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GENDER, AGE, AND CAREGIVING AS MEDIATORS OF CARDIOVASCULAR ILLNESS AND RECOVERY

by

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The impetus for this study evolved from my work as a research assistant on the study "Improving Recovery from Cardiac Surgery". My original interest in families and chronic illness, however, arose from my experiences as a staff nurse on a cardiovascular surgery unit at Duke University Medical Center and from my study of family systems theory in the master's program in the Duke University School of Nursing. I am indebted to Dr. Joanne Hall, then at Duke and now at Oregon Health Sciences University. She opened my eyes to the power of the family in effecting health and illness in its multiple dimensions.

With a growing appreciation of the family's contribution to the patient's well being, I became aware also of the impact the patient's illness makes on the family. Watching my husband manage chronic asthma and my father deal with coronary artery bypass graft surgery, I remembered the families that I had encountered at Duke hospital and their various reactions and coping strategies. It occurred to me then that nurses and other health professionals knew little about the vicissitudes families encounter in situations of acute and chronic illness. I am grateful, therefore, to my husband, Bill, who has not only exemplified "self care" in terms of illness management, but has encouraged me to pursue an advanced degree, has buoyed my flagging spirits during endless statistics courses, and best of all has helped me not to take myself too seriously. My children, Amy and Rob, have been helpful, supportive, and proud, and to both of them I am beholden. To my parents, Bob and Lois Heller, I am grateful for having demonstrated the importance of approaching family study from a life-span

developmental perspective. Indeed, their ability to handle the stressors involved with CABG was the first empirical link I observed between older age and caregiving satisfaction, a link that was upheld in the dissertation.

I owe much to various staff and faculty in the UCSF School of Nursing and particularly to those in the department of Family Health Care Nursing. In particular, I would like to note the contributions made by Doctors Susan Gortner, Catherine Gilliss, and Ramona Mercer. Dr. Gortner, advisor and dissertation sponsor, has been exceedingly generous in many ways and her willingness to involve me actively in her research program from my first days as a doctoral student has contributed enormously to my growth. Dr. Gilliss and I share many interests related to the science of family nursing, and her selfless sharing of her time and resources added to my intellectual development. Lastly, Dr. Mercer exposed me to other research methods and theoretical frameworks through independent research and writing opportunities which she made available to me.

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ABSTRACT

GENDER, AGE, AND CAREGIVING AS MEDIATORS OF CARDIOVASCULAR ILLNESS AND RECOVERY

Sally H. Rankin

The purpose of this study was to explain psychosocial and physiological recovery from cardiac surgery as influenced by the patient's baseline cardiac status and by caregiver characteristics, such as caregiving burden, caregiver age and gender, perceived social support, and caregiver mood states. A secondary aim was to evaluate different measures of patient recovery and to describe under which conditions these measures appeared to be valid for clinical and measurement purposes.

A convenience sample of 117 cardiac surgery patients and their spouses (234 subjects) from 5 northern California hospitals was obtained to tap patient and spouse responses at three critical perioperative data points: the day before surgery, and one and three months post discharge.

Physiological adaptation and recovery were assessed using the New York Heart Association (NYHA) functional status criteria and a measure of self-reported physical recovery. Individual psychosocial variables were measured with the Profile of Mood States (POMS), a measure of family satisfaction (Family APGAR), the Kansas Marital Satisfaction Scale (KMS), the Psychosocial Adjustment to Illness Scale (PAIS), the Social Support Scale (SSS) and related to caregiving burden (Zarit Caregiving Burden Inventory) and the major variables of interest, gender and age.

The primary hypothesis was tested in a staged non-recursive model and was supported in part. High levels of spousal caregiving burden as measured by the Zarit and poor cardiac functional status (NYHA) preoperatively predicted poor physiological and psychological patient recovery as measured by NYHA functional status, mood disturbance (POMS), and patient self-reported recovery at 3 months post discharge. Twenty-two percent of the variance was explained when caregiving burden and NYHA functional status were regressed against patient mood disturbance. Self-reported recovery and NYHA status were also predicted by the model with 15% and 17% of the variance explained. Caregiver gender was found to affect caregiving burden indirectly, but not directly, through its impact on mood disturbance, however, the patient's NYHA functional status did not significantly affect burden as had been predicted in the hypothesis. Age of the caregiver directly influenced caregiving burden but did not directly affect caregiver mood disturbance. Spouses of the youngest patients expressed the greatest caregiving burden.

Levels of social support before surgery were not significantly related to caregiving burden after surgery and did not buffer burden through an interaction effect. There were interesting gender and age differences in terms of perceived social support (SSS), marital satisfaction (KMS), and family satisfaction (Family APGAR).

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CHAPTER ONE

THE STUDY PROBLEM

Each year more Americans die of diseases of the heart and blood vessels than died in World Wars I and II and the Korean and Vietnam wars (Heart Facts, 1987). Heart disease causes half of all U.S. deaths and although mortality from cardiovascular illness has declined 20% in the past decade the toll in terms of morbidity is impressive. The illness related and psychological effects of cardiovascular disease and cardiac surgery on the patient and the family are currently being recognized as potentially disruptive to individual and family well-being (Gortner, Gilliss, Shinn, Sparacino, Rankin, Leavitt, Price, & Hudes, 1988; Gilliss, Gortner, Shinn, & Sparacino, 1988; Killien & Newton, 1988; Patterson, 1986). This study attempts to account for variation in patient recovery by examining patient variables and also variables such as the quality of caregiving proffered in the marital relationship, psychological well-being of patient and spouse, and wider family system variables such as the amount of social support available to the recovering patient and the caregiving spouse.

Two master status variables, gender and age of the patient and caregiving spouse, are important to the physiological and psychosocial recovery of the patient. Age and gender are construed as formative in spousal response to caregiving, and therefore, contributory to patient recovery. While the role of the spouse as caregiver has been explored, particularly in the care of elders, little attention has been paid to the relationship of individual and family life-span development as a factor influencing patient recovery and spousal caregiving.

Purpose

The primary purpose of this study is to describe and explain how spousal variables such as gender, age, mood, and assessment of caregiving burden may be related to the patient's adaptation to chronicity and recovery from surgery. Adaptation to chronic illness and recovery from cardiac surgery are conceptualized as occurring concurrently in this study. While some subjects (patients and spouses) may have known for some time that the patient had either coronary artery disease or valvular disease and had adapted to this condition psychologically, others were unaware of their disease until shortly before surgery. The entire recovery period, therefore, is viewed as a mixture of adaptation to the chronic illness role and recovery from an acute event, cardiac surgery, resulting from the chronic illness. Individual and family life-span development as well as role theory form the theoretical matrix for this study.

Gender and age differences are addressed as they impinge upon individual and family adaptation to the family exigencies arising from chronic heart disease and its exacerbation in an acute event, cardiac surgery. The primary adaptation task for the spouse is conceived of as caregiving, specifically the caregiving that is enacted within the marital dyad. Additionally, the interactional nature of caregiving and receiving is recognized so that the patient's adaptation to chronicity is studied as one variable influencing the caregiver/care-recipient relationship.

Although this study is primarily one of the marital relationship it is also characterized as a "family study" since questions are asked of both partners regarding their perceptions of family issues such as satisfaction with family functioning and perceived and enacted support from family members. Traditional definitions of the family usually stipulate two adults of opposite sex residing in the same household with one or more children. This study employs a less traditional definition of family, that is, a group of two or more individuals usually living in close geographic proximity, having strong emotional bonds, and meeting affectional, socioeconomic, sexual, and socialization needs of the family group and/or the wider social system (Rankin, 1988). Using the categories that Feetham proposed in her review (1984) of family research in nursing, the present study would be characterized as family-related research since some of the components of the model refer to the family but the unit of study is primarily the individual and the marital relationship.

Study Questions

The following study questions arise from the purpose of the investigation. They in turn are succeeded by the study aim which is congruent with the questions and also a synthesis of the various questions.

1) What is the relationship between patient variables such as cardiac status, and spouse variables such as gender and age, psychological status, and caregiving burden? How do these variables affect the psychosocial recovery of the patient?
2) How is patient satisfaction with family functioning related to the caregiver's psychosocial status and his/her satisfaction in the caregiving role?

3) Is there a relationship between gender of the patient/care-recipient and his/her perception of social support and his/her psychosocial adjustment to illness?

4) What are the age and gender-related effects of time on caregiving satisfaction?

5) Are high levels of satisfaction with perceived and enacted social support differentially related to high levels of caregiving satisfaction for men and women?

Aims

Specific study aims are presented below. The term response is used to suggest the various biopsychosocial reactions of the patient which are believed to be important variables in this study and as such are tested using various instruments. For the spouse, or caregiver, response refers to the psychosocial reactions which are deemed to be important variables in the study.

The overriding aim for the entire study is:

1) to explain the patient's psychosocial and physiological recovery from cardiac surgery as it is influenced by the patient's baseline cardiac status and also caregiver variables, such as caregiving burden, caregiver age and gender, social support as perceived by the caregiver, and caregiver mood states. This aim reflects all of the study questions.

While this primary aim directs the entire focus of the study a secondary aim is:

2) to evaluate different criteria of recovery in terms of their ability to best explain which dependent variables are the best measures of patient recovery and under which conditions these measures are important.

In the course of testing the second aim various dependent variables such as New York Heart Association functional status, patient mood states, patient's own report of recovery, and patient satisfaction with family function are utilized. The purpose of evaluating these recovery variables is to assist clinicians in their choice of variables which explain recovery and to further elucidate the conditions under which these various assessments of recovery occur. A brief description of the research design and its relationship to the study variables is included below.

A descriptive, survey design using a convenience sample of cardiac surgery patients from five northern California hospitals is utilized to tap the patient and spouse response at three critical perioperative data points, the preoperative period or day before surgery, and one and three months post discharge. A cross-sectional, time-sampling plan enables assessment of physiological adaptation and recovery of the patient as mediated by spousal reaction (mood states, family satisfaction, social support, caregiving burden) and interaction with the patient's assessment of the same variables.

CHAPTER TWO

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

The conceptual framework interrelates the major variables of interest: 1) heart disease, cardiac surgery, and gender and age differences, 2) the impact of chronic illness on individuals and the marital relationship across the life span, and 3) caregiver and care-recipient response to recovery from cardiac surgery. At the end of the chapter following the literature review, a model is proposed that is used to consider the importance of marital and family relationship variables as well as individual variables as they influence the recovery and adaptation of persons experiencing heart disease and cardiac surgery.

Literature Review

Heart Disease, Cardiac Surgery, and Gender and Age Differences

Morbidity and mortality indices reveal the high toll heart disease takes on the U.S. population. Coronary artery disease (CAD) causes more deaths than any other single disease and is also responsible for more activity limitation than any other disease (Heart Facts, 1987; Strauss, Corbin, Fagerhaugh, Glaser, Maines, Suczek, & Wiener, 1984). The advent of coronary artery bypass graft surgery has been welcomed by many individuals and families as a means of adding precious years and also improving the quality of life. Although the efficacy of CABG is currently debated, it is becoming one of the most frequently performed surgeries with approximately 202,000 Americans having the surgery in 1984 (Heart Facts, 1987).

Valvular disorders are usually etiologically related to rheumatic heart disease or calcification of valves which occurs primarily during the aging process. There are approximately 2,020,000 adults with rheumatic heart disease in the United States and in 1984, 42,00 valve replacement surgeries were performed.

The physiologically related risk factors of CAD are well known and have been delineated extensively in the Framingham study: cigarette smoking, family history, elevated lipids and lipoproteins, obesity, hypertension, lack of exercise, and stress (Castelli, 1984). The psychosocial profile, however, is less well delineated. Frequently mentioned factors are: behavior styles, with the Type A personality a prominent descriptor; sociocultural mobility with frequent changes in residency, occupation or cultural setting important; and the presence of anxiety, depression, and sleep disorders. (Dracup, 1982; Frank, Heller, & Kornfeld, 1979; Friedman & Rosenman, 1974; Underhill, Woods, Sivarajan, & Halpenny, 1982). Demographic variables such as age, gender, and socioeconomic status are also recognized as important risk factors with advanced age, male gender, and racial and ethnic minorities being significant predictors of CAD (Hopkins & Williams, 1986; "Poor Suffer More", 1985).

Women are at less risk for development of CAD than men before age 70; nevertheless, CAD is the leading cause of death in all US women over the age of 40 (Wenger, 1985). Coronary risks are similar for women and men although they tend to cluster differently and are potentiated by additional factors such as oral contraceptive use and menopause to which men are not subject (Murdaugh, 1986). Women are less likely to suffer myocardial infarctions, but when they do their mortality rate in the first month following infarction is 75% greater than that of men. Their disease seems to be qualitatively worse, that is they have significantly more severe and unstable anginal symptoms and more congestive heart failure (Fisher, Kennedy, Davis, et al., 1982). Angiography demonstrates a different profile for women than men; they are less likely to have multiple vessel involvement and they have better left ventricular function or ejection fraction (Wenger, 1985), which would appear to make them better surgical candidates than men. However, as described below, women experience greater morbidity and mortality following CABG.

Although a single vessel lesion is more common in women and their left ventricular function is better preserved than that of men, they are usually older and more symptomatic than men when they present for CABG. Indeed, when women have coronary artery bypass graft (CABG) surgery their bypassed vessels reocclude faster (Tyras, Barner, Kaiser, Codd, Laks, & Willman, 1978), they have a greater mortality rate during and following surgery (Gardner, Horneffer, Gott, Watkins, Baumgartner, Borkon, & Reitz, 1985), and they suffer greater morbidity during recovery. Generally, most thoracic surgeons believe that poorer surgical outcomes for women are related to the size of the arteries, i.e., smaller body size results in smaller coronary arteries and smaller veins used for grafts which are then likely to reocclude faster.

A recent study reported in the Annals of Internal Medicine (Tobin, Wassertheil-Smoller, Wexler, Steingart, Budner, Lense, & Wachspress, 1987) raised interesting questions regarding decisions that were made to refer women for coronary angiography and coronary artery bypass grafting. While men had twice as many abnormal results on cardiovascular nuclear scans as compared to women, men were referred for angiography in a ratio of 10:1, rather than in the expected 2:1 ratio. Even when such variables as age, previous myocardial infarction, presence of typical or atypical angina, and abnormal test results were controlled, the ratio of referral of men to women was 6.3:1. Additionally, during the initial diagnostic phase, cardiologists were significantly more likely to infer a cardiac explanation for presenting symptoms for men, whereas for women somatic or psychiatric symptoms were suspected. If women are indeed older and more symptomatic when CABG is performed it seems possible that their poor outcomes may be related to late referrals and an already compromised physiological status.

Prominent markers of recovery from both myocardial infarction and coronary artery bypass grafting are return to employment and return to sexual functioning. Literature documents that women are less likely to return to work than are men (Wenger, 1985) and also less likely to resume sexuality (Papadopoulos, Beaumont, Shelley, & Larrimore, 1983). Boogaard's study (1984), and those of others, indicated that women were more likely to feel "guilty" that they had abdicated important family roles than were men. This author believes that the complications following MI and CABG, in addition to decreased sexual and employment functioning, experienced by women may account for the greater frequency of depression and anxiety following acute cardiac events.

Valvular disorders, although a less common cause for cardiac surgery, also reveal a different profile by gender and age. The incidence of valve replacement surgery for women is higher than bypass graft surgery with Jenkins and his colleagues (1983) reporting that 39% of their sample were female while Gortner and colleagues (1986) reported 44% of their cardiac valve procedures were done on women. Indeed, in the Gortner study 62% of the women undergoing cardiac surgery had valve replacement or a combination of valve and CABG. The most common pathogenesis of valvular disorders is rheumatic heart disease with the aortic and mitral valves the most frequently affected (Underhill, Woods, Sivarajan, & Halpenny, 1982). The greater incidence of valvular disorders in women is related to the fact that more women suffer from rheumatic heart disease. The age range for patients undergoing valve replacement surgery is typically broader than for CABG with ranges from 25-69 and 30-73 reported in the literature (Gortner, et al, in press; Jenkins, Stanton, Savageau et al., 1983).

Advanced age was originally treated as a risk factor, and those over the age of 70 years were infrequently considered for cardiac surgery, however, data reported recently indicate that morbidity and mortality for patients 70 years and older is similar to that of younger patients (Elayda, Hall, Gray, Mathur, & Cooley, 1984; Rich, Sandra, Kleiger, & Connois, 1985). Since the younger the onset of CAD the poorer the long term prognosis, it may be that the older patient who has not developed CAD until later in life, and has developed it at a slower rate, might have a more benign form of the disease and thus a recovery trajectory similar to that of younger patients. Additionally, the meaning placed on the surgery seems to vary by age. For example, qualitative data in one study indicated that older patients and their spouses tended to view CABG as a chance for a better and longer life while younger patients looked upon the surgery as a portent of their mortality (Rankin, Gortner, Gilliss, & Shinn, 1986).

The next section discusses the impact of illness on marital and family relationships at different junctures of the life-span. Additionally, role theory is employed to better understand the strains arising from the caregiver/care-recipient relationship.

Families and Chronic Illness Across the Life-Span

Interest in the impact of chronic illness on the well-being of the family system and, vice versa, the family's influence on the assumption of the chronic illness role by a family member has been growing exponentially over the last decade. Nursing, medicine, social work, and the social sciences, health psychology and sociology in particular, have pursued this phenomenon with the articulation of various theoretical models and conceptualizations, position papers in journals, and intervention studies. The family's primacy in the patient's adaptation to a chronic illness appears to have been well established in the literature (Cassileth, Lusk, Strouse, Miller, Brown, & Cross, 1985; Kane, Klein, Bernstein, Rothenberg, & Wales, 1985; Liebman, Minuchin, Baker, & Rosman 1976; Minuchin, Baker, Rosman, Liebman, Milman, & Todd, 1975; Minuchin, Rosman, & Baker, 1978). Attempts are now being made to identify the factors prevalent in families that seem to affect the successful adaptation of the patient to a changed and chronic situation. These factors are generally identified as aspects of the family "environment" (Moos, 1974) and also frequently include family cohesion and adaptability (Olson & McCubbin, 1982), family coping characteristics and resources (McCubbin et al., 1981, 1982), and other variables called "family strengths" (Lewis, Beavers, Gossett, & Phillips, 1976; Otto, 1963). Most of these factors or variables are components of the internal environment of the family although they are frequently mediated by interface with the wider community, i.e., financial, social, and health care resources. Various social scientists (Moos, 1974; Pearlin and Turner, 1987; McCubbin & Patterson, 1981, 1982) are presently refining and testing frameworks of family environment or family stress which promise to elucidate the internal workings of the family and its response to such stressors as illness.

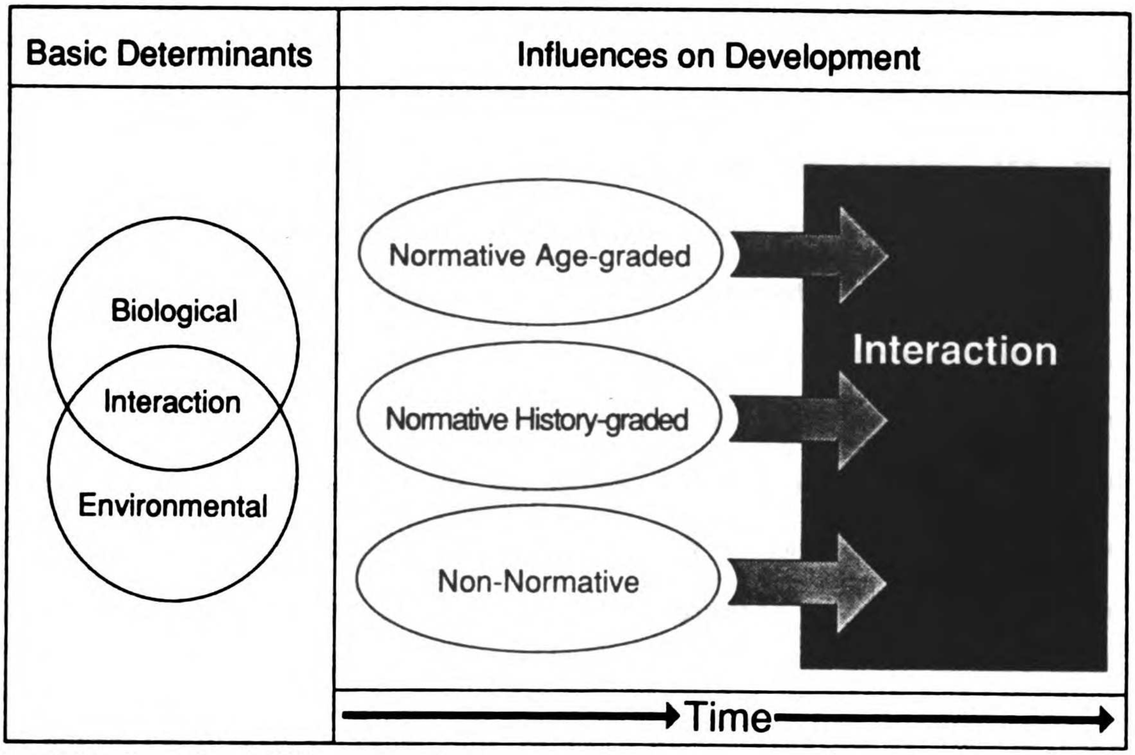
Of late, interest in the impact of the patient's illness on the spouse or the family system has evolved. Three nurse scientists Lewis, Woods, and Ellison (1985), have studied the impact of maternal illness on spouses and children. Others (Dracup, 1982; Gilliss, 1984; Gortner, Gilliss, Sparacino, & Shinn, 1986; Hutton, Elster, Wolfer, & Rolando, 1984; Wishnie, Hackett, & Cassem, 1971) have noted especially the stress experienced by spouses of cardiac surgery and myocardial infarction patients. In this study variables related to marital satisfaction, role strain in the marital relationship, and the physical and psychological stressors of cardiac surgery are examined to better understand the adaptation of both patient and spouse to chronic illnesses such as coronary artery disease and valvular heart disease and the exacerbation of these diseases, i.e., cardiac surgery.

For the purposes of this study family was defined as the spousal dyad, notwithstanding the earlier caveat that the marital relationship is not equivalent to a study of family relationships. Younger families may also have children resident in the home which was postulated to intensify the stressors experienced after cardiac surgery since spouses not only have role strain engendered by caring for the recovering patient but also chronic role strain from their parental responsibilities (Pearlin & Turner, 1987). An area for further study pertinent to family life-span development and chronic illness is the effects of parental illness on young and adolescent children.

Relationship of Individual and Family Theory to the Life-Span Model

Family theory which specifically supports this study includes individual and family life-span development theory and role theory. The internal environment of the family is of exceptional importance in understanding family dynamics. It is, however, notwithstanding the work of various social scientists and family therapists, essentially a "black box" with depths that are difficult to plumb. This study examines the issue of the impact of chronic illness (CAD), and its exacerbation in major cardiac surgery, on the marital dyad from a developmental perspective--a perspective that is also rife with theoretical and methodological problems. The developmental perspective utilized incorporates external environmental variables that are embedded in the social and historical systems surrounding families as well as biophysical and psychological variables. A methodological model proposed by Baltes, Reese and Lipsitt (1980) is illustrated in Figure 1 below.

Although the model was derived primarily for methodological purposes it also serves to explain the major variables in this study. A basic assumption of this model is that biological, environmental, and behavioral determinants in conjunction with specified developmental influences shape the life span of individuals and families. These



(From Baltes, Reese, & Lipsitt, 1980)

Figure 1. Methodological model.

developmental influences include: 1) normative age-graded influences, those ontogenetic factors that include biological and socialization factors occurring across the life span and strongly related to chronological age; 2) normative history-graded factors, historical events that influence particular birth cohorts; and 3) non-normative factors, life events that occur asynchronously with the life course or are not experienced by the population at large.

In terms of this study the important patient biological variables are cardiac status, age, gender, and psychological status. Important spousal biological variables are age, gender, and psychological status. Environmental variables are not being addressed in this study. Normative age-graded variables for the patient and spouse include their individual developmental life stage (Erikson, 1963) or period (Levinson, 1977) as well as the marital couple or family developmental life stage (Duvall & Miller, 1985). While life stage or period are not specifically addressed, patients and spouses are grouped in the study according to important cardiac and family related variables so that young patients and their spouses are those who are 50 years old or less, middle-age couples are those who are 51-69 years old, and old patients and spouses are 70 years of age and older. Within each age group it is possible to determine the importance of family stage (e.g., if there are children in the home the salience of this variable can be assessed) in terms of patient recovery and caregiving burden.

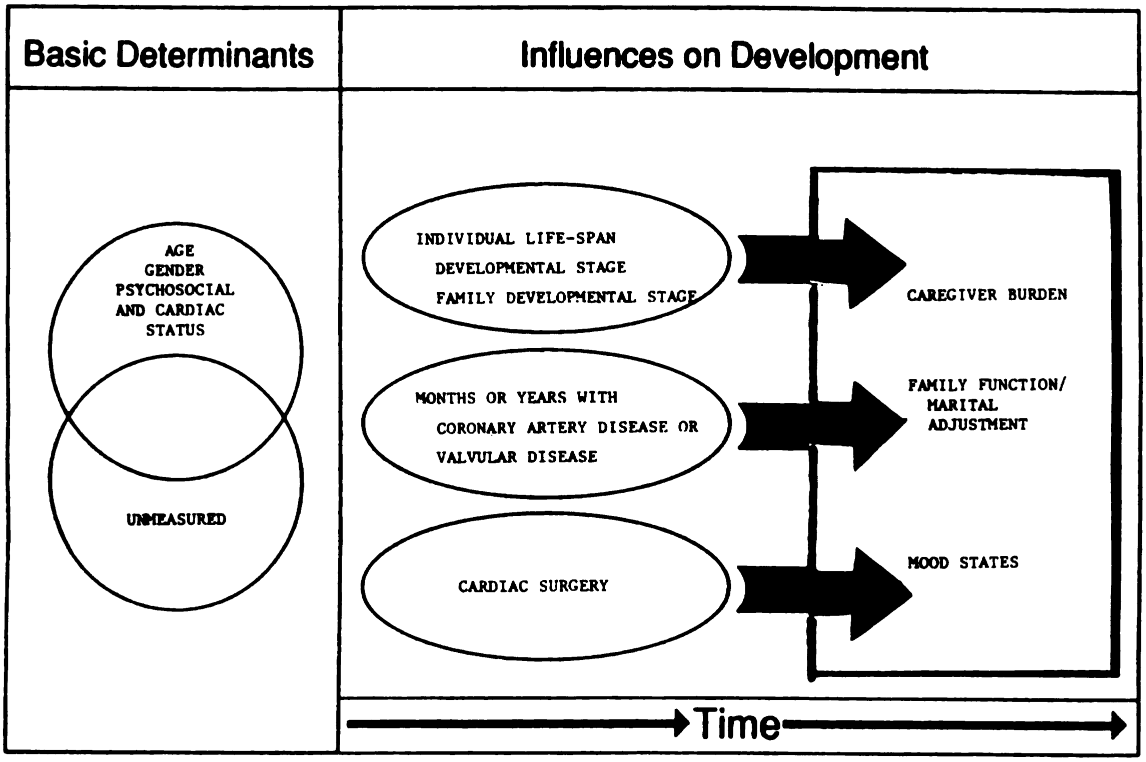
Normative history-graded influences, also referred to in the past as birth cohort will be treated in the study according to recent reformulations by Schaie (1986). Specifically, cohort, initially defined on the basis of birth year is now defined as all persons experiencing a particular event or condition at the same point in time. If this new definition of cohort is applied, we would expect that the psychophysiologic recovery of the patient is influenced more by the amount of calendar time the patient has experienced heart disease than by the age of the patient or the cohort effects. In a parallel fashion the length of time that the spouse has served as a caregiver both pre- and postoperatively may also inform spousal attitudes towards caregiving. Therefore, in this study the normative history graded developmental influence is seen in the longevity of the disease process (Weekes & Rankin, in press).

Non-normative influences in this study consist of the exacerbation of the chronic disease process (either coronary artery disease or valvular disease) and its culmination in cardiac surgery. Whether the surgery has different meanings or not to diverse groups (e.g., age and gender) in the study will be assessed by examining the interaction of the normative age graded and the non-normative influences. As in any study of age (normative age-graded), cohort (normative history-graded), and period/time of measurement (non-normative) one parameter is always confounded by another and therefore unmeasureable (Schaie, 1986). In this study, the non-normative influence, i.e., cardiac surgery, is treated as the confound, set at 0, and therefore not measured.

The interaction of the basic determinants and influences on development are illustrated in Figure 2. For the patient the important dependent variables are physiological and psychosocial recovery as measured by the patient's mood states and satisfaction with the marital relationship or family functioning. For the caregiver/spouse, the major variables that form the interaction are assessment of caregiving burden and psychosocial status (mood states and marital relationship/family functioning). Next, is a discussion of caregiving within the family and marital relationship. Role theory and its concepts are used to elucidate the genesis and nature of various issues confronted in the spousal caregiving relationship.

Caregiver and Care-Recipient Response to Chronic Illness

Research into the phenomenon of caregiving has been increasing since the late 1970's. Most research has been concerned with the impact of caregiving on the family members of an elderly relative (Cantor, 1983; Johnson & Catalano, 1983; Poulshock & Deimling, 1984, Shanas,



(From Baltes, Reese, & Lipsitt, 1980)

Figure 2. The interaction of the basic determinants and influences on development.

1979). Studies of actual spousal caregiving situations (Cantor, 1983; Fengler & Goodrich, 1979; Johnson, 1985; Sexton & Munro, 1983; Worcester & Quayhagen, 1983) indicate that half of the caregivers are men when the unit of caregiving and care-receiving is the spousal relationship. These studies suggest that the greater the centrality of the relationship, the higher the strain, and that possible outcomes of spousal caregiving situations are role entrenchment and social regression, in which both the caregiver and recipient retreat from the outside world and become increasingly immersed in the caregiving/care-recipient role to the exclusion of other roles. Demographic variables such as income and ethnicity have been assessed in terms of their impact on caregiving but findings are still inconclusive (Fengler & Goodrich, 1979; Hanson, Sauer, & Seelbach, 1983; Poulshock & Deimling, 1984; Strong, 1984; and Worcester & Quayhagen, 1983). Clark and Rakowski (1983) mention the importance of studying the impact of caregiving on the care-recipient but note that little work has been completed in this area.

Caregiving is defined in this study as the provision of physical and emotional assistance by the caregiver to an ill or otherwise needy care-recipient, the person generating the tasks involved in caregiving. Caregiving indicates a role relationship and the interactional nature of the two roles, caregiver and care-recipient, must be considered. Two master status variables, gender and age, shape not only caregiving but also care-receiving. In addition to age and gender social support both within the marital relationship and external to the relationship influences the provision and reception of this care. Lastly, societal factors interact with the master status variables and influence the nature and provision of caregiving by men and women. For the purposes of this study, caregiving is examined only within marriage, or in a few cases, within a long term common law marriage.

Explaining the Dynamics of Caregiver and Care-Recipient Response to Chronic Illness

Role theory and theory related to the origins of stress also are useful in further explicating the theoretical dimensions of this study. For this project, role is approached from a dynamic, processual vantage point but with an appreciation of the structural-functional components that roles play in organizing marital relationships, families, and wider social systems. Roles usually imply a two person relationship; they do not exist in isolation. For example, one cannot assume the role behaviors of husband without the presence of a wife. Roles generally include norms, positions, and expectations, with clusters of norms comprising roles and clusters of roles making up positions (Burr, Leigh, Day, & Constantine, 1979). Expectations exist for roles and the degree to which these expectations are met, or conversely not met, can lead to role strain. In general, the greater the involvement demanded by the role the greater the centrality or importance of the role relationship. One would surmise then, that the centrality of the marital relationship would lead to greater role demands and that changes in the marital relationship such as those brought about by illness and surgery could result in role strain and stress.

A short discussion of the relationship of roles, role strain and stress follows. An appreciation of the dual nature of recovery is assumed, that is, the spouse as well as the patient must recover from the acute event, cardiac surgery. The role relationship of interest, therefore, in this study is the caregiver/care-recipient role as enacted within the marital relationship.

Role strains and stress. While there are various theoretical viewpoints regarding stress, this study is primarily concerned with the origins of stress, i.e., familial, societal, and physiological. The work of various epidemiologists (Cassel, 1976; Syme & Berkman, 1976) has pointed to the social and environmental origins of stress. Various social scientists have recognized the importance of societal institutions such as work, marriage, and family as the genesis of stress.

Commonly ascribed to interpretations in the stress literature are that the response of the organism is recognized as stress while the stimulus triggering the response is the stressor (Breznitz & Goldberger, 1982; Carrieri, Lindsey, & West, 1986; Pearlin & Schooler, 1978). This interpretation can be easily visualized as:

stressor ——————> stress response

One of the stressors experienced by both the patient and spouse during the recovery trajectory following cardiac surgery can be attributed to role strain. Role strain as endured by the patient is caused by loss of old roles and taking on of new chronic illness roles. The caregiver experiences role strain as related to the objective and subjective tasks and burdens associated with caregiving. Role strains of both the patient and spouse act and interact to produce the stress response which in this study is conceived of as the adaptation to chronic illness and recovery from cardiac surgery process. The stressor-stress response appears as:

stressor		stress
patient role-strain (losing old roles & taking on of new roles)	→	adaptation to chronicity
	→	recovery from cardiac surgery
spousal role-strain (objective & subjective tasks related to caregiving)	——>	adaptation to caregiving burden

The quality of the marriage relationship and the satisfaction with it and with family functioning may affect the amount of role strain incurred during the adaptation to chronicity and recovery from cardiac surgery process. For example, if the marital relationship were reasonably stable we might expect the demands of caregiving to have less of a negative impact on the caregiver's assessment of burden. The quality of the marital relationship is related to two of the variables, gender and age, with which this study is concerned.

Quality of the marital relationship. The concepts marital adjustment, marital quality, marital happiness, and marital satisfaction are all important to an understanding of caregiving if the marital dyad is the unit of research interest. The convention suggested by Lewis and Spanier (1979) is utilized here, in which marital quality subsumes the other related concepts, marital adjustment, happiness, satisfaction, communication, integration, and marital role strain and conflict. They define marital quality as the subjective evaluation of the marital relationship (p. 269). Marital stability is a related but more straightforward concept than the others and is defined simply as a formal or informal marriage which is intact or is not intact (Lewis & Spanier, 1979).

Marriage development is the term chosen in this study to describe the evolution of marriage over time; it includes the concept of marital quality. Like other aspects of human development, marriage development also is related to gender. Marriage development is not synonymous with family development but has been studied frequently from the perspective of family life transitions and the impact of these transitions on the marriage (Anderson, Russell, & Schumm, 1983; Argyle & Furnham, 1983; Medling & McCarrey, 1981; Menaghan, 1983; Schram, 1979; Swensen, Eskew, & Kohlhepp, 1981).

Although the earlier research on marriage development has been noted as problematic (Schram, 1979), because of its equivocal and diverse findings, later work which has taken advantage of multivariate statistical methods has produced a model of marital quality over the life span which seems acceptable. This model indicates that marital quality follows a curvilinear, U-shaped trend over the marital life cycle (Anderson, Russell, & Schumm, 1983; Schram, 1979; Spanier, Lewis, & Cole, 1975). The interpretation of the U-shaped curve reveals that generally marriage satisfaction is high among young couples, declines after the birth of the first child and remains low through the launching stage when it then increases during the postparental phase. The presence of children in the home seems especially important to the level of marital quality for wives with a number of studies documenting differences in levels of satisfaction (Abbott & Brody, 1985; Anderson, Russell, & Schumm, 1983; Belsky, Lang, & Rovine, 1985; Schumm & Bugaighis, 1986).

A major problem with the measurement and conceptualization of marital quality over the life cycle is that even with the most sophisticated statistical analyses the independent variables chosen to predict marital satisfaction, presence or absence of children, stage of family life cycle, and length of marriage account for modest amounts of variance, (e.g., 12.65% in the Anderson, Russell, and Schumm study, 1983). Additionally, some social scientists have suggested that rather than family life cycle being the important predictor variable in marital quality, that instead what is being measured are the effects of aging (Schram, 1979; Spanier, Lewis, & Cole, 1975), such as social desirability responses and changes in sex-role orientation. Also, depression scores indicate decreasing depression over the life-span which may suggest that overall psychological well-being increases and this in turn affects the assessment of marital quality.

