The Functioning of Patients and Partners after the Coronary Artery Bypass Graft Surgery Process: Examining the Patient's Psychosocial and Physical Adjustment

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DEDICATIONS

This study is dedicated to the millions of patients and their caregivers who have been involved in the coronary artery bypass graft surgery process. The document is also dedicated to the medical and mental health professionals who assist these patients and their caregivers.

Robert A. Palmatier, Sr.

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ABSTRACT

The Functioning of Patients and Partners after the Coronary Artery Bypass Graft Surgery Process: Examining the Patient's Psychosocial and Physical Adjustment

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The coronary artery bypass graft surgery (CABG) process is one of the methods used to assist individuals with serious forms of coronary artery disease. CABG patients may experience difficulty with depression, anxiety, physical functioning, and quality of life problems post-surgery. Research has shown that caregivers/partners have become more responsible for assisting the patient with their quality of life post-surgery and the caregivers have become increasingly vulnerable to psychological distress. Research has also demonstrated that distressed caregivers are associated with decreased post-surgical well-being in patients. Other studies examining the patient and partner's relationship satisfaction have found that greater relationship satisfaction and support before and after surgery are important predictors of the patient's well-being post-surgery. In addition, there have been few studies that provide information concerning what coping skills may serve as potential buffers of patient distress. The aim of this study was to examine the significance of several possible predictors of post-surgical psychological adjustment and quality of life, including the patient's history of cardiovascular disease/coronary

artery disease, history of CABG, number of vessels bypassed, history of angina, and history of myocardial infarction, the patient and partner's ratings of relationship satisfaction before and after surgery, the partner's ratings of depression and anxiety, and the patient and partner's social problem-solving ability. The study consisted of 31 dyads from the Department of Cardiothoracic Surgery at Hahnemann University Hospital. Hierarchical multiple regression analyses were performed and as predicted the patients reporting greater relationship satisfaction after surgery experienced lower depression and greater general quality of life post-surgery. However, the results unexpectedly indicated that patient's reporting greater relationship satisfaction before surgery had an increase in depression and a decrease in general quality of life post-surgery. Also, the results indicated that the patient's physical status, partner's ratings of relationship satisfaction and ratings of depression and anxiety, and the patient and partner's social problem-solving ability did not predict the patient's post-surgical psychosocial and physical adjustment. Results suggest that the patient's post-surgical relationship satisfaction could be an important coping mechanism related to their mood and quality of life. Implications of findings, limitations of the study, and future directions are discussed.

1. INTRODUCTION

1.1. Cardiovascular Disease/Coronary Artery Disease (CVD)/(CAD)

In 2004 and estimated 79,400,000 American adults had cardiovascular disease (CVD). Since 1900 in the United States of America CVD has been the leading cause of death each year, except for 1918 (American Heart Association, 2007). In 2004 CVD was linked to 36.3 percent of all 2,398,000 deaths in the United States. This equates to 1 out of every 2.8 deaths. In addition, CVD has been linked to more deaths then cancer, chronic lower respiratory diseases, accidents, and diabetes mellitus combined. The estimated financial figure (i.e., including direct and indirect costs) of CVD in the United States in 2007 was 431.8 billion dollars (American Heart Association, 2007). To contrast this figure, the estimated direct and indirect costs of cancer (i.e., in 2004) was 190 billion (American Heart Association 2007).

Coronary heart disease (CHD) or coronary artery disease (CAD) comprises more then half of all cardiovascular events in men and women under age 75 and is the single leading cause of death in males and females in the United States. The estimated monetary cost of CHD alone in the United States in 2007 was 151.6 billion dollars (American Heart Association, 2007). Usually, this disease of the arteries is the result the development of atherosclerosis. Atherosclerosis is a process that involves the deposition of plaques (e.g., cholesterol, calcium, cellular waste products) in the inner lining

of the coronary arteries over the course of many years, which results in an obstruction that limits blood flow (Scheidt, 1996).

Previous research has examined the risk factors that produce atherosclerosis and lead to CAD, which involves three primary categories (Bellg, 2004; Roberts, 1996). The first is unchangeable risk factors (i.e., heredity, increasing age, male gender). Approximately, 1 in 500 individuals in the United States develop CAD because of genetics; the other 499 individuals develop atherosclerosis based on their own behavior. There are several risk factors that humans have control over or "changeable risk factors" related to CAD that are highly endorsed by the American Heart Association (e.g., tobacco smoke, high blood cholesterol and other lipids, physical inactivity, being overweight and obesity, and diabetes mellitus).

1.1.1. The Impact of Psychosocial Factors on CAD/CHD

Changeable risk factors (e.g., depression, social isolation, hostility) are the last CAD category (American Heart Association, 2001; Bellg, 2004; Roberts, 1996). In the United States researchers and organizations such as the American Heart Association have been slow to accept the direct link between psychological factors and medical health (e.g., depression as an independent risk factor of CHD/CAD). The National Heart Foundation of Australia has reported that there is an independent association between depression and CHD (Bunker, Colquhoun, Esler, Hickie, Hunt, Jelinek, Oldenberg, Peach, Ruth, Tennat, & Tonkin, 2003). In the United States researchers such as Wulsin &

Singal (2003) have also reported that depression is an independent risk factor for heart disease. Other researchers in the United States and abroad have made less definitive statements, but suggested that psychological factors may be linked to the development of CHD/CAD (Krantz & McCeney, 2002; Shapiro, 1996; Shapiro, Lidagoster, & Glassman, 1997).

1.1.2. CVD with Depression and Anxiety

In the past two decades research has found that patients with CVD (CVD)/(CAD) experience various health-related quality of life problems such as psychological functioning (e.g., depression, anxiety, anger, hostility), cognitive status change (e.g., limited short and long term decreases in cognitive functioning), and physical complications such as the recurrence of angina and myocardial infarction (Allan & Scheidt, 1996; Dew, Kormos, DiMartini, Switzer, Schulberg, Roth, & Griffith, 2001; Dew, Roth, Schulberg, Simmons, Kormos, Trzepacz, & Griffith, 1996; Duits, Boeke, Taams, Passchier, & Erdman, 1997; Junior, Ramadan, Pereira, & Wajngarten, 2000; Langeluddecke, Tennant, Fulcher, Barid, & Hughes, 1989; Shapiro, 1996). In addition, individuals that experience cardiac problems such as a coronary syndrome (e.g., myocardial infraction) or receive medical treatment for heart disorders (e.g., coronary artery bypass graft surgery, heart transplantation) may experience problems related to physical health, employment and financial, social, and sexual functioning (Bennett, 1992; Miller, Garrett, Stoltenberg, McMahon, & Ringel, 1990).

Two of the most common psychological factors examined in the CVD (CVD)/CAD) research have been depression and anxiety (Shapiro, 1996). Considerable attention has been given to depression as a major CAD risk factor. Depression has been reported to be more common in the cardiac population then in the general population (Frasure-Smith, Lesperance, & Talajic, 1995b; Hance, Carney, Freedland, & Skala, 1996). The underlying mechanisms of this risk factor are not understood, but some researchers suggest that it may be related to changes in how the autonomic nervous system regulates the heart. Individuals with depression have demonstrated heightened cardiovascular and neuroendocrine reactivity, reduced heart rate variability and impaired vagal control of the heart rhythm, and possibly problems related to thrombosis or clotting (Bennett & Berkman, 2005). In addition, depressed individuals have demonstrated problematic lifestyle choices such as poorer adherence to medical treatments (e.g., cardiovascular) and an increase in smoking cigarettes (Shapiro et al., 1997). In a study examining almost 3000 adults over the age of 45 with no cardiovascular disease at baseline, the researchers found that symptoms of depression during baseline were associated with up to a 60% increased risk of cardiovascular disease (Anda, Williamson, Jones, Macera, Eaker, Glassman, & Marks, 1993). It should be noted this is considered one of the first methodologically sound studies examining heart disease and depressive symptoms at baseline, and since this investigation other

studies have found similar results (Barefoot & Scholl, 1996; Shapiro et al., 1997).

Depression in individuals with cardiovascular problems has been linked to a decrease in quality of life and increased mortality. In the past two decades numerous studies have shown significant levels of depression after diagnosis of a cardiovascular condition such as the myocardial infarction (MI) event (Allan & Scheidt, 1996; Schwartzman & Glaus, 2000; Shapiro, 1996). In the 1991 Cardiac Arrhythmia Pilot Study the authors reported that depression was a predictor of mortality after MI (Sloan & Bigger, 1991). Several other investigations have found similar results in the past decade (Allan & Scheidt, 1996; Frasure-Smith, Lesperance, & Talajic, 1993; Frasure-Smith, Lesperance, & Talajic, 1995a). Research in this area has not only examined symptoms of depression, but also major depression. A number of studies have reported that major depression has an approximate 20% prevalence rate associated with individuals that have had a MI (Allan & Scheidt, 1996; Shapiro, 1996). In one study major depression was reported to be linked to a fourfold increase in mortality during the first 6 months post acute MI (Frasure-Smith et al., 1993). Another study by the same principle investigator found that in a population of 896 MI patients, those who experienced depression were three times more likely to die in the year post MI then patients who were not depressed (Frasure-Smith, Lesperance, Juneau, Talajic, & Bourassa 1999).

Although, in the CVD (CHD/CAD) literature the examination of anxiety after diagnosis of a heart disease has received less attention then depression, several researchers have addressed anxiety along with depression in their investigations. Problems related to Panic Disorder, Generalized Anxiety Disorder, Agoraphobia and symptoms related to Posttraumatic Stress Disorder are thought to be common after diagnosis of heart disease. Dew and colleagues found Posttraumatic Stress Disorder to be prevalent (i.e., approximately 14%) post-heart transplantation (Dew et al., 1996). In the Normative Aging Study, in a span of 32 years, men who reported two or more phobic related anxiety symptoms had an increased risk of fatal CHD and sudden death (Kawachi, Sparrow, Vokonas, & Weiss, 1994). The underlying physiologic mechanisms are not well understood with anxiety, but research has suggested it may be related to problems with ventricular arrhythmia (Bennett & Berkman, 2005).

1.2. Coronary Artery Bypass Graft Surgery (CABG)

There are various medical and surgical treatments that are involved in treating CAD (e.g., nitrates and beta-blockers for angina, and percutaneous transluminal coronary angioplasty). The coronary artery bypass graft surgery (CABG) process has been used for over 40 years. This surgery has been considered an established and effective medical technique for combating clinical syndromes related to more serious forms of CAD such as medically refractory angina and myocardial infarction (Duits, et al., 1997; Favaloro,

1998; Scheidt, 1996). As discussed in the aforementioned section on CAD, the build-up of plaque can results in blockages in the arteries. In the CABG process surgeons take arteries or veins from other sections of the patient's body (e.g., internal mammary/thoracic artery from the breastbone area, saphenous vein from the leg, veins from the back of the arm, abdominal area, and occasionally from a donor) to make a conduit to bypass the damaged area and provide the heart muscle with more blood (American Heart Association, 2001; Scheidt, 1996). The research has indicated that CABG surgery leads to improvement in symptoms for 80% of patients and decreased morbidity (Duits et al., 1997; Gold, 1996). However, other researchers suggested that despite the medical benefits of the CABG procedure, the recurrence of angina, myocardial infarction, and cardiac death have been estimated as likely within 10 years (Duits et al., 1997; Lip & Metcalfe, 1994).

In 2004 approximately 427,000 CABG procedures were conducted on 249,000 patients in the United States. These figures include both internal mammary artery grafts and saphenous vein grafts (American Heart Association, 2007). The majority of CABG procedures were performed on individuals age 45 and older with twice as many procedures being performed on males then females. The estimated costs of this surgery in 2004 were over 10 billion dollars (Eagle, Guyton, Davidoff, Edwards, Ewy, Gardner, Hart, Herrmann, Hillis, Hutter, Lytle, Marlow, Nugent, & Orszulak, 2004). In a 5-year follow-up study the CABG procedure was more effective than angioplasty

in terms of patient quality of life for the first 3 years (Hlatky, Rogers, Johnstone, Boothrody, Brooks, Pitt, Reeder, Ryan, Smith, Whitlow, Wiens, & Mark, 1997).

1.2.1. CABG and Depression

Investigators have suggested that some of the negative effects of CABG surgery can be linked to physical variables; however other effects remain unexplained (Connerney, Shapiro, McLaughlin, Bagiella, & Sloan, 2001). Depression may be the most studied psychosocial variable in investigations with individuals undergoing the CABG procedure. When examined before or after the surgery process the average prevalence rates of depression have been approximately 20% to 25% (Connerney et al., 2001). Several studies have demonstrated that high levels of depression (i.e., up to 47%) are common before the surgery (Junior et al., 2000; Underwood, Firmin, & Jehu, 1993). In terms of severity, pre-surgery rates of depression have generally been found in the clinical ranges (Langeluddecke, Fulcher, Baird, Hughes, & Tennant, 1989). Post-operative clinically significant levels of depression (i.e., up to 54%) have also been demonstrated (Junior et al., 2000; Lindal, 1990; Strauss, Paulsen, Strenge, Graetz, Regensburger, & Speidel, 1992). Also, high rates of depression have been demonstrated in studies upwards of 1 and 2 years post-surgery. In addition, depression reported before and after the surgery has been shown to effect quality of life after the CABG procedure (Blumenthal, Lett, Babyak, White, Smith, Mark, Jones, Mathew, &

Newman, 2003; Gold, 1996; Vingerhoets, 1998; Magni, Unger, Valfre, Polesel, Cesari, Rizzardo, Paruzzolo, & Galluci, 1987).

Although, many investigations have reported on the high rates of depression during the postoperative phase of the CABG procedure, a few studies have reported decreases in depression within 6 months with one study extending this finding up to 5 years post-surgery (Duits, Duivenvoorden, Boeke, Taams, Mochtar, Krauss, Passchier, & Erdman, 1998; Kiebzak, Pierson, Campbell, & Cook, 2002; Langeluddecke et al., 1989; Lindal, Haroarson, Magnusson, & Alfreosson, 1996). However, studies such as the 1989 investigation by Langeluddecke and colleagues reported that although depression declined, the scores were still higher than those noted in the general population, and 26% and 22% of the studied patients fell in the clinical range at the 6 and 12 month time periods respectively.

1.2.2. CABG and Anxiety

Anxiety is another major psychosocial factor that has been observed pre and post-surgery in several studies. Langeluddecke and colleagues (1989) found high levels of preoperative anxiety scores (i.e., 30% of the sample in the clinical range) for CABG patients. Also, there have been investigations that have found moderate levels anxiety pre-surgery (Edell-Gustafsson & Hetta, 1999; Gallagher & McKinley, 2007; Hartford, Wong, & Zakaria, 2002; Stein, Troudart, Hymowitz, Gotsman, & Kaplan De-Nour, 1990). Post-surgery anxiety has been a problem for CABG patients. In the aforementioned study

almost 40% of the population continued to experience problems with anxiety post-surgery (Edell-Gustafsson & Hetta, 1999). Another study found 25% of all patients still reported high levels of anxiety upwards of 4 months after surgery (Boudrez, Denollet, Amsel, de Backer, Walter, De Beule, & Mohan, 1992). Significant levels of posttraumatic stress disorder symptoms have been found in approximately one-fifth of a patient sample (i.e., however, it should be noted a part of this sample included pure MI patients) post-surgery (Doerfler, Pbert, & DeCosimo, 1994). In the 5-year follow-up study by Lindal and colleagues (1996) the pre-surgery anxiety scores increased during the 3-month and 6-month time periods post-surgery. The anxiety scores sharply decreased at the 1-year time period, however the scores increased to approximate pre-surgery levels at the 5-year time period. Similar to depression, some researchers have found that anxiety decreases post-surgery (e.g., 6-weeks, 6-months and 1-year time periods) with this population (Beckie, 1989; Duits, et al., 1997; Langeluddecke et al., 1989).

1.2.3. CABG and Health-Related and General Quality of Life

Quality of life has been examined with this population using a variety of factors. Vocational or employment status has been considered a major indicator of quality of life after the surgery (Gold, 1996). Impairment in work related activity has been demonstrated in this population (Langeluddecke et al., 1989; Stein et al., 1990). Several studies have shown that high percentages of patients, whether they can physically work or not, are not working (Walter,

1988). Two well-known studies have found high rates (i.e., approximately 50% within 5-years of surgery) of retirement after surgery (Coronary Artery Surgery Study (CASS) principal investigators and their associates, 1984; European Coronary Surgery Study Group, 1982). Impairment has been demonstrated in several other areas of human life before the surgery such as domestic, social, and sexual functioning (Grossi, Zakow, Ribakove, Kallenbach, Ursomanno, Gradek, Baumann, Colvin, & Galloway, 1999; Langeluddecke et al., 1989).

The patient's health-related quality of life has also been a focus of research. Investigations have shown that this type of functioning can be impaired and tends to impact their mood post-surgery (Doering, Moser, Lemankiewicz, Luper, & Khan, 2005; Le Grande, Elliott, Murphy, Worcester, Higgins, Ernest, & Goble, 2006; Mallik, Krumholz, Lin, Kasl, Mattera, Roumains, & Vaccarino, 2005). However, as with aforementioned topics of depression and anxiety, other studies have reported improvements in health-related quality of life post-surgery (Lindquist, Dupuis, Terrin, Hoogwerf, Czajkowski, Herd, Barton, Tracy, Hunninghake, Treat-Jacobson, Shumaker, Zyzanski, Goldenberg, & Knatterud, 2003). Furthermore, studies have found improvements in general quality of life related topics (e.g., daily activities and/or work, social functioning) after CABG surgery (Gold, Charlson, Williams-Russo, Szatrowski, Peterson, Pirraglia, Hartman, Yao, Hollenberg,

Barbut, Hayes, Thomas, Purcell, Mattis, Gorkin, Post, Krieger, & Isom, 1995; Kiebzak et al., 2002).

1.2.4. CABG and Physical Status Variables

A variety of physical status variables have been studied as part of the CABG patient's health-related quality of life. The Society of Thoracic Surgeons has taken into account several physical status variables that measure risk prediction to clarify potential clinical outcomes (McCluskey-Andre, Kleinbart, & Goldberg, 2004; The Society of Thoracic Surgeons, 1994). The main physical status variables include risk factors (e.g., history of CVD, hypertension) and data specific to the CABG diagnosis (e.g., number of vessels with blockages). A common risk factor that has been examined in several behavioral medicine studies is angina. Pre-surgical levels of angina have been found in upwards of 86% of patients, and in 30% of the patients 6-months after surgery (Langeluddecke et al., 1989). Angina is just one example of a physical status variable that research has demonstrated can be found at high levels post-surgery and generally lead to post-surgery complications. However, similar to the topics of depression and anxiety with CABG some other studies have found decreases in physical status variables (e.g., angina) after the surgery (Stein et al., 1990).

1.2.5. Summary of CABG-Related Psychological, Health-Related and General Quality of Life Topics

The majority of research on CABG patients conducted over the past two decades clearly demonstrates that they experience problems related to

psychological factors (e.g., depression and anxiety), health-related and general quality of life factors (e.g., physical functioning, physical status, and employment) before the surgery. However, the research examining these variables after surgery have produced mixed results. Significant deficits or problems have been found in each of the aforementioned areas after surgery with this population. In addition, many researchers (i.e., including those that have demonstrated favorable outcomes post-surgery) have acknowledged and discussed the psychosocial and physical problems that exist post-surgery. In the large review study by Duits and colleagues (1997) they reported that approximately 20% to 25% of patients report psychosocial distress after the surgery. However, this same review does validate investigations that have demonstrated marked improvement in these areas post-surgery compared to baseline measurement. Some authors have suggested that the differences across investigations maybe due to different factors being measured, measurement problems (i.e., there are few sound measures that explore health-related quality of life), different study designs (i.e., cross sectional and longitudinal), different assessment periods within the study design and different sample sizes (Duits et al., 1997; Hartford et al., 2002).

