Quality of life index: Development and psychometric properties. *Advances in Nursing Science*, *8*(1), 15-24.

Ferrans, C., & Powers, M. (1992). Psychometric assessment of the quality of life index. *Research in Nursing and Health*, *15*, 29-38.

Finnis, N. (1988). *The elderly patient's use of nonurgent emergency care*. Unpublished master's thesis, University of Illinois, Chicago.

Goldman, L., Hashimoto, B., Cook, E. F., & Loscalzo, A. (1981). Comparative reproducibility and validity of systems for assessing cardiovascular functional class: Advantages of a new specific activity scale. *Circulation*, *64*, 1227-1234.

Herlitz, J., Wiklund, I., Sjoland, H., Karlson, B.W., Karlsson T., Haglid, M., et al. (2000). Impact of age on improvement in health-related quality of life 5 years after coronary artery bypass grafting. *Scandinavian Journal of Rehabilitation Medicine*, *32*, 41-48.

Hogue, C., Sundt, T., Barzilai, B., Schecthman, K., & Davila-Roman, V. (2001). Cardiac and neurologic complications identify risks for mortality for both men and women undergoing coronary artery bypass graft surgery. *Anesthesiology*, *95*, 1074-1078.

Jalowiec, A. (1988). Confirmatory factor analysis of the Jalowiec Coping Scale. In C. F. Waltz & O. L. Strickland (Eds.), *Measurement of nursing outcomes: Vol. 1* (pp. 287-308). New York: Springer.

Jalowiec, A., Murphy, S. P., & Powers, M. (1984). Psychometric assessment of the Jalowiec coping scale. *Nursing Research*, *33*, 157-161.

Kerestzes, P., Merritt, S., Holm, K., Penckofer, S., & Patel, M. (2003). The coronary artery bypass experience: Gender differences. *Heart & Lung*, *32*(5), 308-319.

King, K. (2000). Gender and short-term recovery from cardiac surgery. *Nursing Research*, *49*, 29-36.

King, K. (2001). Emotional and functional outcomes in women with coronary heart disease. *Journal of Cardiovascular Nursing*, *15*, 54-70.

McDowell, I., & Newell, C. (1987). *Measuring health: A guide to rating scales and questionnaires*. New York: Oxford University Press.

Moore, S. (1996). CABG discharge information: Addressing women's recovery. *Clinical Nursing Research*, *5*, 97-104.

Moore, S., & Dolanksy, M. (2001). Randomized trial of a home recovery intervention following coronary artery bypass surgery. *Research in Nursing and Health*, *24*, 93-104.

Moore, S., Ruland, C., Pashkow, F., & Blackburn, G. (1998). Women's patterns of exercise following cardiac rehabilitation. *Nursing Research*, *47*, 318-324.

Penckofer, S., & Llewellyn, J. (1989). Adherence to risk-factor instructions one year following coronary artery bypass surgery. *Journal of Cardiovascular Nursing*, *3*(3), 10-24.

Tan, E.-S., van der Meer, J., de Kam, P. J., Dunselman, P. H. J. M., Mulder, B. J. M., Ascoop, C. A. P. L., et al. (1999). Worse clinical outcome but similar graft patency in women versus men one year after coronary artery bypass graft surgery owing to an excess of exposed risk factors in women. *Journal of the American College of Cardiology*, *34*, 1760-1768.

Vaccarino, V., Lin, Z., Kasl, S., Mattera, J., Roumanis, S., Abramson, J., et al. (2003). Sex differences in health status after coronary artery bypass surgery. *Circulation*, *108*, 2642-2647.

Ware, J., Johnston, S., Davies-Avery, A., & Brook, R. (1979). *Conceptualization and measurement of health for adults in the health insurance study*: *Vol. 3. Mental health*. Santa Monica, CA: Rand Co.

Wilson, I., & Cleary, P. (1995). Linking clinical variables with health-related quality of life: A conceptual model of patient outcomes. *JAMA*, *273*, 59-65.