Marriage development as a function of gender and age. Rhyne (1981) asserts that one of the few consistent findings regarding marital quality is that men tend to be more satisfied with their marriages than women. While various reasons have been suggested for this phenomena Rhyne purports that the differences are in degree and not in kind, i.e., both spouses value the same positive aspects of marriage but wives tend to attach more importance to the companionship and verbal interaction aspects of the marriage than do their husbands (Rhyne, 1981, p. 951). Argyle and Furnham (1983) and Reedy, Birren, and Schaie (1981) made identical discoveries in their respective research on satisfaction and conflict in long-term relationships and satisfying love relationships across the life span. Females derived more satisfaction from reciprocal relationships involving emotional support, discussing personal problems, and simply interacting with the other person.

There were no significant two way interactions between age and sex for conflict or satisfaction in the Argyle and Furnham study (1983) suggesting that the main effects of sex and age are powerful predictor variables regarding satisfaction and conflict in long-term relationships. When the type of relationship was added to the three way ANOVA, three-way interactions indicated that younger females have the lowest satisfaction from their spouses of any group (Argyle & Furnham, 1983). Such findings indicate the importance of studying the interaction of age and gender in the marital caregiving and care-receiving relationship.

Role strain, multiple roles, and marriage. As stated above, the concept of role strain is usually thought to be subsumed by marital quality, i.e., the greater the role strain the poorer the marital quality. A review of role strain and a related topic, multiple roles, however, seem necessary to the endeavor of explaining role strain in spousal caregiving.

Marriage acts to legitimate, mediate, and create reality for individuals (Rhyne, 1981) and in so doing serves as the most powerful social institution for good or ill known to society. That the investment in marriage is so great makes the stakes that much higher in terms of the experience of role strain since the primary roles in marriage and family life are those that are most central to our lives: husband-wife and parent-child. As marital couples add additional roles to the initial spousal role set the opportunity for role strain intensifies. Research related to transition to parenthood (Belksy, Lang, & Rovine, 1985; Stemp, Turner, & Noh, 1986), work-family conflict (Greenhaus & Beutell, 1985; Keith & Schafer, 1985), and blended or stepfamily role strain (Pink & Wampler, 1985) attest to the fertile area of multiple role conflict and strain in families.

The taking on of additional roles establishes a climate conducive to role strain since the number of roles and the ability to fulfill the role obligations are intimately linked. The decreased marital satisfaction expressed by women, especially younger women with children, is linked to the greater role demands to which these younger women are subjected as compared to the family demands experienced by their husbands (Gove, 1984; Keith & Schafer, 1985). When employment is added to the picture the likelihood of role strain is increased further. It seems likely, therefore, that the additive nature of roles in young and middle adulthood may be related to the additional stress expressed by younger caregiving wives (Fitting, Rabins, Lucas, & Eastham, 1986) as these younger wives are more likely to experience the demands of multiple roles than older wives.

The foregoing construction of role strain and its relationship to marital quality and women's roles is the basis for much of the current work in the social sciences. Recognition, however, of some conflicting evidence weakens some of the force behind the conceptualization of the strain that results from multiple roles. For example, Verbrugge and Madans (1985) using data from the National Health Interview Survey (NHIS) demonstrated that during the 1960's and 1970's the healthiest group of American women were those who were employed and married; being a mother had no influence on physical health status. Additionally, the work of Hibbard and Pope (1985), Thoits (1983), and Nathanson (1977) supports the notion that multiple roles predict greater physical and mental health for employed American women because of the greater potential for socially supportive relationships. Thoits' work indicates the importance of work as it relates to women's life stage (Thoits, 1983). Over the life span the number of roles occupied shrinks, a phenomenon to which Marks (1977) and others refer, and which herein is called role scarcity. Thoits notes that middle-aged and older women may benefit from employment as their life cycle familial involvements shrink. The concept of role scarcity then, allows for increased energy which can be delegated to other domains.

Next a discussion of social support and its ability to ameliorate role strain is presented.

Social Support and Its Association with the Marital Relationship

The concept of social support was early given impetus by the community mental health movement, especially the writings of Gerald

Caplan (1974). Barrera and Ainlay (1983) have reviewed the social support literature and proposed that there are essentially six categories of social support: material aid, behavioral assistance, intimate interaction, guidance, feedback, and positive social interaction (pp. 135-136). Using a factor analysis based on 40 items the six categories were reduced to four factors: directive guidance, nondirective support, positive social interaction, and tangible assistance. While various social scientists and others have characterized social support as consisting of affect, affirmation, and aid (Kahn & Antonucci, 1980), emotional, informational, and tangible support, (Schaefer, Coyne, & Lazarus, 1981), or emotional concern, instrumental aid, information, and appraisal (House, 1981), Barrera and Ainlay's formulation serves the multidimensional nature of social support in the marital relationship well. Lin's (1986) definition of social support is a broader definition as it contains references to formal (the community) and informal supports (social network and confiding partners). Their definition is presented at the end of the chapter.

As Barrera (1986) and Ensel (1986) state, the marital relationship is frequently treated as a proxy for the presence of social support. While the data regarding depression tends to confirm this assumption, i.e., married people have lower depression scores than unmarried, the use of marriage to prove the buffering relationship of social support to depression simply confounds the model. An additional problem with this model is that it does not account for the buffering effect of social support found in close friendships between unmarried people, that is, such an approach would assume that the unmarried have no support (Ensel, 1986). While marriage may provide social support there are also some indications that it can be a stressor (Coyne, 1986). Lastly, data documenting greater depression rates for married women versus married men (Cleary & Mechanic, 1983) calls into question the amount of social support that is available to married women.

The importance of a spouse in acting as a confidante, that is providing intimate interaction, guidance, and feedback, has been noted by Lin and her colleagues (1986). In studies involving gender of the confidante and depression Lin and her associates found that men benefitted more from opposite sex confidantes, whether married or unmarried, than women. Depression scores were lower for men who had an opposite sex confidante than for men who did not. An opposite sex confidante was important in reducing depression scores for women only when women were married. For the purposes of spousal caregiving these findings suggest that the role of the confidante can be very important in reducing depression.

At risk in the caregiver and care-recipient relationship in terms of social support is the reciprocal nature of social support. Reciprocity has been recognized as a central component to ongoing social support relationships (Caplan, 1974; Kahn, 1979). It appears that reciprocity would be threatened in some of the categories of social support if the care-recipient is constantly fatigued, depressed, or restricted in activity. It seems, therefore, that the demands placed on the provision of spousal social support both for the caregiver and the care-recipient become problematic during recovery from cardiac surgery.

Social support has generally been assumed to be a positive force mediating the effects of stressful situations (Barrera & Ainlay, 1983;

Caplan, 1974; Cassel, 1974; Pearlin, 1984; Thoits, 1982). Recently, however, some of the social support literature has alluded to the negative features of network interaction both for the provider and the recipient of the support (Aneshensel, 1986; Clark & Rakowski, 1983; Coyne, & DeLongis, 1986). The social network is the confluence of family, kin, friends, work associates and others from whom social support is garnered. It is similar to the concept of "convoy" which Kahn and Antonucci (1980) describe as the personal network through which social support is given and received over the life-span.

Gender differences seem to account for some of the toll that the provision of social support takes (Turner, 1986). The work of Kessler and McLeod (1985), indicates that because women "cast a wide net in their concern" they are more vulnerable to stresses experienced by their family members, friends, and even by others to whom they are less intimately related (p. 498). In contrast, men structure their lives in such a manner that their net encompasses very few persons. Because their lives do not usually include others outside the immediate family they are less likely to be drawn into a network of support for caregivers although they are not less likely, according to the Kessler and McLeod perspective, to be less caring and empathetic towards their own spouse if caregiving is needed.

The negative aspects of social support may indeed affect the recovery of patients from cardiac surgery. The interaction between caregiver social support to the patient and social support received from those outside the marital relationship is unclear. Indeed, the question of what constitutes effective caregiving and differences in gender approaches to the caregiver role have yet to be resolved.

An overview of research relevant to the study follows. At the end of the overview are assumptions of the study, definitions, and last, a conceptual model and hypotheses, which endeavor to integrate the variables of interest.

Overview of Relevant Research

Caregiving: Gender and Age Differences

Recently gender and age differences in approaches to and satisfaction with spousal caregiving have begun to emerge, particularly in the gerontological literature. The research findings of Fitting et al. (1986), Gilhooly (1984), Worcester and Quayhagen (1983), and Zarit and his colleagues (1986) support the notion that with aging comes greater affiliative needs for men (Rossi, 1980) and thus higher morale and less distress in situations of caregiving than that experienced by elderly women. Fitting and her colleagues (1986) suggest that men may have a different "model" of caregiving derived from work settings. The application of the "work model" to caregiving may allow men to take on caregiving as another work role thus decreasing role scarcity that resulted from assumption of the retirement role.

One would expect that the increasing poor health of the care-recipient and possibly the caregiver, the mounting burden of new tasks associated with the illness, and a possible decreasing income would result in a decrease in spousal caregiving satisfaction over time. Contrary results, however, have been reported in a number of studies (Fitting et al., 1986; Gilhooly, 1984; Johnson, 1985; Zarit, Todd, &

Zarit, 1986) and these results seem to have particular relevance to age and gender variables. Rather than expressing greater dissatisfaction with caregiving, higher morale and mental health was found over time (Gilhooly, 1984) and male spousal caregivers actually reported an improved relationship with their wives after assuming the caregiving role (Fitting, et. al, 1986). Younger wives have been found to express greater dissatisfaction with caregiving duties (Fitting et al, 1986) although Zarit's work (1986) indicated that over a two year time period wives' expression of caregiving dissatisfaction diminished to levels that were consonant with male caregivers.

Fitting and her colleagues (1986) found that younger women, primarily middle-aged, expressed stress resulting from the caregiving role and also were more unhappy with the quality of the marital relationship than were husbands, a finding that is also true in the non-caregiving population (Rhyne, 1981). The multiple roles experienced by female caregivers (Brody, 1981) may add to their dissatisfaction with caregiving. The issue of multiple roles and the quality of roles appears to be more salient for women than for men as caregivers, and, as reflected in the few data bases available that reflect age differentials, more salient for younger persons.

While older men may approach caregiving as a means to resolve role scarcity, caregiving occurs in a different context for younger women. For example, as family roles decrease for women and they reenter the employment arena certain benefits, such as social support, accrue that outweigh the loss of significant family roles (Hibbard & Pope, 1985; Thoits, 1983). Therefore, if middle-aged and younger women are forced to leave their jobs to care for a convalescing or chronically ill spouse the loss in social support accentuates the dissatisfaction with caregiving. In contrast, middle-aged men are much less likely to leave the job market to care for their wives but instead buy services or mobilize other family members (Gilhooly, 1984; Johnson, 1985).

Qualitative data obtained from the experimental subjects of a recent study of recovery from cardiac surgery (Rankin, Gortner, Gilliss, Shinn, & Sparacino, 1986) regarding caregiving and care-receiving indicated that strains were inherent in these roles following surgery. Female caregivers in particular voiced concern regarding their ability to follow the prescribed diet, monitor physical signs of recovery, and engender other risk reduction behaviors in their spouses. Male care-recipients expressed resentment regarding their wives' protectiveness while female care-recipients were more likely to remark on their spouses lack of involvement in their recovery process. Indeed, spouses scored lower on their assessment of marital adjustment than did patients between baseline (preoperative) and at 6 months post-surgery, reflecting perhaps their higher levels of perceived stress with the caregiving role (Gilliss, Neuhaus, & Hauck, 1988). Stress was also expressed in data that indicated that a majority of spouses reported an initial hypervigilance, followed by sleeplessness, anxiety, and irritability. In the more stable caregiving situations these problems usually resolved with the passage of time and the improved physical health of the patient (Gortner, Price, Rankin, Leavitt & Gilliss, 1985).

This preliminary work and the review of the literature indicates that gender and age are critical variables to explore in terms of their effects on long term recovery and adaptation to chronicity. Additionally, the dual nature of recovery, i.e., both patient and spouse, suggests that the "consociate" approach (Plath, 1980) to understanding the stresses and strains involved in the caregiving/care-receiving relationship is an important one. The response to caregiving and care-receiving is believed to evolve within the constraints of family, individual, and gender life-span development as well as in recognition of the illness demands occurring in the dyadic spousal relationship.

Caregiving and Social Support

The importance of social support to the caregiver has been borne out in most of the literature examining the stresses of caregiving (Cantor, 1983; Clark & Rakowski, 1983; Johnson, 1985; Soldo & Myllyluoma, 1983). Social support does indeed seem to buffer the caregiver from some of the daily strains involved in giving care and also offers some much needed respite. The findings that men either make greater use of informal and formal social supports or report more satisfaction with support systems (Gilhooly, 1984; Johnson, 1983; Zarit et al., 1986) may be related to more reported satisfaction with caregiving than is indicated by women (Fitting, Rabins, Lucas, & Eastham, 1986; Gilhooly, 1984; Worcester & Quayhagen, 1983; Zarit et al., 1986). The fact that many wives as caregivers reported loneliness and decreased opportunity for social activities (Fengler & Goodrich, 1979; Fitting et al., 1986; Sexton & Munro, 1985) suggests that the different dimensions of social support have differing meanings for men and women.

The work of Furstenberg and Davis (1984) demonstrated that men were much less likely to report their health problems to others, except for their wives, while women were more likely to obtain and retain a social network from which consultation could be derived. It seems possible that men secure the bulk of social support from their wives by enlisting them as their emissaries, that is, women become secondary seekers for their husbands. This role as an emissary may act to make the caregiving role more difficult for women than men. Women seem more likely to seek out assistance from their mothers, sisters, and female friends (McKinlay, 1973; Scambler & Craig, 1981) than from their husbands which may indicate that women are doubly burdened, that is, they not only are more likely to be caregivers but they also are more likely to be expected to offer network support to those providing care. Indeed, most of the social support literature indicates gender differences in the experience and importance of social support to men and women (Kessler & McLeod, 1985; Stokes & Wilson, 1984; Turner, 1986).

The effects of social support on the care-recipient have received little systematic study (Clark & Rakowski, 1983). However, Coyne and DeLongis (1986) in their review of the negative aspects of social support propose that the social involvement inherent in marriage is not always predictive of effective caregiving and may instead be associated with overprotectiveness that burdens the patient and reduces his/her efforts to achieve autonomy and personal responsibility. Similarly, DiMatteo and Hays (1981) note that if the prescribed regimen is not congruent with family values the support system may negatively influence adherence.

If women, because of sex-role socialization factors and life-span development, approach caregiving in such a way that their support to the recipient becomes overprotective, the gender differences in caregiver style might act to heighten adjustment problems to the care-recipient role. For example, the work of Wishnie, Hackett, and Cassem (1971) proposes that the hypervigilance of some wives was an additional obstacle to the husband's recovery from myocardial infarction. In other words, the benign neglect that some men seem to exercise in the caregiving role may be more closely related to the successful adjustment of the care-recipient, or wife, than the overzealous care proffered by some women. Obviously, there are no simple answers to the issue of too much versus too little support nor is the picture complete yet regarding vulnerability of women to stress as a function of a wide net of care (Thoits, 1986). However, the construct of social support as related to caregiving offers fertile ground for further study in the stresses involved in spousal caregiving.

Cardiac Surgery and Caregiving: Gender and Age Differences

Differences in mortality and morbidity following CABG surgery for women versus men have implications for spousal caregiving. As noted, men tend to exit the caregiving role sooner and also make greater use of informal and formal support systems than do women as caregivers. Abandonment of the caregiving role seems to be especially problematic for younger, employed men than with older men who are retired. Since women have more unstable angina and congestive failure concomitantly with CAD (Fisher, Kennedy, Davis, Maynard, Fritz, Kaiser, & Myers, 1982) it is possible that a special climate is established in the marital relationship as a result of increased needs for monitoring of pain and medications and also an increased fear of sudden death. This climate constructed of fear, reversal in roles, and multiple illness episodes then may sensitize and affect later caregiving relationships following surgery so that male spouses tend to relinquish caregiving responsibilities to others.

Perhaps the fact that women experience more complications during and following surgery also affects the nature of the caregiving by the spouse. First, the husband is frequently inadequately prepared for potential problems and second there is some evidence that there are real differences in the manner in which men and women approach and then abandon the sick role (Brown & Rawlinson, 1977; Wenger, 1985). Lastly, indications from the Gortner/Gilliss (1986) study were that women were less likely to feel they had achieved their desired and expected benefits from cardiac surgery. Women reported attaining only 47% of expected surgical benefits at 3 months after surgery whereas men had achieved an impressive, and statistically significant, 77% of their expectations of surgery. At six months the picture still exhibited significant differences between men and women suggesting either that surgery may not be as efficacious for women or that women do not perceive the surgery as being as effective as do men. The cyclical nature of the problem suggests that possible inadequate male caregiving, increased female morbidity, and a perception of surgical ineffectiveness compound the recovery problems for women.

The reciprocal side to this problem is that the abandonment by the husband of the caregiver role may prolong the patient's recovery and act to increase morbidity. Added to increased physiologic stressors and lack of adequate caregiving is the fact that women, especially younger women with children, experience additional stress related to their inability to fill all of their role responsibilities. It seems, therefore, that female cardiac patients may be subject to dual stressors: an increased physiologic stressor and strain resulting from loss of caregiving.

In terms of important age differences in response to cardiac surgery, data obtained from "Improving Recovery from Cardiac Surgery" (Gortner, et al, in press) suggested that although older patients (>70 years) reported more fatigue and protracted recovery in the first 6 weeks of recovery they also reported significantly more realized benefits from surgery at 6 months than did those patients 50 years old and younger. The under 50-year-old group reported more depression and hostility as measured by the Profile of Mood States (POMS) than the older cohort, i.e., those 70 years and older (Rankin, Gortner, Gilliss, Shinn, & Sparacino, 1986). Qualitative data from these same patients revealed that while older patients viewed the surgery as an opportunity for a longer and higher quality life, younger patients (<50 years) and their spouses were made overwhelmingly aware of their own mortality. Interestingly, there have been few studies that have examined the psychological impact of illness at different ages (Mages & Mendelsohn, 1979; Stevenson, 1983). However, one of the few studies (Rosen & Bibring, 1966) relating age and illness outcomes confirmed qualitative findings from "Improving Recovery from Cardiac Surgery" with data indicating greater psychological vulnerability to the impact of myocardial infarction for men in their 50's and younger.

In summary, it appears that the oldest marital couples (>70 years) are probably the least pregnable to the stressors of cardiac surgery and caregiving as their resources and coping responses have developed to impressive levels over time. On the other hand, it may be that women are at greater risk for depression in and dissatisfaction with the caregiving role. Different coping responses to caregiving by men, such as the mobilization of social support around the wife's needs and the ability to gain respite from the role secondary to greater financial resources, may explain their greater satisfaction with the role as compared to women.

Assumptions and Definitions

Important assumptions of the study include: 1) cardiac surgery is a stressor for marital couples; 2) age is a proxy variable for life-span development; 3) illness casts people into recognizable roles that in this study are characterized as caregiver and care-recipient; 4) roles change in specific ways in response to illness, caregiving, and care-receiving; and 5) cardiac surgery is an acute event but represents an exacerbation of a chronic process. The following definitions are related to important study concepts.

<u>Adaptation to chronic illness and recovery from cardiac surgery</u>. Adaptation to chronic illness and recovery from cardiac surgery are conceptualized as occurring concurrently in this study. While some subjects (patients and spouses) may have known for some time that the patient had either CAD or valvular disease and had adapted to this condition emotionally, others were unaware of their disease until

shortly before surgery. Recovery from cardiac surgery includes both physiological and psychosocial components and is defined in greater detail later. Adaptation and recovery are aspects of the stress response and fall on a continuum from maladaptation to bonadaptation, or poor recovery to good recovery.

Age groups. Age groups <50, 51-69, and >70 years, have been chosen based on the incidence of cardiac disease resulting in surgery and also based on some commonly held assumptions related to characteristics of aging. Age is a proxy variable for life-span development.

Caregiving. Caregiving can be conceptualized as an interaction process formulated in the context of the caregiver/care-recipient relationship. Specifically, it is defined as the provision of physical and emotional assistance by the caregiver, in this case a spouse, to an ill or otherwise needy care-recipient, the person generating the tasks involved in caregiving. Caregiving burden is treated as both a dependent and independent variable in the study and is measured using the Zarit Caregiving Burden Inventory (1980).

Cardiac surgery. Cardiac surgery is operationalized as those surgical procedures requiring a sternotomy incision that include coronary artery bypass graft (CABG), single or double valve replacement, a combination of a valve replacement and a CABG, or a septal repair that would result in a recovery process similar to CABG or valve replacement.

Family. For the purposes of this study the family includes the spousal dyad and sometimes children. The relationship studied is the marital relationship and the influence of children or other relatives on patient recovery and caregiving satisfaction is considered. Satisfaction with family function is a dependent variable in one of the hypotheses and is measured using the Family APGAR (Smilkstein, 1978; 1982).

Gender. A proxy variable for an intricate matrix of behaviors, both psychosocial and biological. Psychosocial behaviors are determined primarily through sex-role socialization and also wider socio-cultural-political factors.

Marital satisfaction. Marital satisfaction is a positive subjective evaluation of the marital relationship by each partner. Marital satisfaction is measured using Schumm, Obiorah, Copeland, Meens, and Bugaighis' KMS (1986) in one subset of the entire sample. Marital satisfaction and family satisfaction are believed to be closely correlated constructs.

Physiological recovery. In this study physiological recovery refers to the patient's biophysical status and is measured primarily by the New York Heart Association's classification of functional status. Physiological recovery also assumes an absence of complications and symptomatology related to recovery from cardiac surgery. Physiological recovery is a major dependent variable.

Psychosocial recovery. Psychosocial recovery refers to the recovery trajectory of both the patient and spouse and is characterized by psychological status as measured by POMS, the psychosocial adjustment to illness as measured by the PAIS (for one subset of the sample), and assessment of marital and family satisfaction. Psychosocial recovery from cardiac surgery consists of major dependent variables for the patient and spouse.

Stress. A sociopsychophysiological phenomenon productive of a state of intellectual, behavior, metabolic, and other physiologic responses induced by a stressor (adapted from Carrieri, Lindsey, and West, 1986).

Stressors. Stressors are those strains (events, stimuli) of endogenous or exogenous origin (Carrieri, Lindsey, & West, 1986), which have the potential to evoke physiological and/or psychosocial reactions.

Role Strains. A particular type of stressor that arises from social origins; they have no physiological parallel although they can interact with physiologic stressors to produce stress. Role strains are measured indirectly through the Zarit Caregiving Burden Inventory.

Social Support. Perceived and enacted instrumental and/or expressive provisions supplied by the community, the social network, and the spousal partners (adapted from Lin, 1986). Perceived and enacted social support are treated as independent variables and measured using the SSS (Funch, et al, 1986).

Conceptual Model

Families play a significant role in the care of their members during chronic and acute illnesses. While some attempts have been made to describe and analyze the family's behavior in illness situations little is known about the variations that occur in patient and family adaptation to chronic illness and the recovery process from an acute event such as major cardiac surgery. The physiological and psychosocial recovery of the patient occurs within the context of the family and the marital relationship in particular. Indeed, the primary caregiver to the chronically ill or recovering patient is often the spouse. The interactional nature of the marital relationship suggests that recovery from major cardiac surgery will be affected by more than physiological variables. Qualities of the marital relationship which were extant before surgery will undoubtedly affect spousal adaptation to caregiving and indirectly the recovery of the patient. In addition, spousal marital satisfaction and mood interact with patient marital satisfaction and mood to affect recovery.

Two master status variables, gender and age, are important to the physiological and psychosocial recovery of the patient. Likewise, these variables are construed as formative in spousal response to caregiving, and therefore, contributory to patient recovery. While the role of the spouse as caregiver has been explored, particularly in the literature related to Alzheimer's caregivers, there has been little work documenting the effects of caregiver mood and caregiver satisfaction to physical and emotional patient outcomes. This model attempts to account for variations in the recovery of the patient as influenced by such patient variables as gender, age, cardiac status, mood states, and assessment of family function and social support. Additionally, the model considers the importance of the marital partner, or caregiver, to the patient's recovery. Caregiver variables such as gender, age, mood states, assessment of family function and caregiving burden, and social support available to the caregiver are included in the conceptual model. The model also attempts to recognize the dynamic interaction of such variables as mood between the caregiver and care-recipient with the belief that one affects the other. Role theory and individual and family life-span development form the theoretical matrix for the model.

The model for the caregiver/care-recipient relationship within the family system is illustrated in Figure 3. It focuses the issue of

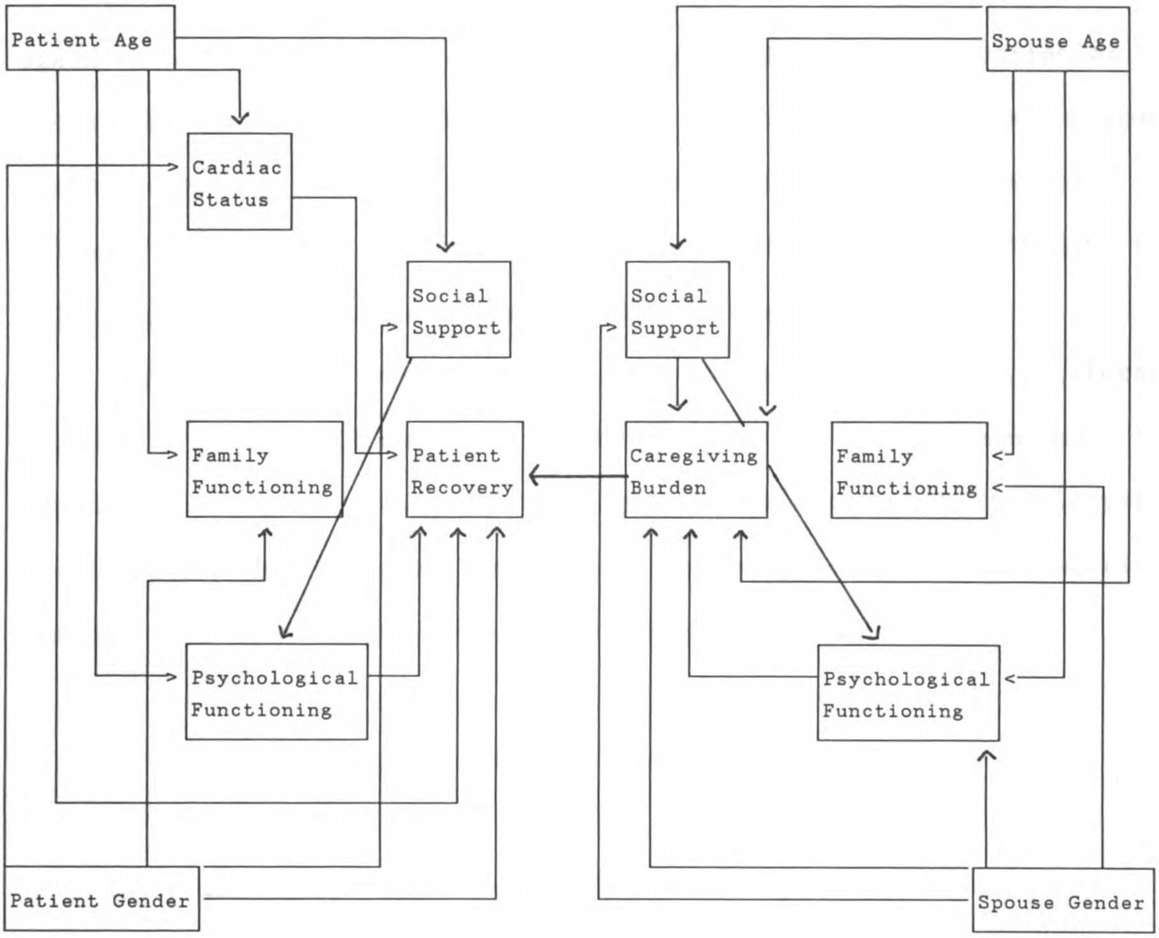


Figure 3. Total system model for gender, age, and caregiving as mediators of cardiovascular illness and recovery.

patient recovery but reflects the importance of spousal/caregiver variables on the recovery process. It attempts to portray the multiple effects of age and gender on the patient's cardiac status, psychological status, and the patient's assessment of family function and social support. On the patient side (left side) of the model we can see that cardiac status, psychological status, assessment of family function, and social support are all mediated or influenced by age and gender before they in turn affect patient recovery. Additionally, one notes that the psychological status of care-recipient and caregiver affect each other.

On the spouse side (right side) of the model, age and gender are again evident and are also believed to influence such variables as spouse assessment of family function, spousal psychological status, social support, and caregiving. In this model, social support is believed to buffer the effects of caregiving burden although the buffering effects will not be statistically tested.

Since the model itself is too large and unwieldy to test, different aspects of it are illustrated below in order to better represent the hypotheses. The constructs and concepts referred to in the total system model are changed below to reflect more precisely the empirical indicants or instruments used in the study.

Hypothesis and Illustrative Model

The primary hypothesis tested in this study is:

1) baseline patient cardiac functional status as measured by the AHA classification, and the following caregiver variables: high scores on caregiving burden, age <50 years, female gender, and negative mood states predict poor scores on a measure of psychosocial recovery (mood states) of cardiac surgery patients at 3 months postoperatively.

The secondary hypotheses are the same as the primary hypothesis except that the dependent variable is different in each of the three successive models, i.e., it is measured by New York Heart functional status at 3 months postoperative, patient self report of recovery, and patient satisfaction with family function. The model below, Figure 4, exhibits in a path analysis type of illustration the primary hypothesis.

As befits this type of model testing the four variables that influence caregiving burden are regressed against the burden score. The

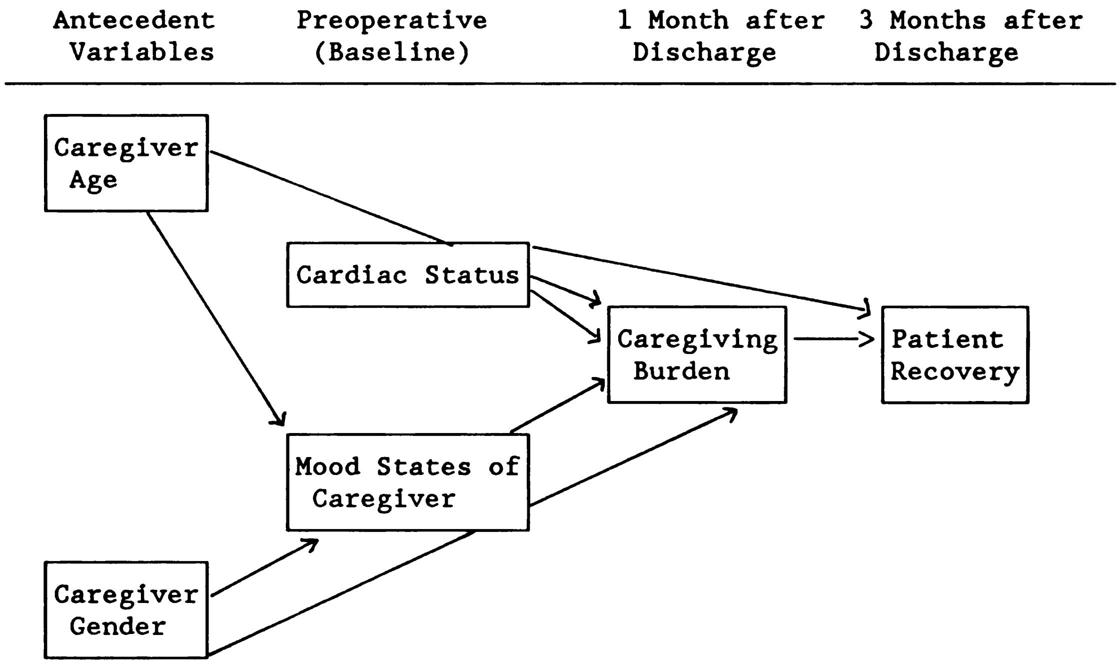


Figure 4. Variables explaining patient mood disturbance.

second step is to test the impact of cardiac status and caregiving burden on the patient's mood states. The explanation for this model is as follows. Patient recovery is directly affected by caregiving burden and preoperative cardiac status. Cardiac status also indirectly affects patient recovery through caregiving burden. Patient recovery in addition is indirectly affected by the age of the caregiver, acting upon mood states of caregiver and caregiver burden. Finally, gender of the caregiver indirectly affects patient recovery through its direct effects on mood states of the caregiver and caregiving burden.

CHAPTER THREE

METHODOLOGY

Research Design

The original design specified induction of 60-90 subjects into this cross-sectional, time sequenced study. Data points and instruments chosen for administration are illustrated in the time frame found in the Data Collection Plan in Appendix A. Data points were chosen to represent the time periods that have been noted as most stressful in physiological and psychosocial recovery (Gortner et al., in press).

Design modifications were made to allow for a sufficiently large sample (also referred to as Group I, Sites D and E) for statistical analyses and another smaller sample (Groups II, III, and IV, Sites A, B, and C) that could be included in the statistical analysis but could also be used for purposes of qualitative data analysis. The design is referred to by Campbell and Stanley (1963) as a separate sample pretest-posttest design. The Data Collection Plan in the appendix indicates that at least half of the study (Group I) was nested within a larger, ongoing randomized clinical trial "Improving Recovery from Cardiac Surgery", 2R01-NR1031-03 (Gilliss, Gortner, Shinn, & Sparacino, 1988). The other half of the study (Groups II, III, and IV) was conducted independently and additional instruments and interviews were administered to the subjects in order to develop a typology of caregiving.

Access to and Description of the Research Settings

Access

A total of five Northern California hospitals were used as the research setting. Access to the first three hospitals described below (Hospitals A, B, and C) was obtained by the student whereas the last two hospitals were sites in which the student had previously collected data but were the primary sites for a larger, and different, study of family recovery from cardiac surgery (Group I, Hospitals D and E).

Access to Hospital A was obtained initially by contact with the person responsible for nursing research at the hospital who also assisted in the preparation of the application to the hospital's Joint Council on Human Research. Following initial contact with this representative of nursing services, the chief of cardiothoracic surgery was approached by telephone, letter, and in person. This surgeon wrote a letter of support to the Joint Council which assisted in gaining their approval. The chief of cardiothoracic (CT) surgery initially requested that the investigator contact each attending surgeon for permission to approach patients. After his colleagues gave inclusive permission to contact their patients, the chief of CT surgery did likewise. All physicians whose patients were involved in the study received copies of the abstract.

The chief of cardiology at Hospital A was contacted in person. He assured access to patients at Hospital A by initially gaining blanket approval of the study during a monthly cardiology meeting. The investigator also presented the study at a second cardiology meeting.

Relationships with the departments of cardiothoracic surgery and cardiology were collegial.

The surgery schedule was mailed to the investigator's home on a weekly basis by the cardiothoracic surgery staff at Hospital A. Patient location and marital status were obtained by calling the inpatient units to which surgical patients were admitted. The appropriateness of each patient for possible induction was reviewed with the nursing staff so that patients who were unduly anxious, or in other ways inappropriate for the study, were not approached. There was only one patient at Hospital A who was inappropriate for induction. The procedure for induction of patient and spouse is described below.

The head nurse and assistant head nurse on the unit to which cardiothoracic surgery patients were admitted assisted the investigator through the efforts of Hospital A's Nursing Education department. At the request of the head nurse, the investigator met with the staff and explained the study.

Access to cardiothoracic surgery patients at Hospital B was obtained through the office of cardiothoracic surgery. Letters of support for the study were written by the various cardiothoracic surgeons.

The clinical nurse specialist and head nurse served as contact persons on the patient unit to which most cardiac surgery patients at Hospital B are admitted. The study was presented to the nursing staff and support for the project was also obtained through the Nursing Research Committee at Hospital B. Patient eligibility for the study was determined by daily screening of surgery schedule, charts, or telephone calls to the nursing unit.

Although the original proposal had specified two sites for subject induction, the investigator determined that neither Hospital A nor Hospital B would afford the necessary number of subjects for the specified analysis. Therefore, Hospital C was approached. Access to patients at Hospital C was initiated with the chief of staff of cardiac and thoracic surgery (see sample letters in Appendix B). He presented the study to the group of five cardiothoracic surgeons at Hospital C and blanket approval for the study was given. Shortly after permission to contact cardiac surgery patients was obtained from physicians the investigator met in person with Hospital C's Research Committee. At this meeting contact was made with the director of nursing service.

The director of nursing service was exceptionally helpful to the investigator and appointed a nurse in the admitting office to screen all potential cardiac surgery admissions for participation in the study. The admissions nurse compiled a daily list of possible subjects for the investigator. Head nurses on the units to which patients were admitted were approached and informed about the study. As at Hospital A and Hospital B, staff nurses were approached regarding appropriateness of patients for the study.

The chief of cardiology at Hospital C was apprised of the study and offered approval from his department. At his suggestion the chief of cardiology at another hospital was also contacted by mail regarding the study since many of the patients in the study were "overflow" surgery patients from that hospital. Relationships with nursing, surgery, and cardiology at Hospital C were collaborative and all staff involved were very helpful.