1.2.6. Cardiac Surgery (CABG) and Neurocognitive Functioning

One important factor in conducting any type of research with individuals undergoing cardiac surgery (e.g., CABG procedure) has been the patient's neurocognitive functioning after the surgery procedure. The medical

technology related to the cardiac surgery (i.e., including the anesthesia process) has improved over the past 20 years, however neurocognitive functioning remains an important problem post-surgery (Murkin, Newman, Stump, & Blumenthal, 1995). These cerebral complications can be associated with an increase in hospital time, mortality and healthcare costs (Wheatley, 2003). Neurologic complications after cardiac surgery can take the form of major cerebrovascular events (e.g., stoke, coma) with a rate of 1% to 4% to diffuse cerebral dysfunction (e.g., memory loss, seizures) which occurs in up to 50% to 80% of patients at time of discharge (Dyke, Prager, & Eagle, 2003).

There have been some large research studies that have focused specifically on the CABG population. In a study of 2108 patients the investigators found that 3% suffered stoke and another 3.1% suffering prolonged unconsciousness, seizures, or encephalopathy post-surgery (Roach, Kanchuger, Mangano, Newman, Nussmeier, Wolman, Aggarwal, Marschall, Graham, & Ley, 1996). In another investigation involving 2000 patients they found an overall stroke rate of 2.8% (Tuman, McCarthy, Najafi, & Ivankovich, 1992). In one of the largest studies on the topic (N = 16,528) Stamou and colleagues found a 2% rate of stroke post-surgery (Stamou, Hill, Dangas, Pfister, Boyce, Dullum, Bafi, & Corso, 2001). High levels of decline in cognitive functioning have been reported in other studies at discharge, six weeks, six months and up to five years after surgery (Newman, Kirchner, Phillips-Bute, Gaver, Grocott, Jones, Mark, Reves, & Blumenthal, 2001).

However, researchers have noted that much of the research examining neurocognitive change after surgery has methodological problems (Newman, Stygall, & Kong, 2001).

1.3. Caregivers (Partners)

1.3.1. Introduction

The role of informal health care provider continues to increase each year and have been several factors that contribute to this growth. One of these variables is diseases that have traditionally been associated with the caregiving role are increasing in number (Houts, Nezu, Nezu, & Bucher, 1996). As a prime example, over two million individuals are effected by Alzheimer's disease with approximately three million expected by 2015 and continued increases projected until 2050 (Ory, Yee, Tennstedt, & Schulz, 2000). Another major factor is the health maintenance organizations that exert strong and important influences on the medical system in the United States and have helped to produce conditions that require patients receive more and more assistance from non-traditional sources. These important factors and others have placed more pressure on the medical patient's family members to assume caregiving roles and act as an "integral component of the health care delivery system" (Elliott, Shewchuk, & Richards, 1999, p. 105). Of particular interest and concern have been the primary caregivers that assist individuals with chronic illness/disease. Although, many studies have shown that these individuals tend to be the patient's spouses (Elliott et al., 1999; Stanley &

Frantz, 1988), caregivers can include other individuals (e.g., same sex or common law life partners). An example of this is caregivers of people living with HIV (Human Immunodeficiency Virus) or AIDS (Acquired Immunodeficiency Syndrome), who tend to be young or middle-aged, male, and non-family members (Folkman, Chesney, Cooke, Boccellari, & Collette, 1994; Turner & Catania, 1997). In addition, studies have shown that caregivers can be parents, siblings, adult children, extended relatives-uncle and aunt, friends, and co-workers (Aneshensel, Pearlin, Mullan, Zarit, & Whitlatch, 1995).

Most of the initial caregiver research examined family members that helped individuals with dementias such as Alzheimer's disease (Adkins, 1999; Cummings, Long, Peterson-Hazan, & Harrison, 1998; Rabins, 1998). More studies are being conducted and information is being produced that examine more chronic medical conditions with longer life expectancies such as spinal cord injury (SCI), cerebrovascular accidents (e.g., strokes), HIV, AIDS, and cancer (Dreer, Elliott, Shewchuk, Berry, & Rivera, 2007; Elliott & Shewchuk, 1998; Elliott, Shewchuk, & Richards, 2001; Grant, Elliott, Giger, & Bartolucci, 2001; Houts et al., 1996).

1.3.2. Activities of the Caregiver (Partners)

Caregivers (e.g., partners, family members) of individuals with chronic illnesses are asked to assist with daily tasks that may be a part of their normal routine (e.g., cleaning the home, making a meal), however the formal caregiver

role can include other tasks that are not usually the caretakers responsibility (e.g., dressing and bathing the patient). There are other additional tasks that caregivers have done that are not part of their normal daily activities related to vocational, financial, medical, and psychosocial topics (Grant & Davis, 1997; Land, 1992). In a large longitudinal survey by Aneshensel and colleagues they looked at caregivers of patients with Alzheimer's disease or a related dementia. Patients relied on their caregiver for help with 9 to 10 out of 15 activities of daily living (ADL) ranging from eating to handling money (Aneshensel et al., 1995). The combination of the caregivers' usual daily activities and these non-normative tasks over a long period of time can lead to psychological, social and physical problems for the caregiver (Aneshensel et al., 1995).

1.3.3. Distress in Caregivers (Partners)

The research examining caregivers (e.g., partners, family members) of individuals with different types of medical, psychological and/or social problems has generally found that these people can experience difficulties in areas such as health, psychological/psychiatric, social support and financial problems (Adkins, 1999; Irving, Bor, & Catalan, 1995; LeBlanc, Aneshensel, & Wight, 1995; LeBlanc, London, & Aneshensel 1997; Lego, 1994; Schulz, Visintainer, & Williamson, 1990; Wight, 2000). Psychological and/or psychiatric problems such as increased levels of psychosocial distress (e.g., depression and anxiety) are common in the caregiver population and have been reported in a plethora of studies (Coppel, Burton, Becker, & Fiore, 1985;

Grant, Weaver, Elliott, Bartolucci, & Giger, 2004; Haley, 1997; Haley, West, Wadley, Ford, White, Barrett, Harrell, & Roth, 1995; Rivera, Elliott, Berry, Grant, & Oswald, 2007; Schulz et al., 1990). In addition, many of the studies have suggested that caregivers experience problems with physical health (Burton, Newsom, Schulz, Hirsch, & German, 1997; Cochrane, Goering, & Rogers, 1997; Fuller-Jonap, & Haley, 1995; Jutras & Lavoie, 1995; Ory et al., 2000). Some studies have found that family members can learn to cope with the demands of the caregiving role. In a recent study, Grant and colleagues found that caregivers of stoke survivors discharged from a rehabilitation facility reported positive feelings related to handling ADLs and related topics 2 and 3 months after discharge (Grant, Glandon, Elliott, Giger, & Weaver, 2006).

1.3.4. The Potential Impact of the Caregiving (Partner) Role on the Patient

Researchers have found evidence of the importance of social support in the form of the caregiver (e.g., partners, family members) role being vital for the psychological, social and physical well-being of the patient. More specifically, SCI patients report less depressive behavior and less psychosocial impairment when caregiver support has been a factor (Elliott, Herrick, Witty, Godshall, & Spruell, 1992a; Elliott, Herrick, Witty, Godshall, & Spruell, 1992b). This important form of social support can be greatly effected if the caregivers' general heath has been compromised. This has been demonstrated in the examination of health problems on the part of SCI caregivers, which can

effect the short and long-term well-being of the SCI patient (Elliott et al., 1999; Elliott & Shewchuk, 1998; Elliott & Shewchuk, 2001). Elliott and colleagues have also looked at the cardiac population (i.e., congestive heart failure – CHF). They found that the caregiver's negative problem orientation was associated with CHF patients reporting an increase in depression and a decrease in life satisfaction (Kurylo, Elliott, DeVivo, & Dreer, 2004). Another investigation with cardiac patients found that the coping ability of caregivers of patients was linked to the patient's recovery (Beach, Maloney, Plocica, Sherry, Weaver, Luthringer, & Utz, 1992). Other researchers have found that psychological distress (i.e., depression) displayed by caregivers of individuals suffering a stroke may impact upon the patient's well-being (e.g., increased depression) and rehabilitation progress (Han & Haley, 1999).

1.3.5. Partners of CABG Patients

The limited amount of research looking at caregivers of this population has primarily been conducted on spouses/partners of these patients. In a similar vein as the CABG patients, the research demonstrates that the spouses predominantly experience distress in the form of depression and anxiety. The research has shown that these spouses experience significant pre-surgery levels of depression (Langeluddecke et al., 1989). Also, after the surgery process, the spouses of CABG patients experience increased levels of psychosocial distress (Davies, 2000; Gilliss, 1984). These findings are similar to results in the literature based on spouses and general caregivers of other cardiac populations

such as myocardial infraction and heart transplantation (Canning, Dew, & Davidson, 1996). In addition to psychosocial distress, poorer physical health has been linked to weaker coping styles and greater caregiver (e.g., spousal, partner) burden during the first year after cardiac surgery (Dew, Goycoolea, Stukas, Switzer, Simmons, Roth, & DiMartini, 1998). It should be noted that not all investigations have found these results post-surgery, one study has suggested that depression and anxiety improves significantly during the first year after the CABG procedure (Langeluddecke et al., 1989).

After CABG surgery, the partner's daily activities may increase in terms of helping the patient with various activities such as monitoring the patient's diet, administering the correct medications, and exercise. The immediate changes due to the chronic illness can place great burden on different roles and functions of the partner and other primary caregivers. The partner may not be able to engage in their regular professional or personal activities. If the patient was the main source for the families' income, this can lead to financial strain. In addition, the partner may have trouble attending to their regular family activities such as duties related to being a parent (Stanley & Frantz, 1988). These new responsibilities can effect the daily functioning of the partner's usual activities including finances, social activity, and sexual functioning (Stanley & Frantz, 1988).

In 2006 two investigations were published that reported on how the caregivers' distress can impact the CABG patients' psychological well-being

and health-related quality of life post-surgery (Halm, Treat-Jacobson, Lindquist, & Savik, 2006; Ruiz, Matthews, Scheier, & Schulz, 2006). The caregivers in these studies were "spouses." In the first study the most interesting finding was that spouses with higher activity-related burden scores after the CABG surgery were associated with patients that experienced poorer health status (Halm et al., 2006). However, it should be noted this study did not focus on examining the potential relationship between the caregivers' distress and the patient's psychological well being. In the second study, the most interesting finding was that the spouses' pre-surgery scores of neuroticism predicted higher depressive symptoms for the patients post-surgery. This team mainly focused on dyads in which the patient was a male and the spouses/caregivers was a female. Thus, the effects of gender may have a significant role in this study. Both team of investigators discussed limitations to their studies and suggested more research be conducted to examine these complex relationships.

1.3.6. Relationship Satisfaction with CABG Patients and Partners

In the CABG literature, a few studies have focused on relationship satisfaction between the patient and their partner prior to surgery and how this effects the patient post-surgical recovery. Research has found that higher relationship satisfaction and support ratings before surgery by the patient are an important predictor of positive well-being (e.g., psychological status, general quality of life) for the patient after surgery (Allen, Young, & Xu, 1998;

Elizur & Hirsh, 1999; King, Reis, Porter, & Norsen, 1993). To date the impact of the partner's pre-surgery ratings of relationship satisfaction on the patient's post-surgery well-being has not been examined. As with the pre-surgical research, relationship satisfaction measured post-surgery and how this effects the patient post-surgery recovery has received very little attention. There were two studies that focused more on relationship support verses relationship satisfaction. The first study by King et al. (1993) found that the CABG patient's post-surgery ratings of relationship support were important predictors of their positive well-being (e.g., linked to anxiety and health-related quality of life). The other investigation examined the CABG patient's post-surgery ratings and found that higher levels of emotional support with the spouse were significantly predictive of patients with lower depression and better quality of life (Kulik & Mahler, 1993). The aforementioned study by King et al. (1993) also focused on the impact of the partner's post-surgery ratings of relationship support. They found that the spouse's post-surgery ratings of relationship support were an important predictor of the CABG patient's well-being (i.e., linked to depression, anxiety and health-related quality of life). This examination of the relationship satisfaction literature reveals only a few studies have been conducted using this population and these investigations focused more on relationship support verses satisfaction.

1.4. Interventions

1.4.1. Psychological Interventions with CABG Patients

For a number of years psychological/psychiatric interventions have been used to help patients with cardiovascular disease with a variety of psychosocial problems. The research examining the effectiveness of the interventions has started to be published in the past 20 years (Friedman, Thoresen, Gill, Ulmer, Powell, Price, Brown, Thompson, Rabin, Breall, Bourg, Levy, & Dixon, 1986). Much of this research has focused on patients experiencing MI. Individuals undergoing the CABG procedure have tended to use different interventions to help them cope with the distress they experience based on the surgery. In a study looking at the self-care practices of CABG patients approximately 14% reported using a type of therapeutic interventions (e.g., "talk" therapy, biofeedback, relaxation techniques, self-help group, sex therapist), however approximately 85% decided to use other types of coping resources (e.g., prayer, exercise, lifestyle-diet, megavitamin therapy, massage). The authors found that the other coping resources and to a lesser degree the therapeutic interventions helped decrease depressive symptoms over the course of a year. However, the sample was small and had higher ratings of depression for the therapeutic intervention category. In addition, the authors never discussed the specific types of interventions used in the therapeutic intervention category (Ai, Dunkle, Peterson, Saunders, & Bolling, 1998). There are few studies that have examined the use of psychotropic medications

with the CABG population. In 1982 one of the first articles was published examining the use of the tricyclic antidepressant Imipramine with 12 males who were diagnosed with depression following CABG or MI (Raskind, Veith, Barnes, & Gumbrecht, 1982). The men were treated over the courses of 4 weeks on this medication. The medication produced significant decreases in depression with the small sample. Roose and colleagues examined a selective serotonin reuptake inhibitor (i.e., Paroxetine) and a tricyclic antidepressant (i.e., Nortriptyline) which were shown to decrease depression in ischemic heart disease patients. Approximately, 35% of the patients had been through the CABG procedure (Roose, Laghrissi-Thode, Kennedy, Nelson, Bigger, Pollock, Gaffney, Narayan, Finkel, McCafferty, & Gergel, 1998).

Providing information to the patient concerning their surgery and the process of post-surgery appears to be important (Duits et al., 1997; Mahler & Kulik, 1991). Some of the research looks promising especially for cognitive and/or behavioral oriented treatment approaches (Burell, 1996; Shapiro, 1996). Burell (1996) worked with CABG patients post-surgery and assigned them to routine medical care or one year of behavior group therapy. The behavior group therapy consisted of 17 sessions over the course of 1 year. The therapy incorporated education about CHD, learning to detect health behaviors (e.g., eating, smoking) and coronary-prone behaviors (e.g., Type A behavior, depression, anxiety), learning to change behaviors related to hostility, depression, and anxiety, and relaxation training. The investigator found that 5

to 6 years post-surgery the patients in the therapy group had fewer follow-up cardiac procedures and spent less time in cardiac units. Subject in this group were also less likely to have heart attacks and die (Burell, 1996). Furthermore, other researchers have reported on how a combination of cognitive and/or behavioral oriented treatment approaches maybe beneficial for the patient (Duits et al., 1997).

1.4.2. The Social Problem-Solving Model

1.4.2.1. Overview

The social problem-solving model defines social problem-solving as a theory that has three major components (i.e., problem solving, the problem, and the solution). Problem solving is considered a cognitive-behavioral process in which people attempt to discover solutions to real-life problems (D'Zurilla, Nezu, & Maydeu-Olivares, 2004). Through this model, a problem is defined as a situation in which there is no immediate solution due to the presence of obstacles. A solution is defined as the coping response used by an individual during the problem solving process to attempt to overcome a specific problem (D'Zurilla et al., 2004; Nezu, 2004).

The model that is discussed here is based on the social problem-solving model explained by D'Zurilla and Goldfried (1971), and then further developed by D'Zurilla & Nezu (1982), D'Zurilla & Nezu (2007), and D'Zurilla et al. (2004). The social problem-solving model has five dimensions that together represent the two major but partially independent problem solving

processes: problem orientation and problem solving skills (D'Zurilla & Nezu, 2007). Problem orientation is mainly a motivational process. It has been defined as "a set of orienting responses that consists of the immediate cognitive-affective-behavioral reactions of a person when first confronted with a problematic situation" (Nezu & D'Zurilla, 1989, p. 294). The orienting responses include a person's attentional set as well as a general set of underlying assumptions, appraisals, beliefs, and expectations concerning one's life problems and problem solving ability. That is to say the orienting responses are based on the person's prior developmental and reinforcement history related to solving real-life problems. A person's problem perception, problem attribution, problem appraisal, perceived control, and emotional reactivity are variables that contribute to the person's problem orientation. These cognitive variables may produce positive emotions and approach motivation (i.e., positive orientation), which is likely to assist with constructive problem solving performance, or they may produce negative emotions and avoidance motivation (i.e., negative orientation), which may inhibit problem solving performance through dysfunctional problem solving styles (D'Zurilla & Nezu, 2007).

The social problem solving model has five dimensions. In the model, two dimensions are orientation variables (i.e., positive problem orientation and negative problem orientation) and the other three are problem solving styles (i.e., rational problem solving, impulsivity/carelessness style, and avoidance

style). Positive problem orientation (PPO) is described as a constructive, problem solving cognitive set that involves (a) the problem is appraised as a challenge rather than a threat to one's well-being, (b) the belief that problems are able to be solved, (c) believe in one's personal ability to successfully solve problems, (d) believe that successful problem solving takes time, effort, and persistence, and (e) commit oneself to solving problems with dispatch rather than avoidance (D'Zurilla & Nezu, 2007). The negative problem orientation (NPO) is the dysfunctional or inhibitive cognitive-emotional set that involves the tendency to (a) view one's problem as a significant threat to well-being, (b) doubt one's ability to successfully solve problems, and (c) become frustrated and upset when confronted with problems (D'Zurilla & Nezu, 2007).

Rational problem solving (RPS) is a constructive problem solving style that is defined as the rational, deliberate, systematic, and skillful application of effective problem solving techniques. In the social problem solving model, this style includes a set of four specific skills that enable a person to solve a particular problem effectively: problem definition and formulation; generation of alternative solutions; decision-making; and solution implementation and verification (D'Zurilla & Nezu, 2007).

Impulsivity/carelessness style (ICS) is a dysfunctional problem solving pattern characterized by active attempts to apply problem solving skills. However, these attempts are narrow, impulsive, careless, hurried, and incomplete (D'Zurilla & Nezu, 2007). Finally, the avoidance style (AS) is a

dysfunctional problem solving dimension characterized by procrastination, passivity, and dependency (D'Zurilla & Nezu, 2007).

Several studies have examined the five components within the social problem-solving model. Cormier, Otani, and Cormier (1986) provided support for the problem-solving orientation components. Furthermore, in several studies examining samples of college students or medical patients, a negative problem-solving orientation compared to a positive orientation has been associated with more psychological problems (e.g., depression), medical problems (e.g., general health complaints), and social problems (D'Zurilla & Nezu, 2007; Elliott, Godshall, Herrick, Witty, & Spruell, 1991; Elliott, Schewchuk, Hagglund, Rybarczyk, & Harkins, 1996; Elliott, Sherwin, Harkins, & Marmarosh, 1995). The social problem-solving style components have been examined in numerous studies. The efficacy of training using problem definition and formulation, generation of alternative solutions, and decision-making have been supported by different investigations (D'Zurilla & Nezu, 1980; D'Zurilla & Nezu, 2007; Nezu & D'Zurilla, 1981a; Nezu & D'Zurilla, 1981b; Nezu & Ronan, 1987). There is less empirical data to support the solutions-implementation and verification component. However, D'Zurilla and Nezu (1999) have made strong arguments concerning the importance of this component based on its relation to self-monitoring and self-evaluation in behavioral assessment.