As noted above the investigator did not have to gain access to Group I (Hospitals D and E) as data collected from these sites was nested within a larger ongoing study.

Description of Sites

The five hospitals from which subjects were gathered are very similar in terms of nursing care, surgical procedure, and surgical outcomes. Two of the hospitals (Hospital B and Hospital D) are university medical centers, and a third, Hospital E, is closely affiliated with Hospital D. Hospital A and Hospital C are both private hospitals with large, well-established cardiac surgery and research programs in place. In the previous study "Improving Recovery from Cardiac Surgery," Hospitals B, D, and E were similar on all baseline variables except for length of stay and number of vessels bypassed, with the community hospital having a shorter length of stay and bypassing more vessels (Gortner, Gilliss, Sparacino, & Shinn, 1986). Hospitals A, C, D, and E do more than 200 bypasses a years while Hospital B does fewer than 200 CABGs but greater than 600 cardiothoracic surgeries. Success of CABG seems largely predicated on the volume of surgeries performed by any one center with 200 surgeries being the critical number as predictive for positive surgical outcomes.

The internal validity problem referred to as selection, however, must be considered in the final analysis of the data since differences between the five hospitals, their patient populations, and their procedures may influence the results. The patient populations did indeed vary by site in terms of socioeconomic status with Hospital B and D, serving a widely diverse group of patients as is typical of university medical centers. On the other hand, Hospitals C and E, while primarily community hospitals, also treat farm families from the central valley of California as well as a number of blue collar families.

Hospital A tends to serve a fairly affluent population. The diversity in socioeconomic status will be considered in the analysis. Evidence of class bias in access to medical care was recently exhibited in a study of coronary bypass grafting in Buffalo, N.Y. (Sidel, 1987). For men whose family income level was above the median level the rate of CABG was more than twice as high as men in the lowest quartile of median family income indicating that income and insurance are artificially superimposed criteria for CABG.

Sample

Nature and Size of Sample/Selection Criteria

Forty to sixty patients from three local San Francisco Bay Area hospitals (Hospitals A, B, and C) were initially projected as the number of patients inducted at the three sites. Additionally, selected data from the other study (Group I, Hospitals D and E) referred to above was expected for an accrual of an additional 50-100 subjects.

Criteria for inclusion in this convenience sample included: 1) ability to speak and read English, 2) married, and 3) age ranging from 30 to 80 years. All patients who met the above criteria and were undergoing either coronary artery bypass graft surgery (CABG), valve or double valve replacement, any combination of valve and CABG, combination of CABG and other cardiac surgical procedure (such as ventricular aneurysm repair), or septal repair were eligible for inclusion.

Although the etiology of coronary heart disease and valvular disease is dissimilar, the actual surgical procedure and recovery period are deemed similar enough to include patients with both types of surgery. Analysis of data from "Improving Recovery from Cardiac Surgery, NU1031" (Gortner, et al., 1986) revealed no statistically significant differences between outcome measurements of physiological, individual psychosocial, or family indices.

The original proposal called for a selective sampling of women so that they would represent half of the actual sample although in reality they represent only 20% of the patient population undergoing cardiac surgery. To this end, one month of data collection was spent selectively sampling for women. However, even with this attempt to increase the numbers of women in the study women do not comprise half of the sample. A second way in which attempts were made to increase the number of women was through "judgement calls", that is, if there were inadequate time or resources to induct all patients scheduled for surgery on a certain afternoon, women were approached first. Gender will be examined as an important variable in the analysis with recognition of unequal group size.

Age groups were not purposively sampled although when the investigator realized the preponderance of the sample was within the 50-69 year old age group judgement calls were applied to age as well. In particular, the investigator worked to increase the induction of subjects younger than 50 years old. Age will be examined in the analysis with age groups of unequal size expected.

Human Subjects Assurance

The proposal was reviewed and approved by Hospital A's Joint Council on Human Research, Hospital B's Committee on Human Research, and Hospital C's Research Committee. Informed consent was obtained during the preoperative period from both patient and spouse using consent forms approved by the various institutions (Appendix C). Access to the spouse was through the patient. Patients and spouses were approached together when possible and the study was verbally presented by the investigator or her research assistant. Potential subjects were then given as long a period of time as needed to read the informed consent and the research subject's bill of rights. Questions were answered if they arose and all consenting subjects signed the consent as did the investigator or research assistant. A copy of the consent was given to both patient and spouse.

All information obtained from subjects was coded to maintain subject confidentiality and patient/spouse information and responses were kept in locked files. Questionnaires administered in the hospital were placed in sealed envelopes for return by the nursing staff to the investigator. Likewise all materials mailed to subjects were identified by code numbers known only to the investigator. Every possible attempt was made to protect the confidentiality of subjects' responses. No discrepancies in routine patient care occurred because of subjects' participation in the study.

Data Collection Methods

Techniques

Both quantitative and qualitative data collection methods were utilized as data collection methods. Baseline quantitative data were collected by the investigator and by research assistants working on the continuation study referred to previously, "Improving Recovery from Cardiac Surgery", Group I. Outcome data collection instruments were mailed to subjects in self-addressed, stamped envelopes and then returned to the investigator by mail. Home interviews for Groups II, III, and IV were arranged with patient and spouse at their convenience.

Instruments

The following instruments were used in the data collection process for those subjects inducted by the investigator; those that are starred were also collected in the larger study and were used in the data analysis. All of the instruments are contained in Appendix D.

Family APGAR. Family APGAR is a 5-item, close-ended, Likert-type questionnaire that has been used with diverse populations, e.g., cardiac, psychiatric, maternity, and college students. Although brief the Family APGAR has a published reliability of alpha=.86 and an alpha from a previous study with cardiac surgery patients ranging from .83 to .87 (Gortner et al., 1986). The questionnaire was originally developed by Smilkstein in 1978 as a clinical tool for the appraisal of family functioning. The five items cover satisfaction with one's family in the areas of adaptability, partnership, growth, affection, and resolve.

Profile of Mood States (POMS). This profile is a 65 5-point adjective rating scale consisting of six mood factors: hostility, confusion, depression, vigor, tension, and fatigue. The POMS was developed by McNair, Lorr, and Droppleman in 1971 and has been used extensively with psychiatric, cardiac, college, and other populations. Published Cronbach's alpha for the six factors range from .84 to .95 and from .82 to .94 on a previous study with cardiac surgery patients. Although the POMS manual does not have published reliabilities for use of a global POMS score it does recognize that such a score may be useful in research. A global POMS score was used in this study and was gained by subtracting the vigor subscale from the sum of the other five subscales. This score was felt to be indicative of total mood disturbance.

Psychosocial Adjustment to Illness Scale (PAIS). The PAIS is a 46-item numerical scale measuring 7 domains of adjustment to illness. The domains include: health care orientation, vocational environment, domestic environment, sexual relationships, extended family relationships, social environment, and psychological distress. The scale is sensitive to gender and age differences (Kaplan DeNour, 1982). Predictive validity has been ascertained using the POMS and the scale has also been found to discriminate between a group of lung cancer patients and controls (Derogatis & Lopez, 1983). Interrater reliability for the interviewer administered format produced an intraclass correlation coefficient ranging from .33 to .86 and the self-report format has reliabilities ranging from .12 to .93 with the scale that produced a reliability of .12 having been recently revised. A group of cardiac patients had internal consistency scores that ranged from .47 to .85.

Social Support Scale (SSS). The Social Support Scale is a new, short scale of social support that can be completed in a few minutes and contains both structural (network) and perceived aspects of social support. The SSS was developed by Funch, Marshall and Gebhardt and first reported on in the literature in 1986. The perceived aspect of social support (SSS-P1) had the greatest internal consistency with alphas ranging from .84 to .61 across three samples: HMO participants, TMJ pain patients, and colorectal cancer patients. Family support and family behavior can both be measured as part of the perceived aspect of this social support instrument. In terms of validity, the Short Scale of Social Support correlated positively with POMS subscales and also with interviewer ratings of psychological status. The SSS can be used to gain information on support by source and also to specify the type of situation, i.e., cardiac surgery, cancer, etc.

Kansas Marital Satisfaction Scale (KMS). The KMS is a very short (3-item) marital satisfaction scale developed by Schumm and his colleagues at Kansas State University and first reported in 1985. The three items are answered in a Likert-type format consisting of seven response categories, from extremely dissatisfied to extremely satisfied. Test-retest reliability ranged from .62 to .82 for a sample of wives and husbands and alpha coefficients are generally around .93. The KMS scale demonstrated concurrent validity by correlating .91 with Norton's Quality Marriage Index (QMI) and .83 with Spanier's Dyadic Adjustment Scale (DAS). The KMS scale exhibited similar, if not better, discriminant validity when compared to the QMI and the DAS.

Zarit Caregiving Inventory. This 22-item Likert-type inventory was designed to measure the amount of burden experienced by caregivers of dementia patients. Zarit mentions that the inventory should be used in conjunction with other indicators of the caregiver's emotional state. Internal reliability for the Zarit Caregiving Burden Inventory has been measured using Cronbach's alpha at .88 by Hassinger (1985) and .91 by Gallagher and others (1985). Test-retest reliability has been reported by Gallagher and colleagues at .71.

Validity estimates have been created by correlating the total score with a single global rating of burden and correlating the total score with Derogatis' Brief Symptom Inventory. Since this particular instrument mixes antecedent and consequent stressors of caregiving in the same scale and contains many of the same affect type items as the POMS, reduced version of the Zarit was also used in the test of the model. The reduced version had six affect items pertaining to embarrassment, anger, fear, stress, loss of control, and uncertainty removed from the total scale. While the Zarit Caregiving Burden Inventory reflects some of the common problems in instrumentation it is relatively short and has been used extensively with caregiving populations. This instrument has been used primarily with caregivers to Alzheimers' patients but the items are sufficiently general to reflect common, everyday stressors encountered by caregivers to a cardiac surgery sample.

<u>Postoperative Self Report of Recovery</u>. This instrument is a structured interview guide that is administered by telephone. The interview includes questions regarding activity levels, return to work and sexuality, smoking, medications, symptomatology, health care follow-up and rehospitalization, New York Heart Association functional status, and self-rated recovery and quality of life continua. The

postoperative self-report of activity is a shortened form of one used in a previous study (Gortner et al, 1986) and was derived by study personnel and examined by two cardiovascular clinical nurse specialists for content validity. The self-report takes approximately 20 minutes to administer.

Caregiving/Care-receiving Structured Interview. This structured interview schedule was derived by the investigator with the help of Professor Leonard Pearlin. The interview is designed to examine primary and secondary causes of role strain leading to caregiver stress and then to determine the characteristics of caregiver coping. The caregiver interview is administered separately from the care-recipient interview and lasts approximately 45 minutes.

The care-recipient interview is shorter in length (20 minutes) and was designed to tap the reciprocal nature of caregiving/care-receiving. Additionally, some of the role strains involved in being a care-recipient are examined.

The caregiver and care-recipient interviews were originally designed to be administered in the home. However, after the wide geographic dispersal of subjects was taken into account it was decided that the interview would be administered by phone and tape recorded using special instrumentation. Final analysis of these interviews is incomplete although portions are used to illustrate some of the quantitative findings.

Procedures

The procedures referred to below are specific to data collection procedures for Groups II, III, and IV. Data collection procedures for

Group I occurred during the same time periods, or data points, but was more extensive and lasted for six months instead of three. Patients and spouses were approached the day before scheduled cardiac surgery. After explanation of the study signed consents were gathered. Patients and spouses then participated in a 15 to 20 minute demographic and symptoms-related interview which was recorded on a form in the hospital room by the investigator or research assistant (Appendix D-7). At this time the investigator or research assistant graded the patient's functional status on the New York Heart Association classification scale. The couple was then asked to complete the following psychosocial individual and family instruments: Family APGAR, and POMS, Profile of Mood States, SSS, Short Social Support scale, and the KMS, Kansas Marital Satisfaction inventory. While the instruments listed above were completed baseline physiologic data was collected from the medical record (Appendix D-8).

In some cases the spouse was not available when the patient was approached preoperatively. If the patient agreed to participate the spouse was contacted following surgery and asked to complete the instruments at this time. While the investigator recognizes the discrepancies inherent in collecting some spousal data before surgery and data from other spouses after surgery, most spouses exhibited similar levels of stress during the early hospitalization period as levels of uncertainty were comparable both preoperatively and immediately postoperatively.

After surgery the patient's medical record was examined for information regarding key variables such as number of vessels bypassed, length of time on cardiopulmonary bypass and so on. If possible both patient and spouse were visited in the intensive care or transitional care units.

While original criteria called for induction of participating patient and spouse, a judgement call was made to induct some female patients whose husbands refused to participate in the study. This decision was made following an unusually high refusal rate from husbands and a concurrent realization that accrual of female patients was not proceeding well. Although there will be no caregiver data available for these subjects, data obtained pertaining to the psychosocial adjustment to illness (PAIS) will be pertinent to one of the hypotheses.

At one month after discharge subjects and spouses in Group I ("Improving Recovery from Cardiac Surgery") were mailed the POMS, the Family APGAR, the Caregiving Burden Inventory, and the SSS, Short Scale of Social Support. Subjects in Groups II, III, and IV received the above instruments and also the KMS, Kansas Marital Scale and the PAIS, Psychosocial Adjustment to Illness Scale. Also at this data point patients were telephoned and the postoperative self-report was administered. These phone calls ranged in length from 10 to 65 minutes depending upon the number of questions patients had for the investigator. While the self-report phone call was not intended as an intervention, it was apparent that some patients used the phone call for their own data gathering purposes. As in the study "Improving Recovery from Cardiac Surgery" patients were referred to their local medical doctors when symptomatology indicated medical care was needed.

At three months post surgery, Group I received the POMS, APGAR, SSS, Caregiving Burden Inventory, and the postoperative self-report a phone call to assess cardiac and other physiologic status parameters.

Groups II, III, and IV received the same instruments and phone call as Group I and in addition completed the KMS. Reliability and validity data are presented in the section on data collection.

The telephone administered caregiving and care-receiving interviews occurred from 4-6 months post surgery and are a retrospective recall of caregiving stressors and the care-recipient's response to caregiving (Appendix D-6). The interviews were tape recorded and transcribed for qualitative analysis procedures. While this modality of data collection does not allow for the collection of nonverbal observations the quality of the interview material was very good. Telephone interviews allowed for privacy during the interview and since the caregiver and care-recipient were not directly confronted by the data collector's presence the data obtained may be both more honest and straightforward.

Analysis of Study

During the period of data collection, which lasted for approximately six months, raw data from the instruments was coded and entered on a personal computer using the CRUNCH statistical package. Code books were derived using the "modify" program and data files were constructed for the various instruments and data collection devices using the "build" program. Preliminary descriptive statistics were run to check the accuracy of the data entry. Data were cleaned by a two person check of raw data to computer generated printouts. Since CRUNCH can manage only 252 variables the number of variables was reduced using the "trans" (transformation) program.

The various hospital sites and their patient populations were compared at baseline using ANOVA to determine that there were no differences in terms of patient and spouse characteristics by gender, age, cardiac status, or other important variables which could affect recovery.

The primary hypothesis was analyzed with a multiple regression analysis. The key independent variables gender, age, cardiac status, caregiving burden, and mood states were regressed on different indicators of patient recovery in separate regressions. The dependent variable, patient recovery, was assessed in terms of physiological recovery (NY Heart Association functional status plus other indicators of physiological recovery at three months) or psychosocial recovery (patient POMS or Family APGAR). Power analysis for the multiple regression suggests that for a moderate effect size of .15, an alpha of .05, and a power of .80, a total of 79 subjects are needed. Additionally, if we estimate 10 subjects per variable, a common convention, 50 subjects are sufficient. Hypotheses 2 and 3 suggest analysis by correlations and t-tests. A projected sample of 60-90 is sufficient for correlations. A one-tailed t-test would require 100 subjects for a moderate effect size of .50. However, more than 15 subjects per group (n=30) is commonly considered acceptable for t-tests.

In addition, a causal model explaining differences in caregiving, age, and gender responses to the illness event and cardiac surgery was utilized. The unhypothesized links in the study were not tested and reiteration of the variables was not performed. Since model testing assumes a non-recursive situation and any model of family recovery is recursive, the model's weaknesses in terms of prediction must be recognized. Study aim 1 was also analyzed through a limited qualitative analysis of interview data.

The primary purpose of the interview data and qualitative analysis is to enrich the quantitative analysis and add to its veracity. However, in the future the qualitative interview data will be analyzed using the methods of data reduction, data displays, and conclusion drawing/verification as outlined in the text by Miles and Huberman (1984).

CHAPTER FOUR

RESULTS

Chapter Four describes the demographic and illness characteristics of the sample including baseline comparisons using the master status variables, gender and age, and also comparisons among the five sites. Additionally, the reliabilities of the various instruments used are presented as are descriptions of their performance according to variables of interest. Repeated measures ANOVA demonstrate differences by age and gender on various psychosocial and physiological measures. Independent and paired differences t-tests reflect differences between patients and caregivers and also differences by gender for the two roles, patient and caregiver. Finally, the major hypothesis is tested using the various dependent variables of interest.

Subjects and Settings

The convenience sample of cardiac surgery patients and their spouses was obtained from five different sites over a period of seven months. Data pertaining to 228 subjects were entered at the baseline data collection point, i.e., the perioperative hospitalization period. One hundred seventeen of the subjects were patients and the remaining 111 subjects were spouses or significant others from long term common law relationships. Although all 117 subjects were considered married, baseline data other than age and gender was unobtainable in six cases. In three cases data were unavailable because of patient death or morbidity, in two cases because male spouses refused to participate, and in one case because the spouse was unavailable at baseline and did not participate later in the study. All subjects who participated during at least one of the three data collection points in the study were entered at baseline. The size of the sample shifts over time and will be described for both the total baseline group and for the group that was available at three months post surgery. Table 1 illustrates the total number of subjects eligible and the final disposition of the subjects in terms of deaths, withdrawals, and subjects dropped secondary to overwhelming morbidity and inability to participate.

The five settings were previously described in Chapter Three. Quality of nursing and physician care were very similar from site to site. The subject characteristics did vary somewhat but these were primarily demographic differences and reflect the nature of the patient populations served. These site differences are described below.

Combination of Data Sets

The 63 patient and 62 spouse cases entered at baseline from the study "Improving Recovery from Cardiac Surgery" (2-R01-NR01030,03,04) were control subjects who received "standard care" at Hospitals D and E as part of a larger randomized clinical trial. They received similar nursing, medical, and surgical treatment to those subjects obtained from the other three sites, i.e., Hospitals A, B, and C. Those subjects who were part of the randomized clinical trial (RCT) completed three additional questionnaires and received a telephone call at two months for data collection purposes which was not part of the protocol for the

Table 1

Disposition of Subjects at End of Induction Period

Family Heart Study (2-R01-NR01030.03.04)

Hospital	D	E	Total
Total Eligible	168	109	277
Total Inducted	92	49	141
Total Baseline Control Cases	40[1]	23[2]	63

Mediators of Illness and Recovery (Rankin Study)

Hospital	A	B	C	Total
Total Eligible	38	16	52	105
Total Refused	4	1	4	9
Total Missed/ Marital Status Unknown	16	4	15	35
Total Ineligible	12	21	1	34
Total Inducted	18	11	32	61
Total Accrued	16[3]	10[5]	30[7]	56
Total Baseline	15[4]	10[6]	28[8]	54

[1] 1 died in surgery; 1 withdrew after discharge; 1 died 10 weeks post discharge at home

[2] 1 died in ICU; 1 dropped in ICU by study

[3] 1 did not have surgery; 1 dropped due to lack of English

[4] 1 died 6 weeks post-op in ICU; 1 dropped due to morbidity

[5] 1 died in ICU; 1 died 10 weeks post surgery

[6] 1 died within 1st month post-discharge at home

[7] 1 lost to follow-up; 1 surgery cancelled due to excessive morbidity; 1 did not have scheduled surgery

[8] 1 died 5 weeks post-op in ICU; 1 dropped due to excessive morbidity

other three sites. Additionally, the subjects from Hospitals A, B, and C completed questionnaires relating to marital satisfaction and psychosocial adjustment to illness that were not part of the trial and thus not given to the control subjects. None of the subjects received any type of experimental intervention; the differences between the groups was simply in terms of instrumentation. The inpatient and outpatient treatment of the various groups was similar enough to warrant merging the data.

Demographic Characteristics

The demographic characteristics of the sample are displayed in Table 2. Data related to ethnicity, education, and religion pertain to the patient. Occupational status is based on the primary breadwinner except in four cases where the patient listed her occupation as housewife and the spouse's occupation was not ascertained. Occupational status for retired subjects is predicated upon their pre-retirement status. Following the demographic characteristics, Table 3 exhibits the illness related characteristics of patients in the sample.

The sample is largely male, Caucasian, and middle-aged. Although efforts were made to selectively sample for women the number of women eligible for induction in the study was much lower than that of men and additionally many of the women were widowed or, if married, their husbands refused to participate. The efforts to increase the number of women in the sample sufficed to enlarge the size of the female group to 26% of the total patient sample, a proportion that ranges in the average bypass population from 12% (Loop, Golding, MacMillan, Cosgrove, Lytle, &

Table 2

Demographic Characteristics of Patients and Caregivers

Characteristic	Mean	S.D.	Range	Number
Patient Age and Gender				
Male	60.13	9.32	38-78	93
Female	62.71	9.78	44-77	24
Caregiver Age and Gender				
Male	64.71	9.25	47-81	24
Female	56.15	10.26	25-76	93
Number of Years Married				
Male	29.85	13.14	2-54	89
Female	37.19	12.20	11-53	23

Characteristic	Frequency (%)
Patient Age by Group	
Group I (38-50 yrs.)	21 (17%)
Group II (51-69 yrs.)	77 (67%)
Group III (70-78 yrs.)	19 (16%)
Caregiver Age by Group	
Group I (25-55 yrs.)	41 (35%)
Group II (56-69 yrs.)	61 (52%)
Group III (70-81 yrs.)	15 (13%)
Ethnicity	
Caucasian	100 (87%)
Black	1 (1%)
Hispanic	7 (6%)
Asian	2 (2%)
Other	5 (4%)
Education	
Grades 1-9	9 (8%)
Grades 1-11	17 (15%)
High School Graduate	30 (26%)
Partial College	25 (22%)
College Graduate	19 (16%)
Graduate School Degree	15 (13%)

Table 2 (continued)

Characteristic	Frequency (%)
Occupation	
Housewife (where spouse's occupation is unknown)	4 (3%)
Unskilled Employees	0 (0%)
Machine Operators & Semi-Skilled Employees	8 (7%)
Skilled Manual Employees	19 (17%)
Clerical, Sales, Technicians, & Owners of Small Businesses	17 (15%)
Administrative Personnel, Small Independent Businesses, Minor Professionals	21 (18%)
Business Managers, Proprietors Medium-Sized Businesses, & Lesser Professionals	24 (21%)
Higher Executives, Major Professionals, Proprietors of Large Concerns	22 (19%)
Religion	
Protestant	47 (42%)
Roman Catholic	36 (32%)
Jewish	2 (2%)
Other	16 (14%)
Decline to State	11 (1%)

Sheldon, 1983) to 23% (Gortner et al., in press). Since valve replacement patients are included in the sample this also serves to maximize the number of female participants as women typically comprise about 40% of the valve replacement population (Jenkins, Stanton, Savageau, Ockene, Denlinger, & Klein, 1983).

Ethnicity of the sample is primarily a function of income and insurance. With the average cardiac surgery costing $50,000 most people without adequate health insurance are unable to undergo the surgery. Since race is considered either a direct risk for cardiovascular disease as with the Black population, or an indirect risk through diabetes, as with Black and Hispanic groups, one would expect a greater proportion of Blacks and Hispanics undergoing the surgery. There were significant differences in ethnicity by site (F=3.470, p=0.010) with post hoc comparisons demonstrating that Hospitals C and E were significantly different from the other three sites. Hospital C served as the overflow for the cardiac surgeries at a nearby hospital not in the study and the range of educational, ethnic, and occupational characteristics tended to be broad.

Approximately half of the sample had at least some partial college education, although a rather large group, 23%, had not graduated from high school. Women had fewer years of formal education than did men with only 30% of female patients being educated above the high school completion level and 57% of the male patients educated beyond high school. Differences by site in terms of education neared significance with Hospital E patients having more years of schooling than patients at any of the other sites and Hospital C patients having the fewest years of formal schooling (F=2.280, p=0.065).

Occupational characteristics revealed that 58% of the sample were in the three highest occupational categories according to the Hollingshead (1957) index, indicating middle- or upper-middle class socioeconomic status for more than half of the sample. Female patients, however, were members of families with significantly lower occupational status than male patients with only 39% of female patients in the three highest occupational levels as determined by breadwinner status and 63% of male patients in the three highest levels (Kendall's tau, 0.2072, p=0.015). These findings may indicate a connection between lower socioeconomic status and cardiovascular disease for women or possibly different access to cardiac surgery. There were no important differences in occupational status by site.

Caregivers were largely women as one would expect with the demographics of the patient population. Male caregivers were significantly older than female caregivers with mean ages of 64.84 and 56.02 years for male and female caregivers respectively (p=0.0002). Age groups for caregivers were readjusted for purposes of analysis since the original lower limit of 50 years was too low to allow any male caregivers in this group. Therefore, caregivers were divided into age groups as follow: <55 years of age, 56-69 years, and 70> years. Since caregivers in the study were primarily female and women usually marry older men the readjusted groups also are theoretically sound. Male caregivers had been married for significantly longer periods of time than female caregivers with mean length of marriage 37.21 years for males and 29.77 years for female caregivers (t=2.50, p=0.014).

Cardiovascular Illness Characteristics

Table 3 displays the cardiovascular illness characteristics of subjects. Seventy-four percent of the sample had coronary artery bypass graft surgery either for the first time, 55%, or were revascularized for either the second or third time, 19%. The remainder had some type of

Table 3

Cardiovascular Illness Characteristics of Subjects

Characteristic	Frequency (%)	
	Males	Females
Type of Surgery		
CABG	55 (59%)	9 (38%)
Valve	9 (10%)	5 (21%)
CABG + Valve	5 (6%)	1 (4%)
Redo CABG	17 (18%)	5 (21%)
Redo Valve	2 (2%)	3 (12%)
Redo Double Valve	1 (1%)	1 (4%)
Septal Repair	2 (2%)	0 (0%)
Other	2 (2%)	0 (0%)
Number of Vessels Bypassed		
2 or fewer	29 (39%)	6 (40%)
3-4	44 (58%)	2 (54%)
5 or more	2 (3%)	1 (6%)
Type of Valve Replaced		
Aortic	8 (42%)	3 (30%)
Mitral	7 (37%)	5 (50%)
Tricuspid	1 (5%)	0 (0%)
Mitral/Tricuspid	0 (0%)	1 (10%)
Aortic/Mitral	2 (11%)	1 (10%)
Valvuloplasty	1 (5%)	0 (0%)
Type of Valve Used		
Bioprosthetic	15 (94%)	7 (100%)
Mechanical	1 (6%)	0 (0%)
New York Heart Functional Status		
Class I	14 (15%)	0 (0%)
Class II	32 (35%)	10 (43%)
Class III	24 (26%)	8 (35%)
Class IV	22 (24%)	5 (22%)
Positive History of Angina	67 (73%)	17 (74%)
Shortness of Breath	47 (52%)	17 (74%)
Congestive Heart Failure		
Positive History	18 (20%)	4 (18%)
History of Hypertension	47 (52%)	13 (59%)
Diabetes Mellitus	21 (23%)	3 (14%)

Table 3 (continued)

Characteristic	Frequency (%)	
	Males	Females
Family History Positive for Cardiovascular Disease	62 (68%)	18 (78%)
Smoking History		
Never Smoked	25 (28%)	8 (36%)
Stopped >1 month	49 (55%)	9 (41%)
Stopped <1 month	3 (3%)	1 (5%)
Presently smokes	12 (14%)	4 (18%)
History of Myocardial Infarction	38 (42%)	4 (23%)
Intensive Care Unit Stay Greater than 4 days	15 (17%)	10 (45%)

Characteristic	Frequency (%)			
	Males		Females	
	n	Range	n	Range
Mean Cardiopulmonary Bypass Time in minutes	99	51-288	102	25-189
Duration of Cardiac Problems in years	7.9	.02-70yrs	12.4	.02-50yrs

Characteristic	Number & Percent of Subjects with >70% Obstruction		Range of Obstruction
Type of Coronary Artery Involved			
	n	%	Range (%)
Left Main			
Male	11	18	20-100
Female	3	17	20-80
Left Anterior Descending			
Male	48	65	25-100
Female	13	65	20-100

Table 3 (continued)

Characteristic	Number & Percent of Subjects with >70% Obstruction		Range of Obstruction
Type of Coronary Artery Involved (continued)			
	n	%	Range (%)
Circumflex			
Male	34	50	20-100
Female	9	50	60-100
Right Coronary			
Male	48	71	15-100
Female	9	48	30-100

valvular repair, 23%, or septal or uncomplicated aneurysm repair, 3%. Ten women or 42% of the female surgical group had some type of valvular replacement while only 18% of the males had valves replaced. Additionally, more men had bypass surgery than women although the differences were not statistically significant even when type of surgery was trichotomized into three groups: CABG, valve, or other.

A total of 29 subjects had valve replacements and of these the greatest proportion was either aortic (38%) or mitral valve (42%) replacement. Although data were incomplete on the type of valve used for replacement, those which are available indicate that all but one of 23 valve replacements were performed with bioprosthetic valves.

Fifteen percent of male patients had no impairment of their functional status as judged by the criteria of the New York Heart Association functional classification. All of the women in the sample were sufficiently symptomatic to have some functional impairment. Fifty percent of the males and 57% of the females were in Classes III and IV indicating interference with ability to perform activities of daily living and work related responsibilities. There were no significant differences between men and women by New York Heart classification criteria when the four classes were dichotomized. However, when those patients with no symptoms (Class I) were compared to those in Classes II, III, and IV, women were found to be more functionally compromised as a result of their cardiac conditions than were men ($t=-4.04$, $p=0.0464$).

Sixty-five percent of the surgeries performed were considered elective while 35% were urgent. Elective surgeries were classified as those which were performed seven or more days after cardiac catheterization. Urgent surgeries were those that were performed one to six days after catheterization. There were significant differences in surgical priority by site ($F=8.369$, $p<0.0001$) with Hospital C having significantly more urgent cases than Hospitals A, D, or E.

Although angina is reported to be the most frequent presenting symptom of coronary artery disease in women (Wenger, 1985), there were no statistically significant differences by gender in this sample. Twenty-six percent of all patients reported no angina while 74% had a history of angina. Other symptomatology of both coronary artery disease and valvular disease, such as syncope, paroxysmal nocturnal dyspnea, orthopnea, and congestive heart failure (CHF) were not significantly different as reported by men and women. Ten percent of the patient sample had experienced syncopal episodes, 17% reported paroxysmal nocturnal dyspnea, and 19% had orthopnea. Congestive heart failure, a common syndrome in patients with incompetent valves, was not sex-linked either. Twenty percent of the sample had experienced CHF. Shortness of breath which can be linked to either CHD or valvular disease was more prominent in women (74%) than men (52%) with differences almost statistically significant ($t=-1.89$, $p=0.062$).

The contribution of other medical problems such as chronic obstructive pulmonary disease (COPD), cancer, and other medical problems was noted since such problems could adversely affect recovery outcomes. There were no gender related differences for COPD, cancer, or other medical problems which ranged variously from peptic ulcer disease to peripheral vascular disease to arthritis amongst others. Only 4% of the total sample reported cancer and 8% of the sample was noted as having COPD. However, 58% of the entire patient sample had some other medical problem extant.

Hypertension, diabetes mellitus, family history of heart disease, smoking, and history of elevated cholesterol levels are all considered to be risk factors for coronary heart disease. There were no significant differences by gender for any of these risk factors. Fifty-three percent of the entire patient group was hypertensive, 21% was diabetic, 70% had a positive family history of cardiovascular disease, 70% had a either a history of having smoked in the past, just ceased smoking, or were smokers at the time of surgery (14%). Fifty-seven percent of the women and 36% of the men had a history of elevated cholesterol levels, a difference that approached significance ($t=-1.71$, $p=0.081$).

The mean ejection fraction of the left ventricle was very similar for men and women, 56% for men and 60% for women on the 64 patients for whom data were available. Women tend to have better preserved left ventricular function before surgery than do men (Loop et al, 1983; Wenger, 1985) although the difference in this sample was not statistically significant.

While four women (18%) had a history of three or fewer myocardial infarctions (MI), 38 men (43%) had a positive history of 3 or fewer MIs. This difference was statistically significant (Kendall's tau =-0.1537, p=0.044). Although this finding is also consistent with the literature reports also indicate that when women do suffer MI their mortality rates are 75% higher than those of men during the first month following MI (Wenger, 1985). Therefore, a natural selection process may occur which mitigates against women who have had MIs being included in the surgical population.

There were no significant differences in mean number of preoperative medications for men or women. Men averaged 3.7 different medications daily while women averaged 3.4. Women are usually found to have fewer vessels needing bypass than men; data from this sample conform with those previously reported (Loop et al, 1983; Wenger, 1985). Eighty-seven percent of the women in the study had 3 or fewer bypasses while 76% of the men had 3 or fewer vessels bypassed. Although men had more bypass grafts performed per surgery, there were no significant differences between men and women as related to numbers of vessels bypassed nor which vessels were bypassed. Additionally, there were no meaningful differences in number of bypasses in previous surgeries for those patients who were repeat CABGs.

In terms of postoperative complications, women had significantly longer intensive care unit stays than men (chi square=6.87, p=0.009). Only 17% of males had to stay in the intensive care unit longer than 4 days while 45% of females had longer lengths of time in the ICU. Length of time in the ICU was different by site with patients at Hospital A and Hospital C staying significantly longer in the ICU than patients at

Hospital D as demonstrated by Scheffe post hoc comparisons (F=3.090, p=0.019). Other postoperative problems were similar for men and women. There were no statistically significant differences in necessity of a return to the ICU after discharge to the surgical floor, nor were there prolonged dysrhythmias in either sex, and neither was there a difference in implantation of pacemakers in either sex.

Also of note here is the mortality rate for men and women. Five percent (n=5) of the males in the baseline sample died either in surgery, the ICU, or post-discharge. Thirteen percent of the females (n=3) died in surgery, the ICU, or post-discharge. The mortality rate for women has been reported in the past as higher than that for men having the same surgery (Loop et al, 1983) although the difference in this sample is not statistically significant.

While there were no statistically significant differences by patient age group on the variables enumerated above except for one, the trends were as one would expect, that is, the oldest patients tended to have poorer New York Heart Association functional status, more CHF, longer ICU stays, more myocardial infarctions, and more shortness of breath. The oldest patients were significantly different in regard to type of surgery (F=3.684, p=0.0280). Using the post-hoc comparison Scheffe test, they were more likely to have valve replacement surgery of one sort or another than the middle-aged group but not more than the youngest group (p=0.0595).

Next, family and individual variables are described with comparisons made based on gender and age responses.

Measurement of Individual and Family Psychosocial Variables

Preoperative physiological and demographic variables have been presented above. Patients and caregivers were queried also regarding individual psychosocial variables such as mood states for instance, anger/hostility, anxiety/tension, depression/dejection, confusion/bewilderment, fatigue, and vigor. Additionally, a subset of patients, i.e., those from Hospitals A, B, and C answered questions pertaining to their psychosocial adjustment to illness at one month after discharge from the hospital. These data are presented below.

Missing data for all scales and subscales, except those pertaining to social support, were handled by plugging missing data with the mean of the scale or subscale. All data were visually inspected to determine the amount of missing data. Very few subjects had greater than 20% of items missing on any particular subscale and it was decided therefore to plug all missing items as it is difficult with the CRUNCH program to write a program which selects out those subjects with greater than 20% missing items. Items on the social support instrument were not plugged as the social support scale (SSS) is scored in such a way that missing support is considered important.

In Chapter One the primary purpose of this study was recognized as examining the patient's recovery in the context of the family. To this end, certain variables pertaining to family were measured in addition to individual variables. The instruments measuring these variables are reported below and include satisfaction with family function, and assessment of perceived, enacted, and available social support from spouse, children, relatives, and friends. Additionally, marital satisfaction, a concept related to but not synonymous with family satisfaction, was measured for one subset of the sample and is communicated below. Variables are first presented separately with description of their reliability and their performance on the master status variables included. Means, standard deviations, and ranges are contained in the appendices. Following the sections on description statistics pertaining to the different variables are results of independent and paired t-tests. When appropriate variables are analyzed over time using repeated measures ANOVA. Finally, variables are examined in terms of their relationships to each other in tests of the major hypotheses.