In the social problem solving model, PPO and RPS represent constructive dimensions, whereas NPO, ICS, and AS are viewed as dysfunctional dimensions. As such, PPO and RPS would be expected to be negatively correlated with psychological distress, whereas the NPO, ICS, and AS would be expected to be positively associated with distress. Thus, important to the overall goal of problem solving therapy is to foster improvements in the constructive dimensions and decreases in the dysfunctional dimensions (D'Zurilla & Nezu, 2007).

1.4.2.2. Medical Patient Research with the Social Problem-Solving Model

The benefits of problem-solving therapy/training (PST), which was developed based on the social problem-solving model have been demonstrated with several different populations (e.g., depression, mental retardation, chronic psychiatric problems, substance-related abuse) in numerous studies (Arean, Perri, Nezu, Schein, Christopher, & Joseph, 1993; Hansen, St. Lawrence, & Christoff, 1985; Nezu, 1986d; Nezu, D'Zurilla, Zwick, & Nezu, 2004; Nezu, Nezu, & Arean, 1991; Nezu & Perri, 1989; Platt, Husband, Hermalin, Cater, & Metzger, 1993).

Nezu, Nezu and colleagues have discussed the importance of PST with cancer patients (Nezu, Nezu, Friedman, Faddis, & Houts, 1998). In addition, they have conducted several studies with this population. Individuals diagnosed with cancer who report having ineffective problem-solving skills reported having greater depression and anxiety symptoms compared to those

patients with effective problems-solving skills (Nezu, Nezu, Faddis, DelliCarpini, & Houts, 1995). Similar results were found in two studies examining PST with cancer patients (Nezu, Nezu, Friedman, Houts, DelliCarpini, Nemeth, & Faddis, 1999; Nezu, Nezu, Houts, Friedman, & Faddis, 1999). In a study of women with breast carcinoma, those subjects who had effective problem-solving skills were able to reduce their cancer-related stress compared to women with poor problem-solving skills (Allen, Shah, Nezu, Nezu, Ciambrone, Hogan, & Mor, 2002). In a recent investigation (i.e., Project Genesis) with 132 adult cancer patients the overall findings demonstrate that PST was an effective intervention for decreasing distress and improving quality of life in this population (Nezu, Nezu, Felgoise, McClure, & Houts, 2003).

Perri and colleagues have conducted a series of studies focusing on weight-related problems. In two studies these researchers demonstrated the effectiveness of problem-solving used in weight maintenance groups in which the training was taught by therapists (Perri, McAdoo, McAllister, Lauer, Jordan, Yancey, & Nezu, 1987; Perri, McAllister, Gange, Jordan, McAdoo, & Nezu, 1988). In a recent study these authors found that women diagnosed with obesity and involved in a PST program demonstrated significantly greater long-term maintenance of lost weight compared to women in a standard behavioral treatment program (Perri, Nezu, McKelvey, Shermer, Renjilian, & Viegener, 2001).

Elliott and colleagues have applied the social problem-solving model in several studies of persons with SCI. These researchers have shown that effective problem-solving appraisal on the part of the SCI patients was significantly predictive of less depressive behavior, less psychosocial impairment, more assertive behaviors and better health related decision making than ineffective problem-solvers (Dreer, Elliott, & Tucker, 2004; Elliott et al., 1991). In contrast to effective problem-solvers, Elliott et al. (1999) found that a negative problem-solving orientation was associated with patients wanting more information on vocational topics. In addition, poor social problem-solving skills and an impulsive/careless problem-solving style were linked to less acceptance of their disability at time of discharge from the rehabilitation hospital. Herrick, Elliott, and Crow (1994) found that SCI patients that had ineffective problem-solving skills (i.e., approach-avoidance) experienced more secondary complications (e.g., pressure sores). PST has also been used in other medical settings (e.g., HIV/AIDS) with successful outcomes (D'Zurilla & Nezu, 1999; Elliott, Grant, & Miller, 2004).

1.4.2.3. Caregiver/Partner Research with the Social Problem-Solving Model

The social problem-solving model has been examined with caregivers of individuals with medical conditions such as dementia, cancer, SCI, and stroke (Nezu, Palmatier, & Nezu, 2004). The problem-solving model was used in a caregiver education program called the Prepared Family Caregiver Course developed by Houts and colleagues. In the program 78% of the caregivers of

cancer patients reported experiencing improvement with feelings of burden and stress (Houts et al., 1996).

In the field of dementia, problem-solving was shown to be effective in reducing caregiver distress in areas such as caregiver burden and psychiatric symptoms (Whitlatch, Zarit, & von Eye, 1991; Zarit, Anthony & Boutselis, 1987). Also, social problem-solving was effective in decreasing depression and increasing morale in caregivers of individual's Alzheimer's disease and other dementias (Lovett & Gallagher, 1988).

Studies have been conducted using social problem-solving as an intervention for depression and health problems with caregivers of stroke patients (Grant et al., 2001). In two studies Grant and colleagues have shown that a telephone approach incorporating social problem-solving was effective in providing more positive problem-solving skills, more caregiver preparedness, reduction in depression during the intervention; and also improve vitality, social functioning, and role limitations related to emotional problems (Grant, 1999; Grant, Elliott, Weaver, Bartolucci, & Giger, 2002).

Elliott and colleagues have examined social problem-solving with caregivers of individuals with SCI in a few studies. A negative problem-solving orientation among SCI caregivers has been associated with more depression, anxiety, and health complaints (Elliott et al., 2001; Rivera, Elliott, Berry, Shewchuk, Oswald, & Grant, 2006). An important finding from this research team was that the SCI caregiver's problem-solving style was

associated with psychological and physical well-being of the patient (Elliott et al., 1999). Specifically, the study found that impulsive and careless problem-solving styles on the caregivers part was associated with lower acceptance of disability and more pressure/bed sores among the patients. Elliott and colleagues are continuing to develop intervention projects (i.e., Project FOCUS) based on the social problem-solving model to assist caregivers and the patients with SCI (Kurylo, Elliott, & Shewchuk, 2001). This team recently reported on the first group of caregivers to enter this project. The investigators were able to work with 60 caregivers of SCI patients and get them to provide information that lead to a broad list of problems commonly faced by these caregivers. The caregivers discussed problems in terms of their problems versus the patient's problems, activity-related demands of the relationship versus emotional demands of the relationship, and time constraints versus emotional burdens (Shewchuk, Rivera, Elliott, & Adams, 2004).

1.5. Summary

As discussed above CHD/CAD is the leading cause of death in males and females in the United States. The research shows that the CABG process has been one of the most effective techniques for treating CHD/CAD. Many studies have demonstrated a link between individuals with CHD/CAD and increased psychological problems (e.g., depression and anxiety). Research on the CABG population has found that these patients can have significant problems with depression, anxiety, and experience problems with their health-

related and overall quality of life after the surgery. However, the literature examining these psychological and quality of life topics after the surgery is inconclusive.

Patients who have a history of CVD/CAD, CABG, angina or MI and require more vessels to be bypassed have been associated with post-surgery complications. The physical status variables above have been established as risk factors for the coronary artery bypass graft surgery process as determined by The Society of Thoracic Surgeons and several previous investigations. Although, investigations have reported these patients can exhibit a significant decrease in their health-related quality of life (e.g., angina, MI), other studies have shown that patients improve in these areas of health-related quality of life post-surgery. One of the objectives of this study was to examine the relationship between these physical status variables and the patient's general health-related quality of life after surgery.

The literature shows that caregivers of individuals with medical disorders are playing larger roles in patient's care. Research has shown that caregivers, such as the CABG patient's partner, report increased levels of distress (e.g., depressions and anxiety). There are a few investigations that have found the caregiver's physical and mental health can impact the patient's psychosocial functioning. In 2006 two investigations were published demonstrating that psychosocial distress in caregivers is associated with decreased post-surgical well being (e.g., increased depression, poorer health

status) in CABG patients. The research looking at how these dyads influence each other is just starting to be published and both investigation teams suggested more studies need to be done to better understand the process and effects of these CABG related relationships. One of the objectives of this study was to examine the partner's influence by looking at the relationship between the partner's self reported ratings of depression and anxiety and the patient's self reported ratings of depression and anxiety, health-related quality of life, and general quality of life.

The few studies that have examined the CABG patient and partner's relationship satisfaction have found that greater relationship satisfaction and support before and after surgery are important predictors of the patient's well-being post-surgery. However, much of the research has focused more on relationship support verses satisfaction. The current investigation attempted to obtain a better understanding of the CABG dyad's thoughts about their relationship satisfaction surrounding the surgery and the effects of these ratings on the patient's post-surgical well-being. The study examined the relationship between the patient and partner's ratings of relationship satisfaction before and after surgery and the patient's self reported ratings of depression and anxiety, health-related quality of life, and general quality of life.

There are few studies that have provided information concerning what coping skills may serve as potential buffers of the CABG patient's distress. Many of these studies have focused on skills such as providing information via

educational groups. Researchers with this population have just started to examine therapeutic interventions such as behavior modification and/or cognitive therapy, which have been shown to be effective with patients. Social problem-solving has been shown to be an effective coping skill set for patients and caregivers across a range of chronic medical illness groups (e.g., SCI, stroke, cancer). The current investigation attempted to obtain a better understanding of the dyad's problem solving abilities and the effects of these abilities on the patient's post-surgical well-being. To this end the study examined the relationship between the patient and partner's social problem-solving ability and the patient's self reported ratings of depression and anxiety, health-related quality of life, and general quality of life.

1.6. Study Objectives

The current study had three objectives. The first objective of the study examined whether the CABG patient's physical status variables would predict their post-surgical health-related quality of life. The second objective of the study examined whether the CABG patient's ratings of relationship satisfaction would predict their post-surgical psychosocial and physical adjustment. Also, this objective examined whether the partner's ratings of relationship satisfaction and psychological functioning would predict the patient's post-surgical psychosocial and physical adjustment. The third and final objective of the study focused on examining whether the CABG patient's social problem-solving ability would predict their post-surgical psychosocial and physical

adjustment. Also, the objective examined whether the partner's social problem-solving ability would predict the patient's post-surgical psychosocial and physical adjustment.

1.7. Hypotheses

The following three hypotheses were examined based on the literature of CABG patients, caregivers/partners, and social problem-solving.

(1) Patient's Physical Status Variables as Predictors of Health-Related Quality of Life:

The first hypothesis was based on the existing literature on physical status variables (IV's) and the patient's health-related quality of life (DV).

(1a.) The patient's history of cardiovascular disease/coronary artery disease, history of coronary artery bypass graft surgery, patient's number of vessels that were bypassed, history of angina, and history of myocardial infarction were hypothesized to be significant predictors of the patient's health-related quality of life (PCS - Physical Component Summary). This relationship will be examined in the regression analysis after accounting for two demographic variables (gender and age) that are likely, based on the literature, to serve as predictors of the dependent variable. As an example of this hypothesis, patients with previous physical status problems (e.g., history of angina) will report poorer health-related quality of life (i.e., lower PCS scores).

(2) Patient and Partner's Ratings of Relationship Satisfaction Before and After Surgery, and Partner's Self Reported Ratings of Depression and Anxiety as Predictors of the Patient's Self Reported Ratings of Depression and Anxiety, and Health-Related and General Quality of Life:

There were four parts to the second hypothesis based on the existing literature on the patient and partner's relationship satisfaction before and after surgery and the partner's self reported ratings of depression and anxiety (IV's), and the patient's self reported ratings of depression and anxiety, and health-related and general quality of life (DV's).

(2a.) Patient and partner's ratings of relationship satisfaction before and after surgery and the partner's self reported ratings of depression and anxiety were hypothesized to be significant predictors of the patient's self reported ratings of depression. This relationship will be examined in the regression analysis after accounting for two demographic variables (gender and age) that are likely, based on the literature, to serve as predictors of the dependent variable. As an example of this hypothesis, the less satisfaction experienced by patients and partners and more psychological distress experienced by the partners will be associated with patients that report more depression.

(2b.) Patient and partner's ratings of relationship satisfaction before and after surgery and the partner's self reported ratings of depression and anxiety were hypothesized to be significant predictors of the patient's self reported ratings of anxiety. This relationship will be examined in the regression analysis after accounting for two demographic variables (gender and age) that are likely, based on the literature, to serve as predictors of the dependent variable. As an example of this hypothesis, the less satisfaction experienced

by patients and partners and more psychological distress experienced by the partners will be associated with patients that report more anxiety.

(2c.) Patient and partner's ratings of relationship satisfaction before and after surgery and the partner's self reported ratings of depression and anxiety were hypothesized to be significant predictors of the patient's health-related quality of life (PCS). This relationship will be examined in the regression analysis after accounting for two demographic variables (gender and age) that are likely, based on the literature, to serve as predictors of the dependent variable. As an example of this hypothesis, the less satisfaction experienced by patients and partners and more psychological distress experienced by the partners will be associated with patients that report poorer health-related quality of life (i.e., lower PCS scores).

(2d.) Patient and partner's ratings of relationship satisfaction before and after surgery and the partner's self reported ratings of depression and anxiety were hypothesized to be significant predictors of the patient's general quality of life. This relationship will be examined in the regression analysis after accounting for two demographic variables (gender and age) that are likely, based on the literature, to serve as predictors of the dependent variable. As an example of this hypothesis, the less satisfaction experienced by patients and partners and more psychological distress experienced by the partners will be associated with patients that report poorer quality of life (i.e., lower QOLI scores).

(3) Patient and Partner's Social Problem-Solving Ability as Predictors of the Patient's Self Reported Ratings of Depression and Anxiety, and Health-Related and General Quality of Life:

There were four parts to the third hypothesis based on the existing literature on the patient and partner's social problem-solving ability (IV's: PPO, NPO, RPS, ICS, AS) and the patient's self reported ratings of depression and anxiety, and health-related and general quality of life (DV's).

(3a.) Patient and partner social problem-solving ability was hypothesized to be a significant predictor of the patient's self reported ratings of depression. This relationship will be examined in the regression analysis after accounting for two demographic variables (gender and age) that are likely, based on the literature, to serve as predictors of the dependent variable. As an example of this hypothesis, patients and partners with lower social problem-solving scores (i.e., on the PPO and RPS dimensions) will be associated with patients that report greater depression.

(3b.) Patient and partner social problem-solving ability was hypothesized to be a significant predictor of the patient's self reported ratings of anxiety. This relationship will be examined in the regression analysis after accounting for two demographic variables (gender and age) that are likely, based on the literature, to serve as predictors of the dependent variable. As an example of this hypothesis, patients and partners with lower social problem-solving scores (i.e., on the PPO and RPS dimensions) will be associated with patients that report greater anxiety.

(3c.) Patient and partner social problem-solving ability was hypothesized to be a significant predictor of the patient's health-related quality of life (PCS). This relationship will be examined in the regression analysis after accounting for two demographic variables (gender and age) that are likely, based on the literature, to serve as predictors of the dependent variable. As an example of this hypothesis, patients and partners with lower social problem-solving scores (i.e., on the PPO and RPS dimensions) will be associated with patients that report poorer health-related quality of life (i.e., lower PCS scores).

(3d.) Patient and partner social problem-solving ability was hypothesized to be a significant predictor of the patient's general quality of life. This relationship will be examined in the regression analysis after accounting for two demographic variables (gender and age) that are likely, based on the literature, to serve as predictors of the dependent variable. As an example of this hypothesis, patients and partners with lower social problem-solving scores (i.e., on the PPO and RPS dimensions) will be associated with patients that report poorer quality of life (i.e., lower QOLI scores).

2. METHOD

2.1. Participants

2.1.1. Inclusion Criteria

The participation of the dyads (i.e., CABG patients and their partners) involved the following set of inclusion criteria. The study sample was comprised of male and/or female patients who were between 18 to 90 years of age. The patients were required to have received a diagnosis of a single or multiple vessel coronary artery disease. Including single and multiple vessel coronary artery disease was not only optimal for obtaining a larger number of subjects, but corresponds to samples from previous research investigations. The patients had recently (i.e., within the past approximate 2 months) undergone the coronary artery bypass graft surgery procedure. The partner was defined as the patient's male or female partner (i.e., a caregiver who lives with the patient in a committed relationship). Furthermore the dyads were made-up of individuals that have lived in the same residence for 6-months or longer. The study sample was comprised of male and/or female partners who were between 18 to 90 years of age. Participants were required to speak and read English at a 6^{th} grade level equivalent. Finally, the study was open to all ethnic groups.

2.1.2. Exclusion Criteria

Participants (patients and/or partners) were excluded due to the following criteria. Those individuals who displayed active delirium,

psychosis, active suicidal/homicidal ideation, as determined by the researcher collecting the data (i.e., the co-investigator an advanced psychology doctoral candidate under the direct supervision of Dr. Christine Maguth Nezu) and/or obtaining on the Brief Symptom Inventory: a Global Severity Index (GSI) T-score greater than or equal to 63. In the study none of the participants met the above exclusion criteria. However, if a participant had met these exclusion criteria they would have been referred to appropriate mental health services. Finally, individuals who were not 18 years of age or able to speak or read English at a 6th grade level equivalent were excluded from the study.

2.1.3. Description of the Sample

In terms of the patient sample, 77.4% were males and 22.6% were females. In terms of the partner sample, 74.2% were females and 25.8% were males. The mean patient age was 62.54 with the youngest patient being 46 and the oldest being 82. The mean partner age was 60.64 with the youngest partner being 43 and the oldest being 77. In the sample 93.5% of the patients and partners were Caucasian and 6.5% were African American. There were no other ethnic groups represented in the sample. In the patient sample 48.4% had 12 years of education, 19.4% had 16 years of education, 12.9% had 18 years of education, 6.5% had 20 years of education, and 3.2% reported having either 6, 8, 10 or 15 years of education (i.e., the 3.2.% represented 1 subject for each of these education groups). Next, in the partner sample 48.4% had 12 years of education, 29% had 16 years of education, 6.5% had either 11 or 14 years of

education, and 3.2% reported having either 10, 15 or 18 years of education (i.e., the 6.5.% represented 2 subjects, and the 3.2% represented 1 subject for each of these education groups). The patient's occupational status was the following: 45.2% reported being "retired," 35.5% reported being "employed," 12.9% were "unemployed," and 6.5% classified themselves as "disabled." The partner's occupational status was the following: 54.8% reported being "employed," 29% were "retired," and 16.1% classified themselves as "unemployed." In terms of the annual salary for the patients, 38.7% fell in the $50,000 to $75,000 category, 25.8% fell in the $25,000 and less category or the $25,000 to $50,000 category, 6.5% fell in the $100,000 and greater category and 3.2% fell in the $75,000 to $100,000 category. In terms of the annual salary for the partners, 32.3% fell in the $25,000 or less category or the $50,000 to $75,000 category, 25.8% fell in the $25,000 to $50,000 category, 6.5% fell in the $100,000 and greater category and 3.2% fell in the $75,000 to 100,000 category.

The following is the examination of the type of relationships for the dyads. In the sample 71% reported being in a heterosexual – married relationship, 16.1% reported being in a heterosexual relationship – not married, 9.7% reported being in a heterosexual – common law marriage, and 3.2% or 1 male partnership reported being in a same sex relationship. The mean number of years the dyads had been in their current relationship was 26 years with a range of 2.5 to 56 years.

The patient's physical status variables (i.e., the history of CVD/CAD, the history of CABG surgery, number of vessels that were bypassed, history of angina, and history of MI) were looked at for this sample. In the sample 41.9% reported a history of CVD/CAD while 58.1% denied this history. Also, 90.3% denied a history of CABG surgery and 9.7% endorsed this as a past procedure. The following statistics describe the number of bypassed vessels for the patients. In the sample 41.9% had two vessels bypassed, 22.6% had either three or four vessels bypassed, 6.5% had five vessels bypassed and 3.2% had either one or six vessels bypassed. In the sample, 54.8% denied a history of angina and 45.2% had a significant history of angina. Finally, in the sample 71.0% of the patient did not have a history of MI and 29% endorsed this as a past problem.