Individual Psychosocial Functioning Throughout the Perioperative and Recovery Period

Mood States

The Profile of Mood States (POMS) was used to assess patient and spouse psychosocial functioning before surgery, at one month, and at 3 months after discharge from the hospital. Internal reliabilities for the POMS subscales were performed at each of the three time periods on sample sizes ranging from 153 at baseline to 132 at 1 month, and 117 at 3 months. Cronbach's alpha coefficients for each of the six subscales ranged from a low of 0.78 for the confusion subscale at 1 month post discharge to a high of 0.94 on the depression subscale at 3 months post discharge. Except for the one confusion subscale of alpha=0.78, alphas ranged from 0.82 to 0.94.

Patient means for the six subscales of the POMS preoperatively are presented in Appendix E (Table E-1). The scores for depression, fatigue, and hostility are higher than those reported by Jenkins and colleagues (Jenkins, Stanton, Savageau, Dininger, & Klein, 1983) on a sample of 318 CABG and 89 valve patients.

Spouse mean scores for all 103 spousal subjects entered at baseline on the six POMS subscales are also in the appendix (see Table E-2). The pattern for all POMS subscales as well as the global POMS score indicated a significant decline after discharge from the hospital. Mean scores for male and female patients and male and female caregivers are compared in Tables 4 and 5. Spouse and patient mean scores are compared in Table 6. The mean scores for female spouse/caregivers are higher on tension/anxiety than the published means for female college students but slightly lower than the other published means. Mean scores for male caregivers are lower overall than the published means for male college students.

At one month post discharge 86 patients and 84 spousal caregivers responded to the request for data. The descriptive statistics are contained in Appendix E. Tables 7 and 8, which are found later in Chapter Four, demonstrate through repeated measures ANOVA the differences over time for the POMS subscales for patients and caregivers by age and gender. A three-way ANOVA was attempted, however, since the assumptions for the ANOVAs were not met, i.e., there were singular cells with no variance, the three factor ANOVAs are not presented. Therefore, the ANOVAs as presented in Tables 7 and 8 contain are two way ANOVAs presenting either age or gender as the important master status variable depending on its theoretical and statistical significance; other

Table 4

Comparison of Patients by Gender Using Independent T-Tests

Dependent Variable	Group 1 Male Patients	Group 2 Female Patients	T-Tests	
APGAR score at baseline				
N	87	21	T	-3.10
Mean	16.776	18.857	DF	106
S.D.	2.849	2.330	P	0.0025
Marital satisfaction score at baseline				
N	36	12	T	2.42
Mean	19.722	18.167	DF	46
S.D.	1.799	2.290	P	0.0195
Anxiety/tension subscale at baseline				
N	87	20	T	2.28
Mean	15.040	10.750	DF	105
S.D.	7.940	5.757	P	0.0247
Anxiety/tension subscale at 1 month				
N	72	14	T	0.61
Mean	10.097	8.857	DF	84
S.D.	7.254	4.833	P	0.5420
Anxiety/tension subscale at 3 months				
N	65	13	T	2.55
Mean	9.578	6.225	DF	43.36
S.D.	7.694	3.268	P	0.0145*
Hostility/anger subscale at baseline				
N	87	20	T	5.41
Mean	8.299	2.050	DF	102.99
S.D.	9.421	2.502	P	0.0000*
Hostility/anger subscale at one month				
N	72	14	T	2.43
Mean	5.556	2.513	DF	54.03
S.D.	8.073	3.055	P	0.0186*
Anger/hostility subscale at 3 months				
N	65	13	T	3.33
Mean	6.819	2.154	DF	44.63
S.D.	8.265	3.436	P	0.0017*
Depression subscale at baseline				
N	87	20	T	4.59
Mean	11.845	4.646	DF	84.25
S.D.	11.589	4.276	P	0.0000*

Table 4 (continued)

Dependent Variable		Group 1 Male Patients	Group 2 Female	T-Tests	Patients
Depression subscale at 3 months					
	N	65	13	T	2.12
	Mean	8.612	4.325	DF	38.37
	S.D.	11.329	5.263	P	0.0409*
Global POMS score for sum of subscales at baseline					
	N	87	20	T	3.70
	Mean	37.425	15.721	DF	66.12
	S.D.	39.614	18.109	P	0.0005*
Global POMS score at 3 months					
	N	65	13	T	1.81
	Mean	17.758	4.261	DF	35.96
	S.D.	40.550	19.756	P	0.0779*
Health care orientation (PAIS)					
	N	33	11	T	1.70
	Mean	4.485	3.065	DF	31.34
	S.D.	3.438	1.932	P	0.0990*
SSS score on network social support					
	N	66	12	T	-1.87
	Mean	3.712	3.917	DF	29.99
	S.D.	0.576	0.289	P	0.0713*

* denote separate variance; F test of equal variances rejected at alpha of 0.05

repeated measures ANOVA are presented in Appendix F. Both patient and spousal scores decreased significantly over time and the trajectories for these recovery patterns are illustrated in Figure 8 later in this chapter. PMS subscales for anger and depression at 3 months post discharge are similar to those found in "Improving Recovery from Cardiac Surgery" (Gortner et al, in press) for all three patient age groups.

After three months at home, patient and caregiver scores on the POMS subscales had decreased significantly. Means are calculated on a patient sample of n=76 and a caregiver sample of n=71 and are presented in Appendix E.

Although the investigator had not originally planned to use a "global" POMS score, that is, the addition of the subscales less the vigor scale, it was decided that the total score gave a useful assessment of total mood disturbance. Therefore, in the regressions the global scores are used. However, the subscales are discussed separately as there are interesting differences by gender and age.

Psychosocial Adjustment to Illness

The Psychosocial Adjustment to Illness (PAIS) questionnaire was used to assess patient adjustment to illness one month after cardiac surgery for one subsample of the study. Forty-five subjects returned the PAIS, however, since less than half of the entire study participants completed the PAIS, results reported here are in terms of the reliability of the instrument, comparisons between male and female patients, and comparisons with other cardiac surgery samples. The PAIS was not used in any of the hypotheses but was considered as a means of gathering additional data to compare patients by gender and also as a means of assessing the instrument for use in future work.

Reliabilities for the PAIS were computed on 40 rather than 47 items as it was necessary to delete the subscale pertaining to work, since at one month post discharge most patients had not yet returned to work. Tests of internal consistency ranged from a low of 0.50 on the subscale pertaining to the quality of the domestic environment (e.g., quality of relationships, family communication, financial resources and so on) to a high of 0.81 on the social environment domain, with the overall alpha equal to 0.83. Internal consistency was generally higher than, or similar to, the cardiac surgery sample on which Derogatis reports.

Means, standard deviations and ranges for the 44 subjects answering items on seven, or fewer, domains (subscales) of the PAIS are reported below. The domains are health care orientation, vocational environment, domestic environment, sexual relationships, extended family, social environment, and psychological distress. The sum of these domain scores produces the global adjustment score with higher scores in global adjustment and all domains indicating poorer adjustment to illness. Norms have been previously reported for cardiac surgery patients and their norms are compared to those from this sample using domain standardized area T-scores which have been published in the PAIS manual (Derogatis & Lopez, 1983). Norms from the other cardiac surgery sample are reported on 170 predominantly white males (males=162, females=16) who were tested preceding surgery. The difference in data collection points should be kept in mind when comparing the data from the 2 studies.

The means for all patients on the health care orientation domain was 4.130 (s.d.=3.170, range=1-14). The vocational environment domain had the lowest number of patients answering questions (n=39) and a mean of 8.505 (s.d.=4.445, range=0-18). The domestic environment subscale had a mean of 5.276 (s.d.=2.638, range=0-11) and the sexual relationship subscale, with 44 subjects reporting, had a mean of 4.759 (s.d.=3.994, range=0-12). Means on the extended family, social environment, and psychological distress domains were 1.301 (s.d.=1.862, range=0-10), 5.977 (s.d.=4.663, range=0-16) and 4.523 (s.d.=3.046, range=0-12), respectively. When the means for this sample were compared to the 170 subjects from the Zyzanski, Stanton, Jenkins, and Klein (1981) study, standardized t-scores ranged from the forty-fourth percentile (domestic environment) to the fifty second percentile with a global psychosocial adjustment to illness score at the fiftieth percentile as compared to other cardiac surgery patients.

Table 5 presents t-tests by gender for caregivers. The reader should note that the only t-tests presented in Tables 4 and 5 are those which exhibited statistically significant findings. Those findings which were statistically insignificant are contained in Appendix G.

Family Functioning and Marital Satisfaction Throughout the Perioperative and Recovery Period

Satisfaction with Family Function

The Family APGAR was used to assess patient and caregiver satisfaction with family function. Internal consistency using the alpha coefficient was computed for all subjects (patients and caregivers) at baseline, one month post discharge, and three months post discharge. The alpha coefficient for 219 baseline cases was 0.87. At 1 month after going home, the alpha reliability was 0.87 (n=81) and at 3 months it was 0.89 (n=148). The size of the sample varies since the APGAR was administered only to a subsample of subjects at one month post discharge. The alpha coefficients correspond favorably to those published elsewhere (0.86, Smilkstein, 1978; 0.83 to 0.87 Gortner et al, in press).

Preoperatively, 107 patients and 105 spouses completed the Family APGAR. At one month after discharge a subsample of 42 patients and 39 spouses completed the APGAR and at three months after discharge the entire sample (76 patients and 71 spouses) again completed the APGAR.

Table 5

Comparisons of Caregivers by Gender Using Independent T-Tests

Dependent Variable		Group 1 Male Caregvrs	Group 2 Female Caregvrs	T-Test	
APGAR score at baseline					
	N	22	84	T	2.34
	Mean	17.955	16.226	DF	104
	S.D.	2.516	3.209	P	0.0211
APGAR score at 1 month					
	N	7	32	T	1.87
	Mean	17.286	15.719	DF	18.82
	S.D.	1.604	3.265	P	0.0768*
APGAR score at baseline					
	N	22	84	T	2.34
	Mean	17.955	16.226	DF	104
	S.D.	2.516	3.209	P	0.0211
KMS score at 1 month					
	N	7	32	T	2.91
	Mean	20.286	18.375	DF	19.04
	S.D.	1.254	2.575	P	0.0090*
Perceived social support at baseline					
	N	10	36	T	3.74
	Mean	3.667	2.815	DF	30.32
	S.D.	0.497	0.990	P	0.0008*
Tension score at baseline					
	N	21	83	T	-3.69
	Mean	11.035	17.009	DF	48.06
	S.D.	5.833	9.142	P	0.0006*
Anger score at baseline					
	N	21	83	T	-2.45
	Mean	3.486	7.472	DF	54.22
	S.D.	5.624	9.735	P	0.0175*
Anger score at 1 month					
	N	13	71	T	-4.57
	Mean	1.769	6.016	DF	69.09
	S.D.	1.833	6.556	P	0.0000*
Anger score at 3 months					
	N	12	62	T	-1.95
	Mean	2.667	5.754	DF	24.21
	S.D.	4.438	7.269	P	0.0623*

Table 5 (continued)

Dependent Variable		Group 1 Male Caregvrs	Group 2 Female Caregvrs	T-Test	
Depression score at baseline					
	N	21	83	T	-1.85
	Mean	7.555	12.961	DF	102
	S.D.	9.597	12.500	P	0.0678
Depression score at 1 month					
	N	13	71	T	-2.98
	Mean	3.308	7.834	DF	44.67
	S.D.	3.750	9.317	P	0.0046*
Fatigue score					
	N	21	83	T	-2.22
	Mean	7.363	10.631	DF	42.44
	S.D.	5.513	7.755	P	0.0320*
Global POMS score at baseline					
	N	20	83	T	-2.27
	Mean	17.296	39.684	DF	101
	S.D.	29.830	41.612	P	0.0086
Global POMS score at 1 month					
	N	13	71	T	-2.25
	Mean	5.231	19.337	DF	28.86
	S.D.	17.857	32.256	P	0.0320*
Zarit score at 3 months					
	N	12	63	T	-2.27
	Mean	12.833	18.378	DF	24.82
	S.D.	6.820	11.488	P	0.0322*
Stressed between spouse, family, work (Zarit) @ 1 mo.					
	N	13	72	T	-2.76
	Mean	0.846	1.653	DF	83
	S.D.	0.899	0.981	P	0.0071
Stressed between spouse, family, work (Zarit) @ 3 mos.					
	N	12	62	T	-3.65
	Mean	0.500	1.387	DF	25.43
	S.D.	0.674	1.150	P	0.0012*
Relationships w/others affected neg. (Zarit) @ 1 mo.					
	N	13	71	T	-2.51
	Mean	0.231	0.634	DF	33.24
	S.D.	0.439	0.882	P	0.0171*
Relationships w/ others affected neg. (Zarit) @ 3 mos.					
	N	12	62	T	-3.40
	Mean	0.167	0.677	DF	31.58
	S.D.	0.389	0.785	P	0.0019*

Table 5 (continued)

Dependent Variable		Group 1 Male Caregvrs	Group 2 Female Caregvrs	T-Test	
Health suffered (Zarit) at 1 month					
	N	13	72	T	-3.38
	Mean	0.077	0.500	DF	57.78
	S.D.	0.277	0.839	P	0.0013*
Better job in care (Zarit) at 1 month					
	N	13	70	T	2.17
	Mean	1.769	1.086	DF	81
	S.D.	1.092	1.032	P	0.0326
Better job in care (Zarit) at 3 months					
	N	12	61	T	2.26
	Mean	1.583	0.951	DF	71
	S.D.	0.669	0.921	P	0.0269
Network social support at baseline					
	N	12	36	T	2.72
	Mean	2.917	2.472	DF	45.90
	S.D.	0.289	0.845	P	0.0093*

* denote separate variance; F test of equal variances rejected at alpha of 0.05

Table 6

Paired Differences T-Tests for Marital Dyads

Variables	N	Means	S.D.	T-test		Correlation	
Patient APGAR score at baseline							
		17.201	2.857	T	1.627	R	0.228
	102			DF	101	DF	100
		16.598	3.157	P	0.1069	P	0.0211
Spouse APGAR score at baseline							
Patient APGAR total score at 1 month							
		17.447	2.627	T	3.142	R	0.431
	38			DF	37	DF	36
		15.895	3.047	P	0.0033	P	0.0068
Spouse APGAR score at 1 month							
Patient perceived social support at 1 mo.							
		3.212	0.685	T	5.717	R	0.485
	79			DF	78	DF	77
		2.675	0.914	P	0.0000	P	0.0000
Spouse perceived social support at 1 month							

Table 6 (continued)

Variables	N	Means	S.D.	T-test		Correlation	
Patient perceived social support at 3 mos.							
		3.144	0.722	T	4.734	R	0.487
	71			DF	70	DF	69
		2.681	0.885	P	0.0000	P	0.0000
Spouse perceived social support at 3 mos.							
Patient fatigue subscale, 1 month							
		9.870	6.906	T	2.297	R	0.291
	82			DF	81	DF	80
		7.935	5.825	P	0.0242	P	0.0079
Spouse fatigue subscale, 1 month							
Patient vigor subscale, 1 month							
		15.242	6.224	T	-2.878	R	0.133
	82			DF	81	DF	80
		17.848	6.231	P	0.0051	P	0.2340
Spouse vigor subscale, 1 month							

Descriptive statistics for patients and caregivers are presented in Appendix H (Table H-1). There were no main effects for gender or age for either patients or caregivers. The decline in family satisfaction was greater for caregivers than it was for patients.

Marital Satisfaction

Marital satisfaction was measured for a subgroup of the larger sample at three different time periods using the Kansas Marital Satisfaction (KMS) scale. Cronbach's alpha varied from 0.90 at baseline (93 subjects), to 0.97 at one month post discharge (82 subjects), and finally to 0.96 at three months post discharge (85 subjects). Schumm and his colleagues report an alpha coefficient of 0.93 during their use of the KMS (1986).

There are only three items on the KMS: satisfaction with the marriage, satisfaction with the spouse, and satisfaction with the marital relationship. The means on each item as well as the overall mean were examined separately for patient and spouse. Descriptive statistics for this instrument are presented in Appendix I (Tables I-1 and I-2). The erosion of marital satisfaction over time for both patient and spouse is notable. There is a significant difference between male and female patients' responses at the baseline data collection point and at one and three months female patients are less satisfied although not at a statistically significant level (Table 7). Additionally, for caregivers the significant difference is a decrease in marital satisfaction from baseline to 3 months postoperative (Table 8). Figure 13 in Chapter Five illustrates the decline in marital satisfaction experienced by patients and spouses. Chapter Five discusses the gender differences in responses to marital satisfaction items.

Perceived and Network Social Support

Properties of the social support network and the perceived aspects of social support were assessed using the Social Support Scale (SSS), a short self-administered scale which can be scored in 3 different ways to gain an indication of: 1) the variety of sources of support in the social network, 2) the mean levels of perceived social support, and 3) a combined score which reflects both levels of network support and perceived social support. The SSS was administered to the subsample at baseline and to the entire sample at one and three months post discharge.

Mean levels of social support from spouses were not obtained for caregivers as the investigator assumed that recovering patient/spouses

Table 7

Repeated Measures ANOVA for Patients by Gender or Age

Marital Satisfaction (KMS)

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Males	19.82	1.83	19.33	2.07	18.94	3.18
Females	17.89	2.47	18.11	3.69	16.67	5.36

Source	df	MSS	F	p
Between Ss	41			
Gender	1	69.35	4.43	0.04
Error	39	1.55		
Within Ss	84			
Time	2	9.81	2.38	0.10
Gender x Time	2	2.03	0.49	NS
Error	80	4.12		

Family Satisfaction (APGAR)

Means and Standard Deviations

	Baseline		3 Months	
	Mean	S.D.	Mean	S.D.
Males	16.58	3.04	16.28	3.39
Females	19.46	0.78	16.98	3.95

Source	df	MSS	F	p
Between Ss	77			
Gender	1	69.75	4.88	0.03
Error	76	14.30		
Within Ss	78			
Time	1	17.17	2.99	0.09
Gender x Time	1	25.76	4.50	0.03
Error	76	5.72		

Table 7 (continued)

Perceived Social Support (SSS for subsample)

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Young	3.64	0.48	3.71	0.57	3.54	0.47
Middle-Age	3.00	0.72	3.18	0.67	3.08	0.68
Old	3.61	0.61	3.68	0.55	3.68	0.55

Source	df	MSS	F	p
Between Ss	41			
Age Group	2	4.34	5.22	0.01
Error	39	0.83		
Within Ss	84			
Time	2	0.22	1.04	NS
Age Group x Time	4	0.04	0.17	NS
Error	78	0.21		

Perceived Social Support (SSS- for entire sample)

Means and Standard Deviations

	1 Month		3 Months	
	Mean	S.D.	Mean	S.D.
Young	3.58	0.56	3.44	0.45
Middle-Age	3.07	0.73	2.99	0.74
Old	3.56	0.59	3.56	0.58

Source	df	MSS	F	p
Between Ss	69			
Age Group	2	3.85	4.90	0.01
Error	67	0.79		
Within Ss	70			
Time	1	0.16	1.05	NS
Age Group X Time	1	0.03	0.17	NS
Error	67	0.15		

Table 7 (continued)

Perceived Social Support by Source: Child

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Young	3.86	0.38	3.86	0.38	3.71	0.49
Middle-Age	3.14	1.24	3.14	1.30	2.86	1.33
Old	2.86	1.95	2.86	1.95	2.86	1.95

Source	df	MSS	F	p
Between Ss	41			
Age Group	2	5.90	1.24	NS
Error	39	4.78		
Within Ss	84			
Time	2	0.64	2.54	0.08
Age Group x Time	4	0.08	0.33	NS
Error	78	0.25		

Perceived Social Support by Source: Relatives

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Young	3.43	0.79	3.43	1.13	3.29	0.76
Middle-Age	2.25	1.38	2.61	1.451	2.501	1.26
Old	3.86	0.38	4.00	0.00	4.00	0.00

Source	df	MSS	F	p
Between Ss	41			
Age Group	2	22.36	10.63	0.0002
Error	39	2.10		
Within Ss	84			
Time	2	0.74	0.68	NS
Age Group x Time	4	0.15	0.14	NS
Error	78	1.08		

Table 7 (continued)

Perceived Social Support by Source: Friends

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Young	3.29	0.95	3.57	0.79	3.14	1.07
Middle-Age	2.82	1.09	3.18	0.90	3.14	1.04
Old	3.71	0.49	3.86	0.38	3.86	0.38

Source	df	MSS	F	p
Between Ss	41			
Age Group	2	5.03	3.48	0.04
Error	39	1.45		
Within Ss	84			
Time	2	1.06	1.77	NS
Age Group x Time	4	0.20	0.34	NS
Error	78	0.59		

Global POMS Mood Disturbance

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Males	38.65	39.49	24.51	35.98	16.05	40.19
Females	20.09	20.20	14.60	23.67	5.06	20.41

Source	df	MSS	F	p
Between Ss	68			
Gender	1	5147.16	1.77	NS
Error	67	2897.72		
Within Ss	138			
Time	2	7906.73	14.84	<.0001
Gender x Time	2	220.54	0.41	NS
Error	134	532.69		

Tension/Anxiety Subscale (POMS)

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Males	15.65	8.18	10.58	7.33	9.35	7.58
Females	11.42	7.14	8.25	4.75	6.08	3.37

Source	df	MSS	F	p
Between Ss	68			
Gender	1	319.70	3.02	0.09
Error	67	115.88		
Within Ss	138			
Time	2	714.08	25.09	<.0001
Gender x Time	2	9.04	0.32	NS
Error	134	28.46		

Anger/Hostility Subscale (POMS)

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Males	7.89	9.85	5.49	7.72	6.46	8.41
Females	2.25	2.49	2.43	3.20	2.33	3.52

Source	df	MSS	F	p
Between Ss	68			
Gender	1	542.70	3.80	0.06
Error	67	142.94		
Within Ss	138			
Time	2	65.77	2.53	0.08
Gender x Time	2	16.52	0.64	NS
Error	134	25.98		

Table 7 (continued)

Depression/Dejection Subscale (POMS)

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Males	12.05	11.52	8.38	9.89	8.11	11.34
Females	5.71	4.87	6.58	5.55	4.59	5.41

Source	df	MSS	F	p
Between Ss	68			
Gender	1	449.77	1.98	NS
Error	67	227.41		
Within Ss	138			
Time	2	236.08	5.46	0.006
Gender x Time	2	52.25	1.20	NS
Error	134	43.23		

Fatigue Subscale (POMS)

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Males	10.37	6.78	9.88	6.86	8.74	7.39
Females	8.74	7.39	7.08	4.94	5.28	4.70

Source	df	MSS	F	p
Between Ss	68			
Gender	1	101.08	1.37	NS
Error	67	73.67		
Within Ss	138			
Time	2	298.17	11.99	<.0001
Gender x Time	2	7.49	0.30	NS
Error	126	24.16		

Table 7 (continued)

Confusion/Bewilderment Subscale (POMS)

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Males	7.82	5.93	5.32	4.46	5.43	5.36
Females	5.67	2.87	4.75	3.11	4.45	3.74

Source	df	MSS	F	p
Between Ss	68			
Gender	1	45.04	0.82	NS
Error	67	54.83		
Within Ss	138			
Time	2	111.84	10.97	<.0001
Gender x Time	2	6.69	0.66	NS
Error	134	10.19		

Vigor Subscale (POMS)

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Males	15.11	6.15	15.14	5.50	19.68	6.48
Females	13.69	5.37	14.50	8.23	17.67	6.15

Source	df	MSS	F	p
Between Ss	68			
Gender	1	54.83	0.75	NS
Error	67	72.78		
Within Ss	138			
Time	2	442.23	21.44	<.0001
Gender x Time	2	4.72	0.25	NS
Error	134	20.62		

Table 7 (continued)

New York Heart Association Functional Cardiac Status

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Young	2.55	1.29	1.36	0.50	1.45	0.52
Middle-Age	2.58	0.97	1.34	0.56	1.26	0.53
Old	2.60	0.97	1.30	0.67	1.30	0.48

Source	df	MSS	F	p
Between Ss	70			
Age Group	2	0.05	0.07	NS
Error	68	0.77		
Within Ss	138			
Time	2	37.64	86.60	<.00001
Age Group x Time	4	0.07	0.16	NS
Error	136	0.43		

Patient Self-Report of Recovery

Means and Standard Deviations

	1 Month		3 Months	
	Mean	S.D.	Mean	S.D.
Young	6.44	1.74	7.89	2.15
Middle-Age	7.06	1.99	7.59	2.08
Old	6.80	1.81	8.00	1.70

Source	df	MSS	F	p
Between Ss	67			
Age Group	2	0.28	0.04	NS
Error	65	6.33		
Within Ss	68			
Time	1	19.13	11.95	0.001
Age Group x Time	2	2.18	1.36	NS
Error	65	1.60		

Table 8

Repeated Measures ANOVA by Gender or Age Group for Caregivers

Marital Satisfaction (KMS)

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Males	21.00	0.00	20.60	0.89	19.20	2.17
Females	19.37	1.81	18.57	2.46	18.37	2.74

Source	df	MSS	F	p
Between Ss	34			
Gender	1	28.93	2.96	0.10
Error	33			
Within Ss	70			
Time	2	11.27	4.00	0.02
Gender x Time	2	1.60	0.57	NS
Error	66	2.82		

Family Satisfaction (APGAR)

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Males	19.00	1.22	17.60	1.52	17.00	2.92
Females	16.96	2.50	15.89	3.10	15.93	3.20

Source	df	MSS	F	p
Between Ss	32			
Gender	1	32.78	2.06	NS
Error	31	15.91		
Within Ss	66			
Time	2	14.62	3.49	0.04
Gender x Time	2	1.02	0.24	NS
Error	62	4.18		

Table 8 (continued)

Family Satisfaction (APGAR, entire sample)

Means and Standard Deviations

	1 Month		3 Months	
	Mean	S.D.	Mean	S.D.
Males	17.73	2.65	16.82	3.19
Females	16.55	2.89	15.52	3.39

Source	df	MSS	F	p
Between Ss	68			
Gender	1	28.35	1.93	NS
Error	67	14.70		
Within Ss	69			
Time	1	35.51	7.50	0.008
Gender X Time	1	0.07	0.02	NS
Error	67			

Perceived Social Support (SSS)

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Males	3.80	0.30	2.72	1.01	2.67	1.27
Females	2.86	0.93	2.83	0.91	2.79	0.83

Source	df	MSS	F	p
Between Ss	34			
Gender	1	0.75	0.40	NS
Error	33			
Within Ss	70			
Time	2	0.46	1.04	NS
Gender x Time	2	1.59	3.57	0.03
Error	66	0.45		

Table 8 (continued)

Perceived Social Support by Source: Child

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Males	4.00	0.00	3.40	0.89	3.00	1.00
Females	2.90	1.47	3.07	1.36	2.93	1.41

Source	df	MSS	F	p
Between Ss	34			
Gender	1	3.21	0.67	NS
Error	33	4.81		
Within Ss	70			
Time	2	0.27	0.77	NS
Gender x Time	2	1.23	3.54	0.03
Error	66	0.35		

Perceived Social Support by Source: Relatives

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Males	3.60	0.55	1.60	1.82	2.40	1.34
Females	2.53	1.55	2.50	1.38	2.23	1.30

Source	df	MSS	F	p
Between Ss	34			
Gender	1	0.16	0.04	NS
Error	33	3.99		
Within Ss	70			
Time	2	1.72	1.77	NS
Gender x Time	2	4.15	4.27	0.02
Error	66	0.97		

Table 8 (continued)

Perceived Social Support by Source: Relatives

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Young	3.29	0.61	2.50	1.22	2.29	1.07
Middle-Age	1.94	1.78	2.12	1.65	2.06	1.44
Old	3.75	0.50	3.00	1.41	3.00	1.41

Source	df	MSS	F	p
Between Ss	34			
Age	2	9.35	2.64	0.09
Error	32	3.54		
Within Ss	70			
Time	2	1.72	1.66	NS
Age x Time	4	1.52	1.47	NS
Error	64	1.04		

Global POMS Mood Disturbance

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Males	15.28	24.42	4.82	19.50	8.06	29.16
Females	40.16	41.88	20.26	33.99	13.28	33.31

Source	df	MSS	F	p
Between Ss	63			
Gender	1	6297.81	2.29	NS
Error	62	2754.35		
Within Ss	128			
Time	2	9747.85	21.40	<.00001
Gender x Time	2	880.68	1.93	NS
Error	124	455.48		

Table 8 (continued)

Tension/Anxiety Subscale (POMS)

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Males	11.02	5.51	7.82	5.64	6.85	6.93
Females	17.41	9.21	9.88	6.62	8.43	6.96

Source	df	MSS	F	p
Between Ss	63			
Gender	1	305.40	2.93	0.09
Error	62	104.24		
Within Ss	128			
Time	2	1219.90	39.35	<.00001
Gender x Time	2	63.85	2.06	NS
Error	124	31.00		

Anger/Hostility Subscale (POMS)

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Males	1.82	2.40	1.73	1.95	2.73	4.65
Females	6.53	9.26	5.96	6.71	5.70	7.23

Source	df	MSS	F	p
Between Ss	63			
Gender	1	431.94	3.81	0.06
Error	62			
Within Ss	128			
Time	2	5.58	0.25	NS
Gender x Time	2	7.37	0.33	NS
Error	124	22.56		

Table 8 (continued)

Anger/Hostility Subscale (POMS)

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Young	8.42	9.84	6.96	6.34	6.81	8.75
Middle-Age	5.21	8.30	5.05	6.62	4.64	5.82
Old	0.29	0.49	1.00	1.53	3.14	5.84

Source	df	MSS	F	p
Between Ss	63			
Age Group	2	297.34	2.64	0.08
Error	61	112.59		
Within Ss	128			
Time	2	5.58	0.25	NS
Age Group x Time	4	14.77	0.65	NS
Error	122	22.57		

Depression/Dejection Subscale (POMS)

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Males	6.38	6.82	3.36	4.08	5.75	8.44
Females	12.87	12.64	7.78	9.06	6.98	9.00

Source	df	MSS	F	p
Between Ss	63			
Gender	1	447.60	2.09	NS
Error	62	214.29		
Within Ss	128			
Time	2	505.97	12.97	<.00001
Gender x Time	2	64.16	1.64	NS
Error	124	39.02		

Table 8 (continued)

Fatigue Subscale (POMS)

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Males	7.30	4.99	7.82	5.36	6.18	6.29
Females	11.15	7.86	7.97	6.02	6.29	5.71

Source	df	MSS	F	p
Between Ss	63			
Gender	1	51.30	0.60	NS
Error	62	85.65		
Within Ss	128			
Time	2	289.34	14.87	<.00001
Gender x Time	2	42.06	2.16	NS
Error	124			

Confusion/Bewilderment Subscale (POMS)

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Males	3.73	2.45	4.36	2.98	3.18	1.94
Females	7.52	5.42	5.62	4.72	4.81	4.22

Source	df	MSS	F	p
Between Ss	63			
Gender	1	135.20	2.93	0.09
Error	62	46.21		
Within Ss	128			
Time	2	89.28	11.85	<.00001
Gender x Time	2	17.07	2.27	NS
Error	124	7.53		

Table 8 (continued)

Vigor Subscale (POMS)

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Males	16.69	5.48	20.27	4.27	16.64	5.16
Females	15.33	7.15	16.95	6.75	18.93	6.32

Source	df	MSS	F	p
Between Ss	63			
Gender	1	17.33	0.22	NS
Error	62	79.87		
Within Ss	128			
Time	2	146.22	6.25	0.003
Gender x Time	2	74.15	3.17	0.045
Error	124	23.38		

Caregiving Burden (Zarit)

Means and Standard Deviations

	1 Month		3 Months	
	Mean	S.D.	Mean	S.D.
Young	18.10	10.32	20.83	12.07
Middle-Age	16.04	8.17	16.13	9.01
Old	7.95	6.63	9.97	10.09

Source	df	MSS	F	p
Between Ss	67			
Age Group	2	549.25	3.69	0.03
Error	65	148.81		
Within Ss	68			
Time	1	45.17	1.32	NS
Age Group x Time	2	26.32	0.77	NS
Error	65	34.27		

would not be able to offer any social support. Therefore, mean levels of perceived social support for the caregiver do not include his or her evaluation of support from the recovering patient. The paired differences t-tests indicate a significant difference between mean levels of support for patient and spouse. This may be an artifact of gender or role, or it may be related to instrumentation.

Evaluations of internal consistency were performed separately on patient and spouse scores using the coding methods outlined by Funch, Marshall, and Gebhardt (1986). The best reliabilities were those obtained on the measure as it was scored for mean levels of perceived social support from spouse, children, relatives, and friends. For perceived social support, alpha coefficients varied for patients from 0.65 (n=39) at baseline, to 0.76 (n=72) at one month, and 0.77 (n=60) at three months. Caregivers' reliabilities ranged from 0.56 (n=33) at baseline, to 0.82 (n=63) at one month, and 0.80 (n=60) at 3 months. Funch and her colleagues found that internal reliabilities were best for the instrument when scored for mean levels of perceived social support with reported alphas ranging from 0.61 to 0.84.

An alternative method of scoring this instrument obtained scores for the size of the social support network. Standardized alphas are reported here as the items could not be reasonably expected to have equal variances (e.g., all patients in the study had spouses but not all patients had children). Standardized alpha coefficients for patients varied from 0.67 (n=49) at baseline, to 0.44 (n=88) at one month, and 0.34 (n=78) at 3 months. For spouses, alphas were 0.49 (n=48), 0.57 (n=85), and 0.72 (n=75). Alpha coefficients for this method of scoring were reported by Funch to range from 0.26 to 0.50. Because two thirds of the standardized alphas fall below 0.60 this method of scoring the instrument was not used in tests of the hypotheses. Additionally, the third method of scoring the SSS, which is a combination of available and perceived social support, was not utilized either as Funch's results indicated undesirably low alpha coefficients (0.35 to 0.65).

Descriptive statistics for mean levels of perceived social support, perceived support by source, and also for network social support are presented in Appendix H (Tables H-1 to H-4). Network social support and total mean perceived social support scores are compared using independent t-tests in Tables 4 and 5 for patients and caregivers by gender. Table 6 compares spouse and patient perceptions of mean levels of perceived social support at the one and three month data collection points. Both patients and spouses reported declining levels of perceived social support. There are noteworthy differences for patients regarding the amount of social support received from children with female patients reporting more perceived social support from children than male patients during the post discharge period although the differences are not statistically significant. For caregivers, there were also differences by gender in amounts of perceived social support although the differences by gender are reversed from patients. Male caregivers perceive more social support from children and friends than do female caregivers during the preoperative period. Tables 7 and 8 contain repeated measures ANOVA for these variables.

Caregiving Burden

Caregiving burden of spousal caretakers was evaluated using a self report form of the Zarit Caregiving Burden Interview. Internal consistency was 0.82 at one month and 0.91 at three months after discharge to the home. The sample size at one month was 85 caregivers and 75 at 3 months. The internal consistency of the measure for this sample compares similarly with other reports of 0.88 and 0.91 (Zarit & Zarit, 1983).

Mean scores for the Zarit Caregiving Burden were 16.933 (s.d.=8.853, range=0-47) at one month and 17.491 (s.d.=11.031, range=0-44) at 3 months after discharge. Zarit and Zarit report that although norms for caregiving burden have not been established, estimates of the degree of burden are as follow: 0-20, little or no burden, 21-40 mild to moderate burden, 41-60 moderate to severe burden, and 61-88 severe burden. These estimates are founded on a senile dementia population and one would expect them to be higher for caregivers to such a group. Additionally, included in the published scores are those of non-spouses; these are other family member caregivers who generally express more burden than do spouses. Means at both time periods, however, would indicate generally little or no burden when measured against the burden of caregiving to dementia patients. The instrument does indicate significant differences between age groups and male and female caregivers for this sample. Tables 5 and 8 illustrate these differences.

Self-Reported Activity Levels and Physiological Parameters of Patient Recovery

Patients were contacted by telephone at one and three months after discharge from the hospital. Telephone follow-up allowed an opportunity to evaluate recovery in terms of the classic markers: return to work or household activity, recreational activity, and sexual activity. Patients were also questioned regarding their smoking behavior, how their physical comfort compared to that of 6 months prior to surgery, and whether anginal pain and/or shortness of breath was present. Additionally, patients were queried regarding the existence of new physical problems or if rehospitalization had occurred. Finally, New York Heart Association functional status was determined and patients were asked to determine on a continuum from 0 to 10 how far recovered they were, what their quality of life was, and how satisfied they were with their quality of life. The repeated measures ANOVA for self-reported patient recovery are illustrated in Table 9.