The next series of statistics looks at how satisfied the patients and partners were with their relationships before and after the surgery. In relation to the patient's ratings of satisfaction before surgery: 58.1% reported they were "very satisfied," 32.3% said they were "satisfied," 6.5% said they were "somewhat satisfied," and 3.2% were "unsatisfied." In relation to the patient's ratings of satisfaction after the surgery: 54.8% reported they were "very satisfied," 32.3% said they were "satisfied," 9.7% said they were "somewhat satisfied," and 3.2% said they were "somewhat unsatisfied." In examining the partner's ratings the results determined that prior to the surgery 48.4% reported they were "very satisfied," 32.3% said they were "satisfied," 12.9% reported

they were "somewhat satisfied," and 6.5% were "very unsatisfied." In relation to the partner's ratings of satisfaction after the surgery: 45.2% said they were "very satisfied," 35.5% reported they were "satisfied," 9.7% said they were "somewhat satisfied," 6.5% were "very unsatisfied," and 3.2% said they were "somewhat unsatisfied." Participant demographic information is presented in Tables 1 and 2 (please see Appendix 1).

2.2. Design and Procedure

The subjects were collected from two sites. The first was the Department of Cardiothoracic Surgery's outpatient cardiology clinic at Hahnemann University Hospital in Philadelphia, Pennsylvania. The second site was the inpatient cardiology unit at Hahnemann University Hospital while the patients were recovering after their CABG surgery. This second site was added, after the investigators obtained IRB approval via an addendum. This was enacted due to the low number of patients returning to the outpatient clinic accompanied by a partner in the first six weeks of data collection.

The logistical aspects of the procedure are examined in more detail next. First, the investigators coordinated collection efforts with the clinic staff. The patients and their partners were first approached by the clinical staff (e.g., physician, nurse, cardiothoracic clinic team member) after their surgery or during their first follow-up visit to the outpatient cardiology clinic (i.e., two weeks to two months post-surgery). This was done to protect their confidentiality. The dyads were provided with the research study recruitment

letter. If they expressed interest in the study they were asked to sign the letter indicating their interest and then the co-investigator talked with them so they could learn more about the study and decide whether they wanted to participate.

Next, the participants (i.e., patients and partners) were taken through the following procedures:

1.) They were screened for inclusion and exclusion criteria, and required to complete an informed consent form explaining the risks, benefits, and confidentiality of the study. The consent form included HIPPA authorization for the researcher to access participant medical charts for relevant medical information.

2.) The participants were asked to provide information about themselves, such as date of birth, ethnicity, educational level, and information about how they view their current relationship.

3.) To fill out several brief questionnaires asking how they typically solve problems in living, and the current feelings and attitudes that they have regarding the CABG surgery process. Patients were also asked to complete measures asking how they feel about their quality of life. The dyads were told that they would only be asked to fill out the questionnaires for the study once. The participants were asked to voluntarily participate in this study and there were no financial cost to the subject for participation in this study.

4.) The participants were asked to mail the questionnaires to the investigators via a self-addressed stamped envelope. It should be noted the participants recruited in the outpatient cardiology clinic were given the option of completing the questionnaires while they were waiting for their doctor. After the measures were sent in the questionnaires were scored.

The design of the study was based on examination of conventional standards and the literature on prior studies looking at the CABG population, caregivers, and social problem- solving. The investigators used the conventional rule of an alpha level of .05, power of .80, and a small to medium effect size (Cohen & Cohen, 1983). The power analysis revealed that 115 dyads or 230 subjects (i.e., including patients and their partners) were needed to conduct the regression equations. The final number of subject recruited (i.e., meeting study inclusion criteria and engaging in consent and HIPPA procedures) was 59 dyads or 118 subjects (i.e., including patients and their partners). However, 28 dyads or 56 subjects (i.e., including patients and their partners) did not send in their packets to the investigators. The final number of subjects examined in the study was 31 dyads or 62 subjects (i.e., including patients and their partners).

2.3. Study Measures

Background Information Form This basic questionnaire was given to both the patient and partner. Participants were asked to provide demographic information pertaining to topics such as type of relationship, ethnicity,

socioeconomic status, and level of education. Two questions were included on the demographic questionnaires to assess relationship satisfaction between the patient and partner. The questions asked the dyad to rate their pre and post-surgery level of satisfaction with the relationship on a 7 – point Likert scale (i.e., were 1 = "very unsatisfied with the relationship" to 7 = "very satisfied with the relationship").

A CABG Patient Diagnostic Form was used to assess the patient's physical health related to the CABG procedure. The form was obtained by asking the patient's questions during the subject recruitment phase and examining the patient's medical charts in their physicians' office. The categories that were examined include the patient's history, patient's risk factors (e.g., history of angina, history of MI), and specific CABG surgery data (e.g., number of arteries bypassed).

As reported above, although there are questions about the research concerning neurocognitive functioning after the CABG surgery procedure, cognitive deficits have been widely reported in the literature. The Folstein Mini-Mental State Examination (MMSE) (Cockrell & Folstein, 1988; Folstein, Folstein, & McHugh, 1975) was used to obtain a brief understanding of the patient's current cognitive functioning. The test is divided into two sections. The first part involves verbal responses on the patient's part and looks at orientation, memory, and attention. The second part examines the patient's ability to name, follow verbal and written instructions, write a sentence

spontaneously, and copy a complex polygon. The maximum total score on the test is a 30. In this study, the patient's overall score for both sections was the primary focus.

Validity and reliability of the test were documented on 206 patients (e.g., dementia) and 63 normal subjects. Test-retest reliability scores of .82 and .88 have been demonstrated on different administrations. In addition, the examination has good construct and concurrent validity. This was partially determined by it's correlation with the Wechsler Adult Intelligence Scale (Folstein et al., 1975; Cockrell & Folstein, 1988).

The Brief Symptom Inventory (BSI; Derogatis, 1975) was used to obtain self reported ratings of depression and anxiety for CABG patients and their partners. The BSI is a 53-item self-report symptom inventory (BSI; Derogatis, 1975) designed to reflect the psychological symptom patterns of psychiatric and medical patients as well as non-patients. The BSI is scored and profiled in terms of 9 primary symptom dimensions: Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism (Derogatis & Spencer, 1982). The measure also has three global indices (i.e., global severity index, positive symptom distress index and positive symptom total) that help aid in the overall assessment of the patient's "psychopathologic status." The respondents are asked to rate their psychological symptoms on a 5 – point scale of distress (0 = "not at all" to 4 = "extremely").

The measure was examined for reliability in two ways, looking at the internal consistency on psychiatric outpatients (N = 719) and test-retest reliability on non-patient individuals (N = 60). This inventory has strong internal consistency (i.e., the lowest alpha coefficient was .71 on the Psychoticism dimension and the highest was .85 on the Depression dimension) and test-retest reliability (i.e., the lowest alpha coefficient was .68 on the Somatization dimension and the highest was .91 on the Phobic Anxiety dimension). In the examination of the validity, the inventory has been shown to have convergent validity with the Minnesota Multiphasic Personality Inventory (i.e., coefficients greater then or equal to .30 between the 9 primary dimensions and the clinical scales of the Minnesota Multiphasic Personality Inventory). Factor analysis has demonstrated that the inventory has strong construct validity. Furthermore, Derogatis and colleagues have shown that the BSI has substantial predictive validity (Derogatis & Spencer, 1982).

To assess the patient's life satisfaction the Quality of Life Inventory (QOLI; Frisch, 1994) was used in this investigation. This is a 32-item self-report measure that examines 16 areas of human life related to overall satisfaction with life and happiness. The 16 areas are used to find an overall QOLI score. The areas are health, self esteem, goals-and-values, money, work, play, learning, creativity, helping, love, friends, children, relatives, home, neighborhood, and community. Respondents rate how important each of the 16 domains are to their overall happiness (0 = "not important," 1 =

"important," 2 = "extremely important") followed by rating of how satisfied they are in the areas (3 = "very dissatisfied" to 3 = "very satisfied"). The satisfaction ratings for each item are multiplied to form weighted satisfaction ratings ranging from -6 to 6.

The current version of the measure was based on a standardized sample of 798 non clinical individuals. In looking at the sample this instrument has produced an internal consistency reliability (coefficient alpha) of .79. Also, based on a subsample of 55 individuals from this group, the measure has good test-retest reliability (0.73). The measure was examined for convergent and discriminant validity based on the use of three other measures (i.e., the Satisfaction With Life Scale, Quality of Life Index, and Marlowe-Crowne Social Desirability Scale). The QOLI was significantly and positively correlated with the Satisfaction With Life Scale ($r = .56$, $p < .001$) and Quality of Life Index ($r = .75$, $p < .001$). The QOLI was also correlated with the Marlowe-Crowne Social Desirability Scale ($r = .25$, $p < .001$). The impact of the social desirability response set is considered minimal based on the small size of the correlation (Frisch, 1994).

The Short-Form-12v2 Health Survey (SF-12v2) was used to assess the patient's physical health status (Ware, Kosinski, Turner-Bowker, & Gandek, 2002). The SF-36 Health Survey (SF-36) is the predecessor to the SF-12v2 and has been shown to relate to the health-related ideas most frequently included in many health measures. The SF-36 has been used in a few CABG

studies and has been shown to be effective for detecting changes in health-related quality of life with CHD/CAD patients having undergone the CABG procedure (Gold, 1996; Kiebzak et al., 2002).

The SF-12v2 is a multipurpose short-form made-up of 12-items that was developed to provide a shorter version of the SF-36 and reproduces the two summary components (i.e., Physical Component Summary and Mental Component Summary). The two summary components are made-up of eight subscales (i.e., physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional, and mental health). The Physical Component Summary (PCS) was used in this study. The 12 items used in the shorter version achieve a $R^2 = 0.911$ in the prediction of the Physical Component Summary – 36 (i.e., general U.S. population of N = 2,474).

Reliability has been examined for the summary component. Reliability tests for the 12-item measurement yielded a coefficient of 0.89 for the Physical Component Summary. This was based on a general US population of N = 6,917. Validity has also been measured for the summary component. In general, the 12-item version with the Physical Component Summary have compared very well to the SF-36 component. The Physical Component Summary was examined using a 1998 general U.S. population involving individuals with physical conditions, mental health conditions and no self reported chronic conditions. The relative validity estimate for the Physical Component Summary was 0.81 compared to the same SF-36 component.

Many independent investigators examining the validity of the SF-12v2 compared to the SF-36 and other measures of overall health status have found similar results and concluded that the SF-12v2 is the "instrument of choice" for investigations needing a short summary health status measure. In general, Ware and colleagues (2002) provide solid evidence of the content, concurrent, predictive and construct validity of this measure.

The Social Problem-Solving Inventory-Revised, Short Form (SPSI-R:S; D'Zurilla, Nezu, & Maydeu-Olivares, 2002) was used to assess problem-solving ability for both patients and partners. This is a 25-item self-report inventory that measures social problem-solving abilities. The individual completing the questionnaire is rating their cognitive, behavioral or affective responses to problem situations using a 5-point Likert scale (scale ranges from 0 = "not at all true of me" to 4 = "extremely true of me"). The SPSI-R:S is based on the five dimensions of the social problem-solving model and the questionnaire yields scores for each of these subscales. Two dimensions are adaptive forms of problem-solving: Positive Problem Orientation (PPO), and Rational Problem Solving (RPS). Higher scores on these two components represent adaptive problem solving. The other three dimensions are dysfunctional forms of problem-solving: Negative Problem Orientation (NPO), Impulsivity-Carelessness Style (ICS), and Avoidance Style (AS). Higher scores on these three scales represent dysfunctional problem solving. This study utilized each of the five dimensions.

In general the SPSI-R:S has strong reliability and validity. Reliability estimates for the SPSI-R:S have been assessed using normative samples including young adults (N = 1053), middle-aged adults (N = 100), and elderly adults (N = 100). Internal consistency (alpha) ratings were .89, .93 and .88 for the young adults, middle-aged adults, and elderly adults respectively. Test-retest reliability (over 3 weeks) for the sample of young adults (N = 138) was .84. The examination of structural validity of the SPSI-R:S produced factor loading of the five scales ranging from .50 to .84. In addition, the predictive validity of the SPSI-R:S produced correlations between the SPSI-R:S (i.e., the five scales) and external measures of psychological distress and well-being (i.e., measures examining depression, anxiety, hopelessness, suicidality and life satisfaction). The correlations ranged from -.43 to .61 (D'Zurilla et al., 2002). In general, the research demonstrates the measure has strong concurrent, content and predictive validity (D'Zurilla et al., 2002).

2.4. Data Analysis Plan

The data analyses in this study were conducted using SPSS 15.0 statistical software for Windows. All data were examined to detect data entry errors, missing data, outliers, and, assumptions of multivariate analysis (i.e., multivariate normality, linearity, homoscedasticity, and multicollinearity) before examining the research hypotheses. In general, missing data was minimal. In looking at the participants in the study (31 dyads or 62 individuals, including patients and their partners), 3 participants had missing

items on the QOLI measure, 5 participants had missing data on the SPSI-R:S, and 3 on the BSI. The data that were missing did not exceed the maximum allowable number of missing responses to render the results invalid for these measures. The missing data were replaced according to the procedures in the QOLI, BSI and SPSI-R manuals respectively (D'Zurilla et al., 2002; Frisch, 1994; Derogatis & Spencer, 1982). The remaining participants did not have missing data cases. All variables, especially the predictor and the criterion variables were inspected for violations of univariate normality and the multivariate analysis was conducted. The multivariate analyses revealed that a few outliers were found associated with the patient and partner's ratings of relationship satisfaction before and after surgery. These variables had high Mahalanobis Distance values (> 10). There is no clear method on how to proceed with multivariate outliers and removal of the data to reduce the influence of the multivariate outliers is not usually recommended (Allison & Gorman, 1993; Field, 2005; Tabachnick & Fidell, 2007). One recommendation is to run the data analysis with and without the outliers to examine if removing the outliers would significantly change the results (Allison & Gaorma, 1993; Field, 2005). This procedure was conducted and the results from both sets of analyses were fairly similar. Since these results were similar the multivariate outliers were used in the analyses. In addition, to discovering multivariate outliers, the same two independent variables demonstrated problems with multicollinearity. The patient and partner's

ratings of relationship satisfaction before and after surgery were highly correlated with each other. The higher correlations were typically ranging from .90 to .95. As an example for many of the analyses it was common for the patient's ratings of satisfaction before surgery to be highly correlated with their ratings after surgery. The redundancy can be partially understood since these ratings are measuring the same concept, but for two different time periods. It has been recommended that when multicollinearity is detected and the data are being used for prediction only, you do not need to adjust the data (Tabachnick & Fidell, 2007). The other independent variables in the analysis did not demonstrated any evidence of multicollinearity or singularity (i.e., the correlations were less than .90). Also, scatterplots of the residuals against the predicted residuals and normal probability plots were examined to test for multivariate normality, linearity, and homoscedasticity. Finally, the Durbin-Watson test was used to examine the independence of residuals. These assumptions were met based on the testing.

A series of hierarchical multiple regression analyses were conducted to test the three objectives of this study. The Background Information Form contained two demographic variables: gender and age that based on the literature reviewed for this investigation provided some evidence that these type of variables might serve as predictors of the dependent variables (Koertge, Weidner, Elliott-Eller, Scherwitz, Merritt-Worden, Marlin, Lipsenthal, Guarneri, Finkel, Saunders, McCormac, Scheer, Collins, & Ornish, 2003; Le

Grande et al., 2006; Mallik et al., 2005; Steine, Laerum, Eritsland, & Arnesen, 1996; Vaccarino, Lin, Kasl, Mattera, Roumanis, Abramson, & Krumholz, 2003). Given the past findings, these two variables were controlled for by forming the first block in each regression analysis.

The following was the order of variable entry for the first hypothesis which again examined the patient's physical status variables as predictors of their post-surgical health-related quality of life. In this hypothesis the first block had the demographic variables (gender and age) entered into the regression equation. The second block had physical status variables entered: history of CVD/CAD, history of CABG, number of vessels that were bypassed, history of angina, and history of MI. The final block of the hypothesis had the patient's PCS scores entered as the dependent variable.

The following was the order of variable entry for the second hypothesis which again examined patient and partner's ratings of relationship satisfaction before and after surgery, and the partner's self reported ratings of depression and anxiety as predictors of the patient's self reported ratings of depression and anxiety, and health-related and general quality of life. In each of the four parts of this hypothesis the first block had the demographic variables (gender and age) entered into the regression equation. The second block had the patient's ratings of relationship satisfaction before and after the CABG surgery entered into the equation. The third block had the partner's ratings of relationship satisfaction before and after surgery, and the partner's self reported ratings of

depression and anxiety. The equation was run four different times with separate dependent variables for the final block. The following were these final four blocks: the patient's self-reported ratings of depression, patient's self-reported ratings of anxiety, patient's ratings of PCS, and patient's ratings of QOLI.

The following was the order of variable entry for the third hypothesis which again examined the patient and partner's social problem-solving ability as predictors of the patient's self reported ratings of depression and anxiety, and health-related and general quality of life. In each of the four parts of this hypothesis the first block had the demographic variables (gender and age) entered into the regression equation. The second block had the patient's PPO, NPO, RPS, ICS, and AS scores entered into the equation and the third block had the partner's PPO, NPO, RPS, ICS, and AS scores in the equation. The equation was run four different times with separate dependent variables for the final block. The following were these final four blocks: the patient's self-reported ratings of depression, patient's self-reported ratings of anxiety, patient's ratings of PCS, and patient's ratings of QOLI.

3. RESULTS

3.1. Preliminary Analyses

3.1.1. Descriptive Statistics of Independent and Dependent Variables

The means, standard deviations, minimum and maximum scores were calculated for all variables of interest. These included the patient's demographic data (gender and age), and their physical status variables (i.e., history of CVD/CAD, the history of CABG, number of vessels that were bypassed, history of angina, and history of MI). Also, examined were the patient and partner's ratings of relationship satisfaction before and after the surgery, self reported ratings of depression and anxiety, and their social problem solving variables. Finally, the patient's health-related and general quality of life variables were examined in the preliminary analyses. These statistics are presented in Tables 3 and 4 (please see Appendix 1). All data fell within the normative range of values related to means, standard deviations, minimum and maximum scores for those measures with documented psychometric properties.

3.1.2. Neurocognitive Functioning

The patient's cognitive functioning was examined using the MMSE questionnaire (Cockrell & Folstein, 1988; Folstein et al., 1975). The maximum total score on the test is a 30. The patients in this sample displayed a mean of 26.8 with a standard deviation of 2.53. The minimum score was 21

and the maximum score was 30. The results of these analyses are presented in Table 5 (please see Appendix 1).

3.2. Correlational Analyses: The Relationship between Independent Variables with the Patient's Psychosocial and Physical Adjustment

In this study correlational analyses were performed on all variables for the patients and their partners. Specifically, zero-order Pearson correlation coefficients were performed to examine the relationships between the independent variables and dependent variables (Pallant, 2001). Again, the dependent variables are self reported ratings of depression and anxiety as measured by the BSI, health-related quality of life (i.e., the PCS) as measured by the SF-12v2, and general quality of life as measured by the QOLI (i.e., overall raw score). The full analyses are displayed in Tables 6 and 7(please see Appendix 1).

3.2.1. Patient's Physical Status Variables

The analyses reveled that the patient's physical status variables (i.e., history of CVD/CAD, history of CABG, number of vessels that were bypassed, history of angina, and history of MI) were not correlated with the dependent variable that was examined in the first hypothesis: health-related quality of life (i.e., the PCS).