At one month after discharge data were available on 77 patients and at 3 months data were available for 92 patients. In terms of recreational and work/household activities 75% of the patients contacted were working less and having fewer recreational activities as compared to 6 months prior to surgery. By 3 months after discharge, recreational activities had increased (F=39.661, p=<.00001) but slightly more than half of the group were working at their jobs or household work less when compared to 6 months prior to surgery. Repeated measures ANOVA revealed a significant interaction between age and gender with the youngest men and the oldest women working at jobs or household work significantly less when compared to 6 months prior to surgery (F=4.192, p=0.0194).

Table 9

Repeated Measures ANOVA by Age Group of Patient for Postoperative Recovery Variables

Level of Recreational Activity Compared to 6 Months Prior to Surgery

Means and Standard Deviations

	1 Month		3 Months	
	Mean	S.D.	Mean	S.D
Young	-1.00	0.00	-0.40	0.70
Middle-Age	-0.66	0.59	0.00	0.76
Old	-0.90	0.32	0.00	0.94

Source	df	MSS	F	p
Between Ss	69			
Age Group	2	1.17	2.43	0.10
Error	67	0.48		
Within Ss	70			
Time	1	16.46	41.99	<.00001
Age Group x Time	2	0.14	0.36	NS
Error	67	0.39		

Level of Work Compared to 6 Months Prior to Surgery

Means and Standard Deviations

	1 Month		3 Months	
	Mean	S.D.	Mean	S.D
Young	-0.90	0.32	-0.60	0.70
Middle-Age	-0.74	0.49	-0.48	0.61
Old	-0.50	0.71	-0.20	0.79

Source	df	MSS	F	p
Between Ss	69			
Age Group	2	0.85	2.15	0.12
Error	67	0.40		
Within Ss	70			
Time	1	2.58	9.14	0.004
Age Group x Time	2	0.01	0.02	NS
Error				

Table 9 (continued)

Satisfaction with Sexual Activity

Means and Standard Deviations

	1 Month		3 Months	
	Mean	S.D.	Mean	S.D
Young	0.70	0.48	0.70	0.48
Middle-Age	0.34	0.52	0.50	0.51
Old	0.40	0.52	0.70	0.48

Source	df	MSS	F	p
Between Ss	69			
Age Group	2	0.71	1.77	NS
Error	67	0.40		
Within Ss	70			
Time	1	0.86	7.82	0.007
Age Group x Time	2	0.11	1.02	NS
Error	67	0.11		

Sexual Frequency as Compared to 6 Months Prior to Surgery

Means and Standard Deviations

	1 Month		3 Months	
	Mean	S.D.	Mean	S.D
Young	-0.50	0.53	-0.20	0.63
Middle-Age	-0.44	0.50	-0.24	0.56
Old	-0.30	0.67	-0.10	0.57

Source	df	MSS	F	p
Between Ss	69			
Age Group	2	0.17	0.40	NS
Error	67	0.43		
Within Ss	70			
Time	1	1.61	9.09	0.004
Age Group x Time	2	0.02	0.12	NS
Error	67	0.18		

Table 9 (continued)

Level of Physical Comfort as Compared to 6 Months Prior to Surgery

Means and Standard Deviations

	1 Month		3 Months	
	Mean	S.D.	Mean	S.D
Young	-0.27	0.90	0.09	0.94
Middle-Age	-0.08	0.90	0.26	0.88
Old	0.00	1.05	0.50	0.85

Source	df	MSS	F	p
Between Ss	70			
Age Group	2	0.61	0.56	NS
Error	68	1.10		
Within Ss	71			
Time	1	4.76	8.96	.004
Age Group x Time	2	0.05	0.10	NS
Error	68	0.53		

Shortness of Breath Symptomatology after Surgery

Means and Standard Deviations

	1 Month		3 Months	
	Mean	S.D.	Mean	S.D
Young	0.64	0.50	0.55	0.52
Middle-Age	0.27	0.67	0.43	0.65
Old	0.80	0.42	1.00	0.00

Source	df	MSS	F	p
Between Ss	69			
Age Group	2	2.75	6.87	.002
Error	67	0.40		
Within Ss	70			
Time	1	0.58	1.80	NS
Age Group x Time	2	0.16	0.50	NS
Error	67	0.32		

At one month after surgery only two subjects were smoking but at 3 months after surgery the number had increased to five. There were no significant differences in smoking behavior between men and women, by patient age, or by time on a repeated measures ANOVA.

Sexual activity is another marker of recovery. At one month after surgery 55% of all patients reported that they had not resumed sexual activity to their satisfaction. It should be noted that of those who had not resumed sexual activity a sizable proportion reported that they had not been engaging in sexual relations before surgery either as a result of partner problems or what they referred to as "age". Most physicians, and also patient teaching materials (American Heart Association & Santa Clara Heart Association, 1976), suggest that sex not be resumed until 6 weeks after surgery so that responses may reflect compliance with physicians' and others' suggestions. Indeed, by 3 months after discharge 59% had resumed sexual activity to their satisfaction. The difference between time 1 and time 2 was statistically significant (F=7.490, p=0.0081) but there were no significant differences by age or gender. At one month after surgery 54% of the subjects said that frequency of sexual activity had not changed while 45% said it was less frequent than 6 months prior to surgery. Only one patient claimed greater frequency of sexual activity at one month post discharge. By 3 months after surgery 30% of all patients said they were having less sexual activity than they had experienced 6 months prior to surgery; 62% stated frequency had not changed and 7 patients or 8% claimed greater frequency. The differences between one and three months in terms of frequency of sexual activity when compared to 6 months prior to surgery were statistically significant (F=8.373, p=0.0052). There was also a significant age group by gender interaction for sexual frequency with the youngest men and oldest women reporting greatest decline in frequency of sexual activity. However, this interaction must be interpreted conservatively since the

3-factor ANOVA resulted in three singular cells which makes interpretation more difficult.

When subjects were questioned regarding physical comfort/discomfort at one month after surgery, it was not surprising that 45% said they were feeling worse than compared to 6 months prior to surgery. Incisional discomfort and complications related to surgery such as wound infections and post-pericardotomy syndrome usually accounted for those subjects feeling worse than prior to surgery. Seventeen percent of all patients felt no differently and 38% were actually feeling better than they had compared to 6 months prior to surgery. By 3 months after surgery 54% of all patients reported feeling better than they had 6 months prior to surgery. However, an impressive 28% said they felt worse than they had 6 months prior to surgery and 18% stated they felt no different. There were statistically significant improvement changes from time 1 to time 2 ($F=8.388$, $p=0.0052$) but no significant differences by age group or gender although the youngest group reported feeling the worst.

The primary purpose of CABG surgery is alleviation of chest pain. This desired outcome of surgery was reported by 92% of the patients at 1 and 3 months post discharge. However, 7 patients, or 8% of the patient sample, were still experiencing angina after surgery. When compared to 6 months previous to surgery, however, 72% of the group reported an improvement at 1 month and 75% at 3 months after discharge. Only 2 patients at 1 and 3 months stated that their angina was worse; the remainder felt that their had been no change in their angina. The 22-25% who felt that their angina had not changed included those who were asymptomatic preoperatively. There were no statistically significant changes in angina from time 1 to time 2 nor were there any significant differences by age or gender.

Shortness of breath is a frequent symptom of valvular disease and less frequently of coronary artery disease. At one month after discharge 8% of all patients felt that their shortness of breath was worse when compared to 6 months prior to surgery while 49% felt it was better and 43% reported no change. By 3 months after discharge 57% reported improvement, 9% felt they were worse, and 34% communicated that no change had occurred. Shortness of breath did not change in a significant fashion from time 1 to time 2, however, there was a significant main effect for age with the oldest patients having significantly more shortness of breath than the middle-aged group (Scheffe post-hoc test, p=0.0035).

Three months after discharge from the hospital 15% (14 patients) of all patients contacted had been rehospitalized, primarily for cardiovascular related problems. The number of times of hospitalization ranged from 1-8 and does not include those patients who died after discharge from the hospital. Rehospitalization also does not include emergency room visits that did not result in inpatient status.

New York Heart Association functional status was assessed preoperatively, and at one and three months postoperatively. Repeated measures ANOVA exhibited a significant improvement over time (F=86.631, p=<.0001) but no differences by patient gender or age group. There were no significant improvements from one to three months post discharge.

When patients self rated their recovery on a scale from 1 to 10 there were no significant differences by gender or age group but there was a main effect within subjects for time (F=14.146, Although age did not significantly affect perception of recovery the oldest age group was most likely to claim the highest recovery levels.

Patients were asked to rate their quality of life preoperatively and at one and three months postoperatively on a scale of 1 to 10. Ratings changed only very slightly over time and there were no significant differences by repeated measures ANOVA for patient gender, age group, or time. Youngest patients rated their own quality of life the lowest. In terms of satisfaction with quality of life there were no significant differences by gender, age, or time. Again, however, the youngest patients were the least satisfied with their quality of life and the oldest were most satisfied.

At one and three months after discharge patients were questioned regarding the onset of new problems. There were significantly more new problems reported at one month than at 3 months after discharge ($F=5.017$, $p=0.0286$), however, there were no main effects for gender. The youngest patients, in a trend that was close to significance ($F=2.788$, $p=0.0685$), were more likely to report the onset of new problems. Correlations of important individual, family, and social support variables are contained in the appendix (Appendix K).

Description of Sample at Three Months after Discharge from the Hospital

Complete data were available for 70 of the 117 couples at 3 months after discharge from the hospital. This data set contains those couples for whom data on the following dependent variables were available: caregiving burden score at 1 and 3 months postoperative and the following patient scores at 3 months post discharge, global POMS score, New York Heart functional status, self reported recovery and satisfaction with family function (APGAR). Some of the multiple regressions which were used to test the hypotheses indicate a smaller sample size than 70; this is related to missing independent variables. Tables 10 and 11 present selected demographic and illness characteristics for those couples included in tests of the hypotheses.

Tests of Hypotheses

The primary aim of this study is to explain the patient's psychosocial recovery from cardiac surgery as it is influenced by the patient's baseline cardiac status and caregiver variables, such as caregiving burden, caregiving age and gender, and caregiver mood states. In order to operationalize this aim the following hypothesis is tested:

1. poor baseline cardiac functional status as measured by the American Heart Association classification, and the following caregiver variables: high scores on caregiving burden at 1 month post discharge, age <55 years, female gender and negative mood states predict poor scores on measures of psychosocial and physiological recovery of cardiac surgery patients at 3 months post discharge.

Table 10

Demographic Characteristics of Patients and Caregivers for whom Data Were Available at 3 Months after Discharge

Characteristic	Mean	S.D.	Range	Number
Patient Age and Gender				
Male	61.00	8.91	40-76	60
Female	64.00	8.06	50-74	10
Caregiver Age and Gender				
Male	65.00	9.91	47-81	10
Female	57.46	9.10	39-76	60
Number of Years Married				
Male Patients	30.31	13.25	2-54	58
Female Patients	36.30	13.55	12-53	10

Characteristic	Frequency (%)
Patient Age by Group	
Group I (38-50 yrs.)	8 (11)
Group II (51-69 yrs.)	51 (73)
Group III (70-78 yrs.)	11 (16)
Caregiver Age by Group	
Group I (25-55 yrs.)	21 (30)
Group II (56-69 yrs.)	42 (60)
Group III (70-81 yrs.)	7 (10)
Ethnicity	
Caucasian	65 (93)
Black	0 (0)
Hispanic	2 (3)
Asian	1 (1)
Other	2 (3)
Education	
Grades 1-9	2 (3)
Grades 1-11	9 (13)
High School Graduate	20 (29)
Partial College	20 (29)
College Graduate	11 (16)
Graduate School Degree	7 (10)
Occupation	
Housewife (where spouse's occupation is unknown)	0 (0)
Unskilled Employees	0 (0)

Table 10 (continued)

Characteristic	Frequency (%)
Machine Operators and Semi-Skilled Employees	5 (7)
Skilled Manual Employees	10 (14)
Clerical, Sales, Technicians, and Owners of Small Businesses	9 (13)
Administrative Personnel, Small Independent Businesses, and Minor Professionals	15 (22)
Business Managers, Proprietors Medium-Sized Businesses, and Lesser Professionals	18 (26)
Higher Executives, Major Professionals, Proprietors of Large Concerns	12 (17)
Religion	
Protestant	32 (46)
Roman Catholic	23 (33)
Jewish	0 (0)
Other	7 (10)
Decline to State	1 (1)

Table 11

Cardiovascular Illness Characteristics of Subjects for whom Data Were Available 3 Months after Discharge

Characteristic	Frequency (%)	
	Males	Females
Type of Surgery		
CABG	38 (63%)	5 (50%)
Valve	4 (7%)	1 (10%)
CABG + Valve	3 (5%)	0 (0%)
Redo CABG	10 (17%)	2 (20%)
Redo Valve	0 (0%)	2 (20%)
Redo Double Valve	1 (2%)	0 (0%)
Septal Repair	2 (3%)	0 (0%)
Other	2 (3%)	0 (0%)

Table 11 (continued)

Characteristic	Frequency (%)	
	Males	Females
Number of Vessels Bypassed		
2 or fewer	17 (33%)	2 (29%)
3-4	32 (63%)	5 (71%)
5 or more	2 (4%)	0 (0%)
Type of Valve Replaced		
Aortic	3 (30%)	0 (0%)
Mitral	4 (40%)	2 (67%)
Aortic/Mitral	2 (20%)	1 (33%)
Valvuloplasty	1 (10%)	0 (0%)
New York Heart Functional Status		
Class I	9 (15%)	0 (0%)
Class II	19 (32%)	1 (10%)
Class III	15 (25%)	7 (70%)
Class IV	17 (28%)	2 (20%)
History of Angina	46 (77%)	7 (78%)
Shortness of Breath	28 (47%)	6 (67%)
Congestive Heart Failure Positive History	12 (20%)	2 (25%)
History of Hypertension	35 (58%)	5 (63%)
Diabetes Mellitus	12 (20%)	1 (13%)
Family History Positive for Cardiovascular Disease	40 (67%)	8 (89%)
Smoking History		
Never Smoked	18 (30%)	5 (62%)
Stopped >1 month	32 (53%)	3 (38%)
Stopped <1 month	2 (3%)	0 (0%)
Presently smokes	8 (13%)	0 (0%)
History of Myocardial Infarction	25 (42%)	1 (11%)
Intensive Care Unit Stay Greater than 4 days	7 (12%)	4 (44%)

			Range	
	Males	Females	Males	Females
Mean Cardiopulmonary Bypass Time in minutes	90	102	51-188	25-188
Duration of Cardiac Problems in years	7.9	14.9	.02-70yrs	.02-45yrs

The path model illustrated in Figure 5 below and earlier in Chapter Two was tested.

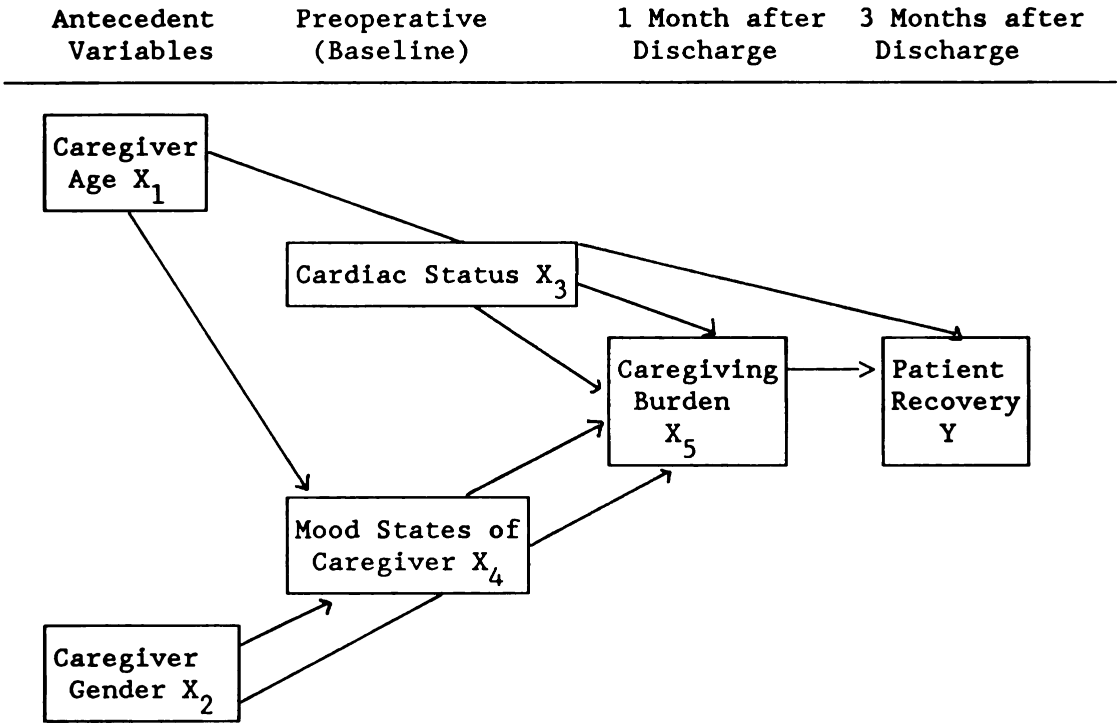


Figure 5. Patient recovery as affected by spousal variables.

The appropriate type of multiple regression to use in a theoretical test of a model is a hierarchical regression as opposed to a simultaneous or stepwise regression. Hierarchical regressions were performed with variables entered in the order in which they appear in the model moving from left to right. Entry in this fashion is necessary since the model reflects an orderly sequence of events. In the first step of model testing caregiver age and gender were regressed against mood states of the caregiver. The mathematic equation for this portion of the model testing is: $X_4 = a + b_1X_1 + b_2X_2 + e$.

The second step of model testing involved testing the multiple effects of caregiver age and gender as they directly affect caregiving burden and also as they indirectly affect caregiving burden through mood states. Additionally, the direct effect of the patient's preoperative cardiac status on caregiving burden was entered into the equation. Therefore, the mathematic equation for this portion of the model is:

$$X_5 = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + e$$

The final step of model testing involved the following mathematic equation: $Y = a + b_3X_3 + b_5X_5 + e$. The final step was tested using the following dependent variables as measures of patient recovery as determined at 3 months post discharge in 4 different regressions: global measures of patient mood states (total POMS score), patient self-reported recovery score (single item score), patient's report of satisfaction with family function (patient APGAR), and the New York Heart Association functional status.

Before the total model, i.e., the final step as described above, was tested in the overall equation, the links among the variables preceding patient recovery were regressed against each other as described in the equations above. First, the links between caregiver age and gender and caregiver mood states were tested (see Table 12 for R^2 changes and significance testing). The rationale for testing this part of the total model is that patient recovery is indirectly affected by the age and gender of the caregiver acting upon the mood states of the caregiver. The age of the caregiver did not significantly predict the caregiver's total POMS score although younger caregivers expressed the greatest amounts of mood disturbance. The gender of the caregiver was related, and nearly significantly so ($p=0.055$), to the global POMS score which supports the direction that was anticipated in the conceptual framework and also in tests of the general population. In

Table 12

Tests of the Models

Gender and Age of Caregiver Regressed on Caregiver Mood States

Variable	R^2	Beta	R^2 Change	F
Gender	0.06	0.20		3.81 (p=0.055)
Age	0.07	-0.12	0.01	0.83 NS

Gender and Age of Caregiver, Cardiac Status, and Mood States Regressed on Caregiving Burden

Variable	R^2	Beta	R^2 Change	F
Gender	0.006	-0.11		0.43 NS
Age	0.04	-0.12	0.03	2.60(p=.11)
Cardiac status at baseline	0.04	-0.16	0.002	0.184 NS
Mood States	0.24	0.47	0.20	15.50 (p=.0002)

Cardiac Status and Caregiving Burden Regressed on Patient Mood States

Variable	R^2	Beta	R^2 Change	F
Cardiac status at baseline	0.05	0.26		3.99 (p=.0503)
Caregiving Burden	0.22	0.42	0.17	13.64 (p=.0005)

other words female caregivers scored higher on total mood disturbance than male caregivers. If the proportions of male and female caregivers had been closer the difference in scores would most likely have been significant.

The second equation tested the contributions that caregiver age and gender, baseline cardiac status, and mood states of the caregiver made to the caregiver's evaluation of his/her caregiving burden (see Table 12 for R^2 changes and significance testing). The rationale for testing this part of the model are as follows: patient recovery is indirectly affected by the age and gender of the caregiver acting directly upon mood states of the caregiver all of which then act directly upon caregiving burden.

As illustrated the caregiver's age came very close to being a significant predictor of the caregiver's assessment of caregiving burden with the youngest caregivers being the most burdened. The gender of the caregiver was not directly related to the expression of caregiving burden, a finding which was a surprise to the investigator although again the ratio between male and female caregivers was so disproportionate that the results could have been affected by this. However, gender of the caregiver was indirectly related through the caregiver's mood states. The New York Heart Association cardiac/ functional status of the patient at baseline did not affect caregiving burden either. Lastly, total mood disturbance of the caregiver at baseline was significantly related to the caregiver's burden at 1 month post discharge and accounted for 22% of the explained variance. Figure 6 demonstrates the explanatory model for caregiving burden.

The third and final equation was the overall test of the contribution that caregiving burden and New York Heart baseline cardiac/functional status made to patient recovery. Additionally, the model further illustrates that cardiac status indirectly affects patient recovery through caregiving burden. Patient recovery is also indirectly affected by age and gender of caregiver, acting upon mood states of the caregiver and the caregiving burden. The model was tested 4 different times using the dependent variables listed above (New York Heart functional status at 3 months, total patient mood disturbance score at 3 months, patient APGAR at 3 months, and self reported recovery at 3

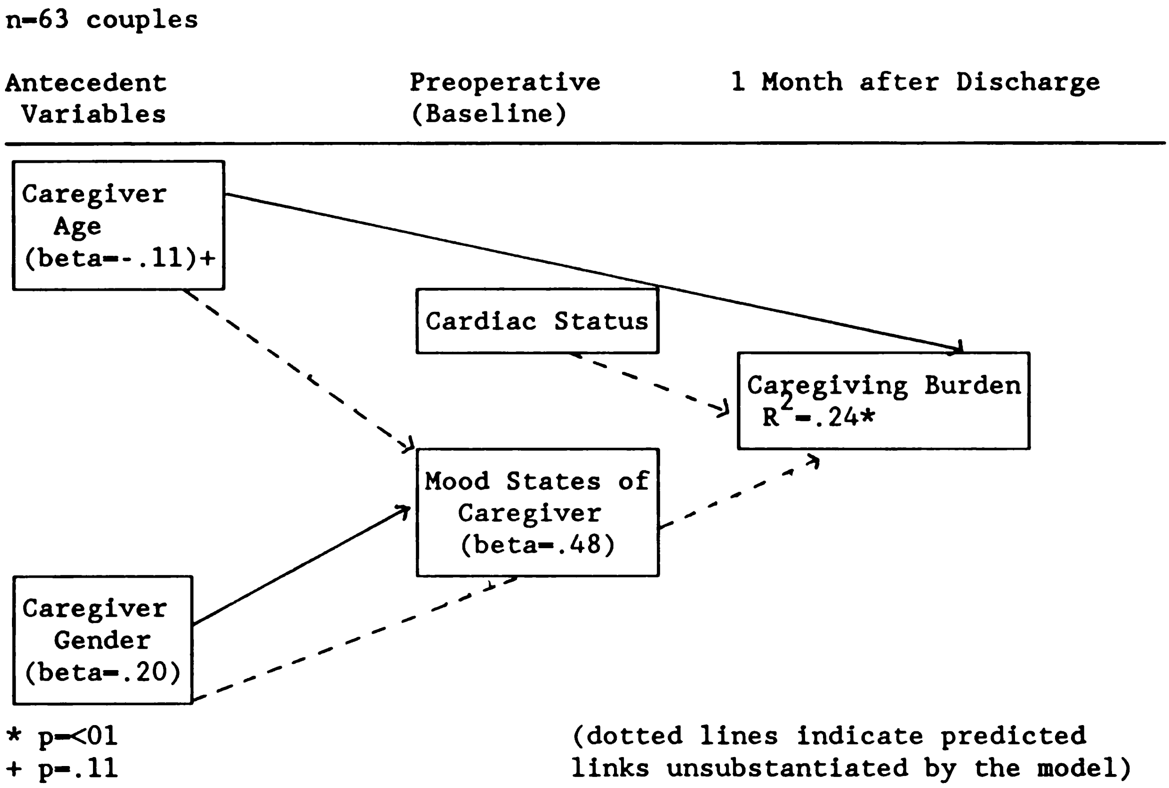


Figure 6. Explanatory model to predict variables influencing caregiving burden.

months). Table 13 illustrates the R^2 changes using the additional dependent variables.

Variance explained using the same predictors but different dependent variables ranges from 12 to 23%. Various explanations for the difference in variance are made in Chapter Five. Additionally, different variables are added to the model to determine if the amount of explained variance can be increased. As illustrated in Tables 12 and 13 the model works using three of the four dependent variables with patient satisfaction with family function the only dependent variable not explained by the model.

The illustration in Figure 7 demonstrates the standardized beta weights, the significance tests, and the total amount of variance explained in the total test of the model. Figures 8 and 9 demonstrate

Table 13

Cardiac Status and Caregiving Burden as Predictors of Various Recovery Variables

Self-Report of Recovery

Variable	R^2	Beta	R^2 Change	F
NYH cardiac status at baseline	0.05	-0.25	--	3.60 ($p=.06$)
Caregiving Burden at 1 month post d/c	0.15	-0.31	0.10	7.01 ($p=.01$)

New York Heart Functional Status at 3 Months post Discharge

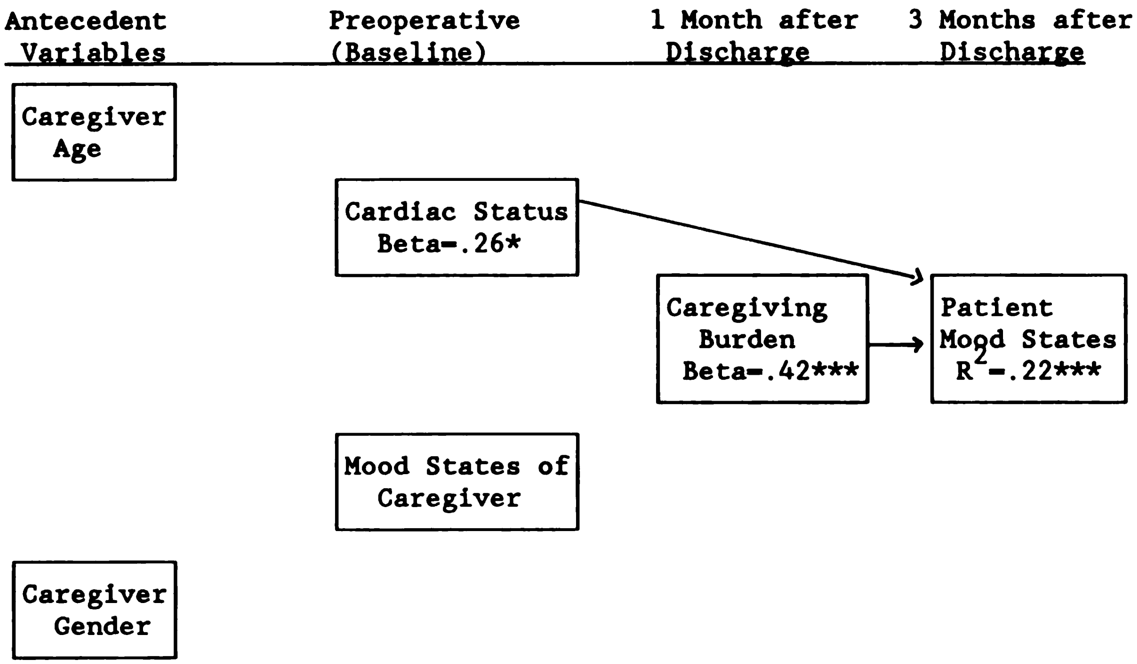
Variable	R^2	Beta	R^2 Change	F
NYH cardiac status at baseline	0.09	0.18	--	6.32 ($p=.01$)
Caregiving Burden at 1 month post d/c	0.17	0.29	0.08	5.99 ($p=.02$)

Patient Satisfaction with Family Function (APGAR) at 3 Months

Variable	R^2	Beta	R^2 Change	F
NYH cardiac status		-0.20	--	
Caregiving Burden		-0.04		

the performance of the same independent variables on the two additional dependent variables that were statistically significant.

The first model which uses patient global mood disturbance as a dependent variable explains more of the variance than the other dependent variables in the following figures. Although baseline cardiac status (NYH) adds to the explanatory potential of the equation, by far the largest beta is for caregiving burden. The direction of the relationship indicates that the greater the caregiving burden the greater the mood disturbance. Even when mood disturbance at one month



* p=<.05, ** p<.01, *** p<.001

Figure 7. Variables explaining patient mood states.

post discharge is controlled, caregiving burden still enters the equation.

The age of the caregiver directly influenced the caregiving burden (Table 12) and according to the model indirectly influences patient recovery through caregiving burden. The younger the caregiver the greater the caregiving burden. Gender of the caregiver influenced caregiver mood states directly but did not directly influence caregiving burden. Therefore, we might say that gender influenced patient recovery indirectly through mood states and caregiving burden, but not directly through caregiving burden.

A note of caution must be interjected here since the unhypothesized links in the model have not been tested and may indeed influence the explanatory power of the model. As mentioned in Chapter Three, causal models are based on an assumption that the model represents a non-recursive reality. However, reciprocity between patient and spouse in terms of mood states and other variables is obvious and thus the model probably represents a recursive, or two-way reality, rather than a non-recursive view of recovery.

Figure 8 explains recovery in terms of the patient's own subjective response to the question "on a scale of 1 to 10 how far recovered are you?" Although the reliability of such a dependent variable is questionable, patient response correlated with clinical features of recovery, such as New York Heart Association criteria and also to psychological aspects of recovery, i.e., mood disturbance. The beta weights demonstrate an inverse relationship between caregiving burden and patient self reported recovery so that patients who report high levels of recovery are significantly more likely to have spouses who report low levels of caregiving burden (or vice versa).

Of interest was the finding that caregiving burden and self reported recovery were not correlated at one month post discharge. However, caregiving burden at one month did significantly predict self-reported recovery at three months. The direction of this relationship indicates the reciprocity between caregiver and patient and the importance of caregiver variables in affecting the patient's assessment of his/her own recovery at a later point in time.

The relationship between baseline cardiac status and recovery is also inverse so that the less symptomatic a patient was preoperatively the greater s/he rates recovery at 3 months post discharge. Again, the earlier portions of the model which were tested in separate regressions help predict patient recovery as outlined in the discussion for Figure 5.

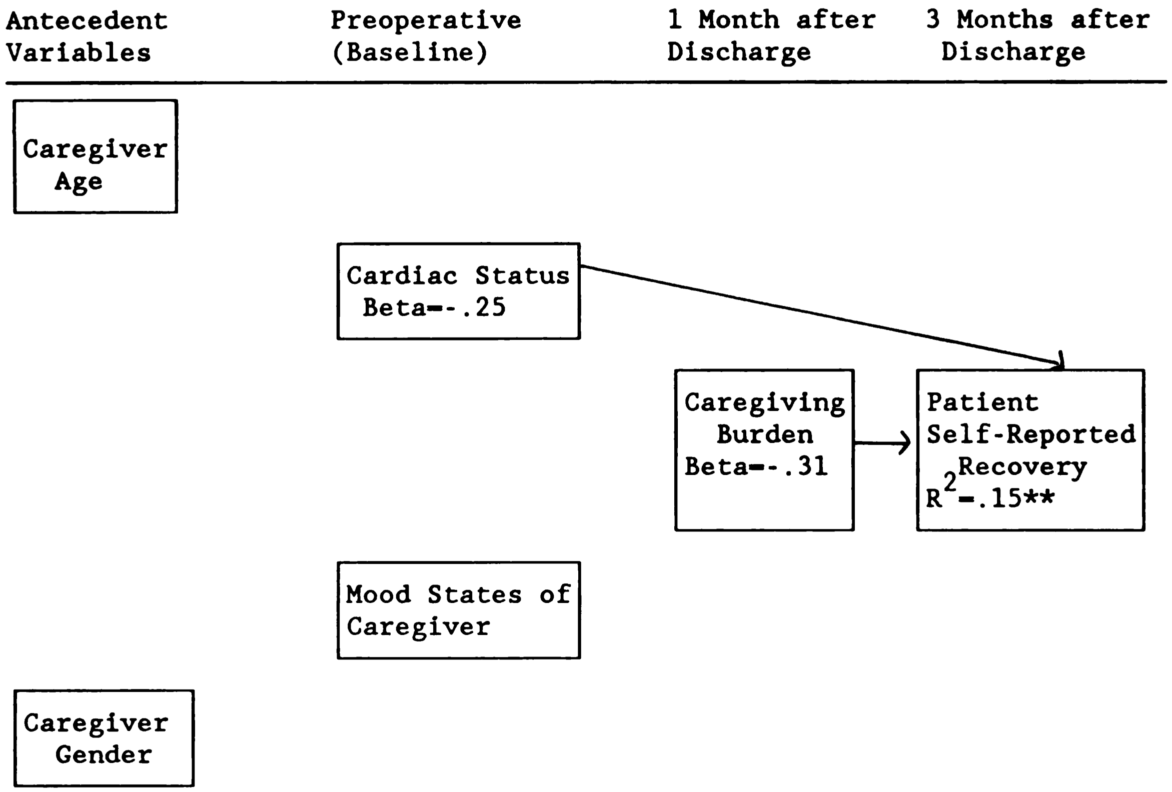


Figure 8. Variables explaining self-reported patient recovery.

As shown in Figure 9, the surprisingly large contribution of caregiving burden to the patient's clinical recovery (New York Heart functional status) at 3 months post discharge emphasizes even more the importance of considering factors outside the patient as possible influences on recovery. The positive relationship between baseline cardiac status and cardiac status at 3 months post discharge was not unexpected. We would expect that those patients with the poorest functional status preoperatively would also have poorer functional status at 3 months post discharge than patients who were relatively asymptomatic. The reciprocal relationship between the patient and the spouse and the impact of the patient's cardiac status on caregiving burden will be discussed further in Chapter Five.

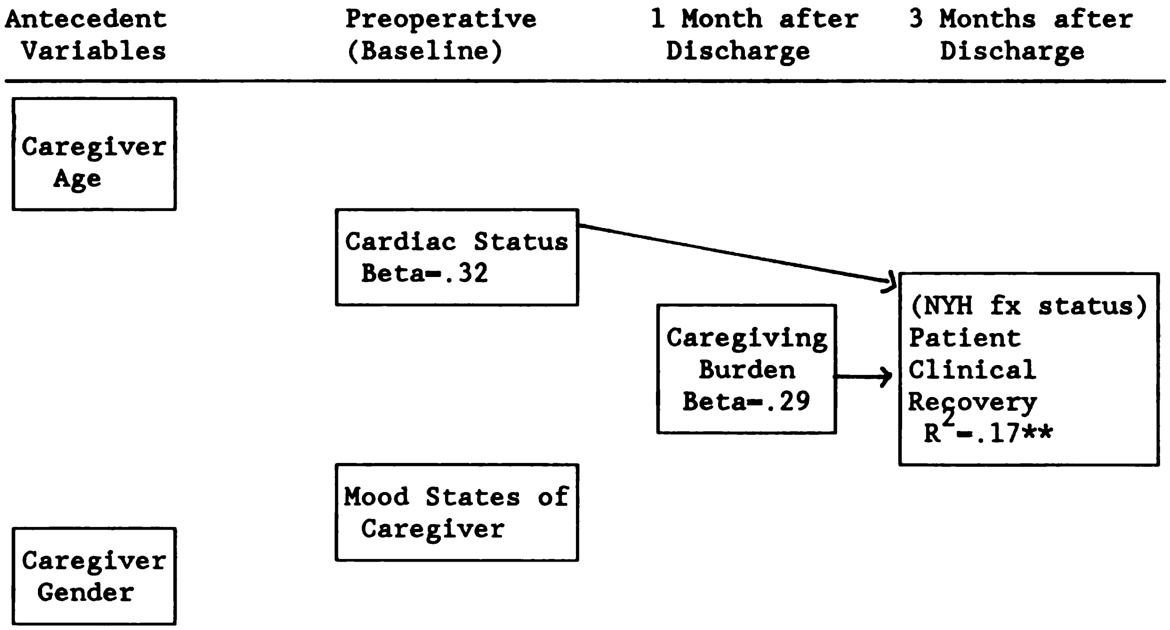


Figure 9. Variables explaining patient cardiac/functional status recovery.

Mathematical Assumptions of Regression

Important assumptions of regression which should be considered are: zero mean, homoscedasticity, independence, normal distribution, fixed X_i, and no measurement error (Cohen & Cohen, 1983; Verran & Ferketich, 1984). In checking for the assumption that the residuals did have a zero mean the unstandardized residuals from the dependent variables used to assess patient recovery, i.e., mood disturbance, self-reported recovery, and New York Heart functional status were tested. Analysis revealed that each set of residuals for the three dependent variables had a zero mean.

The second mathematical assumption that was tested was that the residuals of major dependent and independent variables have a normal distribution. The unstandardized residuals were examined visually in histograms to determine their conformation with normality. Visual inspection revealed some deviations from a normal distribution but since there was not much evidence of heteroscedasticity a power transformation was not performed. Verran and Ferketich (1984) point out that abnormality of distributions are primarily a problem when there is also heterogeneity of variance (e.g., heteroscedasticity).

The test used for homoscedasticity was a plot of the standardized residuals versus the predicted dependent variable. Standardized residuals for the equation representing patient mood disturbance:

$$Y = a + b_3X_3 + b_5X_5 + e$$

were plotted against the predicted dependent variable, total mood disturbance. The scatterplot revealed basic homoscedasticity although the variance for the dependent variable, i.e., POMS score, was more homogeneous at the low end of mood disturbance than at the high end. When the standardized residuals for patient self-reported recovery, were plotted against the predicted dependent variable, self-reported recovery, the scatterplot revealed a slightly fan shaped configuration of residuals. This indicates that the equation predicted better for higher levels of recovery than for lower levels of recovery. The third dependent variable, New York Heart cardiac status, was also tested for homoscedasticity. There were three outliers but the remaining cases clustered fairly close to the zero mean indicating homogeneity of variance.

The tests for independence and fixed X_i were not performed. Measurement error was controlled to an extent by only using those variables which have been demonstrated in the past, and in this study, to possess construct validity and internal consistency. All of the instruments used in tests of the model had internal consistency scores higher than 0.70 with the exception of the patient's self-reported recovery score for which it is impossible to ascertain a reliability and the New York Heart functional status rating which did not have an interrater reliability performed on it.

Summary

This chapter has presented findings related to the demographic and illness characteristics of the sample, reliabilities of the instruments used, and performance of the instruments and their major variables. Statistical tests examining paired differences between patients and spouses and independent tests between male and female patients and caregivers were reported. Repeated measures ANOVA were performed on the variables of interest using between subjects factors of gender and age group and time, as a within subjects factor. Finally, tests of the model were presented with the model demonstrating some satisfaction in its explanatory potential.

Chapter Five discusses the findings in more detail and tests the model using additional variables.

CHAPTER FIVE

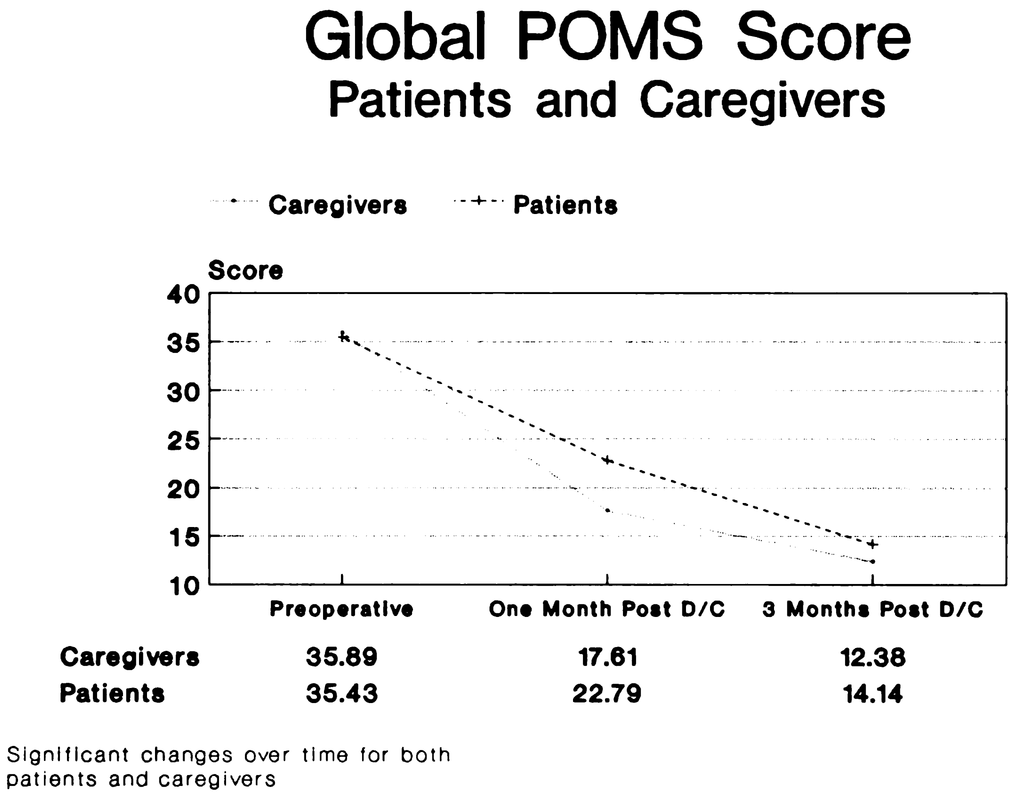
DISCUSSION

Chapter Five presents a discussion of the findings revealed in the previous chapter. Findings are treated initially by the variables and instruments used in the study with particular attention paid to the age and gender of the patient and caregiver. Following the more general discussion of the variables is an in-depth review of the hypotheses and tests of the proposed model succeeded by variations of the model. Significance and limitations of the findings, implications for nursing, and future research suggested by the study are contained in Chapter Six.

Individual Psychosocial Functioning Throughout the Perioperative and Recovery Period

Mood States: Marital Congruency

Individual mood states represent striking parallels between patients and spouses as was demonstrated in Table 6 in Chapter Four. Paired differences T-tests indicate that patients and spouses had highest mood disturbance during the preoperative phase, a finding that seems logical and perhaps indicative of the generalized irritability to which both patient and caregiver were prone. Figure 10 demonstrates the trajectory of mood disturbance for both patients and caregivers. Anxiety is certainly heightened by the hospital environment, the multitude of health professionals with whom the patient and caregiver are confronted, and a generalized fear of the unknown. There were no



	Preoperative	One Month Post D/C	3 Months Post D/C
Caregivers	35.89	17.61	12.38
Patients	35.43	22.79	14.14

Significant changes over time for both patients and caregivers

Figure 10. Global POMS score: patients and caregivers.

significant differences between patient and spouse scores and all but vigor were correlated at p=<.05 indicating a convergence of response states.

One and three months after surgery patient and spouse mood states are still very similar with no differences except for fatigue and vigor. By one month after discharge fatigue has diminished considerably for spouses when compared to the preoperative period but increased for patients while vigor has improved for the caregiver but not for patients. The total mood disturbance score has dropped dramatically for both patients and spouses and indeed a repeated measures ANOVA demonstrated significant changes for both groups over time with the greatest mood disturbance reported during the preoperative period and the least at 3 months post discharge to the home.

Mood States: Incongruencies in Patient Role

While couples were congruent in their mood states before and after surgery there were interesting discrepancies between patients related to gender and age differences. Table 4 in Chapter Four illustrated important gender differences at the three different data points while Table 7 illustrates through repeated measures ANOVA the differences by patient age group and gender. Figures 11, 12, and 13 compare patients by gender differences over time using findings from repeated measures ANOVA. Female patients were significantly less anxious, angry, and depressed than their male counterparts during the preoperative phase as measured by the Profile of Mood States (POMS). At one month post surgery there were no significant differences in mood states for male and female patients except for anxiety with women significantly less anxious.

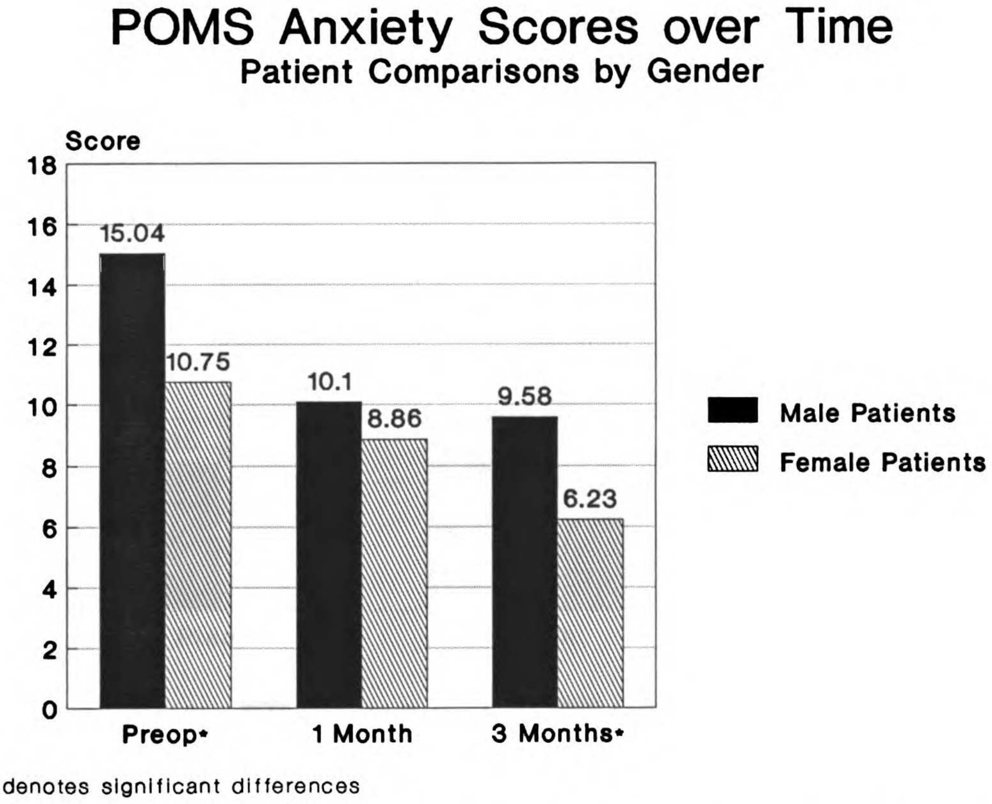
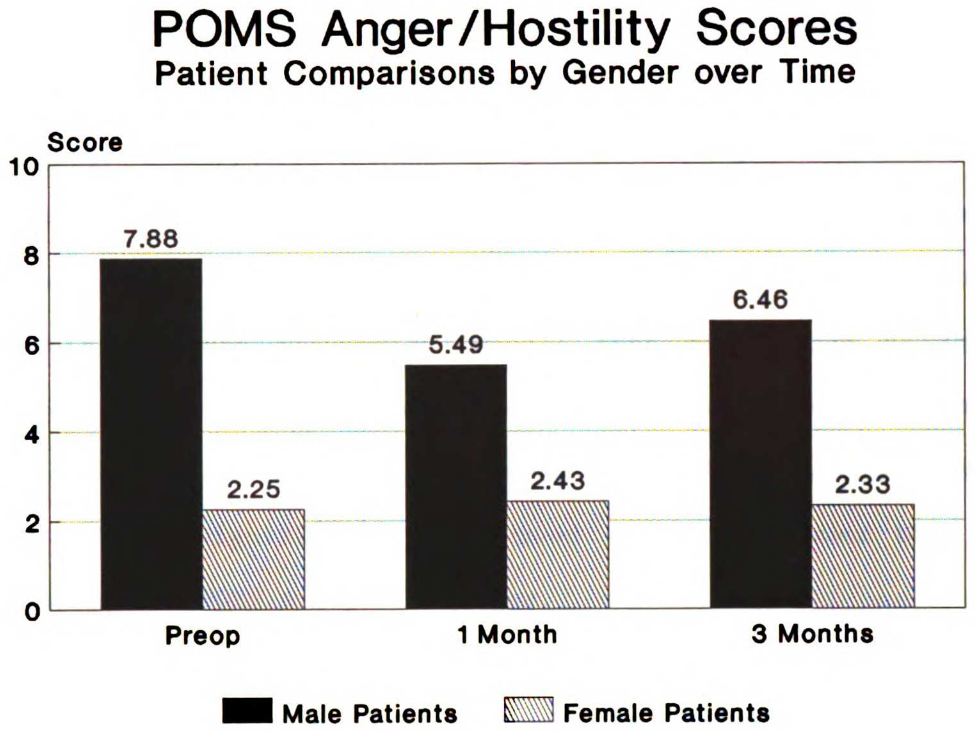
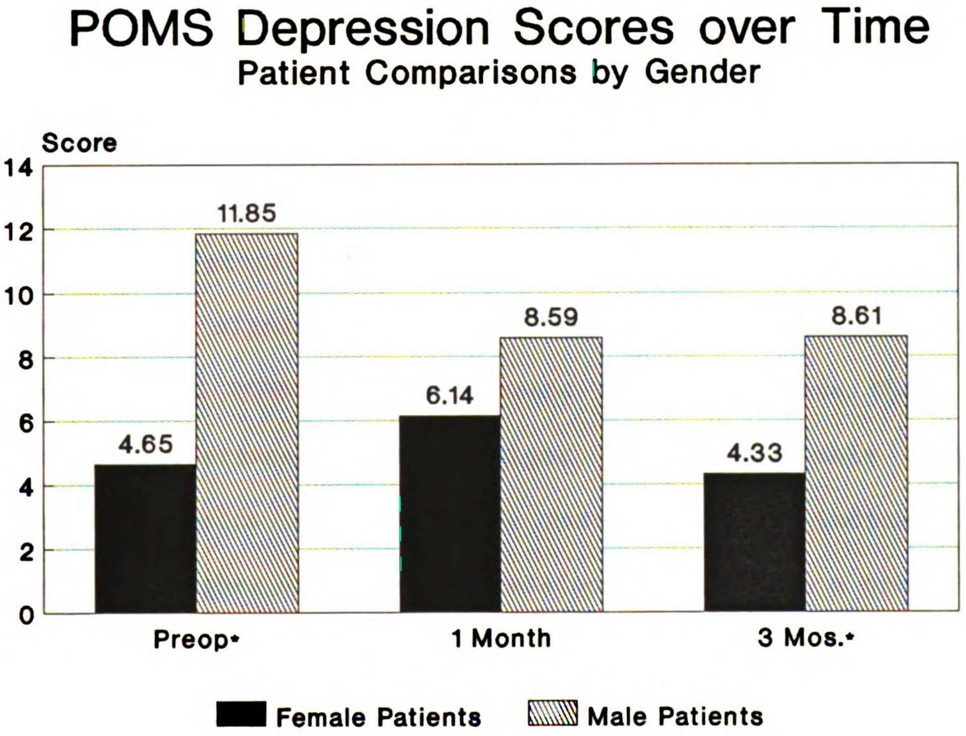


Figure 11. POMS anxiety scores over time: patient comparisons by gender.



Main effects for gender and time

Figure 12. POMS anger/hostility scores: patient comparisons by gender over time.



• denotes statistical significance

Figure 13. POMS depression scores over time: patient comparisons by gender.

During the first month at home the mood states of male patients had moderated considerably bringing their scores closer to those of the female cohort. By three months post discharge women were again significantly less anxious, angry, and depressed than male patients. The repeated measures ANOVA, which is computed on a smaller sample size since only subjects responding at all test points can be included, supported the t-tests although the significance levels never quite reached the 0.05 level. As indicated by the repeated measures, all patients showed significantly less mood disturbance over time on all subscales of the POMS except for anger.

Trichotomization of patient age into three groups (<50 years, 51-69 years, and >70 years) produced insignificant findings when related to mood states. There were not any consistent trends for various age groups either. Interpretation of gender and age findings will follow a discussion of caregiver findings.

Mood States: Incongruencies in Caregiver Role

Tables 5 and 8 in Chapter Four presented findings related to caregiver mood states. T-tests at baseline indicated that male caregivers had significantly less mood disturbance than female caregivers on all POMS subscales except for vigor where there were no significant differences between vigor levels for male and female caregivers. Results at one month post discharge indicated female caregivers had higher levels of depression and anger on a proxy variable measuring mood disturbance (POMS). By 3 months the only significant difference between male and female caregivers was anger with females again more angry than males. Repeated measures ANOVA showed the same improvement in mood states as that exhibited by patients. Gender performed similarly in ANOVA for caregivers as it did for patients, that is, it approached significance with female caregivers exhibiting greater mood disturbance.

There were no significant differences exhibited by age of the caregiver in the ANOVA when age of caregiver was trichotomized into three groups (<55, 56-69, and 70> years). However, the trend was consistent in that the youngest caregivers were always the most angry, depressed, confused, anxious, and fatigued and the least vigorous on measures of mood disturbance. Figure 14 illustrates the pattern of the subscale anger as one indicant of mood disturbance.

Interpretation of the above findings regarding congruencies and incongruencies is made cautiously and with cognizance of the difficulty in making more than relational statements, since causality is beyond the purview of this study. However, the striking correspondence between mood states of husbands and wives reveals the power of one's "consociates" not only to influence long term development but also as a major influence on the response to such stressors as cardiac surgery. Cardiac surgery is of sufficient importance in the lives of families that the anxieties, depression, and hostilities of one family member are communicated to and shared with the other. The interweaving of the mood states suggests that it may be possible to intervene with one family member in order to decrease mood disturbance not only for one individual but also for the other.

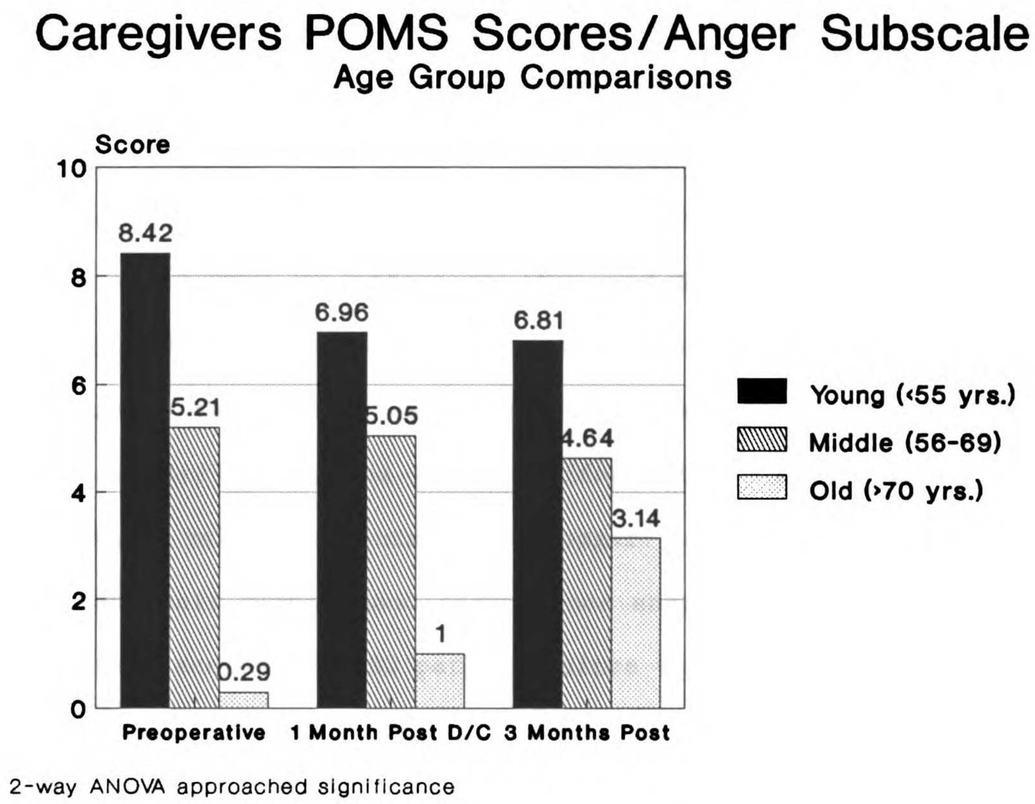


Figure 14. Caregivers POMS scores on anger subscale: age group comparisons.

Gender Consistency and Inconsistency

The incongruency between mood states for patients and caregivers by gender was a very interesting one. The differences between male and female patients for mood disturbance was unexpected. McNair, Lorr, and Droppleman (1971) report that women outpatients scored significantly higher than men on anxiety, depression, fatigue, and confusion. One might imagine that female cardiac surgery patients would score at least as high as males if not higher, but instead they are reporting much less mood disturbance. The size of the female sample should be considered since only 26% of the baseline group was female and additionally by 3 months post discharge complete data was available for only 10 women versus 60 men. Another consideration is that because male caregivers were more likely to refuse to participate in the study the group of female patients is atypical. The female patients who did not participate in the study might have exhibited mood states more in keeping with the anticipated model.

The Mann-Whitney U test was used to determine if valve replacement surgery might have an effect on the mood disturbance scores of female patients. Because there are proportionately more women having valve replacements than men it could be hypothesized that the type of surgery might have influenced the gender differential. A common assumption is that since valve patients have longer to adjust to their chronic condition their global mood disturbance scores would be lower than mood disturbance scores of CABG patients since their surgery is frequently of a more acute nature. However, female valve replacement patients had higher mood disturbance scores at all three data points than did CABG female patients and the difference was nearly significant during the preoperative period ($U=23.0$, $df=18$, $p=0.0574$). Reasons for the discrepancies between male and female mood disturbance are thus difficult to explain with the available data although it is possible they could be related to findings below regarding caregivers.

Gender was also an important determinant of mood disturbance for caregivers. Female caregivers reported consistently more depression, anxiety, and anger than male caregivers as measured by the POMS, and the youngest female caregivers had the greatest mood disturbance of any group. Additionally, female caregivers had greater mood disturbance than female patients suggesting that gender is not the only factor affecting response. Total mood disturbance was much lower for male caregivers than for female caregivers and although the numbers of male caregivers were few in the repeated measures ANOVA ($n=11$) the oldest male caregivers had the greatest mood disturbance for the group of male caregivers.

The large correlations between patient/spouse responses at all time periods may indicate that one member of the couple is setting the tone for mood disturbance. For example, the high scores of female caregivers are paralleled by the high scores of male patients while the low scores of female patients are comparable to the low scores of their male caregivers. It seems likely that the patient is the individual acting as the thermostat of mood disturbance. Indeed, the differential meanings of the sick role for men and women may affect their response to cardiac surgery and thus the caregiver's mood states. If it is more culturally acceptable for women to be sick and also more compatible with their role responsibilities as has been suggested in the past (Brown & Rawlinson, 1977; Gove, 1984; Nathanson, 1977) then it is possible that female patients are less likely to be distressed by cardiac surgery than males and thus their spousal male caregivers reflect lower distress levels.

Additionally, female caregivers may not only reflect their spouses' distress precipitated by entry into the sick role, but they also are faced with greater role changes in their own lives than the male caregiver cohort. For example, female caregivers are more likely to experience role overload as a result of their husbands' cardiac surgery. Diminished income as a result of their husbands' not working adds to financial worries and responsibilities, responsibility for household maintenance increases, and previous workload related to child care continues. Whereas male caregivers were more likely to hire household help or activate support systems from children and relatives, thus enabling escape from caregiving, most female caregivers did not have the expendable income necessary to hire help for their recovering husbands. In addition, as was reported in Table 6 of Chapter Four female caregivers reported less perceived social support from children and friends preoperatively than did male caregivers indicating that, at least at baseline, they believed less support was available to them in caring for their recovering husbands.

Psychosocial Adjustment to Illness

The Psychosocial Adjustment to Illness Scale (PAIS) was used with a patient subsample of the study and data are available for 44 subjects. The PAIS is a rather lengthy instrument and provided little data other than construct validity for other instruments employed in the study. The various domains produced results that are consistent with the study's theoretical framework, in that the youngest patients tended to exhibit the greatest problems in the various domains. In a two way ANOVA there were no significant main effects for gender or age group of patient. There was, however, an interesting interaction between age and gender. The effect of age was not constant for male and female patients so that the oldest females scored highest on the psychological distress domain of the PAIS and the oldest males scored the lowest. This finding is inconsistent with findings for the entire sample on the POMS since females in general suffered less mood disturbance than male patients, and, in particular, the oldest males and oldest females had very similar levels of mood disturbance. Additionally, the size of the cells for oldest males ($n=4$) and females ($n=3$) was sufficiently small as to raise doubts about the validity of this interaction.

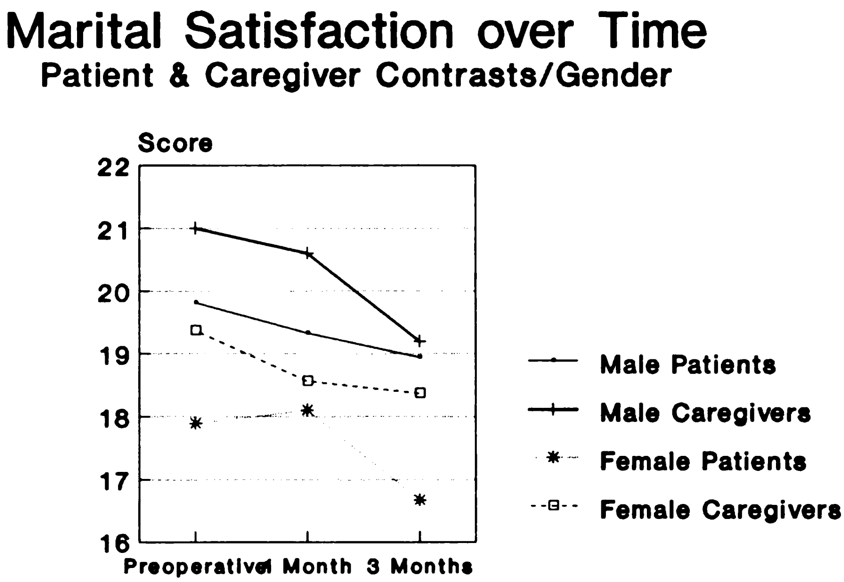
Marital, Family, and Social Support Relationships

Marital and Family Satisfaction

Marital and family satisfaction are reported together as the concepts are related although the instruments measuring the two did not always perform in the same way. First, marital and family satisfaction will be reported on within the smaller subgroup which was tested three times. Then results for the entire sample on family satisfaction will be presented. There were two data points, preoperative and 3 months postoperative, for the entire sample for family satisfaction.

Marital satisfaction, like satisfaction with family function, declined over time. As illustrated in Figure 16 the decline for marital satisfaction occurred for both patients and caregivers but was significant only for caregivers whereas the decline in family function occurred in both patient and caregiver groups over time and was significant for both groups. Marital satisfaction was not correlated within the marital dyad until the third data point, 3 months after discharge indicating that patients and their spouses had incongruent levels of satisfaction with their marriages. Additionally, although patient marital satisfaction was correlated significantly over time, caregiver marital satisfaction was only correlated at baseline (preoperative) and one-month post discharge but baseline marital satisfaction was not correlated with marital satisfaction for caregivers at three months post discharge.

Satisfaction with family function was correlated significantly at all data points for both patient and caregiver groups when compared over time. However, satisfaction with the marriage and with family function



Male Patients	19.82	19.33	18.94
Male Caregivers	21	20.6	19.2
Female Patients	17.89	18.11	16.67
Female Caregivers	19.37	18.57	18.37

2-way ANOVAs

Figure 15. Marital satisfaction over time: patient and caregiver contrasts/gender.

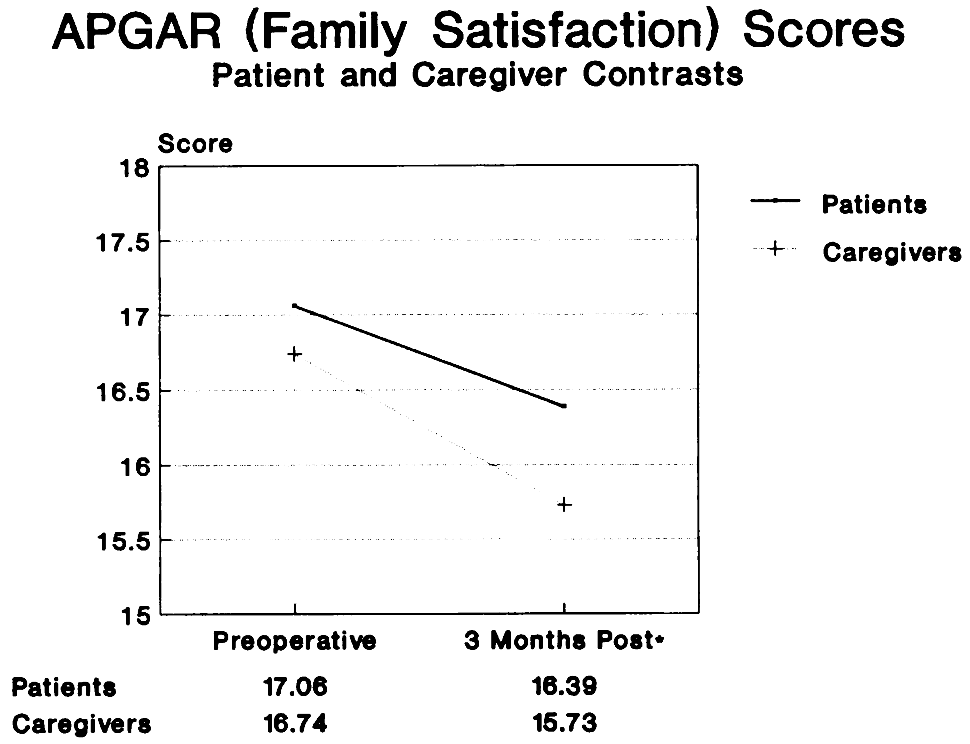
were not significantly correlated with each other when patient and spouse scores were compared. When patient satisfaction with family function was compared to marital satisfaction there were significant correlations at one and three months post discharge. For the spousal caregiver the only positive correlation between marital satisfaction and satisfaction with family function was at the preoperative data collection point.

Thomas and Barnard (1986) correlated various family measures with POMS scores in a group of 17 mothers with a child less than three years in the home. They found no correlation between POMS and the Family APGAR and conjectured that the Family APGAR may deal with a sense of family over long periods of time and therefore may reflect the homeostatic processes of the family system. Caregiver data support this interpretation as there was no correlation between family satisfaction (APGAR) and mood disturbance (POMS). However, for patients there was a significant inverse correlation between mood disturbance and family satisfaction at three months post discharge. The following discussion on gender issues may clarify the findings regarding correlation between POMS and Family APGAR since patients were primarily male and caregivers primarily female.

Gender Issues Related to Marital and Family Satisfaction

In terms of gender issues, female patients were significantly more likely to have lower scores on marital satisfaction than male patients. However, there were no significant differences for gender of the caregiver in terms of marital satisfaction although as Table 8 in Chapter Four illustrates, the difference is definitely in the same direction and is nearly significant (p=0.095). For both patients and spouses there were significant declines with time (Figure 16). The youngest females, whether patients or caregivers, uniformly had the lowest levels of marital satisfaction. This finding is consistent with those of others (Rhyne, 1981) although the differences are not statistically significant.

On the family APGAR there were no main effects for gender for either patients or caregivers although there were significant differences by time period with both patients and spouses making significant declines over the measurement period (Figure 17). Interestingly, female patients scored higher than male patients on satisfaction with family function at all three time periods while on



1-way ANOVA (*significant for time)

Figure 16. APGAR (family satisfaction) scores: patient and caregiver contrasts.

marital satisfaction they scored lower. Female caregivers, however, expressed lower satisfaction with family function than male caregivers a finding that is consistent with their scores on marital satisfaction. Gender is obviously not the only determinant of marital or family satisfaction in this situation. It seems likely that issues pertaining to role may be helpful in explaining this discrepancy; these will be pursued later in the discussion.

Family APGAR scores were examined for the total sample for the available data points: one and three months post discharge. (See Figure 17.) The same trends held as with the smaller subsample, i.e., female patients reported higher APGAR scores than males and female caregivers reported lower APGAR scores than male caregivers. Gender was

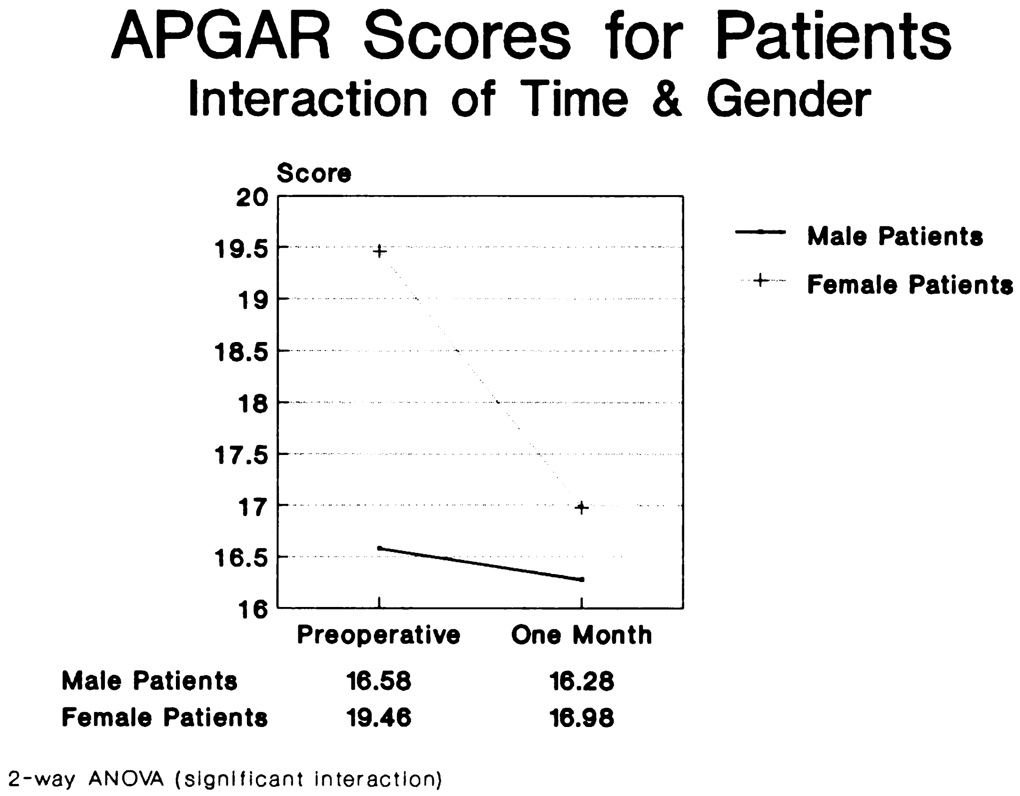
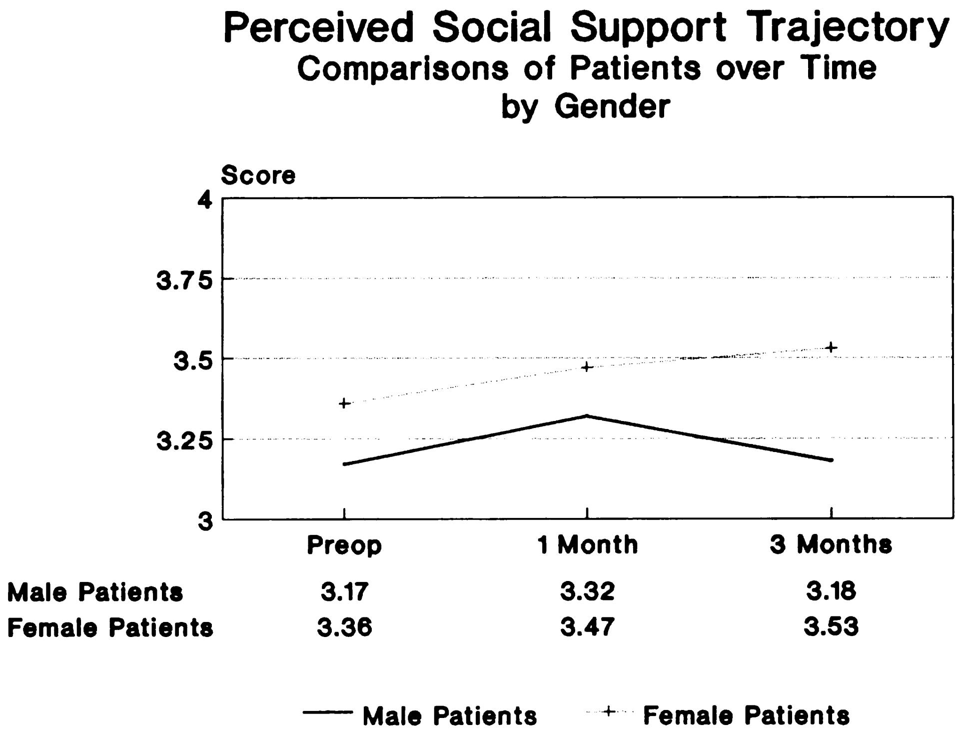


Figure 17. APGAR scores for patients: interaction of time and gender.

significant in a 2-factor ANOVA for patients but not for caregivers. The main effect of gender for patient APGAR scores must be interpreted with caution, however, since there was a significant interaction effect between gender and time (see Figure 18). As illustrated, the difference between female and male patient satisfaction with family function is greater at baseline (preoperatively) than at 3-months postoperative. In other words, female patients have high satisfaction before surgery but after three months at home, satisfaction with family function has declined almost to the same level as male satisfaction with family function. Caregiver APGAR scores dropped more than patient scores with a significant change between the baseline and three month postoperative period.