3.2.2. Patient and Partner's Ratings of Relationship Satisfaction

Next in the analysis of the independent variables was the patient and partner's ratings of relationship satisfaction. This looked at how satisfied they were with their relationship before and after the CABG surgery. They were

examined with the dependent variables. The patient's satisfaction ratings were not correlated with their depression, anxiety, and physical component summary scores. However, the satisfaction ratings before and after surgery were significantly correlated with their quality of life scores ($r = .510$, $p < .01$, $r = .667$, $p < .01$, respectively).

The partner's ratings of satisfaction were examined with the dependent variables. The partner's satisfaction ratings were not correlated with the patient's depression, anxiety, physical component summary scores or general quality of life scores.

3.2.3. Partner Psychological Functioning

The partner's self reported ratings of depression and anxiety as measured by the BSI were examined with the dependent variables. The partner's psychological functioning ratings were not correlated with the patient's depression, anxiety, physical component summary scores or quality of life scores.

3.2.4. Patient Social Problem-Solving

The patient's social problem-solving variables were measured next. More specifically, this group of variables PPO, NPO, RPS, ICS and AS focused on examining the patient's social problem-solving. This was related to the patient's dependent variables. The patient's social problem-solving variables were not correlated with their anxiety and physical component summary scores. The patient's rational problem solving scores were

significantly correlated with their depression scores in this analysis (r = -.379, p < .05). The patient's social problem- solving variables were significantly related to quality of life. The significant correlations included negative problem orientation (r = -.410, p < .05), and avoidance style (r = -.559, p < .01).

3.2.5. Partner Social Problem-Solving

The partner's social problem-solving variables PPO, NPO, RPS, ICS and AS were examined in relation to the dependent variables. The partner's social problem-solving variables were not correlated with the patient's depression, anxiety, physical component summary scores. The partner's avoidance style scores were correlated with the patient's quality of life (r = -.499, p < .01).

3.3. Primary Analyses of Patient's Psychosocial and Physical Adjustment

3.3.1. Hypothesis 1: Patient's Physical Status Variables as Predictors of Health-Related Quality of Life

Hierarchical multiple regression analyses were conducted to test the three hypothesis. The first hypothesis looked at the patient's physical status variables as predictors of their health-related quality of life. The results of these analyses are presented in Table 8 (please see Appendix 1).

In this hypothesis the first block had the demographic variables (gender and age) entered into the regression equation. The second block included the independent variables which were the physical status variables (history of CVD/CAD, history of CABG, number of vessels that were bypassed, history

of angina, and history of MI). The final block had the patient's PCS scores entered as the dependent variable. After step 1, with the demographic variables (gender and age) in the equation, the results were not significant (R^2 = .017, *Adjusted* R^2 = -.053, ΔR^2 = .017, $F_{change}(2,28)$ = .248, p = .782). When step 2 was added to the equation, no significant relationship was found between the physical status variables (history of CVD/CAD, history of CABG, number of vessels that were bypassed, history of angina, and history of MI) and PCS (R^2 = .219, *Adjusted* R^2 = -.018, ΔR^2 = .202, $F_{change}(5,23)$ = 1.19, p = .345). In summary, none of the physical status variables were found to be significant predictors of health-related quality of life (i.e., the patient's Physical Component Summary scores). As no significant effects were detected, no follow-up analyses were examined (Cohen & Cohen, 1983).

3.3.2. Hypothesis 2: Patient and Partner's Ratings of Relationship Satisfaction Before and After Surgery, and Partner's Self Reported Ratings of Depression and Anxiety as Predictors of Depression and Anxiety, and Health-Related and General Quality of Life

The second hypothesis had four parts that looked at the patient and partner's ratings of relationship satisfaction before and after surgery, and the partner's self reported ratings of depression and anxiety as predictors of the patient's self reported ratings of depression and anxiety, and health-related and general quality of life. The results of these analyses are presented in Tables 9 - 12 (please see Appendix 1).

In the first part of this hypothesis the initial block had the demographic variables (gender and age) entered into the regression equation. The second

and third blocks included the independent variables. More specifically, the second block had the patient's ratings of relationship satisfaction before and after the CABG surgery entered into the equation. The third block had the partner's ratings of relationship satisfaction before and after surgery, and the partner's self reported ratings of depression and anxiety. The final block had the patient's self reported ratings of depression scores entered as the dependent variable. After step 1, with the demographic variables (gender and age) in the equation, the results were not significant ($R^2 = .126$, *Adjusted* $R^2 = .063$, $\Delta R^2 = .126$, $F_{change}(2,28) = 2.01$, $p = .153$). When step 2 was added to the equation, a significant relationship was found between the patient's ratings of relationship satisfaction before and after surgery and their self reported ratings of depression ($R^2 = .307$, *Adjusted* $R^2 = .201$, $\Delta R^2 = .182$, $F_{change}(2,26) = 3.41$, $p < .05$). This step accounted for 18% of the variance, even when the effects of gender and age were statistically controlled for in the equation. The patient's ratings of relationship satisfaction before and after surgery were significant predictors of the patient's self reported ratings of depression ($\beta = .982$, $p < .05$, $\beta = -1.08$, $p < .05$, respectively). The results indicate that as the patient's ratings of relationship satisfaction before surgery increase, their depressive scores increase. Also, as the patient's ratings of relationship satisfaction after surgery increase, their depressive scores decrease. Finally, when step 3 was added to the equation, no significant relationship was found between the partner's ratings of relationship satisfaction before and after surgery, and the

partner's self reported ratings of depression and anxiety and the dependent variable: patient's self reported ratings of depression (R^2 = .372, *Adjusted* R^2 = .144, ΔR^2 = .065, $F_{change}(4,22) = .567$, p = .689). In summary for the first part of this hypothesis the patient's ratings of relationship satisfaction before and after surgery were found to be significant predictors of their self reported ratings of depression.

In the second part of this hypothesis the initial block had the demographic variables (gender and age) entered into the regression equation. The second and third blocks included the independent variables. More specifically, the second block had the patient's ratings of relationship satisfaction before and after the CABG surgery entered into the equation. The third block had the partner's ratings of relationship satisfaction before and after surgery, and the partner's self reported ratings of depression and anxiety. The final block had the patient's self reported ratings of anxiety scores entered as the dependent variable. After step 1, with the demographic variables (gender and age) in the equation, the results were not significant (R^2 = .008, *Adjusted* R^2 = -.063, ΔR^2 = .008, $F_{change}(2,28) = .113$, p = .893). When step 2 was added to the equation, no significant relationship was found between the patient's ratings of relationship satisfaction before and after surgery and the patient's self reported ratings of anxiety (R^2 = .034, *Adjusted* R^2 = -.115, ΔR^2 = .026, $F_{change}(2,26) = .350$, p = .708). Finally, when step 3 was added to the equation, no significant relationship was found between the partner's ratings of

relationship satisfaction before and after surgery, and the partner's self reported ratings of depression and anxiety and the dependent variable: patient's self reported ratings of anxiety (R^2 = .062, *Adjusted* R^2 = -.279, ΔR^2 = .028, $F_{change}(4,22) = .163$, $p = .955$). In summary for the second part of this hypothesis none of the patient and partner's ratings of relationship satisfaction, and partner's self reported ratings of depression and anxiety were found to be significant predictors of the patient's self reported ratings of anxiety. As no significant effects were detected, no follow-up analyses were examined (Cohen & Cohen, 1983).

In the third part of this hypothesis the initial block had the demographic variables (gender and age) entered into the regression equation. The second and third blocks included the independent variables. More specifically, the second block had the patient's ratings of relationship satisfaction before and after the CABG surgery entered into the equation. The third block had the partner's ratings of relationship satisfaction before and after surgery, and the partner's self reported ratings of depression and anxiety. The final block had the patient's PCS scores (i.e., examining health-related quality of life) entered as the dependent variable. After step 1, with the demographic variables (gender and age) in the equation, the results were not significant (R^2 = .017, *Adjusted* R^2 = -.053, ΔR^2 = .017, $F_{change}(2,28) = .248$, $p = .782$). When step 2 was added to the equation, no significant relationship was found between the patient's ratings of relationship satisfaction before and after surgery and their

PCS (R^2 = .175, *Adjusted* R^2 = .048, ΔR^2 = .158, $F_{change}(2,26) = 2.48$, p = .103). Finally, when step 3 was added to the equation, no significant relationship was found between the partner's ratings of relationship satisfaction before and after surgery, and the partner's self reported ratings of depression and anxiety and the dependent variable: patient's PCS (R^2 = .377, *Adjusted* R^2 = .151, ΔR^2 = .202, $F_{change}(4,22) = 1.79$, p = .167). In summary for the third part of this hypothesis none of the patient and partner's ratings of relationship satisfaction, and partner's self reported ratings of depression and anxiety were found to be significant predictors of health-related quality of life (i.e., the patient's Physical Component Summary scores). As no significant effects were detected, no follow-up analyses were examined (Cohen & Cohen, 1983).

In the fourth part of this hypothesis the initial block had the demographic variables (gender and age) entered into the regression equation. The second and third blocks included the independent variables. More specifically, the second block had the patient's ratings of relationship satisfaction before and after the CABG surgery entered into the equation. The third block had the partner's ratings of relationship satisfaction before and after surgery, and the partner's self reported ratings of depression and anxiety. The final block had the patient's general quality of life entered as the dependent variable. After step 1, with the demographic variables (gender and age) in the equation, the results were not significant (R^2 = .083, *Adjusted* R^2 = .017, ΔR^2 = .083, $F_{change}(2,28) = 1.26$, p = .298). When step 2 was added to the equation, a

significant relationship was found between the patient's ratings of relationship satisfaction before and after surgery and their general quality of life (R^2 = .532, *Adjusted* R^2 = .460, ΔR^2 = .450, $F_{change}(2,26) = 12.50$, $p < .0005$). This step accounted for 45% of the variance, even when the effects of gender and age were statistically controlled for in the equation. The patient's ratings of relationship satisfaction before and after surgery were significant predictors of their general quality of life ($\beta = -.804$, $p < .05$, $\beta = 1.38$, $p < .01$, respectively). The results indicate that as the patient's ratings of relationship satisfaction before surgery increase, their general quality of life decreases. Also, as the patient's ratings of relationship satisfaction after surgery increase, their general quality of life increases. Finally, when step 3 was added to the equation, no significant relationship was found between the partner's ratings of relationship satisfaction before and after surgery, and the partner's self reported ratings of depression and anxiety and the dependent variable: patient's general quality of life (R^2 = .587, *Adjusted* R^2 = .437, ΔR^2 = .055, $F_{change}(4,22) = .733$, $p = .579$). In summary for the fourth part of this hypothesis the patient's ratings of relationship satisfaction before and after surgery were found to be significant predictors of their general quality of life.

3.3.3. Hypothesis 3: Patient and Partner's Social Problem-Solving Ability as Predictors of Depression and Anxiety, and Health-Related and General Quality of Life

The third hypothesis had four parts that looked at the patient and partner's social problem-solving ability (PPO, NPO, RPS, ICS, AS) as

predictors of the patient's self reported ratings of depression and anxiety, and health-related and general quality of life. The results of these analyses are presented in Tables 13 - 16 (please see Appendix 1).

In the first part of this hypothesis the initial block had the demographic variables (gender and age) entered into the regression equation. The second and third blocks included the independent variables. More specifically, the second block had the patient's social problem-solving ability dimensions (PPO, NPO, RPS, ICS, AS) entered into the equation. The third block had the partner's social problem-solving ability dimensions (PPO, NPO, RPS, ICS, AS) entered into the equation. The final block had the patient's self reported ratings of depression entered as the dependent variable. After step 1, with the demographic variables (gender and age) in the equation, the results were not significant ($R^2 = .126$, *Adjusted* $R^2 = .063$, $\Delta R^2 = .126$, $F_{change}(2,28) = 2.01$, $p = .153$). When step 2 was added to the equation, no significant relationship was found between the patient's social problem-solving ability dimensions (PPO, NPO, RPS, ICS, AS) and their self reported ratings of depression ($R^2 = .394$, *Adjusted* $R^2 = .209$, $\Delta R^2 = .268$, $F_{change}(5,23) = 2.04$, $p = .111$). Finally, when step 3 was added to the equation, no significant relationship was found between the partner's social problem-solving ability dimensions (PPO, NPO, RPS, ICS, AS) and the patient's self reported ratings of depression ($R^2 = .467$, *Adjusted* $R^2 = .112$, $\Delta R^2 = .073$, $F_{change}(5,18) = .497$, $p = .775$). In summary, the patient and partner's social problem-solving abilities were not significant

predictors of the patient's self reported ratings of depression. As no significant effects were detected, no follow-up analyses were examined (Cohen & Cohen, 1983).

In the second part of this hypothesis the initial block had the demographic variables (gender and age) entered into the regression equation. The second and third blocks included the independent variables. More specifically, the second block had the patient's social problem-solving ability dimensions (PPO, NPO, RPS, ICS, AS) entered into the equation. The third block had the partner's social problem-solving ability dimensions (PPO, NPO, RPS, ICS, AS) entered into the equation. The final block had the patient's self reported ratings of anxiety entered as the dependent variable. After step 1, with the demographic variables (gender and age) in the equation, the results were not significant (R^2 = .008, *Adjusted* R^2 = -.063, ΔR^2 = .008, $F_{change}(2,28)$ = .113, p = .893). When step 2 was added to the equation, no significant relationship was found between the patient's social problem-solving ability dimensions (PPO, NPO, RPS, ICS, AS) and their self reported ratings of anxiety (R^2 = .148, *Adjusted* R^2 = -.111, ΔR^2 = .140, $F_{change}(5,23)$ = .758, p = .589). Finally, when step 3 was added to the equation, no significant relationship was found between the partner's social problem-solving ability dimensions (PPO, NPO, RPS, ICS, AS) and the patient's self reported ratings of anxiety (R^2 = .478, *Adjusted* R^2 = .131, ΔR^2 = .330, $F_{change}(5,18)$ = 2.28, p = .090). In summary, the patient and partner's social problem-solving abilities

were not significant predictors of the patient's self reported ratings of anxiety. As no significant effects were detected, no follow-up analyses were examined (Cohen & Cohen, 1983).

In the third part of this hypothesis the initial block had the demographic variables (gender and age) entered into the regression equation. The second and third blocks included the independent variables. More specifically, the second block had the patient's social problem-solving ability dimensions (PPO, NPO, RPS, ICS, AS) entered into the equation. The third block had the partner's social problem-solving ability dimensions (PPO, NPO, RPS, ICS, AS) entered into the equation. The final block had the patient's health-related quality of life (PCS) entered as the dependent variable. After step 1, with the demographic variables (gender and age) in the equation, the results were not significant (R^2 = .017, *Adjusted* R^2 = -.053, ΔR^2 = .017, $F_{change}(2,28)$ = .248, p = .782). When step 2 was added to the equation, no significant relationship was found between the patient's social problem-solving ability dimensions (PPO, NPO, RPS, ICS, AS) and their PCS (R^2 = .266, *Adjusted* R^2 = .043, ΔR^2 = .249, $F_{change}(5,23)$ = 1.56, p = .211). Finally, when step 3 was added to the equation, no significant relationship was found between the partner's social problem-solving ability dimensions (PPO, NPO, RPS, ICS, AS) and the patient's PCS (R^2 = .508, *Adjusted* R^2 = .180, ΔR^2 = .242, $F_{change}(5,18)$ = 1.77, p = .170). In summary, the patient and partner's social problem-solving abilities were not significant predictors of the patient's health-related quality of life (i.e., PCS

scores). As no significant effects were detected, no follow-up analyses were examined (Cohen & Cohen, 1983).

In the fourth part of this hypothesis the initial block had the demographic variables (gender and age) entered into the regression equation. The second and third blocks included the independent variables. More specifically, the second block had the patient's social problem-solving ability dimensions (PPO, NPO, RPS, ICS, AS) entered into the equation. The third block had the partner's social problem-solving ability dimensions (PPO, NPO, RPS, ICS, AS) entered into the equation. The final block had the patient's general quality of life scores entered as the dependent variable. After step 1, with the demographic variables (gender and age) in the equation, the results were not significant ($R^2 = .083$, *Adjusted* $R^2 = .017$, $\Delta R^2 = .083$, $F_{change}(2,28) = 1.26$, $p = .298$). When step 2 was added to the equation, a significant relationship was found between the patient's social problem-solving ability dimensions (PPO, NPO, RPS, ICS, AS) and their general quality of life ($R^2 = .432$, *Adjusted* $R^2 = .259$, $\Delta R^2 = .349$, $F_{change}(5,23) = 2.83$, $p < .05$). This step accounted for 35% of the variance, even when the effects of gender and age were statistically controlled for in the equation. However, examination of the β weight coefficients determined that none of the patient's social problem-solving ability dimensions (PPO, NPO, RPS, ICS, AS) were significant predictors of their general quality of life (β = .184, $p = .601$; β = -.183, $p = .609$; β = .101, $p = .753$; β = .306, $p = .274$; β = -.264, $p = .427$, respectively).

Finally, when step 3 was added to the equation, no significant relationship was found between the partner's social problem-solving ability dimensions (PPO, NPO, RPS, ICS, AS) and the patient's general quality of life (R^2 = .527, *Adjusted* R^2 = .211, ΔR^2 = .095, $F_{change}(5,18) = .719$, $p = .617$). In summary, the patient and partner's social problem-solving abilities were not significant predictors of the patient's general quality of life.

4. DISCUSSION

4.1. Overview of Investigation

The current investigation focused on CAD, which is the single leading cause of death in males and females in the United States. CABG surgery has been one of the most effective techniques used to treat the most serious forms of CAD. In the United States almost half a million individuals undergo the CABG procedure each year (American Heart Association, 2007).

There are numerous investigations reporting that CABG patients struggle with high levels of depression and anxiety after the surgery. Investigations have also reported these patients can exhibit a significant decrease in their health-related quality of life (e.g., problems with physical functioning, increased general pain and specific pain such as angina) and overall quality of life (e.g., problems with work and hobbies) post-surgery (Edell-Gustafsson & Hetta, 1999; Junior et al., 2000; Le Grande et al., 2006). However, other studies in the literature have shown that CABG patients improve in the areas of psychological functioning, and health-related and overall quality of life post-surgery (Duits et al., 1997; Hartford et al., 2002; Lindquist et al., 2003).

Physical status variables such as history of CVD/CAD, CABG, angina or MI, and number of vessels that were bypassed have been linked to post-surgical complications. However, the research examining these variables after surgery has produced mixed results. Many investigations have reported these

patients can exhibit a significant decrease in the health-related quality of life (e.g., experiencing a MI post-surgery) and other studies have shown that patients demonstrate improvements in post-surgical health-related quality of life.

The few studies that have examined the CABG patient and partner's relationship satisfaction have found that greater relationship satisfaction and support before and after surgery are important predictors of the patient's well-being post-surgery. However, much of the research has focused more on relationship support verses satisfaction.

Past research has demonstrated that the spouses also experience distress in the form of depression, anxiety, and problems with physical health post-surgery (Davies, 2000; Gilliss, 1984). This has been associated with weaker coping styles during the first year after the CABG surgery. There are only two studies known to the investigators that have specifically examined the impact of the partner's distress and how it impacts the CABG patient's overall well-being post-surgery. These two studies found that higher levels of psychosocial distress (i.e., neuroticism, activity- related burden) were associated with patients that experienced greater depression and poorer health status post-surgery (Halm et al., 2006; Ruiz et al., 2006).

Furthermore, only a few studies that have looked at specific interventions to help patients and their caregivers better cope with the distress related to the CABG process. These studies tend to focus on psychoeducation

interventions and other studies are just starting to look at interventions based on behavioral modification and/or cognitive therapy.