RM ANOVA (n=42)

Figure 18. Perceived social support trajectory: comparisons of patients over time by gender.

Interpretation of the above discussion is made with caution, mindful of the sample size, and the fact that surgical recovery was still progressing at 3-months post discharge. While gender appears to be a potent variable in influencing marital satisfaction, satisfaction with family function seems to be more a function of role, i.e., that of patient or caregiver, than gender. The findings regarding role and family function are consistent with those of Gilliss (1984). Throughout the sample and throughout time periods males were more satisfied with their marriages than were females. However, female patients were more satisfied with family function than male patients and these scores were not correlated with their marital satisfaction.

Perceived Social Support and Satisfaction with Family Function: A Possible Explanation for Patients

A possible explanation for the higher levels of female patient satisfaction with family function at baseline may be related to perceived social support. Data for patients and spouses describing perceived social support across all three data collection points in a repeated measures ANOVA are available only for a subsample of the study (n=42) and are available for the total sample at one and three months post discharge (n=70). However, these data indicate that women patients consistently rate perceived social support higher from three different sources, children, relatives, and friends, than do male patients at all data collection points (see Figure 18). Interestingly, the only source which female patients do not rate higher as a possible source of support is the spouse. Perhaps the lower spousal social support scores reported by female patients are related to their lower scores for marital satisfaction and higher family satisfaction scores are related to higher scores on other areas of social support. Conversely, for male patients perceived social support from spouse was higher than that perceived by female patients and marital satisfaction was also higher. The fact that men structure their lives in a different fashion from women and depend on much smaller networks of social support (Kessler & McLeod, 1985) may be related to the higher levels of marital satisfaction. The marital relationship may be the primary source of social support for men whereas for women recovering from cardiac surgery, children, extended family, and friends supply the greatest amount of social support.

Perceived social support scores increased in most areas for women patients over time and were higher than scores for male patients paralleling the scores of female patients on the family APGAR, which although they decreased over time were still higher than scores for male patients. While this explanation is theoretically sound the repeated measures ANOVA unfortunately exhibit only trends and not any significantly positive main effects for gender or time. Figure 18 demonstrates the trajectories for social support for both male and female patients.

While life span studies of social support are scant, network size is generally thought to remain stable throughout adulthood, especially within the inner circles of the "convoy" to which Kahn and Antonucci (1980) refer. This inner circle is comprised mostly of family, kin, and close friends and thus is not as fluctuant as the outer circles which contain network members gained, and lost, through moves, employment, and other life transitions. Indeed, the findings in this study related to network size do not exhibit any appreciable differences between networks of the youngest, middle-aged, or oldest patients. The network size of the youngest patients was larger than that of both the middle-aged and elder group but not significantly different. Since only married couples were included in this study we might expect network size to be somewhat larger than in the population at large. Such an assumption would be especially true of older women as they are more likely to be widowed and thus without a spouse as a possible network source of support.

In terms of perceived social support from the network of spouse, children, relatives, and friends patients in this sample do differ by age groups. For example, as was demonstrated in Table 7 in Chapter Four, mean levels of perceived social support differed significantly amongst the three age groups with the oldest group reporting the highest levels.

Post hoc comparison Scheffe' demonstrated that the younger group claimed greater social support than the middle-aged group ($p=.06$) and the oldest group had more than the middle-aged group ($p=.05$). This same pattern was exhibited again by the oldest and youngest patients in their reports of perceived support from relatives and friends, that is, the oldest group reported the greatest amount of social support, the youngest the second highest amount, and the middle-aged group the least amount of social support (Figure 19).

There were no statistically significant differences in perceived support from spouse or children amongst the age groups. In fact, in a trend that was opposite from those on the other sources of social support the oldest age group reported lower levels of perceived social support from their children. This was a surprise to the author as a plethora of studies in the area of caregiving to elders has demonstrated that children frequently provide instrumental and expressive support to their parents (Brody, 1981; Lieberman, 1978; Shanas, 1979). However, a review by Schulz and Rau (1985) on social support through the life span suggests a possible explanation for this finding. Well-being of older persons was not found to be related to interactions with family members but rather to interactions with friends. It might be that for older persons social support from children is viewed as an obligatory response and as such is not rated as highly when compared to other sources of support. On the other hand, older persons may be less willing to call upon their children for help, or may not have children who are geographically available, and thus they are less likely to view them as sources of support than young and middle aged persons.

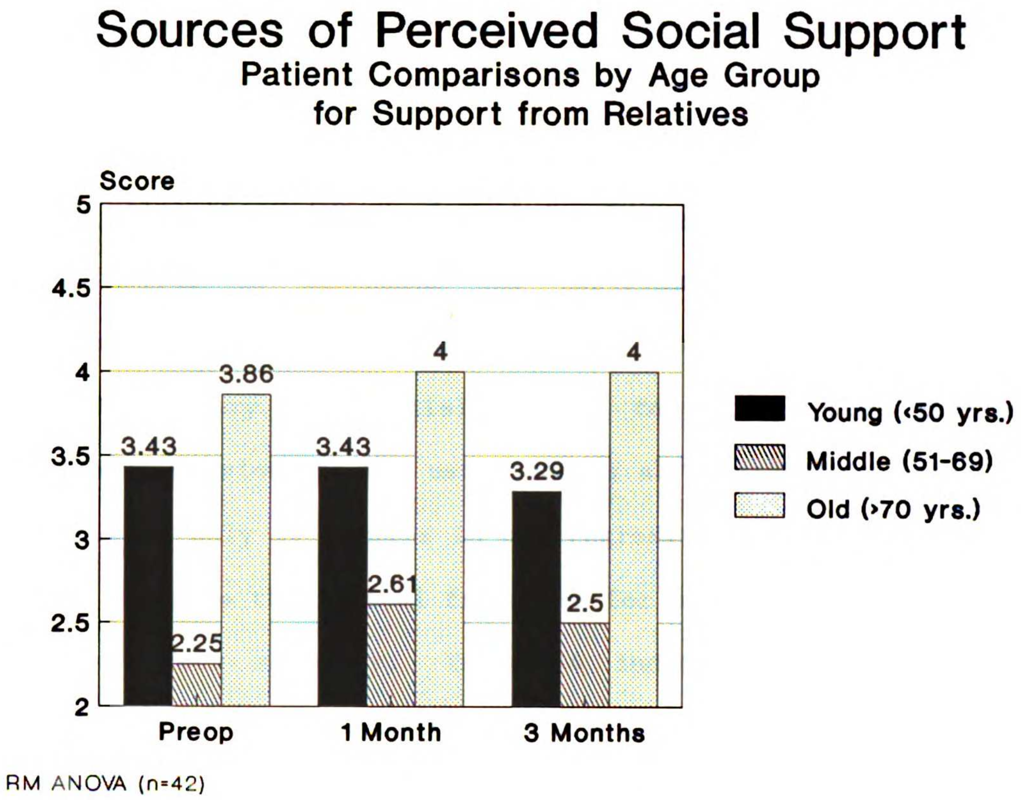


Figure 19. Sources of perceived social support: patient comparisons by age group for support from relatives.

In summarizing social support findings it appears that for patients age is a more potent master status variable than gender. The oldest patients had the smallest networks but also the greatest amount of perceived social support. Social support from children was perceived to decline over time for all ages and both genders. The oldest group had greater social support from relatives and friends as measured by the SSS than the younger groups.

For caregivers gender is the more powerful master status variable. Male caregivers typically overinflated their estimates of social support from various sources before their wives' surgery. After surgery, they expressed large declines in perceived social support as measured by the SSS. Male caregivers scores declined and interacted with those of female caregivers for all sources of social support except for that from friends.

Effects of Family and Marital Satisfaction on Patient Mood Disturbance

In order to determine the importance of marital and family satisfaction, cardiac functional status, patient gender and age, self reported recovery, and social support to patient mood disturbance a stepwise regression was run using scores at three months post discharge. As there are only 39 couples in the regression the analysis is meant to offer a possible theoretical framework for understanding these variables as they affect recovery. Table 14 indicates that the caregiver's dissatisfaction with the marriage was most responsible for mood disturbance, followed by the patient's current cardiac functional status, and the patient's satisfaction with family function. The patient's own satisfaction with the marriage, perception of recovery, gender, total amount of social support as perceived by the patient, and social support from the caregiver did not enter the equation. The age of the patient almost entered the equation with younger patients suffering more mood disturbance.

The importance of marital and family variables to patient psychosocial recovery seems well established with low levels of marital and family satisfaction predictive of high levels of patient mood disturbance. It was interesting to note that it was caregiver marital satisfaction that entered the equation, not patient marital satisfaction. It seems, therefore, that marital unhappiness on the part of the caregiver has more impact on the patient than his/her own marital satisfaction although we must also consider that the patient's mood

Table 14

Effects of Marital and Family Satisfaction on Patient Mood Disturbance

Variable	R^2	Beta	R^2 Change	F
Caregiver marital satisfaction	0.24	-0.40	----	19.27 (p=.0001)
NYH cardiac functional status	0.44	0.44	0.20	15.74 (p=.0004)
Patient family satisfaction	0.55	-0.35	0.12	9.51 (p=.004)
Patient age	0.58	-0.16	0.02	1.94 (p=.17)

disturbance could contribute to the caregiver's lack of marital satisfaction. The direction of causality is difficult to ascertain and we might suppose that the patient and caregiver are caught in a spiralling association of mood disturbance and dissatisfaction with marriage and family. Also of interest is the fact that the patient's cardiac functional status was not the primary predictor of the patient's level of mood disturbance.

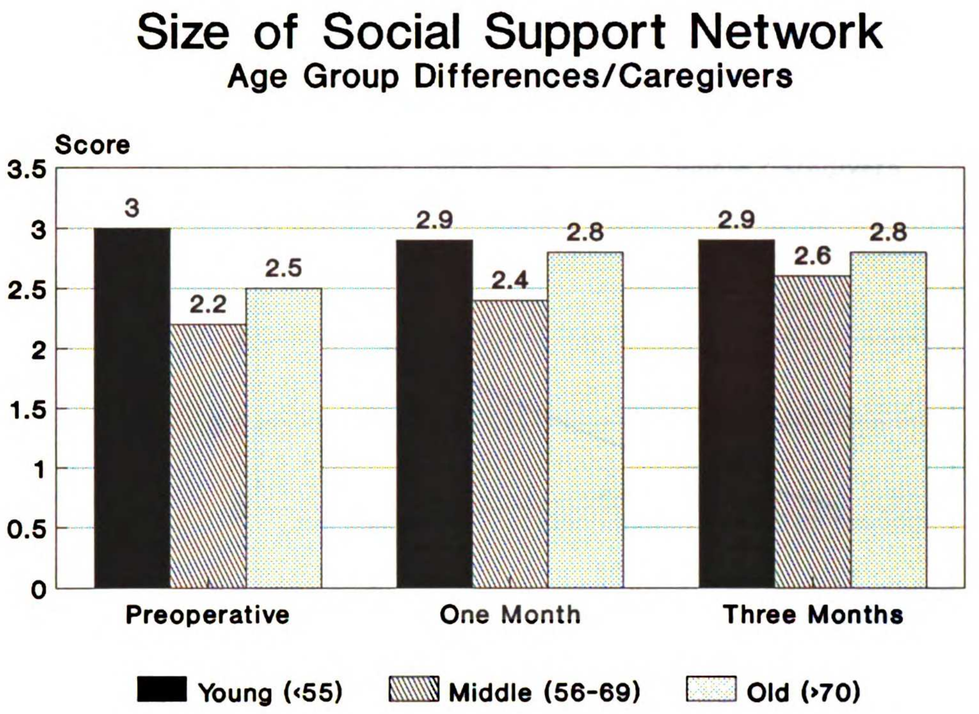
The next section of the chapter examines caregiver variables with attention given to social support and its relationship to marital and family satisfaction as well as caregiving burden.

Social Support as Related to Caregiver Marital and Family Satisfaction

As recounted in Chapter Four, there were no main effects for gender in a repeated measures ANOVA of family satisfaction or marital satisfaction, however, there was a main effect for time with all caregivers reporting a decrease in marital and family satisfaction (Figures 15 and 16). Female caregivers suffered the greatest decline in both marital and family satisfaction. There were no main effects for gender or time in a two way ANOVA of perceived social support but there were significant interactions between gender and time.

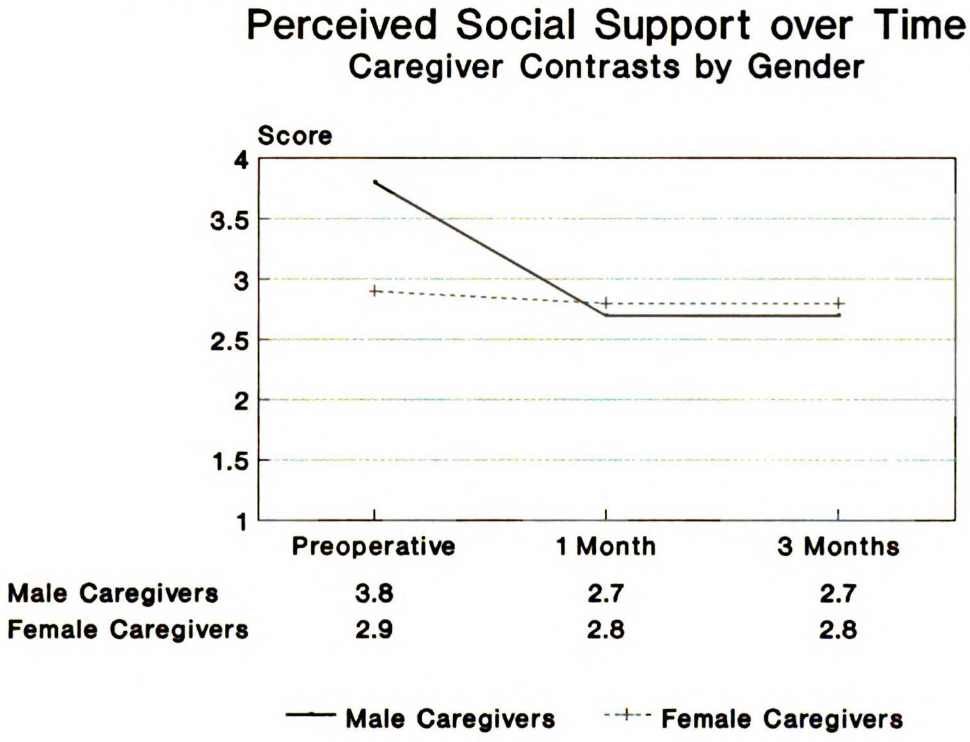
The explanation of social support and its impact on caregiver marital satisfaction and satisfaction with family function is quite different from the explanation for the same patient variables. While network size for patients was not significantly different by age group, the youngest caregivers did report a significantly larger social support network than the other age groups (Figure 20). Gender was not related to network size for caregivers. Since caregivers did not assess their spouses as possible sources of support it is impossible to compare network social support for patients and caregivers in paired differences t-tests. Age and gender explanations for patient evaluation of network support also apply to caregivers. However, the nature of the network seems to operate in a different fashion for caregivers as compared to patients and this is illustrated by the discussion below of perceived social support for the caregiver.

The subsample of 35 caregivers who had complete data for the preoperative, and one and three months post discharge data points is reported first. Typically, significant interactions reveal that male caregivers scored very high on perceived social support during the preoperative period but declined significantly after discharge so that the differences between male and female caregivers was very little by 3 months post discharge (Figure 21). In other words male caregivers probably overinflated their estimations of social support and once at home attending to recovering wives either their social support sources withered or their perceptions of the amount of help available became more realistic. The decline in estimations of social support was particularly acute for social support from children (Figure 22).



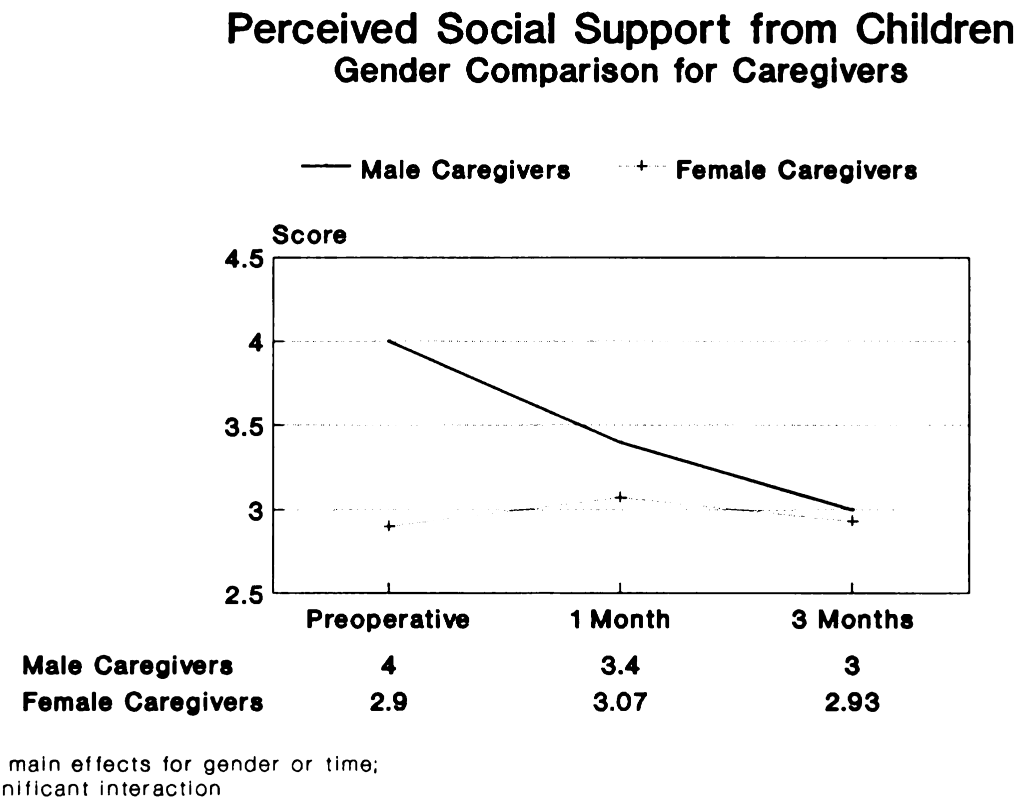
Satistically significant differences
by age group for n=35

Figure 20. Size of social support network: age group differences/ caregivers.



Significant gender by time interaction

Figure 21. Perceived social support over time: caregiver contrasts by gender.



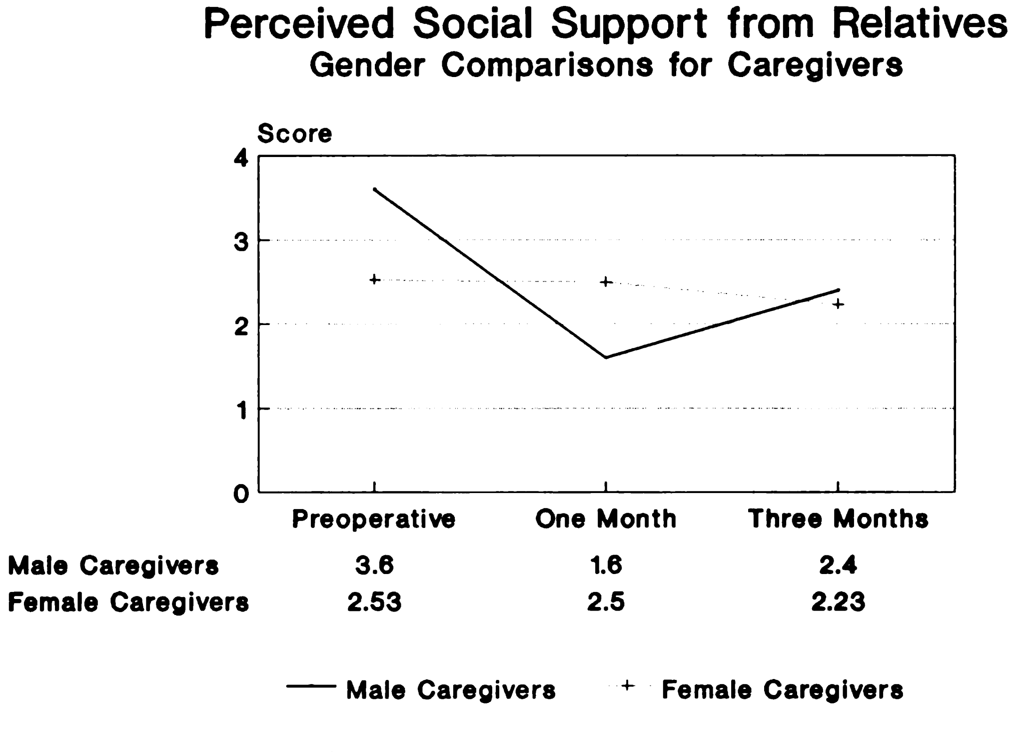
	Preoperative	1 Month	3 Months
Male Caregivers	4	3.4	3
Female Caregivers	2.9	3.07	2.93

No main effects for gender or time; significant interaction

Figure 22. Perceived social support from children: gender comparison for caregivers.

Additionally, estimations of perceived social support from relatives declined drastically from preoperatively to one month postoperatively and then resumed to levels approximating female caregivers (Figure 23). Female caregivers rated all social support from various sources as less helpful than did male caregivers during the preoperative period, but whereas male caregivers ratings decreased female caregivers' ratings increased (Figure 21).

Data on perceived social support was available for the total sample only for the one and three months post discharge data points. Because baseline data was unavailable the interaction effects were not as obvious, i.e., male caregivers levels of perceived social support had "bottomed out" by the time the total sample was tested during the post



No significant main effects for time or gender; significant interaction

Figure 23. Perceived social support from relatives: gender comparisons for caregivers.

discharge recovery period. There was a significant interaction effect for gender and time in the repeated measures ANOVA on perceived social support from relatives with male caregivers increasing and female caregivers decreasing estimations of perceived social support.

Effects of Family and Marital Satisfaction and Social Support on Caregiving Burden

In trying to understand marital and family satisfaction as well as social support for caregivers a stepwise multiple regression was run to determine the impact of gender and age of the caregiver, family and marital satisfaction, and the patient's cardiac status on caregiving burden (Table 15). The age of the caregiver was the most important

Table 15

Variables Affecting Caregiving Burden at 3 Months Post Discharge

Variable	R^2	Beta	R^2 Change	F
Caregiver age	0.27	-0.37	----	16.77 (p=.0003)
NYH cardiac status	0.37	0.36	0.10	6.51 (p=.02)
Patient family satisfaction	0.45	-0.23	0.07	4.67 (p=.04)

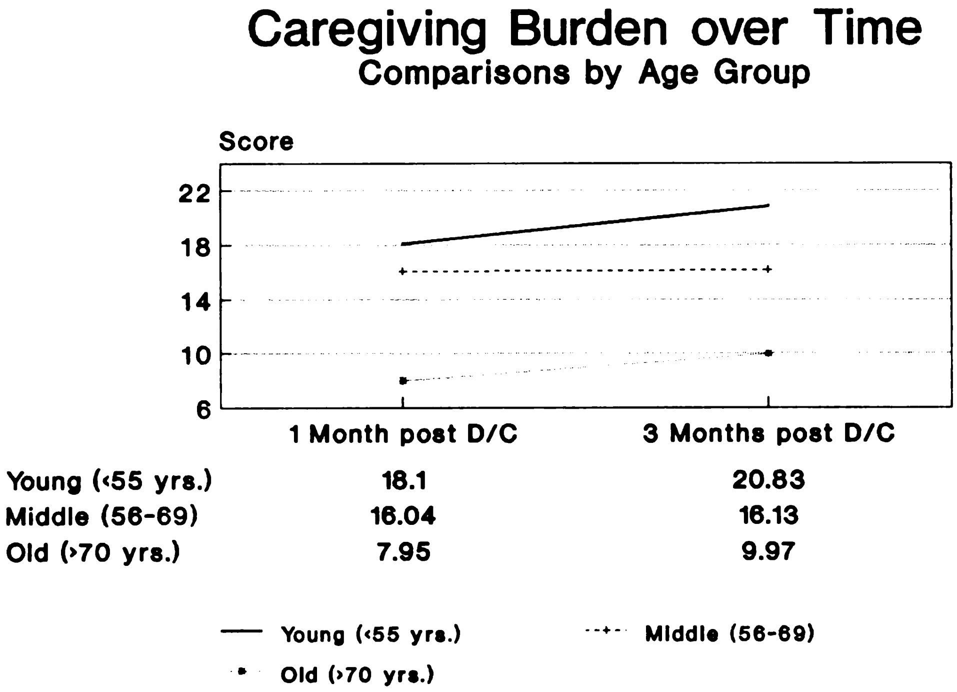
predictor of caregiving burden with the youngest caregivers being the most burdened. Age was followed in the regression by the cardiac status of the patient, and the patient's level of family satisfaction. Like the regression for the patient, the sample size for this regression is small (n=37 couples). However, it is interesting to note that also similar to the patient regression is the entry of spousal variables. For example, the patient's dissatisfaction with family function was responsible for 7% of the variance in the caregiver's mood disturbance and the patient's clinical cardiac status was responsible for 11% of the variance. Of note is the fact that marital satisfaction for neither caregiver or spouse ever entered the equation nor did social support as perceived by the caregiver.

To sum up caregiver marital and family satisfaction, it seems possible that the youngest caregivers with the sickest spouses have the greatest caregiving dissatisfaction. Additionally, we note the contribution that low levels of family satisfaction on the part of the patient make to the caregiver's assessment of burden. The intimacy and reciprocity of family life suggests that when one person is dissatisfied with family life the repercussions will be expressed in other areas.

Because the youngest caregivers are almost exclusively female and are more likely to have added role responsibilities as related to employment and children we may postulate that young, female caregivers have lowest levels of family and marital satisfaction as a result of their sick husbands and ongoing role responsibilities. These same factors most likely affect marital satisfaction and satisfaction with family function. The following section on caregiving burden will be an attempt to further explain these variables.

Caregiving Burden

Burden related to caregiving's objective and subjective components has been widely established in the literature (Poulshock & Deimling, 1984; Zarit et al, 1980, 1986; Johnson, 1985). Figure 24 demonstrates the differences in the amount of caregiving burden as expressed on the Zarit for the three age groups over time. Additionally, the contribution of age and gender differences to the experience of caregiving has been documented (Fitting et al, 1986; Gilhooly, 1984; Worcester & Quayhagen, 1983). The model which was tested in Chapter Four with caregiving burden as the dependent variable was not totally supported. Additionally, gender of the caregiver did not influence various measures of patient recovery directly although the age of the caregiver was close to contributing a significant amount of variance to the R square change at the last step of the regression. Most predictive of the caregiver's sense of burden at one month post discharge was his/her mood disturbance during the preoperative period. The gender of the caregiver was a close to significant ($p=0.055$) predictor of caregiver mood states at baseline



	1 Month post D/C	3 Months post D/C
Young (<55 yrs.)	18.1	20.83
Middle (56-69)	16.04	16.13
Old (>70 yrs.)	7.95	9.97

RM ANOVA; significant main effect for
age group but none for time

Figure 24. Caregiving burden over time: comparisons by age group.

which may indicate that gender affects caregiving burden indirectly through its influence on mood states but does not directly influence caregiving burden. The next section describes various regressions that were conducted in order to produce a more explanatory model of caregiving burden.

The contribution of demographic variables to caregiving burden was tested first. These variables were put in the model and regressed against caregiving burden at 1 and 3 months with data from 63 couples, or 126 subjects, in the regression. The results shown in Table 16 and 17 indicate how the different demographic variables performed with those that entered the equations with significant p-values reported.

At both one and three months after discharge from the hospital the greatest predictor of caregiving burden is caregiver mood states. However, at 1 month post discharge the patient's occupational status

Table 16

Predictors of Caregiving Burden at 1 Month Post Discharge

Variable	R^2	Beta	R^2 Change	F
Occupation of Patient	0.23	-0.29	0.06	5.19 ($p=.03$)
Caregiver Mood States	0.38	0.42	0.15	6.18 ($p=.004$)

Table 17

Predictors of Caregiving Burden at 3 Months Post Discharge

Variable	R^2	Beta	R^2 Change	F
Age of Caregiver	0.06	-0.23	----	5.02 ($p=.03$)
Caregiver Mood States	0.31	0.40	0.13	9.98 ($p=.003$)

made a significant contribution to the caregiver's feelings of burden as expressed on the Zarit questionnaire. The negative beta weight indicates that since the highest occupational status was coded with the lowest number those caregivers whose spouses were in the highest occupational categories expressed the least amount of caregiving burden. At one month after discharge most patients were still at home recuperating from surgery so that almost all caregivers were confronted during this time period with the presence of a recovering spouse.

By 3 months after discharge from the hospital occupational status is no longer a significant predictor of burden which is probably related to the fact that most patients had returned to work. Of those who had not returned to work, however, the greatest number were in the lower occupational categories, i.e., skilled and semi-skilled workers, whose physicians recommended against return to work until 3 months postoperative because the nature of their work included heavy lifting and other manual activities. The primary predictors of caregiving burden at 3 months are the age of the caregiver and the caregiver's mood states. Age was the only demographic variable which entered the equation at 3 months post discharge.

In another attempt to produce a more explanatory model the same model as presented in the conceptual framework was tested in a cross sectional fashion at three months post discharge with data from 65 couples. The rationale for testing the model cross sectionally is that spouse and patient mood states, cardiac functional status, and caregiving burden were not static variables but rather, changed with the passage of time. It seemed possible that this approach might explain greater variance. Table 18 exhibits the R^2 changes and their tests of significance at the last step.

Indeed, this model does explain much more of the variance than the staged model above, in fact, it accounts for approximately 60% of the variance. Although the cross-sectional model may be more predictive the possible problem of multicollinearity should be considered since caregiving burden scores and total mood disturbance scores are correlated with each other at $r=0.73$ at 3 months post discharge. However, the fact that the originally proposed portion of the model explaining caregiver burden does not predict any more than 24% of the variance in caregiving burden also indicates how difficult it is to predict from one time period to another with very limited information about family recovery. We should note that this is the only regression in which the patient's functional cardiac status enters the regression

Table 18

Cross-Sectional Test of the Model Explaining Caregiver Burden

Variable	R^2	Beta	R^2 Change	F
Caregiver Gender	0.02	0.05	----	2.27 ($p=.14$)
Caregiver Age	0.07	-0.10	0.05	7.79 ($p=.007$)
NYH cardiac status at 3 months	0.18	0.16	0.11	17.01 ($p=.0001$)
Total caregiver mood disturbance	0.60	0.68	0.42	61.99 ($p<.00001$)

on caregiver burden, a further indication of the dynamism of the moment since by three months post discharge most patients' physiological condition had improved.

The multiple regression that was reported earlier in this chapter on a subsample of the study indicated the power of marital and family satisfaction to influence the caregiver's assessment of burden. A hierarchical regression was run in order to evaluate social support and its ability to buffer caregiving burden. Table 19 indicates the variables that were forced in at each step.

It appears then that prior caregiving burden is the best predictor of future caregiving burden and that it is not ameliorated by social support. Additionally, caregiving burden is inversely related to satisfaction with family function at 3 months and is significantly affected by baseline mood states. In other words, in this sample, spousal caregivers who tended to experience high levels of burden at 1 month post discharge were also likely to experience increased burden at 3 months, decreased family satisfaction at 3 months, and demonstrated

Table 19

Effects of Mood Disturbance, Social Support, and Family Satisfaction on Caregiving Burden at 3 Months (n=50)

Variable	R^2	Beta	R^2 Change	F
Global Mood Disturbance Preoperatively	0.20	0.26	----	18.46 (p=.0001)
Caregiving Burden at 1 month	0.46	0.60	0.26	24.87 (p<.00001)
Social Support at 1 month	0.46	0.18	0.00	NS
Burden x Social Support Interaction	0.46	-0.14	0.00	NS
Caregiver Family Satisfaction at 3 months post d/c	0.53	-0.31	0.07	6.91 (p=.01)

significant levels of mood disturbance as measured by the POMS during the preoperative period. Neither social support nor the interaction term (social support x caregiving burden) were statistically significant and together account for less than .001% of the variance.

Accounting for Possible Autocorrelation between Mood States and Caregiving Burden

The correlation table in Appendix L indicates that there is a high correlation between the caregiver's mood disturbance score and the caregiver's burden score. In order to determine if the Zarit caregiving burden inventory was autocorrelated with mood disturbance the Zarit was divested of 6 items that were primarily affect items. These items included embarrassment regarding the patient's behavior, anger towards the patient, fear about the future, strain generated by the patient, loss of control, and uncertainty. The model was then tested again using the pared down Zarit. The model performed in exactly the same fashion that it had using the entire Zarit with the reduced Zarit predicting patient mood disturbance, patient self-reported recovery, and New York Heart Association cardiac status but not family satisfaction. The amount of variance predicted ranged from 23% to 17%. Additionally, a test of the predictors of caregiving burden, that is the equation, $X_5 = b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + e$, yielded results that were consistent with earlier model tests.

It appears then that either caregiving burden and mood states are measuring discretely different constructs or that they are both representative of a "generalized irritability" or a heightened affect as a result of the various assaults to individual and family integrity. The correlation between preoperative caregiver mood states and caregiving burden at 1 month post discharge was 0.40 ($p=0.0015$) using the reduced or pared down Zarit caregiving scale. However, the correlations during the same data collection point are higher, that is, caregiver mood states at 1 month post discharge has a correlation with caregiver burden at 1 month of 0.64 ($p<0.00001$).

Patient Recovery

Patient recovery was described in Chapter Four using the overall model with four different dependent variables. The only dependent variable that was not in some way explained by the model was the patient's satisfaction with family function at 3 months post discharge. Although it was possible to account for 60% of the variance when the model was tested cross-sectionally for variables contributing to caregiving burden there was very little additional, if any, variance explained when the model was tested in this fashion against the various patient dependent variables. In an attempt to increase the explanatory power of the model additional variables were added as explained below.

Variables not in the Model

In order to account for the possible contribution that demographic variables other than age and gender might make to the model, variables were entered in a stepwise regression for tests of their contribution to caregiving burden and also to patient recovery. Ethnicity and religion were both dummy coded as is customary in the treatment of nominal variables while occupation and education were treated as ordinal variables. Age and gender of the patient were also entered in these regressions.

In terms of testing the model as a whole the only dependent variable which was predicted by any of the demographic variables was the patient's assessment of family function. Occupation was nearly significant ($p=0.052$) when it was entered in a regression with other demographic variables to predict patient satisfaction with family function and predicted 6% of the variance. In this case, high levels of satisfaction with family function are associated with being employed as a less skilled worker while low levels of family satisfaction are associated with higher occupation levels. We should remember, however, that patient satisfaction with family function was the only dependent variable which was not predicted by the model and thus this finding relating to demographics does not actually increase the explanatory potential of the model.

Mood disturbance, self reported recovery, and New York Heart cardiac functional status were not predicted by any of the demographic variables. Socioeconomic status and education are frequently related to health outcomes and the fact that neither occupation nor education are significantly related to the various dependent variables, mood disturbance, self-reported recovery, or cardiac status is somewhat surprising. Since the sample was 87% Caucasian we would not expect ethnicity to be an important demographic variable.

In a final attempt to determine if there were any additional variables that would add to the part of the model predicting patient recovery the following variables were entered: employment status of caregiver, length of time cardiac problems were present, and the development of new medical problems after discharge. Table 20 illustrates the performance of these variables when regressed against patient self-reported recovery and mood states.