The purpose of this study was to explore the relationships between several possible predictors of post-surgical psychological adjustment and quality of life, including the patient's history of CVD/CAD, CABG, angina, MI, and number of vessels that were bypassed, the patient and partner's ratings of relationship satisfaction before and after the CABG surgery, the partner's self reported ratings of depression and anxiety, and the patient and partner's social problem-solving ability. Specifically, the impact of the patient's physical status variables on their post-surgical health-related quality of life was examined. Also, the patient and partner's ratings of relationship satisfaction and the partner's ratings of psychological functioning on the patient's post-surgical psychosocial and physical adjustment were examined. Finally, the patient and partner's social problem-solving ability on the patient's post-surgical psychosocial and physical adjustment were examined.

4.2. Summary of Results

4.2.1. Patient's Physical Status Variables Related to Health-Related Quality of Life

In looking at the first hypothesis, the physical status variables (i.e., history of CVD/CAD, history of CABG, number of vessels that were bypassed, history of angina, and history of MI) did not result in significant contributions to predicting the dependent variable: health-related quality of life (PCS). This was found after controlling for the effects of the demographic

variables (gender and age). Thus, the first hypothesis was not supported based on the results. In previous investigations, the physical variables have been associated with the patient's post-surgery health-related quality of life. As an example, history of angina and MI have been associated with events such as problems with pain, surgical re-intervention and experiencing a MI post-surgery (Blackstone, 2003; El-Hamamsy, Cartier, Demers, Bouchard, & Pellerin, 2006; Pavie, Doguet, & Bonnet, 2007). It is puzzling why relationships found in previous studies were not found in this study. There are a few factors that may have lead to these results. One important factor was the power of the statistical analyses. The sample size was well below the recommended minimal number of subjects to obtain adequate power. Another important factor in these results may have been the role of selection bias. Both of these topics are discussed in more detail in the limitations section.

4.2.2. Patient and Partner's Ratings of Relationship Satisfaction Before and After Surgery, and Partner's Self Reported Ratings of Depression and Anxiety Related to Depression and Anxiety, and Health-Related and General Quality of Life

The second hypothesis had four parts that looked at the patient and partner's ratings of relationship satisfaction before and after surgery, and partner's self reported ratings of depression and anxiety as predictors of the patient's self reported ratings of depression and anxiety, and health-related and general quality of life.

In the first part of this hypothesis the patient and partner's ratings of relationship satisfaction before and after surgery, and partner's self reported

ratings of depression and anxiety were hypothesized to predict the patient's depression. After controlling for the effects of the demographic variables (gender and age) in the first step, the patient's ratings of relationship satisfaction before and after surgery were significant predictors of their ratings of depression in the second step. The examination of the coefficients table determined that as the patient's ratings of relationship satisfaction before surgery increase, their depressive scores increase. There are very few studies that have looked at this relationship prior to surgery, but the aforementioned finding is contrary to previous results. Two studies have reported that CABG patients with higher pre-surgery ratings of marital satisfaction and support displayed greater psychological well-being (i.e., lower depression) post-surgery (Elizur & Hirsh, 1999; King et al., 1993). There are a few factors that may have lead to these results which will be discussed in more detail in the implications, limitations and future direction sections. The second major finding in this section was that as the patient's ratings of relationship satisfaction after surgery increase, their depressive scores decrease. This finding supported the hypothesis. One study examining post-surgical data on CABG patients showed that greater emotional support with the spouse was significantly predictive of lower depression (Kulik & Mahler, 1993). It should be noted that this finding focused more on relationship support then relationship satisfaction. Finally, the partner's ratings of relationship satisfaction before and after surgery, and their self reported ratings of

depression and anxiety did not result in significant contributions to predicting the patient's self reported ratings of depression.

Unfortunately, the second and third parts of this hypothesis were not supported based on the results. In the second part of this hypothesis the patient and partner's ratings of relationship satisfaction before and after surgery, and partner's self reported ratings of depression and anxiety did not result in significant contributions to predicting the patient's ratings of anxiety. This was found after controlling for the effects of the demographic variables (gender and age). Also, in the third part of this hypothesis the patient and partner's ratings of relationship satisfaction before and after surgery, and partner's self reported ratings of depression and anxiety did not result in significant contributions to predicting the patient's health-related quality of life (PCS). This was found after controlling for the effects of the demographic variables (gender and age).

In the fourth part of this hypothesis the patient and partner's ratings of relationship satisfaction before and after surgery, and partner's self reported ratings of depression and anxiety were hypothesized to predict the patient's general quality of life. After controlling for the effects of the demographic variables (gender and age) in the first step, the patient's ratings of relationship satisfaction before and after surgery were significant predictors of their general quality of life in the second step. The examination of the coefficients table determined that as the patient's ratings of relationship satisfaction before

surgery increase, their general quality of life decreases. This is another area in which very little research has been done examining this relationship prior to surgery, but the aforementioned finding are contrary to previous results. Allen and colleagues reported that CABG patients with higher pre-surgery ratings of marital quality displayed better quality of life ratings post-surgery (Allen et al., 1998). There are a few factors that may have lead to these results which will be discussed in more detail in the implications, limitations and future direction sections. The second major finding in this section was that as the patient's ratings of relationship satisfaction after surgery increase, their general quality of life increases. This finding supported the hypothesis. In one investigation looking at CABG patients, greater emotional support with the spouse was predictive of better quality of life post-surgery (Kulik & Mahler, 1993). It should be noted that this finding focused more on relationship support then relationship satisfaction. Finally, the partner's ratings of relationship satisfaction before and after surgery, and their self reported ratings of depression and anxiety did not result in significant contributions to predicting the patient's general quality of life.

There are several predictors related to the second hypothesis that were insignificant. At this point in time there have been very few studies looking at the CABG patient's ratings of relationship satisfaction before and after surgery as predictors of the patient's anxiety and health-related quality of life. Quality of the relationship pre-surgery has been demonstrated to be an important

predictor of the CABG patient's well being (i.e., linked to anxiety and health-related quality of life) post-surgery (Kulik & Mahler, 1993; Lindsay, Hanlon, Smith, & Wheatley, 2000). Similar results have been displayed in one study looking at post-surgery ratings of relationship support with anxiety and health-related quality of life (King et al., 1993). Another area that has received little attention in the literature is examination of the CABG partner's ratings of relationship satisfaction before and after surgery as predictors of the patient's self reported ratings of depression and anxiety, and health-related and general quality of life. Pre-surgery ratings have not been examined, but in one study by King et al. (1993) the post-surgery ratings of the spouse's relationship support were an important predictor of the CABG patient's well being (i.e., linked to depression, anxiety and health-related quality of life). In another study focused on acute MI patients the investigators found a statistically significant positive relationship between the spouse's marital satisfaction and the patient's quality of life (Beach et al., 1992). Finally, the results indicated that the CABG partner's self reported ratings of depression and anxiety did not result in significant contributions to predicting the patient's self reported ratings of depression and anxiety, and health-related and general quality of life. As previously discussed there are only two known investigations published on this topic and they demonstrated that the spouse's distress impacted the CABG patients' well being post-surgery (Halm et al., 2006; Ruiz et al., 2006). There are a few factors that may have lead to all of the aforementioned findings

which will be discussed in more detail below in the implications, limitations and future direction sections.

4.2.3. Patient and Partner's Social Problem-Solving Ability Related to Depression and Anxiety, and Health-Related and General Quality of Life

The third hypothesis had four parts that looked at the patient and partner's social problem-solving ability (PPO, NPO, RPS, ICS, AS) as predictors of the patient's self reported ratings of depression and anxiety, and health-related and general quality of life.

In the first part the patient and partner's social problem-solving abilities was hypothesized to predict the patient's depression. The patient and partner's social problem-solving abilities (PPO, NPO, RPS, ICS, AS) did not result in significant contributions to predicting the patient's self reported ratings of depression. This was found after controlling for the effects of the demographic variables (gender and age). Thus, the first part of this hypothesis was not supported based on the results. However, previous investigations on medical populations (e.g., cancer, SCI) have shown a relationship between effective problem-solving ability and lower levels of self reported depression (Elliott et al. 1991; Elliott, Herrick, & Witty, 1992; Nezu et al., 2003). Also, there are several studies that have demonstrated a significant relationship between ineffective problem-solving skills and greater depression in the medical population. As an example, this relationship has been identified with cancer patients (Nezu et al., 1995; Nezu et al., 1999). Researchers have examined the

caregiver's social problem-solving ability as predictors of depression in the congestive heart failure population. They found that the caregiver's NPO was predictive of depression (Kurylo et al., 2004).

In the second part of this hypothesis the patient and partner's social problem-solving abilities was hypothesized to predict the patient's anxiety. The patient and partner's social problem-solving abilities (PPO, NPO, RPS, ICS, AS) did not result in significant contributions to predicting the patient's self reported ratings of anxiety. This was found after controlling for the effects of the demographic variables (gender and age). Thus, the second part of this hypothesis was not supported based on the results. Although, to date there have not been any studies looking at the partner's social problem-solving ability as predictors of the patient's self reported ratings of anxiety, these findings contrast with past investigations examining the patient's problem-solving ability. Investigations with medical populations (e.g., cancer) that examined treatment packages including problem-solving therapy have demonstrated the patients experience significantly lower levels of anxiety (Fawzy, Cousins, Fawzy, Kemeny, Elashoff, & Morton, 1990; Fawzy, Fawzy, & Canada, 2001). Also, there are a few studies that have demonstrated a significant relationship between ineffective problem-solving skills and greater anxiety in the medical population. Individuals diagnosed with cancer with less effective problem-solving ability including lower RPS ability were associated

with higher levels of self reported ratings of anxiety (Nezu et al., 1995; Nezu et al., 1999).

In the third part of this hypothesis the patient and partner's social problem-solving abilities were hypothesized to predict the patient's health-related quality of life (PCS). The patient and partner's social problem-solving abilities (PPO, NPO, RPS, ICS, AS) did not result in significant contributions to predicting the patient's self reported ratings of health-related quality of life (PCS). This was found after controlling for the effects of the demographic variables (gender and age). Thus, the third part of this hypothesis was not supported based on the results. Effective problem-solving skills have been linked to better health-related quality of life in medical populations such as hypertension, cancer and diabetes (Allen et al., 2002; García-Vera, Labrador, & Sanz, 1997; Hill-Briggs, Yeh, Gary, Batts-Turner, D'Zurilla, & Brancati, 2007). Also, there are a few studies that have demonstrated a significant relationship between ineffective problem-solving ability and lower health-related quality of life in the medical population such as SCI and chronic pain patients (Herrick et al., 1994; Kerns, Rosenberg, & Otis, 2002). Nezu and colleagues reported that cancer patient's with higher ICS scores reported higher levels of cancer-related problems including physical activities and pain (Nezu et al., 1999). Elliott and colleagues have examined the caregiver's social problem-solving ability as predictors of health-related quality of life in the SCI population. They found that caregiver's tendencies to impulsively and

carelessly solve problems were predictive of pressure sores at one year follow-up (Elliott et al., 1999).

The initial three parts of this hypothesis were not supported based on the results. The simple explanation for the aforementioned findings is that the patient and partner's social problem-solving abilities are not predictive of the patient's depression, anxiety and health-related quality of life. However, it should be noted that the size of the sample for this investigation was much lower then needed to obtain adequate power, which can lead to the possible occurrence of Type II errors. In future investigations if the sample size were improved this might significantly increase the power and increase the possibility of detecting a relationship that is present. This topic and other problems with the study will be discussed more in the limitations section.

In the fourth part of this hypothesis the patient and partner's social problem-solving abilities were hypothesized to predict the patient's general quality of life. After controlling for the effects of the demographic variables (gender and age) in the first step, a significant relationship was found between the patient's social problem-solving ability dimensions (PPO, NPO, RPS, ICS, AS) and their general quality of life in the second step. However, examination of the β weight coefficients determined that none of the patient's social problem-solving ability dimensions (PPO, NPO, RPS, ICS, AS) were significant predictors of their general quality of life. Also, the partner's social problem-solving abilities (PPO, NPO, RPS, ICS, AS) did not result in

significant contributions to predicting the patient's general quality of life. Thus, overall the fourth part of this hypothesis was not supported based on the results. Although, to date there have not been any studies looking at the partner's social problem-solving ability as predictors of the patient's general quality of life, these findings contrast with past investigations examining the patient's problem-solving ability. Effective problem-solving skills have been linked to enhanced quality of life in medical populations such as cancer patients (Nezu et al., 2003). Research with cancer patients has also shown that ineffective problem-solving ability has been associated with lower quality of life (Nezu et al., 1998; Nezu et al., 1999).

Although a significant relationship was found between social problem-solving ability and general quality of life, examination of the coefficients table determined that none of the social problem-solving dimensions were significant predictors of general quality of life. Further analysis of the coefficients table revealed that none of the β weight coefficients trended toward significance. Again, a major factor in the results not being significant could be that the size of the sample for this investigation was much lower then needed to obtain adequate power. In future investigations if the sample size were improved this might significantly increase the power and increase the possibility of detecting a relationship between these variables. This topic and other problems with the study will be discussed more in the limitations section.

4.2.4. Neurocognitive Functioning

The cognitive functioning of CABG patients has been discussed in the literature for many years. Investigations have reported post-surgical complications ranging from diffuse cerebral dysfunction to major cerebrovascular events (Dyke et al., 2003). In this investigation the MMSE was used to better understand the patient's post-surgery neurocognitive functioning. In examining the overall scores the patients in this sample displayed a mean of 26.8 with a standard deviation of 2.53. The maximum score on this test is a 30. The above findings are very similar to statistics reached by Folstein and colleagues who reported a "normal" elderly sample had a mean of 27.6 with a standard deviation of 1.7. However, it was markedly different from the subjects with dementia (i.e., mean 9.6 and standard deviation 5.8). In looking at studies that have used the MMSE with the CABG population the above results are very similar. Blumenthal and colleagues reported subjects had a mean of 26.5 with a standard deviation of 2.6 (Blumenthal, Mahanna, Madden, White, Croughwell, & Newman, 1995). The current study and the investigation by Blumenthal and colleagues showed that these patients scored within more of a mild range of cognitive impairment (Cockrell & Folstein, 1988). Unfortunately, this study did not test the patients prior to surgery, which would have lead to a better understanding of potential cognitive change.

4.3. Implications of Findings

In the results there were two regression analyses that were significant and supportive of the hypothesis. These findings may have important clinical implications. In looking at these two predictions it appears that after having the surgery patients who rate their relationship as being more satisfying associate this with decreased levels of depression and a higher overall quality of life. More importantly as stated previous research supports the importance of this social support with CABG patients. This form of social support seems to help patients cope with some of the psychosocial effects of this complex medial procedure.

This information may be useful in helping mental health clinicians better understand the relationship between CABG patients and their partners, and how this effects the patient's psychosocial course soon after surgery. This information could also assist other healthcare team members. This would include medical team members that have regular contact with the CABG patient while they are inpatient after surgery (e.g., nurses, medical doctors, physical therapists) or after discharge (e.g., primary care physician, outpatient cardiothoracic surgery team). The mental health professionals could teach the other members of the medical team about the importance of these types of relationships. As previously reported there have been few studies looking at psycho-therapeutic modalities for CABG patients. Many of these interventions have been psychoeducational in format. Mental health clinicians could

develop evaluation and treatment strategies (e.g., psychoeducational) to help identify and assist patients having difficulty after the surgery.

In the study two results revealed significant predictors, but the coefficients table determined that the directions of the relationships were not as hypothesized. Again, as the patient's ratings of relationship satisfaction before surgery increases, their depressive scores increases and their general quality of life decreases. It is interesting that both of these results are found pre-surgery, but the same post-surgery examination supported the hypothesis. As the patient's ratings of relationship satisfaction after surgery increases, their depressive scores decreases and their general quality of life increases. It could be plausible that the satisfaction ratings prior to surgery are tied into significant stress related to preparing for the surgery and this is being revealed post-surgery. Unfortunately, this is unknown as pre-surgery levels of psychosocial distress were not obtained in the investigation. Although, these two findings should be reevaluated in a future study with a larger number of subjects, the findings maybe useful to clinicians when evaluating or treating patients pre-surgery. Clinicians working with patients that report having a satisfying and supportive relationship pre-surgery may need to carefully monitor for psychosocial problems after surgery.

Although, a significant relationship was found between the patient's social problem-solving ability dimensions and their general quality of life in this study, none of the social problem-solving ability dimensions were

significant predictors of general quality of life. As previously discussed if the sample size for the study were increased this could lead to more power for the analyses and the possibility of detecting a relationship between these variables. This finding is worth reexamining in a future investigation since previous research has demonstrated that effective social problem-solving ability have been linked to better quality of life and ineffective problem-solving ability has been linked to lower quality of life in medical patients. If future results determine that there is a significant link between the patient's social problem-solving ability and quality of life then problem solving training could be beneficial for CABG patients with quality of life problems. Mental health clinicians working with CABG patients might benefit from training in the social problem-solving model and using this as one key component in their therapeutic tool box. The social problem-solving skills could be used with other cognitive-behavioral therapeutic skills such as stress management/relaxation training to help combat the patient's difficulty with their post-surgery quality of life (e.g., problems with social functioning, work).

4.4. Limitations

The present study found relationships between a few of the independent variables and the patient's psychosocial and physical adjustment variables. However, these findings should be interpreted with great caution, especially in terms of generalizing these results to the CABG population. The following are

some of the main variables, measurement and methodological problems that should be taken into consideration when examining the results.

The main limitation of this study was the sample size, which fell well below the recommended minimal number of subjects for adequate power. An estimation of 115 dyads or 230 subjects (i.e., including patients and their partners) were required to have adequate power for the regression equations. The final number of subjects examined in the study was 31 dyads or 62 (i.e., including patients and their partners) were considerably short of this goal. This problem can lead to a strong possibility that Type II errors are occurring and that significant relationships exist, but are not being detected. If the sample size were increased, the possibility of detecting a relationship that is present might increase. Also, in the regression analyses section there were several tests conducted which could have effected the power.

Of the 115 dyads or 230 subjects (i.e., including patients and their partners) that were needed for the study, 59 dyads or 118 subjects were successfully recruited. However, 28 dyads or 56 did not follow through with sending in their research packets. Again, the final number of subjects examined in the study was 31 dyads or 62. The concept of selection bias should be considered when examining the findings. Some of the questions that need to be addressed in future studies include what are the factors that may predict who is more likely to volunteer and then complete this type of an investigation. Could these patients and partners be exhibiting better

psychosocial and physical adjustment pre and/or post-surgery? Possibly these patients and partners would report experiencing a more successful surgery and/or better overall hospital stay.

As this study was cross-sectional in design, causal or directional conclusions can not be made. Although, some significant associations were observed between the dyad relationships and the patient's psychosocial and physical functioning the directional nature of such relationships is still uncertain. As an example to the possible threat to internal validity, it is not certain whether the patient's higher levels of relationship satisfaction ratings after surgery lead to an increase in their quality of life scores or vice versa.

Another threat to internal validity is extraneous variable interference. In a correlational study like this one there was a possibility that a third variable is present. A third variable or construct has to be considered with any of the significant results. Several of the questionnaires that were used in this study have a good reputation of measuring what they are designed to measure (BSI, QOLI, SF-12v2, SPSI-R:S). However, no measure can account for every possible variable. In this study it would have been helpful to obtain more physical status variables that measure risk prediction. Many other studies have used the variables obtained in this study (e.g., history of CABG, history of angina, history of MI), but other very common factors that are examine include left ventricular ejection fraction, and history of hypertension and diabetes.

Problems with methodology have been discussed above such as the

investigations cross sectional design. Another important concern with a study like this is exclusive reliance on self-report measures to obtain the independent and dependent variables. The use of self-report measures could lead to problems related to distortion and social desirability. In this study the self-report method was important considering the general questions being investigated. As an example, it was thought that the best way to determine the patient's quality of life was to get the patients subjective judgment about their life circumstances. In the present investigations there was no evidence that distortion and social desirability were effecting the results.

Finally, as part of the study, there was an attempt to measure the dyad's relationship satisfaction. The two questions on the Background Information Form were constructed by the current investigators to obtain a simple and quick measurement because the participants were being asked to fill out several questionnaires that took 40 and 75 minutes (i.e., approximate length of time reported by the partners and patients, respectively). However, it is possible that these two questions were not sensitive enough to obtain an adequate understanding of the dyad's experience.

4.5. Future Directions

This was one of the first studies to focus on how the partner's well-being impacts the CABG patient's psychosocial and physical status post-surgery. Also, it is the first known study to examine the role of the social problem-solving model with both CABG patients and their partners. The

investigation's findings provided information that maybe important for future research.

As discussed in the limitations section possibly the most important problem with the current study was the low sample size. It would be important to try to replicate these results, but future investigations should focus on obtaining a larger sample to increase the power of the study for the analyses. This would help to find any significant relationships that might be present.

Possibly the most important findings from this study related to the patient's ratings of relationship satisfaction. The patient's rating of relationship satisfaction after surgery was associated with their depression and general quality of life as hypothesized. It would be important to replicate these results in a study with a larger number of subjects. One of the objectives of the new study would be to test the two significant findings that did not support the hypothesis. The investigation would benefit from obtaining pre-surgery ratings of psychosocial variables such as depression, anxiety and quality of life. Would the patient's pre-surgery satisfaction ratings still be significant predictors on depression and quality of life and what would be the direction of the relationship? Again, as discussed in the limitations section the measure used in this study may have methodological problems. Future researchers may want to use an established measure with good validity and reliability such as Spanier's Dyadic Adjustment Scale (Spanier, 1976). This measure has been used in numerous studies over the past 30 years. In addition to replicating the

post-surgery results on patient's relationship satisfaction, future studies may want to look at interventions that focus on providing information and coping strategies on the importance of relationship satisfaction and support post-surgery and examine how this effects the patient's depression and quality of life.

It has been argued in this and other studies that CABG patients and their partners are in need of efficacious therapeutic psychosocial interventions. Social problem-solving therapy is based on a cognitive behavioral model that has a history of success with many populations which include medical patients and their caregivers. It would be interesting to consider research using this model in a multi-therapeutic approach with the CABG population and their partners. Nezu, Nezu, & Jain (2005) discussed such an idea with cardiac and non cardiac patients using social problem-solving skills with other cognitive behavioral skills (e.g., challenging negative thoughts) and stress management skills (e.g., deep breathing). However, at the present time, such an investigation with the CABG dyads may not be warranted based on the current findings. Unfortunately, the patient and partner's social problem-solving abilities were not predictive of the dependent variables in this study. However, as noted in the limitations section the study had problems with the main focus being on the sample size. Future research may benefit from examining the model again with the CABG dyads using a larger sample to increase the power for the analyses.

This study failed to find significant associations between the partner's psychosocial distress and the patient's psychological distress, health-related and general quality of life. However, some of these associations have been found by Halm et al. (2006) and Ruiz et al. (2006). Given that the findings from these other studies support exploring the original hypothesis, other factors should be explored. Again, one major methodological problem was the low sample size. It should be noted the aforementioned studies both had samples over 100. It would be important to continue exploring these relationships in future studies that obtain adequate sample sizes.

It would be beneficial in a future project to reduce possible effects of a third variable or construct. In the present study this was clearly seen with the first hypothesis. Although, this study obtained several important physical status variables (e.g., history of CABG, history of MI), future studies should attempt to obtain other common variables (e.g., left ventricular ejection fraction, history of hypertension) that have been associated with the patient's post-surgery health-related and general quality of life.

The investigators were unable to talk with many of the 28 dyads or 56 subjects that decided not to participate in the study after initially consenting. However, the investigators were able to briefly talk with approximately 12 subjects and/or partners when they returned for another follow-up session with their surgeon in the outpatient cardiology clinic. These subjects provided various responses about filling out the questionnaires such as they still planned

to fill out the questionnaires and mail them in or they were so busy with the recovery process they had misplaced the packets, but planned to find them and send them in, or they did not have time to complete them. There are many options for strengthening data collection in future studies. Investigators may want to consider the following options when attempting too obtain the take-home questionnaire packet. Investigators may want to provide a reminder for the dyads such as follow-up phone calls or a letter in the mail about completing and returning the packets. Also, it may be helpful for some dyads to have the investigators administer the questionnaires on the phone or possibly go to their homes to administer the measures. These options should only be undertaken after obtaining IRB approval and consent from the dyads. However, as noted above some of these dyads mentioned that time was a primary component in their decision not to complete the packet. Future investigators may want to consider shorter measures, especially related to obtaining information on depression and anxiety. As an example the Beck Depression Inventory-II and Beck Anxiety Inventory could be used instead of the BSI (Beck & Steer, 1993; Beck, Steer, & Brown, 1996).

Finally, if future research is going to examine the patient's neurocognitive functioning then the researchers may want to consider testing for cognitive changes by assessing the patients pre and post-surgery, which was not done in this study. Although, the MMSE has been used with the cardiac population and specifically CABG patients it has been suggested by

one research team that the test may not be sensitive enough by itself to detect cognitive changes with cardiac patients after surgery (Burker, Blumenthal, Feldman, Thyrum, Mahanna, White, Smith, Lewis, Croughwell, Schell, Newman, & Reves, 1995). Other tests (e.g., sections of the Wechsler Adult Intelligence Scale–Revised) may need to be included or used in place of the MMSE to better detect these changes (Burker et al., 1995).

5. SUMMARY AND CONCLUSIONS

CAD is the leading cause of death in males and females in the United States and the CABG procedure is still considered one of the most effective treatments modalities for CAD. The overall body of literature has produced mixed results related to the impact of several CABG dyad's psychosocial and physical adjustment variables on the patient's well-being post-surgery. In addition, new studies are starting to find that the partner's psychosocial factors impact the CABG patient's well being post-surgery. To date there have not been many studies examining specific interventions to help patients cope with the distress related to the CABG process.

This study set out to test if the CABG patient's physical status variables would predict their post-surgical health-related quality of life. The study examined whether the patient and partner's ratings of relationship satisfaction would predict the patient's post-surgical psychosocial and physical adjustment. Also, this objective examined whether the partner's psychological functioning would predict the patient's post-surgical psychosocial and physical adjustment. Finally, the investigation focused on examining whether the patient and the partner's social problem-solving ability would predict the patient's post-surgical psychosocial and physical adjustment.

The significant results from this investigation revealed that the patient's ratings of relationship satisfaction before and after surgery were associated with their post-surgical psychosocial functioning. As

expected the patient's reporting greater relationship satisfaction after surgery experienced lower depression and greater general quality of life post-surgery. However, two significant findings emerged that did not support the hypotheses. Patient's reporting higher levels of relationship satisfaction before surgery had an increase in depressive scores and a decrease in general quality of life post-surgery.

The clinical implications for this study are mainly focused on the patient's ratings of relationship satisfaction before and after surgery. The CABG patient's satisfaction with their partner post-surgery appears to be an important coping mechanism related to their mood and quality of life. Although, the patient's pre-surgery relationship satisfaction was a significant predictor of their psychosocial adjustment, the directions of the relationships were not as hypothesized. These are positive first steps in better assessing and understanding what these patients experience after surgery. However, more research with a larger sample size is called for to reexamine the relationship satisfaction and social problem-solving variables before developing psychological intervention programs for these patients and their partners.

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APPENDIX 1: TABLES

Table 1. Descriptive Summary of Patient Demographic Information (N = 31)

Variable	Percentage	*M*	*SD*	Minimum	Maximum
Race/Ethnicity					
Caucasian	93.5%	__	__	__	__
African American	6.5%	__	__	__	__
Other	0.0%	__	__	__	__
Education					
20 Years	6.5%	__	__	__	__
18 Years	12.9%	__	__	__	__
16 Years	19.4%	__	__	__	__
15 Years	3.2%	__	__	__	__
12 Years	48.4%	__	__	__	__
10 Years	3.2%	__	__	__	__
8 Years	3.2%	__	__	__	__
6 Years	3.2%	__	__	__	__
Occupational Status					
Retired	45.2%	__	__	__	__
Employed	35.5%	__	__	__	__
Unemployed	12.9%	__	__	__	__
Disabled	6.5%	__	__	__	__
Annual Salary					
< $25,000	25.8%	__	__	__	__
$25,000 to $50,000	25.8%	__	__	__	__
$50,000 to $75,000	38.7%	__	__	__	__
$75,000 to $100,000	3.2%	__	__	__	__
> $100,000	6.5%	__	__	__	__
Dyads: Type of Relationship					
Heterosexual-married	71.0%	__	__	__	__
Heterosexual-common law married	9.7%	__	__	__	__

Table 1 (continued).

Variable	Percentage	*M*	*SD*	Minimum	Maximum
Heterosexual-not married	16.1%	__	__	__	__
Same Sex	3.2%	__	__	__	__
Dyads: Years in Relationship	__	26	16	2.5	56

Note. Patient's demographic data (race/ethnicity, education, occupational status, annual salary, dyads: type of relationship, dyads: years in relationship).

Table 2. Descriptive Summary of Partner Demographic Information (N = 31)

Variable	Percentage	*M*	*SD*	Minimum	Maximum
Gender					
Males	25.8%	—	—	—	—
Females	74.2%	—	—	—	—
Age	—	60.64	9.43	43	77
Race/Ethnicity					
Caucasian	93.5%	—	—	—	—
African American	6.5%	—	—	—	—
Other	0.0%	—	—	—	—
Education					
18 Years	3.2%	—	—	—	—
16 Years	29.0%	—	—	—	—
15 Years	3.2%	—	—	—	—
14 Years	6.5%	—	—	—	—
12 Years	48.4%	—	—	—	—
11 Years	6.5%	—	—	—	—
10 Years	3.2%	—	—	—	—
Occupational Status					
Retired	29.0%	—	—	—	—
Employed	54.8%	—	—	—	—
Unemployed	16.1%	—	—	—	—
Annual Salary					
< $25,000	32.3%	—	—	—	—
$25,000 to $50,000	25.8%	—	—	—	—
$50,000 to $75,000	32.3%	—	—	—	—
$75,000 to $100,000	3.2%	—	—	—	—
> $100,000	6.5%	—	—	—	—

Table 2 (continued).

Variable	Percentage	*M*	*SD*	Minimum	Maximum
Dyads: Type of Relationship					
Heterosexual-married	71.0%	__	__	__	__
Heterosexual-common law married	9.7%	__	__	__	__
Heterosexual-not married	16.1%	__	__	__	__
Same Sex	3.2%	__	__	__	__
Dyads: Years in Relationship	__	26	16	2.5	56

Note. Partner's demographic data (gender, age, race/ethnicity, education, occupational status, annual salary, dyads: type of relationship, dyads: years in relationship).

Table 3. Descriptive Summary of Independent and Dependent Variables under Investigation for Patients

Variable	Percentage	*M*	*SD*	Minimum	Maximum
Gender		1.22	.42	1	2
Males	77.4%	—	—	—	—
Females	22.6%	—	—	—	—
Age	—	62.54	9.42	46	82
History of CVD/ CAD	—	.41	.50	.00	1
Yes:	41.9%	—	—	—	—
No:	58.1%	—	—	—	—
History of CABG	—	.09	.30	.00	1
Yes:	9.7%	—	—	—	—
No:	90.3%	—	—	—	—
Number of Vessels Bypassed	—	2.96	1.16	1	6
One vessel	3.2%	—	—	—	—
Two vessels	41.9%	—	—	—	—
Three vessels	22.6%	—	—	—	—
Four vessels	22.6%	—	—	—	—
Five vessels	6.5%	—	—	—	—
Six vessels	3.2%	—	—	—	—
History of Angina	—	.45	.50	.00	1
Yes:	45.2%	—	—	—	—
No:	54.8%	—	—	—	—
History of MI	—	.29	.46	.00	1
Yes:	29.0%	—	—	—	—
No:	71.0%	—	—	—	—
Satisfaction Before Surgery	—	6.38	1.02	2	7
Very satisfied	58.1%	—	—	—	—
Satisfied	32.3%	—	—	—	—
Somewhat-satisfied	6.5%	—	—	—	—
Unsatisfied	3.2%	—	—	—	—
Satisfaction After Surgery	—	6.35	.91	3	7
Very satisfied	54.8%	—	—	—	—
Satisfied	32.3%	—	—	—	—
Somewhat-satisfied	9.7%	—	—	—	—

Table 3 (continued).

Variable	Percentage	*M*	*SD*	Minimum	Maximum
Somewhat-unsatisfied	3.2%	__	__	__	__
Positive Problem Orientation	__	13	4.13	4	20
Negative Problem Orientation	__	3	3.83	.00	14
Rational Problem Solving	__	13	3.75	5	20
Impulsivity-Carelessness Style	__	4	3.46	.00	13
Avoidance Style	__	3	3.65	.00	12
Depression	__	.21	.24	.00	.83
Anxiety	__	.21	.25	.00	.67
Physical Component Summary	__	33.71	9.34	18.90	55.30
QOLI	__	2.86	1.69	-.75	6

Note. Patient's demographic data (gender and age), and patient's physical status variables (CVD/CAD = history of cardiovascular disease/coronary artery disease, CABG = history of coronary artery bypass graft surgery, number of vessels that were bypassed, history of angina, and MI = history of myocardial infarction. Patient's satisfaction with relationship before and after the surgery, social problem solving = positive problem orientation, negative problem orientation, rational problem solving, impulsivity-carelessness style, and avoidance style, self reported depression and anxiety, patient's physical component summary, and quality of life inventory scores.

Table 4. Descriptive Summary of Independent and Dependent Variables under Investigation for Partners

Variable	Percentage	*M*	*SD*	Minimum	Maximum
Satisfaction Before Surgery	__	6.03	1.51	1	7
Very satisfied	48.4%	__	__	__	__
Satisfied	32.3%	__	__	__	__
Somewhat-satisfied	12.9%	__	__	__	__
Very unsatisfied	6.5%	__	__	__	__
Satisfaction After Surgery	__	5.93	1.59	1	7
Very satisfied	45.2%	__	__	__	__
Satisfied	35.5%	__	__	__	__
Somewhat-satisfied	9.7%	__	__	__	__
Somewhat-unsatisfied	3.2%	__	__	__	__
Very unsatisfied	6.5%	__	__	__	__
Depression	__	.21	.24	.00	.83
Anxiety	__	.34	.33	.00	1.35
Positive Problem Orientation	__	14	3.56	4	20
Negative Problem Orientation	__	3	2.99	.00	11
Rational Problem Solving	__	12	3.41	6	19
Impulsivity-Carelessness Style	__	4	2.65	.00	10
Avoidance Style	__	3	2.74	.00	10

Note. Partner's satisfaction with relationship before and after the surgery, self reported depression and anxiety, social problem solving = positive problem orientation, negative problem orientation, rational problem solving, impulsivity-carelessness style, and avoidance style.

Table 5. Patient's Neurocognitive Functioning Summary Information

Variable	Percentage	*M*	*SD*	Minimum	Maximum
MMSE-					
Total score	__	26.8	2.53	21	30
Total score					
30	16.1%	__	__	__	__
29	9.7%	__	__	__	__
28	16.1%	__	__	__	__
27	22.6%	__	__	__	__
26	12.9%	__	__	__	__
25	6.5%	__	__	__	__
24	3.2%	__	__	__	__
22	9.7%	__	__	__	__
21	3.2%	__	__	__	__

Note. MMSE = Mini-Mental State Examination.

Table 6. Intercorrelations between Independent and Dependent Variables-Patient

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
1. Gender																		
2. Age	-.032																	
3. History of CVD/CAD	-.146	.387*																
4. History of CABG	-.177	-.055	.385*															
5. # of Vessels Bypassed	.216	-.080	-.033	-.276														
6. History of Angina	.130	-.005	.148	-.297	.251													
7. History of MI	-.005	.445*	.753**	-.209	.142	.276												
8. Satisfaction before surgery	-.131	.192	.258	.199	-.017	-.285	.107											
9. Satisfaction after surgery	-.127	.220	.246	.235	-.020	-.286	.064	.918**										
10. PPO	.135	.064	.355*	-.121	-.146	.116	.358*	.197	.166									
11. NPO	.117	-.086	-.277	-.169	.384*	.282	-.123	-.420*	-.463**	-.564**								
12. RPS	.206	.083	.105	-.133	-.098	.083	.145	.009	.051	.787**	-.491**							
13. ICS	.116	-.073	-.152	.047	.279	.271	-.095	-.330	-.318	-.330	.763**	-.224						
14. AS	.056	-.162	-.369*	-.166	.309	.130	-.225	-.525**	-.602**	-.275	.545**	-.074	.526**					
15 Depression	-.337	.120	.350	.078	.006	.109	.395*	.023	-.139	-.072	.069	-.379*	.022	.027				
16. Anxiety	-.011	.089	.164	.223	.133	.062	.095	-.101	-.129	-.033	.087	-.231	.084	.029	.566**			
17. PCS	.118	.054	-.016	-.052	-.289	.142	-.077	.354	.265	.126	-.023	.217	-.060	-.308	-.292	-.311		
18. QOLI	-.031	.287	.314	-.009	.030	-.071	.214	.510**	.667**	.339	-.410*	.267	-.226	-.559**	-.048	.029	.166	

Note. Patient's demographic data (gender and age), and patient's physical status variables (CVD/CAD = history of cardiovascular disease/coronary artery disease, CABG = history of coronary artery bypass graft surgery, number of vessels that were bypassed, history of angina, and MI = history of myocardial infarction. Patient's satisfaction with relationship before and after the surgery, self reported depression and anxiety, social problem solving = positive problem orientation, negative problem orientation, rational problem solving, impulsivity-carelessness style, and avoidance style, patient's physical component summary, and quality of life inventory scores.

* = Correlation is significant at the 0.05 level, ** = Correlation is significant at the 0.01 level.

Table 7. Intercorrelations between Independent and Dependent Variables–Partner

Variable	1. Partner Satisfaction Before Surgery	2. Partner Satisfaction After Surgery	3. Partner Depression	4. Partner Anxiety	5. Partner PPO	6. Partner NPO	7. Partner RPS	8. Partner ICS	9. Partner AS
1. Gender	.247	.269	-.066	-.096	.072	-.185	.281	-.134	-.146
2. Age	.136	.151	.297	.145	-.192	-.110	-.302	-.268	-.222
3. History of CVD/CAD	.113	.119	.258	.073	.153	-.234	.008	-.185	-.220
4. History of CABG	.212	.223	-.218	-.119	.030	-.323	.068	-.123	-.181
5. # of Vessels Bypassed	-.056	-.001	.313	.056	-.091	-.004	.025	-.068	-.019
6. History of Angina	-.150	-.211	.374*	.134	.102	.283	.183	.123	.138
7. History of MI	.034	.026	.440*	-.060	.140	-.150	.006	-.267	-.170
8. Satisfaction before surgery	.121	.139	-.041	.133	.237	-.119	-.063	-.021	-.225
9. Satisfaction after surgery	.088	.154	-.087	.078	.241	-.211	-.007	-.180	-.342
10. PPO	-.153	-.194	.145	.097	.198	-.038	.411*	.077	-.071
11. NPO	-.233	-.239	-.051	.048	-.278	.357*	-.327	.225	.380*
12. RPS	.017	-.043	.155	-.027	.119	-.053	.407*	-.168	-.061
13. ICS	-.196	-.244	.032	-.089	-.147	.285	-.105	.179	.367*
14. AS	-.346	-.356*	.163	.043	-.534**	.275	-.074	.036	.458**
15. Depression	-.079	-.133	.319	.022	.005	.024	-.054	.021	.029
16. Anxiety	-.016	-.003	.102	-.060	.049	-.058	.173	-.121	-.213
17. PCS	.213	.132	-.162	.198	.230	.124	-.201	.161	-.060
18. QOLI	.205	.257	.045	.143	.263	-.294	.032	-.197	-.499**

Note. Patient's demographic data (gender and age), and patient's physical status variables (CVD/CAD = history of cardiovascular disease/coronary artery disease, CABG = history of coronary artery bypass graft surgery, number of vessels that were bypassed, history of angina, and MI = history of myocardial infarction. Patient and partner's satisfaction with relationship before and after the surgery, self reported depression and anxiety, social problem solving = positive problem orientation, negative problem orientation, rational problem solving, impulsivity-carelessness style, and avoidance style, patient's physical component summary, and quality of life inventory scores.

* = Correlation is significant at the 0.05 level, ** = Correlation is significant at the 0.01 level.

Table 8. Hierarchical Regression Analyses: Patient's Physical Status Variables Related to the Physical Component Summary (PCS)

Model Summary

Model					Change Statistics					
	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	η^2
1	.132(a)	.017	-.053	9.58497	.017	.248	2	28	.782	
2	.468(b)	.219	-.018	9.42629	.202	1.190	5	23	.345	0.46

Note:
a. Predictors: (Constant), Gender of patient, Age of patient
b. Predictors: (Constant), Gender of patient, Age of patient, History of cardiovascular disease/coronary artery disease, History of coronary artery bypass graft surgery, Number of vessels that were bypassed, History of angina, History of myocardial infarction
c. Dependent Variable: Patient's Physical Component Summary (PCS)
* = Correlation is significant at the 0.05 level, ** = Correlation is significant at the 0.01 level, *** = Correlation is significant at the 0.0005 level

Coefficients

		Standardized Coefficients		
Model		Beta	t	Sig.
2	Gender of Patient	.186	.965	.344
	Age of Patient	.060	.286	.778
	History of CVD/CAD	.584	1.071	.295
	History of CABG	-.423	-1.129	.270
	# of Vessels Bypassed	-.376	-1.883	.072
	History of Angina	.173	.825	.418
	History of MI	-.625	-1.251	.223

Note:
Dependent Variable: Patient's Physical Component Summary (PCS)
* = Correlation is significant at the 0.05 level, ** = Correlation is significant at the 0.01 level, *** = Correlation is significant at the 0.0005 level

Table 9. Hierarchical Regression Analyses: Patient and Partner's Ratings of Relationship Satisfaction Before and After Surgery, and Partner's Self Reported Ratings of Depression and Anxiety Related to Depression

Model					Change Statistics					
	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	η^2
1	.354(a)	.126	.063	.23592	.126	2.010	2	28	.153	
2	.554(b)	.307	.201	.21792	.182	3.408	2	26	*.048	
3	.610(c)	.372	.144	.22556	.065	.567	4	22	.689	0.60

Note:
a. Predictors: (Constant), Gender of patient, Age of patient
b. Predictors: (Constant), Gender of patient, Age of patient, Patient's Ratings of Relationship Satisfaction Before Surgery, Patient's Ratings of Relationship Satisfaction After Surgery
c. Predictors: (Constant), Gender of patient, Age of patient, Patient's Ratings of Relationship Satisfaction Before Surgery, Patient's Ratings of Relationship Satisfaction After Surgery, Partner's Ratings of Relationship Satisfaction Before Surgery, Partner's Ratings of Relationship Satisfaction After Surgery, Partner's Self Reported Ratings of Depression, Partner's Self Reported Ratings of Anxiety
d. Dependent Variable: Patient's Depression
* = Correlation is significant at the 0.05 level, ** = Correlation is significant at the 0.01 level, *** = Correlation is significant at the 0.0005 level

Coefficients

		Standardized Coefficients		
Model		Beta	t	Sig.
3	Gender of Patient	-.327	-1.820	.082
	Age of Patient	.108	.577	.570
	Patient: Satisfaction Before Surgery	.982	2.062	*.050
	Patient: Satisfaction After Surgery	-1.075	-2.171	*.041
	Partner: Satisfaction Before Surgery	-.222	-.275	.786
	Partner: Satisfaction After Surgery	.159	.193	.849
	Partner: Depression	.263	1.392	.178
	Partner: Anxiety	-.153	-.810	.427

Note:
Dependent Variable: Patient's Depression
* = Correlation is significant at the 0.05 level, ** = Correlation is significant at the 0.01 level, *** = Correlation is significant at the 0.0005 level

Table 10. Hierarchical Regression Analyses: Patient and Partner's Ratings of Relationship Satisfaction Before and After Surgery, and Partner's Self Reported Ratings of Depression and Anxiety Related to Anxiety

Model					Change Statistics					
	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	η^2
1	.090(a)	.008	-.063	.26282	.008	.113	2	28	.893	
2	.184(b)	.034	-.115	.26915	.026	.350	2	26	.708	
3	.249(c)	.062	-.279	.28834	.028	.163	4	22	.955	0.24

Note:
a. Predictors: (Constant), Gender of patient, Age of patient
b. Predictors: (Constant), Gender of patient, Age of patient, Patient's Ratings of Relationship Satisfaction Before Surgery, Patient's Ratings of Relationship Satisfaction After Surgery
c. Predictors: (Constant), Gender of patient, Age of patient, Patient's Ratings of Relationship Satisfaction Before Surgery, Patient's Ratings of Relationship Satisfaction After Surgery, Partner's Ratings of Relationship Satisfaction Before Surgery, Partner's Ratings of Relationship Satisfaction After Surgery, Partner's Self Reported Ratings of Depression, Partner's Self Reported Ratings of Anxiety
d. Dependent Variable: Patient's Anxiety
* = Correlation is significant at the 0.05 level, ** = Correlation is significant at the 0.01 level, *** = Correlation is significant at the 0.0005 level

Coefficients

		Standardized Coefficients		
Model		Beta	t	Sig.
3	Gender of Patient	-.037	-.170	.867
	Age of Patient	.107	.469	.644
	Patient: Satisfaction Before Surgery	.287	.493	.627
	Patient: Satisfaction After Surgery	-.444	-.734	.471
	Partner: Satisfaction Before Surgery	-.620	-.630	.535
	Partner: Satisfaction After Surgery	.603	.599	.556
	Partner: Depression	.098	.424	.676
	Partner: Anxiety	-.085	-.368	.716

Note:
Dependent Variable: Patient's Anxiety
* = Correlation is significant at the 0.05 level, ** = Correlation is significant at the 0.01 level, *** = Correlation is significant at the 0.0005 level

Table 11. Hierarchical Regression Analyses: Patient and Partner's Ratings of Relationship Satisfaction Before and After Surgery, and Partner's Self Reported Ratings of Depression and Anxiety Related to the Physical Component Summary (PCS)

Model					Change Statistics					
	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	η^2
1	.132(a)	.017	-.053	9.58497	.017	.248	2	28	.782	
2	.418(b)	.175	.048	9.11430	.158	2.483	2	26	.103	
3	.614(c)	.377	.151	8.60706	.202	1.789	4	22	.167	0.61

Note:
a. Predictors: (Constant), Gender of patient, Age of patient
b. Predictors: (Constant), Gender of patient, Age of patient, Patient's Ratings of Relationship Satisfaction Before Surgery, Patient's Ratings of Relationship Satisfaction After Surgery
c. Predictors: (Constant), Gender of patient, Age of patient, Patient's Ratings of Relationship Satisfaction Before Surgery, Patient's Ratings of Relationship Satisfaction After Surgery, Partner's Ratings of Relationship Satisfaction Before Surgery, Partner's Ratings of Relationship Satisfaction After Surgery, Partner's Self Reported Ratings of Depression, Partner's Self Reported Ratings of Anxiety
d. Dependent Variable: Patient's Physical Component Summary (PCS)
* = Correlation is significant at the 0.05 level, ** = Correlation is significant at the 0.01 level, *** = Correlation is significant at the 0.0005 level

Coefficients

		Standardized Coefficients		
Model		Beta	t	Sig.
3	Gender of Patient	.172	.960	.347
	Age of Patient	.057	.307	.762
	Patient: Satisfaction Before Surgery	.267	.562	.580
	Patient: Satisfaction After Surgery	.082	.167	.869
	Partner: Satisfaction Before Surgery	1.687	2.105	.057
	Partner: Satisfaction After Surgery	-1.574	-1.916	.068
	Partner: Depression	-.292	-1.548	.136
	Partner: Anxiety	.198	1.048	.306

Note:
Dependent Variable: Patient's Physical Component Summary (PCS)
* = Correlation is significant at the 0.05 level, ** = Correlation is significant at the 0.01 level, *** = Correlation is significant at the 0.0005 level

Table 12. Hierarchical Regression Analyses: Patient and Partner's Ratings of Relationship Satisfaction Before and After Surgery, and Partner's Self Reported Ratings of Depression and Anxiety Related to Quality of Life (QOLI)

Model					Change Statistics					
	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	η^2
1	.288(a)	.083	.017	1.68062	.083	1.263	2	28	.298	
2	.730(b)	.532	.460	1.24525	.450	12.501	2	26	***.000	
3	.766(c)	.587	.437	1.27167	.055	.733	4	22	.579	0.76

Note:
a. Predictors: (Constant), Gender of patient, Age of patient
b. Predictors: (Constant), Gender of patient, Age of patient, Patient's Ratings of Relationship Satisfaction Before Surgery, Patient's Ratings of Relationship Satisfaction After Surgery
c. Predictors: (Constant), Gender of patient, Age of patient, Patient's Ratings of Relationship Satisfaction Before Surgery, Patient's Ratings of Relationship Satisfaction After Surgery, Partner's Ratings of Relationship Satisfaction Before Surgery, Partner's Ratings of Relationship Satisfaction After Surgery, Partner's Self Reported Ratings of Depression, Partner's Self Reported Ratings of Anxiety
d. Dependent Variable: Patient's Quality of Life (QOLI)
* = Correlation is significant at the 0.05 level, ** = Correlation is significant at the 0.01 level, *** = Correlation is significant at the 0.0005 level

Coefficients

		Standardized Coefficients		
Model		Beta	t	Sig.
3	Gender of Patient	.014	.094	.926
	Age of Patient	.072	.473	.641
	Patient: Satisfaction Before Surgery	-.804	-2.082	*.049
	Patient: Satisfaction After Surgery	1.376	3.427	**.002
	Partner: Satisfaction Before Surgery	.334	.512	.614
	Partner: Satisfaction After Surgery	-.133	-.199	.844
	Partner: Depression	.064	.420	.678
	Partner: Anxiety	.153	1.000	.328

Note:
Dependent Variable: Patient's Quality of Life (QOLI)
* = Correlation is significant at the 0.05 level, ** = Correlation is significant at the 0.01 level, *** = Correlation is significant at the 0.0005 level

Table 13. Hierarchical Regression Analyses: Patient and Partner's Social Problem-Solving Ability Related to Depression

Model					Change Statistics					
	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	η^2
1	.354(a)	.126	.063	.23592	.126	2.010	2	28	.153	
2	.628(b)	.394	.209	.21670	.268	2.037	5	23	.111	
3	.684(c)	.467	.112	.22963	.073	.497	5	18	.775	0.68

Note:
a. Predictors: (Constant), Gender of patient, Age of patient
b. Predictors: (Constant), Gender of patient, Age of patient, Patient's Positive Problem Orientation, Patient's Negative Problem Orientation, Patient's Rational Problem Solving, Patient's Impulsivity-Carelessness Style, Patient's Avoidance Style
c. Predictors: (Constant), Gender of patient, Age of patient, Patient's Positive Problem Orientation, Patient's Negative Problem Orientation, Patient's Rational Problem Solving, Patient's Impulsivity-Carelessness Style, Patient's Avoidance Style, Partner's Positive Problem Orientation, Partner's Negative Problem Orientation, Partner's Rational Problem Solving, Partner's Impulsivity-Carelessness Style, Partner's Avoidance Style
d. Dependent Variable: Patient's Depression
* = Correlation is significant at the 0.05 level, ** = Correlation is significant at the 0.01 level, *** = Correlation is significant at the 0.0005 level

Coefficients

		Standardized Coefficients		
Model		Beta	t	Sig.
3	Gender of Patient	-.308	-1.505	.150
	Age of Patient	.181	.889	.386
	Patient's Positive Problem Orientation	.856	2.341	.061
	Patient's Negative Problem Orientation	.024	.064	.950
	Patient's Rational Problem Solving	-1.051	-3.122	.066
	Patient's Impulsivity-Carelessness Style	-.004	-.015	.988
	Patient's Avoidance Style	.355	1.030	.316
	Partner's Positive Problem Orientation	.224	.635	.534
	Partner's Negative Problem Orientation	.067	.217	.830
	Partner's Rational Problem Solving	.035	.095	.925
	Partner's Impulsivity-Carelessness Style	-.265	-.915	.372
	Partner's Avoidance Style	-.046	-.127	.900

Note:
Dependent Variable: Patient's Depression
* = Correlation is significant at the 0.05 level,
** = Correlation is significant at the 0.01 level,
*** = Correlation is significant at the 0.0005 level

Table 14. Hierarchical Regression Analyses: Patient and Partner's Social Problem-Solving Ability Related to Anxiety

Model					Change Statistics					
	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	η^2
1	.090(a)	.008	-.063	.26282	.008	.113	2	28	.893	
2	.385(b)	.148	-.111	.26869	.140	.758	5	23	.589	
3	.692(c)	.478	.131	.23769	.330	2.278	5	18	.090	0.69

Note:
a. Predictors: (Constant), Gender of patient, Age of patient
b. Predictors: (Constant), Gender of patient, Age of patient, Patient's Positive Problem Orientation, Patient's Negative Problem Orientation, Patient's Rational Problem Solving, Patient's Impulsivity-Carelessness Style, Patient's Avoidance Style
c. Predictors: (Constant), Gender of patient, Age of patient, Patient's Positive Problem Orientation, Patient's Negative Problem Orientation, Patient's Rational Problem Solving, Patient's Impulsivity-Carelessness Style, Patient's Avoidance Style, Partner's Positive Problem Orientation, Partner's Negative Problem Orientation, Partner's Rational Problem Solving, Partner's Impulsivity-Carelessness Style, Partner's Avoidance Style
d. Dependent Variable: Patient's Anxiety
* = Correlation is significant at the 0.05 level, ** = Correlation is significant at the 0.01 level, *** = Correlation is significant at the 0.0005 level

Coefficients

		Standardized Coefficients		
Model		Beta	t	Sig.
3	Gender of Patient	-.160	-.791	.439
	Age of Patient	.236	1.169	.258
	Patient's Positive Problem Orientation	.421	1.163	.260
	Patient's Negative Problem Orientation	.127	.345	.734
	Patient's Rational Problem Solving	-.748	-2.245	.068
	Patient's Impulsivity-Carelessness Style	.076	.266	.793
	Patient's Avoidance Style	.259	.760	.457
	Partner's Positive Problem Orientation	-.131	-.376	.712
	Partner's Negative Problem Orientation	.558	1.830	.084
	Partner's Rational Problem Solving	.714	1.978	.063
	Partner's Impulsivity-Carelessness Style	.006	.022	.983
	Partner's Avoidance Style	-.878	-2.469	.064

Note:
Dependent Variable: Patient's Anxiety
* = Correlation is significant at the 0.05 level,
** = Correlation is significant at the 0.01 level,
*** = Correlation is significant at the 0.0005 level

Table 15. Hierarchical Regression Analyses: Patient and Partner's Social Problem-Solving Ability Related to the Physical Component Summary (PCS)

Model					Change Statistics					
	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	η^2
1	.132(a)	.017	-.053	9.58497	.017	.248	2	28	.782	
2	.516(b)	.266	.043	9.13939	.249	1.559	5	23	.211	
3	.713(c)	.508	.180	8.45790	.242	1.771	5	18	.170	0.71

Note:
a. Predictors: (Constant), Gender of patient, Age of patient
b. Predictors: (Constant), Gender of patient, Age of patient, Patient's Positive Problem Orientation, Patient's Negative Problem Orientation, Patient's Rational Problem Solving, Patient's Impulsivity-Carelessness Style, Patient's Avoidance Style
c. Predictors: (Constant), Gender of patient, Age of patient, Patient's Positive Problem Orientation, Patient's Negative Problem Orientation, Patient's Rational Problem Solving, Patient's Impulsivity-Carelessness Style, Patient's Avoidance Style, Partner's Positive Problem Orientation, Partner's Negative Problem Orientation, Partner's Rational Problem Solving, Partner's Impulsivity-Carelessness Style, Partner's Avoidance Style
d. Dependent Variable: Patient's Physical Component Summary (PCS)
* = Correlation is significant at the 0.05 level, ** = Correlation is significant at the 0.01 level, *** = Correlation is significant at the 0.0005 level

Coefficients

		Standardized Coefficients		
Model		Beta	t	Sig.
3	Gender of Patient	.199	1.013	.324
	Age of Patient	-.101	-.515	.613
	Patient's Positive Problem Orientation	-.112	-.318	.754
	Patient's Negative Problem Orientation	.186	.521	.609
	Patient's Rational Problem Solving	.611	1.888	.075
	Patient's Impulsivity-Carelessness Style	-.096	-.346	.733
	Patient's Avoidance Style	-.064	-.195	.848
	Partner's Positive Problem Orientation	.681	2.007	.060
	Partner's Negative Problem Orientation	.085	.287	.778
	Partner's Rational Problem Solving	-.847	-2.417	.066
	Partner's Impulsivity-Carelessness Style	.057	.205	.840
	Partner's Avoidance Style	-.072	-.209	.837

Note:
Dependent Variable: Patient's PCS
* = Correlation is significant at the 0.05 level,
** = Correlation is significant at the 0.01 level,
*** = Correlation is significant at the 0.0005 level

Table 16. Hierarchical Regression Analyses: Patient and Partner's Social Problem-Solving Ability Related to Quality of Life (QOLI)

Model					Change Statistics					
	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	η^2
1	.288(a)	.083	.017	1.68062	.083	1.263	2	28	.298	
2	.657(b)	.432	.259	1.45902	.349	2.830	5	23	*.039	
3	.726(c)	.527	.211	1.50564	.095	.719	5	18	.617	0.72

Note:
a. Predictors: (Constant), Gender of patient, Age of patient
b. Predictors: (Constant), Gender of patient, Age of patient, Patient's Positive Problem Orientation, Patient's Negative Problem Orientation, Patient's Rational Problem Solving, Patient's Impulsivity-Carelessness Style, Patient's Avoidance Style
c. Predictors: (Constant), Gender of patient, Age of patient, Patient's Positive Problem Orientation, Patient's Negative Problem Orientation, Patient's Rational Problem Solving, Patient's Impulsivity-Carelessness Style, Patient's Avoidance Style, Partner's Positive Problem Orientation, Partner's Negative Problem Orientation, Partner's Rational Problem Solving, Partner's Impulsivity-Carelessness Style, Partner's Avoidance Style
d. Dependent Variable: Patient's Quality of Life (QOLI)
* = Correlation is significant at the 0.05 level, ** = Correlation is significant at the 0.01 level, *** = Correlation is significant at the 0.0005 level

Coefficients

		Standardized Coefficients		
Model		Beta	t	Sig.
3	Gender of Patient	-.092	-.478	.639
	Age of Patient	.128	.664	.515
	Patient's Positive Problem Orientation	.184	.533	.601
	Patient's Negative Problem Orientation	-.183	-.520	.609
	Patient's Rational Problem Solving	.101	.319	.753
	Patient's Impulsivity-Carelessness Style	.306	1.128	.274
	Patient's Avoidance Style	-.264	-.812	.427
	Partner's Positive Problem Orientation	.197	.593	.560
	Partner's Negative Problem Orientation	.122	.422	.678
	Partner's Rational Problem Solving	-.146	-.424	.677
	Partner's Impulsivity-Carelessness Style	-.017	-.061	.952
	Partner's Avoidance Style	-.462	-1.364	.189

Note:
Dependent Variable: Patient's QOLI
* = Correlation is significant at the 0.05 level,
** = Correlation is significant at the 0.01 level,
*** = Correlation is significant at the 0.0005 level

VITA

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