The addition of the caregiver's work status to the model and its ability to predict 8% of the variance accounting for the patient's self-reported recovery indicates again the reciprocal nature of recovery in the family context. Perhaps those caregivers who worked were less likely to reflect the patient's mood disturbance because of the social support they received from their employment environment. This explanation is supported by some of Thoits' work (1983) and also that of Hibbard and Pope (1985), particularly as social support in the work environment affects women. Another rather obvious explanation for the positive relationship between employment status and self-reported recovery is that working caregivers may ameliorate some of the stress caused by the patient's unemployment. A third possible explanation is

Table 20

Caregiver Employment, Duration of Cardiac Symptoms, and Development of New Illness Problem as Predictors in the Model of Patient Recovery

Dependent Variable: Self-Reported Recovery

Variable	R^2	Beta	R^2 Change	F
Caregiver burden	.07	-0.34	--	4.31 (p=.04)
Caregiver employment	.15	0.24	0.07	5.12 (p=.03)
NYH cardiac status at baseline	.19	-0.20	0.04	2.33 (p=.13)

Dependent Variable: Patient Mood States

Variable	R^2	Beta	R^2 Change	F
Caregiver burden	0.14	0.42	--	8.72 (p=.005)
Duration of cardiac problems	0.18	0.17	0.04	2.51 (p=.12)
NYH cardiac status at baseline	0.20	0.16	0.02	1.59 (p=.21)

that if the caregiver is working he or she is less likely to become involved in the web of depression and anxiety which frequently follow cardiac surgery and less likely to become overly surveillant of the recovery process. Hypervigilance has been recognized as a possible barrier to recovery by various scientists (Wishnie, Hackett, & Cassem, 1971). The employment status of the caregiver increased the amount of explained variance in the test of the model by 4%.

The second dependent variable against which the model was tested and to which the variables related to caregiver employment, development of new medical problem, and duration of cardiac problems were regressed is patient mood states at 3 months post discharge. Neither the caregiver's employment status nor development of new medical problems explained higher levels of mood disturbance but the duration of cardiac problems did. Those patients who had suffered from cardiovascular disease for longer periods of time were more likely to have higher levels of mood disturbance than patients who did not have long histories of cardiac problems.

This finding supports theoretical work related to chronic stress (Pearlin, 1983). Qualitative findings revealed that patients who had bypass grafts performed in quick succession to cardiac catheterizations were acutely anxious during the preoperative period as compared to those patients with a longer history of documented heart disease. However, by 3 months postoperative these same patients were more likely to express positive feelings about the efficacy of the surgery and to believe that they had been "cured". On the other hand, patients who were having repeat bypasses or valve replacements were less anxious preoperatively but by 3 months after surgery were more cognizant of the truly chronic nature of their medical problems. The addition of duration of cardiac problems to the model did not quite reach statistical significance ($p=.12$) and when entered it grabbed the variance previously explained by New York Heart functional status so that the model did not perform as originally formulated.

Duration of cardiac problems is not necessarily correlated with age of the patient since surgery is usually performed fairly promptly following diagnosis of CHD regardless of the patient's age. Instead, duration of cardiac problems is more likely to reflect those patients of varying ages whose CHD has been medically managed, unsuccessful angioplasty has been performed, a previous bypass graft is no longer patent, or valvular disorders have been medically managed. Therefore, findings that younger caregivers have higher burden scores and younger patients have higher anger/hostility scores on the POMS is likely to reflect developmental factors such as the non-normative nature of heart disease for younger persons and their spouses. The interaction of normative age-graded influences and non-normative influences accounts for the distress of the youngest group of subjects expressed on the various psychosocial measures. In other words, the developmental tasks related to childrearing, career demands, individual and family developmental stage interact with the non-normative nature of cardiac surgery to result in greater caregiving burden and greater patient mood disturbance.

The last section of Chapter Five discusses the second aim of the study which is to ascertain which dependent variables serve as the best measures of patient recovery.

Performance of the Various Measures of Patient Recovery

The second aim of this study was to evaluate various dependent variables as measures of patient recovery. Since the model was tested in three different equations a discussion of aim #2 will examine the contribution of the variables for the three equations.

The first equation tested the contribution of caregiver age and gender to the caregiver's mood disturbance during the preoperative period. As was discussed in Chapter Four gender of the caregiver was nearly significant (p=.06) in predicting mood disturbance with female caregivers expressing the greatest amount of disturbance as measured by the POMS. Age of the caregiver was not a significant predictor of mood disturbance although the regression coefficient for age was negative suggesting that the youngest caregivers responded on the POMS with the greatest amount of mood distress. Both of these findings are consistent with the conceptual framework of the study. These findings are not, however, always consistent with the norms reported by McNair, Lorr, and Droppleman (1971) indicating that in this situation related to caregiving, role and gender may interact. For example, POMS norms indicate that women score higher on all subscales of the POMS except for anger. In this sample female caregivers scored nearly significantly higher (p=.055) on the anger subscale than male caregivers, as well as scoring higher on the other subscales. The fact that male caregivers were significantly older than female caregivers (t=2.49, df=68, p=.02) may account for some of this discrepancy since norms on the POMS indicate that older individuals' scores on the anger subscale are generally lower than younger patients. Additionally, work by Lin, Ensel, and Dean (1986) and Ensel (1986) support these findings for both age and gender. Therefore, findings related to the test of the first equation in the model seem to be consistent with reported demographic trends and with theoretical issues addressed in the framework.

The second equation tested was a regression of caregiver age, gender, and mood states and the patient's cardiac status against caregiving satisfaction. The direct contribution of age to caregiving burden was in the expected direction with younger caregivers expressing more burden on the Zarit Caregiving Burden Inventory (p=.11). There were no direct effects for gender. However, we know from the previous equation that gender affects burden indirectly through its effect on mood disturbance. The greatest predictor of caregiving burden at one month was caregiver mood disturbance during the preoperative period. The fact that in the test of the model the patient's cardiac functional status during the preoperative period did not influence the caregiver's burden score at one month after discharge from the hospital was somewhat unexpected since we might assume that the sicker the patient is the greater the burden for the caregiver. This might be related to an accommodation to the spouse's illness, a finding that has been reported by others (Fitting et al, 1986; Gilhooly, 1984; Zarit et al, 1986). On the other hand, it might instead reflect the fact that patient psychological distress, commonly experienced after cardiac surgery, influences caregiver psychological disturbance and is a better predictor of caregiving burden than physiological status. Indeed, this interpretation was borne out in all of the regressions which contained either the patient's or the spouse's mood states. Mood states were always a greater predictor of caregiving burden than was the patient's cardiac functional status.

The last equation tested in the model was the contribution of New York Heart functional status and caregiving burden to the patient's recovery as measured separately by four different dependent variables. The model was supported in three of the four tests with the only dependent variable not predicted by the model being patient satisfaction with family function. It appears that patient satisfaction with family function is not related to the variables in the model and that it may not be an adequate measure of patient recovery.

An interesting component of the variables measuring marital and family satisfaction is their tendency to decline over time while mood states improve over time. One might expect that with the decrease in mood disturbance an increase in satisfaction with family function and satisfaction with the marriage would occur. There are two possible explanations for the improvement in mood states and the decrease in family/marital satisfaction. The first is that individual recovery occurs more swiftly than family recovery and that not only are the two types of recovery different from each other but they are also different by role. Further research is needed in this area.

A second explanation is that scores during the preoperative period may reflect a generalized irritability or hypersensitivity to the situation experienced by patients and caregivers alike so that all psychosocial response states are heightened. As time passes, patients and caregivers alike moderate their feeling tones and mood states return to normal. At the same time the threat to the family and marital unit decrease and satisfaction with family and marital life returns to a level that may be more consistent with prehospitalization. Various clinicians have spoken to the marshalling of family resources when the family is threatened by some type of crisis (McCubbin & Patterson, 1983). Leavitt (1982) speaks of the "family face" which families present in these situations. Perhaps the family face is reflected in artificially inflated marital and family satisfaction scores, which while they diminish with time, reflect more truthfully a return to pre-crisis states rather than a real decrease in satisfaction.

Summary

Chapter Five has presented a discussion of the findings and an attempt to explain more of the variables affecting caregiving burden and patient recovery. Demographic variables were added to the equations testing the model to determine their ability to predict caregiving burden and recovery. Also, additional characteristics of the environment in which the patient recovered and medical factors relating to adjustment to chronicity and surgery were tested in the model. Possible explanations related to the situations in which the model was upheld were offered. Chapter Six presents the limitations of the study, its significance and implications for nursing, and future research.

CHAPTER SIX

SUMMARY AND CONCLUSIONS

Chapter Six reviews the limitations of the study and the significance of the work for nursing practice. Additionally, directions for future research are suggested.

Limitations

Limitations of the study have to do primarily with three factors. These are: sample size, reliability of the dependent variables, and unequal male/female distribution.

Sample size is always a problem in longitudinal studies with various data collection points. Additionally, collecting data from a clinical sample that is both chronically and acutely ill is problematic. The nature of the study and the testing of a time staged model meant that only subjects for whom there was complete data at all three data collection points could be included in the study. Complete data was available for 140 subjects or 60% of those couples originally entered at baseline. However, attrition related to death, overwhelming morbidity, and failure to return study data indicates that the sample at 3 months may not be representative of the cardiac surgery population as a whole. Generalizing from the 70 couples to the cardiac surgery population is done with caution although also with the belief that those subjects for whom data are available are the healthiest both physically and psychosocially.

Reliability and validity of dependent and independent variables is crucial to any study (Cohen & Cohen, 1983). The reliability and validity of two of the dependent variables, the POMS and the APGAR, are well established and indeed the internal reliabilities for both instruments in this study were excellent. However, the reliability for the remaining two dependent variables, the self-report of recovery and the New York Heart Association functional status (also referred to in this study as cardiac status) are potentially a problem. Self reports are generally thought to be unreliable measures as it is very difficult to standardize them (e.g., what one subject may claim as a good recovery is a poor recovery to another subject). The other dependent variable was a clinician rated variable which had specific criteria for performance of the rating. There was, however, no interrater reliability performed to judge the veracity of each clinician's rating. With these qualifications in mind, however, it was apparent that the self report of recovery correlated with both the POMS mood disturbance and the New York Heart Association functional status. In fact, the self reported recovery seemed to perform as an adequate combination of both physical and psychosocial recovery.

The third limitation is related to the sample size and also to the generalizability of the findings regarding female patients and male caregivers. Although many attempts were made to increase the number of female subjects in the sample it was impossible to expand the size of the female pool beyond 26% of the sample at baseline. By 3 months post discharge there was greater attrition from the couples in which the patient was female and their proportion of the sample was down to 17%. As stated earlier there were more male caregivers who refused to participate than female caregivers. Therefore problems related to subject induction and subject attrition decreased the size of the female patient pool. The generalizability of results to the cardiac surgery population must be questioned since the multiple regressions and repeated measures ANOVAs were based on only 10 female patients and their husbands and 60 male patients and their wives at 3 months post discharge.

With these limitations in mind the significance of the study and implications for practice are presented next.

Significance and Implications for Practice

The significance of the study resides in its ability to further the understanding of the recovery of the patient in the context of the marital dyad and family unit. This work builds upon that of Gortner and Gilliss in nursing who have examined previously the effects of major cardiac surgical events on families. The study extends the understanding of important master status variables, gender and age, which serve as proxies for socioculturally determined behaviors related to sex-role socialization, biological variables, and life span development.

In this study women were identified during the baseline preoperative period as having significantly more shortness of breath and poorer cardiac functional status. After surgery women continued to have greater problems than men as exhibited by their longer intensive care unit stays and proportionately more deaths during the perioperative and post discharge period. Although the physiological profile of women was worse initially their recoveries did not differ from men when they were compared at one and three months post discharge on such variables as New York Heart functional status, shortness of breath postoperatively, sexual, recreational or work activity levels, self report of recovery, self reported quality of life, angina or any of the other variables examined during the recovery period. These findings are not entirely consonant with those reported in the literature which have remarked upon greater complications during the post discharge period. The greater loss of women by death and unknown causes of attrition might mean that this sample is unusually healthy.

Implications for practice include increased emphasis placed on the recognition of symptoms such as shortness of breath and atypical angina for women. Women consistently presented with more shortness of breath whether they were candidates for valve or bypass graft surgery. Additionally, empirical data indicated that women did not have typical angina preoperatively. They were more likely to have head, neck, shoulder, and ear pain than men and less likely to have chest pain. While this finding has not been documented in the literature the information that is extant about female symptomatology and coronary artery disease is scant. Longer intensive care stays should be considered when preparing women and their families during the preoperative period.

In terms of psychological measurement women were found to have less mood disturbance than men as measured by the POMS. This finding was unexpected and was explained in terms of adjustment to the sick role. Not only did women express less mood disturbance on the POMS preoperatively but also throughout the postoperative period. In turn their spouses also described less mood disturbance on the POMS. One wonders whether the low levels of mood disturbance for male caregivers is related solely to their wives' levels or if it is not also related to their lack of involvement in their spouses' recovery process.

Those male caregivers who were interviewed regarding caregiving spoke primarily in terms of the "work of caregiving". One 78-year-old male described in great detail building a box for his wife's medications and scheduling her visits to various doctors and therapists. Another male caregiver spoke of his caregiving in terms of monitoring his wife's medication schedule and organizing the bedroom so that the physical aspects of recovery were easier. He said:

> I arranged her room so that she didn't have to move to do anything. The phone was right there by the bed and the television was right hand, and she didn't have to get up to do anything.

Contrast the male instrumental approach to caregiving with the female expressive approach:

> He's really pretty helpless when he's sick. I mean he wants a lot of attention, and I didn't mind giving it. To me, it was like caring for a baby. In many ways it was like having a newborn home. You sleep when they sleep, and you know, you just set aside that period of time and know that that's what you're going to be doing.

The differences that were exhibited on measures of caregiving burden indicated that male caregivers were significantly less burdened overall as measured by t-tests at 3 months post discharge, and also that they felt that they could do a better job in caring for their wives. Perhaps their willingness to become involved in the "work of caregiving" and to apply a work model to their delivery of care alleviated their mood disturbance.

Patterns for couples in which the patient was male differed from those described above. Both patient and spouse reported much higher levels of mood disturbance on the POMS preoperatively and post discharge. The family systems concept of positive feedback may be applicable to these couples. The patient's mood disturbance, serving as the thermostat for the couple, works to amplify that of the female caregiver's. Additionally, such social system stressors as job and relationships with others may add to caregiving burden for female caregivers. For example, female caregivers were significantly more likely than male caregivers to respond on the Zarit Caregiving Burden Inventory that they felt stressed between spouse, family, and work, that their relationships with others were negatively affected, and that they felt their health had suffered as a result of caregiving.

The significance of these findings suggests that for female caregivers discharge planning should be addressed to methods of modifying the home environment so that the multiple strains female caregivers experience can be decreased. Female caregivers' perceptions of their social support networks did not decline as much over time as did those of male caregivers. Perhaps female caregivers would benefit from the guidance of health professionals in mobilizing the network at the time of hospital discharge in specific ways that are helpful in decreasing role strain and other forms of caregiving burden.

Other interventions suggested by the findings include formation of caregiver groups before hospital discharge so that some of the problems involved in recovery can be anticipated. The reciprocity between caregiver and patient which was indicated by significant correlations in mood states and family satisfaction implies that intervening with the caregiver may produce better outcomes for the patient.

The second master status variable that was of interest was age. Physical recovery for the oldest group was very similar to that of the other age groups except that the elders had significantly more shortness of breath at 1 and 3 months post discharge. Interestingly, the next age group with appreciable amounts of shortness of breath was the youngest group. In fact, this pattern was maintained throughout most of the analysis of physiological variables, that is, the middle aged group did the best, followed by the youngest, and then the oldest. The similarity in the recovery trajectories for all age groups suggests that the oldest patients are equally good candidates for cardiac surgery as younger patients. However, a note of caution should be interjected here regarding their postoperative morbidity and its effects on their cognitive ability. Experiential evidence gained from working with the various age groups revealed that perioperatively this group was more likely to suffer intraoperative strokes and to require longer hospitalization. Once home, their recoveries appeared to take longer as their physical resources were more depleted by surgery than was found in the younger groups.

In terms of response on psychosocial measures the oldest group performed equally well, if not better, than the other age groups. Their mood states were commensurate with those in the other age groups and their recovery in terms of mood disturbance was very similar. Caregivers in the oldest group expressed the least amount of caregiving burden. Indeed, the age group that seemed most at risk for disturbance resulting from the cardiac surgery was the youngest group of patients and caregivers.

Both physiologically and psychosocially younger patients may be at risk for greater disruption than the other age groups. For example, both coronary artery disease and valvular disease portend a less promising outcome for younger patients as compared to older patients. Both cardiovascular illness groups are likely candidates for resurgeries and begin a downward spiral into chronicity at a younger age than occurs for the middle-aged or oldest group. Their sense of "appropriate timing" is disturbed as was discussed earlier in Chapter Two. Additionally, the burden to family members is greater since income is frequently lost, roles are reassigned, and multiple social system stressors (e.g., nuclear and extended family responsibilities, occupation etc.) are more likely to be present than for older patients and caregivers.

The implications for practice regarding different age groups include specialized preparation for hospital discharge. The needs of couples and families during different stages of the life span should be addressed and patient teaching should be tailored for different age groups. Post discharge follow-up should also be differentiated by age groups.

In terms of findings related to the recovery trajectory for the patient sample we note that there were no significant improvements reported in quality of life over time when subjects were asked to assess their quality of life considering both health and family related aspects. Since symptomatology was more pronounced preoperatively we would hypothesize that the reported quality of life would improve from the preoperative period to 3 months post discharge. The lack of significant findings may indicate that one's assessment of life quality is a stable factor that is not affected as much by health status as by other intangible factors. The patient sample reported a mean quality of life of 7.5 on an analog scale of 0 to 10 with minor variations by age and time. Interestingly, the oldest group reported the highest quality of life by 3 months post discharge, a finding that supports surgeries for those over 70 years.

Future Research

Future plans for research include a "second wave" or follow-up at 12 to 18 months after discharge from the first surgery. The second wave will be conducted with the subsample of subjects inducted at PPMC, UCSF, and Seton hospitals. Since the consent form was written to accommodate such a plan there will be few problems implementing it. PPMC has already approved the study for a second year.

The follow-up study will utilize the same instruments used in the initial study. There are few reports of both physiological and psychosocial recovery from cardiac surgery at a year or later following surgery. These findings should add to clinicians' knowledge regarding the efficacy of the surgery and the adaptation made by the patient and family to surgery and chronic illness.

A second area in which more research is needed is in the area of declining marital and family satisfaction following surgery. The meaning of the decline is unclear. Is the decline a true reflection of family disruption or is it just a return to real baseline functioning? In other words, does the stressor of surgery cause the patient and spouse to inflate their estimation of marital and family satisfaction as a protective shield or is surgery so disorganizing that satisfaction deteriorates. Some work related to maternal breast cancer and diabetes (Lewis, Woods, & Ellison, 1988) suggests that individual illness has important, and negative ramifications, for the entire family system and individual subsystems (e.g., spouse and children). One the other hand, the inability to find significant differences between experimental and control groups following randomized clinical trials to enhance family recovery after cardiac surgery (Gortner et al, 1988) or to decrease problems related to the postpartal period (Donaldson, 1987) may be associated with an artifact of measurement rather than lack of effect of the intervention. Findings from the follow up should answer some of these questions.

Third, the model of patient recovery that was proposed is generic and could easily be applied in other research to different disease populations. Whether age and gender findings would remain constant in other disease groups is unknown although Stetz (1988) found similar gender results in a study of caregivers to cancer patients.

Fourth, gender profiles of male and female cardiology patients may help disentangle some of the discrepancies between males and females and the coronary heart disease process. It may be that female patients are either being missed during diagnosis or that unnecessary surgeries are being performed because the symptomatology is related to factors extrinsic to coronary artery disease (e.g., viral myocarditis). An extensive chart review of female cardiology patients is an area for further research with an attempt to gain a more systematic profile of the female heart disease patient.

Lastly, since nursing is an intervention oriented discipline attempts should be made to distinguish those families who are in reality at risk for disruption from cardiac surgery and adaptation to chronic illness. In truth, distress as measured by the POMS and the Zarit was relatively low when compared to norms for other populations. However, there were marital dyads in which distress was apparent and there were also those who coped extremely well. Identification of these marital/family units and the various factors which contributed to their distress levels might assist health professionals in directing interventions at the neediest groups.

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APPENDIX A

Data Collection Plan

DATA COLLECTION PLAN

Site	Baseline (Preoperative)	One Month Postoperative	Three Months Postoperative
Group I Hospitals D and E Family Heart Study n = 40-80 subjects	APGAR POMS Cardiac status Demographic (Family Profile)	POMS SSS Caregiving Burden (spouses only) Cardiac status	POMS APGAR Caregiving Burden (spouses only) Cardiac status SSS
Group II Hospital C n = 20 subjects	APGAR POMS Cardiac status Demographic (Family Profile)	POMS SSS Caregiving Burden (spouses only) Cardiac status KMS PAIS Home Interview	POMS APGAR Caregiving Burden (spouses only) Cardiac status KMS Home Interview
Group III Hospital A n = 20-30 subjects	APGAR POMS Cardiac status Demographic (Family Profile)	POMS SSS Caregiving Burden (spouses only) Cardiac status KMS PAIS Home Interview	POMS APGAR Caregiving Burden (spouses only) Cardiac status KMS Home Interview
Group IV Hospital B n = 20-30 subjects	APGAR POMS Cardiac status Demographic (Family Profile)	POMS SSS Caregiving Burden (spouses only) Cardiac status KMS PAIS Home Interview	POMS APGAR Caregiving Burden (spouses only) Cardiac status KMS Home Interview

APPENDIX B

Letters to Chiefs of Surgery/Cardiology at Hospitals A and B

APPENDIX B

LETTER TO CHIEF OF SURGERY AT HOSPITAL A

Dear Dr. __,

Enclosed is a copy of the abstract of my study "Gender, Age, and Caregiving as Mediators of Cardiovascular Illness and Recovery". I am a doctoral candidate in the Ph.D. program in nursing at the University of California, San Francisco and am interested in the recovery of patients following cardiac surgery and the spouse's role in facilitating the recovery.

I am presently collecting data at [Hospitals A, C, D, and E], and will soon be adding [Hospital B] to my data collection sites. Preoperative contact with patients at [Hospital A] takes no more than 30 minutes. Postoperatively patients and spouses are contacted by phone and mail at one and three months.

I will continue to check with the nursing staff regarding appropriateness of patients for the study so that those patients who are very ill or anxious will not be approached. Your willingness to allow your patients to participate is very much appreciated.

Sincerely,

Sally H. Rankin, RN, MSN
Doctoral Candidate, UCSF

LETTER TO CHIEF OF CARDIOLOGY AT HOSPITAL B

Dear Dr. __,

I am a doctoral candidate in the Ph.D. program in nursing at the University of California, San Francisco and am interested in the recovery of patients following cardiac surgery and the spouse's role in facilitating the recovery. My protocol has been reviewed and and approved by various physicians and research committees at UCSF and [Hospital A]. Additionally, the research committee at [Hospital B] has approved my protocol as have the cardiothoracic surgeons.

Enclosed is a copy of the abstract for my study, "Gender, Age, and Caregiving as Mediators of Cardiovascular Illness and Recovery," consent forms, and a copy of my curriculum vitae for your review.

I would be very happy to any any questions you may have about my research either in your office or by telephone. My contact with patients hospitalized at [Hospital B] would be prior to surgery and would not take more than 30 minutes. If possible I would appreciate your presenting this to the weekly cardiology meeting. If there is no opposition to the study, a letter of support from you and the cardiology staff to Ms ____, Director of Nursing at [Hospital B], would be very much appreciated. I will plan to check with the nursing staff before inducting patients as to their appropriateness for my study so that very ill or anxious patients would not be approached.

Thank you very much for your consideration of this matter.

Sincerely H. Rankin, RN, MSN
Doctoral Candidate, UCSF

APPENDIX C

Consent to Be a Research Subject Forms

APPENDIX C-1

Patient

HOSPITAL A
CONSENT TO ACT AS A RESEARCH SUBJECT

Gender, Age, and Caregiving as Mediators of Illness & Recovery

1) If I agree to participate in the study being conducted by Mrs. Sally Rankin, RN, MSN, doctoral student at UCSF, I will receive the care regularly provided for cardiac surgery patients by the hospital. I will complete questionnaires after my first contact with Mrs. Rankin, which will take about 10 minutes. Four weeks and twelve weeks after discharge I will fill out more questionnaires which will take a maximum of 60 minutes and can be completed at my convenience and returned by mail. At this time I will also be contacted by telephone by Mrs. Rankin who will ask me a few questions about my recovery. If I am willing I may be asked to participate in an interview with my spouse at a location that is convenient to me. My hospital record will be reviewed to provide information on my medical status. I may be contacted at 6 to 18 months after my surgery to find out how I have recovered by that time. My doctor is aware that I have been invited to participate in this study.
2) The purpose of doing this study is to learn more about the recovery process for patients and their spouses following cardiac surgery.
3) I have been told that the procedures described above involve the following discomforts or inconveniences, both immediate and long term. While my individual responses will not be identifiable to anyone other than Mrs. Rankin, overall results of this study may be shared with other health care professionals and my be reported in the scientific literature. My name will never be associated with any reports. I may find completion of the questionnaires and discussion of recovery tiring. This may bring to the surface some things I don't care to think about.
4) It is not known whether this research will be directly helpful to me. The research conducted by Mrs. Rankin may result in improved understanding of patient and spouse recovery following cardiac surgery and this knowledge may be helpful to other families and to nurses and physicians.
5) This information was discussed with me by ________________. She will answer any further questions I may have concerning this study or the procedures. I can reach her at 415-435-1681.
6) I have been advised that [HOSPITAL A] has no special program by which it provides compensation or medical treatment if injury occurs during biomedical or behavior research.
7) My records of treatment will be kept confidential according to standard medical practice.
8) I recognize that my participation in this study is voluntary. Without any prejudice to my future medical treatment, I am free to take part in, or withdraw from the study at any time.
9) I have received a copy of the Experimental Subject's Bill of Rights and a copy of this consent form for my own use.

____________________ Date	____________________ Home Address
____________________ Signature	____________________ Telephone Number

Should I have any questions about my rights as a subject, I may call the Joint Council on Human Research, between 9 a.m. and 5 p.m., Monday through Friday, at 561-1765.

Spouse

HOSPITAL A
CONSENT TO ACT AS A RESEARCH SUBJECT

Gender, Age, and Caregiving as Mediators of Illness & Recovery

1) If I agree to participate in the study being conducted by Mrs. Sally Rankin, RN, MSN, my spouse will receive the care regularly provided for cardiac surgery patients by the hospital. I will complete questionnaires after my first contact with Mrs. Rankin, which will take about 10 minutes. Four weeks and twelve weeks after discharge I will fill out more questionnaires which will take a maximum of 60 minutes and can be completed at my convenience and returned by mail. At this time I will also be contacted by telephone by Mrs. Rankin who will ask me a few questions about my recovery. If I am willing I may be asked to participate in an interview with my spouse at a location that is convenient to me. My hospital record will be reviewed to provide information on my medical status. I may be contacted at 6 to 18 months after my surgery to find out how my spouse and I have recovered by that time.

2) The purpose of doing this study is to learn more about the recovery process for patients and their spouses following cardiac surgery.

3) I have been told that the procedures described above involve the following discomforts or inconveniences, both immediate and long term. While my individual responses will not be identifiable to anyone other than Mrs. Rankin, overall results of this study may be shared with other health care professionals and my be reported in the scientific literature. My name will never be associated with any reports. I may find completion of the questionnaires and discussion of recovery tiring. This may bring to the surface some things I don't care to think about.

4) It is not known whether this research will be directly helpful to me. The research conducted by Mrs. Rankin may result in improved understanding of patient and spouse recovery following cardiac surgery and this knowledge may be helpful to other families and to nurses and physicians.

5) This information was discussed with me by ________________. She will answer any further questions I may have concerning this study or the procedures. I can reach her at 415-435-1681.

6) I have been advised that [Hospital A] has no special program by which it provides compensation or medical treatment if injury occurs during biomedical or behavior research.

7) My records of treatment will be kept confidential according to standard medical practice.

8) I recognize that my participation in this study is voluntary. Without any prejudice to my future medical treatment, I am free to take part in, or withdraw from the study at any time.

9) I have received a copy of the Experimental Subject's Bill of Rights and a copy of this consent form for my own use.

____________________	____________________
Date	Home Address
____________________	____________________
Signature	Telephone Number

Should I have any questions about my rights as a subject, I may call the Joint Council on Human Research, between 9 a.m. and 5 p.m., Monday through Friday, at 561-1765.

APPENDIX C-2

CHR #939120-01 <u>Patient</u>

CONSENT TO BE A RESEARCH SUBJECT

PURPOSE AND BACKGROUND:

Mrs. Sally Rankin, doctoral candidate in the Department of Family Health Care Nursing, UCSF, is conducting a study to learn more about the recovery process for patients and their spouses following cardiac surgery.

PROCEDURES:

If I agree to participate in this study, I will receive the care regularly provided for cardiac surgery patients by the hospital. I will complete questionnaires after my first contact with Mrs. Rankin, which will take about 10 minutes. These questionnaires are designed to indicate my perceptions of recovery. Four weeks and twelve weeks after discharge I will fill out more questionnaires which will take a maximum of 60 minutes and can be completed at my convenience and returned by mail. At this time I will also be contacted by telephone by Mrs. Rankin who will ask me a few questions about my recovery. If I am willing I may be asked to participate in an interview with my spouse at a location that is convenient to me. This interview will last approximately 60 minutes and will concern my spouse's and my feelings about the recovery period at home. My hospital record will be reviewed to provide information on my medical status. I may be contacted at 6 to 18 months after my surgery to find out how I have recovered by that time.

RISKS/DISCOMFORTS:

Confidentiality of my responses to the questionnaires and interview questions, as well as medical record data, will be protected as far as possible. While my individual responses will not be identifiable to anyone other than Mrs. Rankin overall results of this study may be shared with other health care professionals and may be reported in the scientific literature. My name will never be associated with any reports. I may find completion of the questionnaires and discussion of recovery tiring. This may bring to the surface some things I don't care to think about. I understand that I may refuse to answer any questions.

BENEFITS:

There is no direct benefit to me from participation in this study. The research conducted by Mrs. Rankin may result in improved understanding of patient and spouse recovery following cardiac surgery and this knowledge may be helpful to other families and to nurses and physicians.

PAYMENT:

I will not receive reimbursement for participation in the study. However, the results of the investigation will be made available to me upon completion of the study, if I so desire.

QUESTIONS:

I have talked with __________________ and my questions have been answered. If I have any other questions, I may call:

Mrs. Sally Rankin
415/435-1681

If I have any comments about participation in this study, I should first talk with Mrs. Rankin. If for some reason I do not wish to do this, I may contact the Committee on Human Research, which is concerned with protection of volunteers in research projects. I may reach the committee office between 8:00 and 5:00, Monday through Friday, by calling 415/476-1814, or by writing: Committee on Human Research/ University of California, San Francisco/ San Francisco, CA 94143-0616.

CONSENT:

Participation in research is voluntary. I have the right to decline to participate or to withdraw at any point in this study without jeopardy to my medical care. If I wish to participate I should sign this form.

I have been given a copy of this form and the Experimental Subject's Bill of Rights to keep.

Date	Signature of Patient
Hospital Unit	Signature of Person Obtaining Consent

The rights below are the rights of every person who is asked to be in a research study. As an experimental subject I have the following rights:

1) To be told what the study is trying to find out.

2) To be told what will happen to me and whether any of the procedures, drugs, or devices is different from what would be used in standard practice.

3) To be told about the frequent and/or important risks, side effects or discomforts of the things that will happen to me for research purposes.

4) To be told if I can expect any benefit from participating, and, if so, what the benefit might be.

5) To be told the other choices I have and how they may be better or worse than being in the study.

6) To be allowed to ask any questions concerning the study both before agreeing to be involved and during the course of the study.

7) To be told what sort of medical treatment is available if any complications arise.

8) To refuse to participate at all or to change my mind about participation after the study is started. This decision will not affect my right to receive the care I would receive if I were not in the study.

9) To receive a copy of the signed and dated consent form.

10) To be free of pressure when considering whether I wish to agree to be in the study.

CHR #939120-01 <u>Spouse</u>

UNIVERSITY OF CALIFORNIA, SAN FRANCISCO
CONSENT TO BE A RESEARCH SUBJECT

PURPOSE AND BACKGROUND:

Mrs. Sally Rankin, doctoral candidate in the Department of Family Health Care Nursing, UCSF, is conducting a study to learn more about the recovery process for patients and their spouses following cardiac surgery.

PROCEDURES:

If my spouse and I agree to participate in this study, my spouse will receive the care regularly provided for cardiac surgery patients by the hospital. I will complete questionnaires after my first contact with Mrs. Rankin, which will take about 10 minutes. These questionnaires are designed to indicate my perceptions of recovery. Four weeks and twelve weeks after discharge I will fill out more questionnaires which will take a maximum of 60 minutes and can be completed at my convenience and returned by mail. At this time I will also be contacted by telephone by Mrs. Rankin who will ask me a few questions about my spouse's recovery. If I am willing I may be asked to participate in an interview with my spouse at a location that is convenient to me. This interview will last approximately 60 minutes and will concern my spouse's and my feelings about the home recovery period. I may be contacted at 6 to 18 months after my surgery to find out how my spouse has recovered by that time.

RISKS/DISCOMFORTS:

Confidentiality of my responses to the questionnaires and interview questions will be protected as far as possible. While my individual responses will not be identifiable to anyone other than Mrs. Rankin overall results of this study may be shared with other health care professionals and may be reported in the scientific literature. My name will never be associated with any reports. I may find completion of the questionnaires and discussion of recovery tiring. This may bring to the surface some things I don't care to think about.

BENEFITS:

There is no direct benefit to me from participation in this study. The research conducted by Mrs. Rankin may result in improved understanding of patient and spouse recovery following cardiac surgery and this knowledge may be helpful to other families and to nurses and physicians.

PAYMENT:

I will not receive reimbursement for participation in the study. However, the results of the investigation will be made available to me upon completion of the study, if I so desire.

QUESTIONS:

I have talked with ____________________ and my questions have been answered. If I have any other questions, I may call:

Mrs. Sally Rankin
415/435-1681

If I have any comments about participation in this study, I should first talk with Mrs. Rankin. If for some reason I do not wish to do this, I may contact the Committee on Human Research, which is concerned with protection of volunteers in research projects. I may reach the committee office between 8:00 and 5:00, Monday through Friday, by calling 415/476-1814, or by writing: Committee on Human Research/ University of California, San Francisco/ San Francisco, CA 94143-0616.

CONSENT:

Participation in research is voluntary. I have the right to decline to participate or to withdraw at any point in this study without jeopardy to my spouse's medical care. If I wish to participate I should sign this form.

I have been given a copy of this form and the Experimental Subject's Bill of Rights to keep.

____________________ Date	__________________________ Signature of Spouse
_____________________ Hospital Unit	__________________________ Signature of Person Obtaining Consent

---

The rights below are the rights of every person who is asked to be in a research study. As an experimental subject I have the following rights:

1) To be told what the study is trying to find out.

2) To be told what will happen to me and whether any of the procedures, drugs, or devices is different from what would be used in standard practice.

3) To be told about the frequent and/or important risks, side effects or discomforts of the things that will happen to me for research purposes.

4) To be told if I can expect any benefit from participating, and, if so, what the benefit might be.

5) To be told the other choices I have and how they may be better or worse than being in the study.

6) To be allowed to ask any questions concerning the study both before agreeing to be involved and during the course of the study.

7) To be told what sort of medical treatment is available if any complications arise.

8) To refuse to participate at all or to change my mind about participation after the study is started. This decision will not affect my right to receive the care I would receive if I were not in the study.

9) To receive a copy of the signed and dated consent form.

10) To be free of pressure when considering whether I wish to agree to be in the study.

APPENDIX D

Instruments

D-1

For each of the following questions, please check only one box.

	ALWAYS	ALMOST ALWAYS	SOME OF THE TIME	HARDLY EVER	NEVER
am satisfied that I can turn to my family for help when something is troubling me.	___	___	___	___	___
I am satisfied with the way my family talks over things with me and shares problems with me.	___	___	___	___	___
I am satisfied that my family accepts and supports my wishes to take on new activities or directions.	___	___	___	___	___
I am satisfied with the way my family expresses affection, and responds to my emotions, such as anger, sorrow or love.	___	___	___	___	___
I am satisfied with the way my family and I share time together.	___	___	___	___	___

Using the scale below, please circle the appropriate number.

1 = Extremely Dissatisfied
2 = Very Dissatisfied
3 = Somewhat Dissatisfied
4 = Mixed
5 = Somewhat Satisfied
6 = Very Satisfied
7 = Extremely Satisfied

1. How satisfied are you with your marriage?	1	2	3	4	5	6	7
2. How satisfied are you with your wife/husband as a spouse?	1	2	3	4	5	6	7
3. How satisfied are you with your relationship with your wife/husband?	1	2	3	4	5	6	7

When a person is sick, some people are helpful and others are not at all helpful. Please indicate from the list below how much help the following people have been to you. Have they been:

	NOT AT ALL HELPFUL	A LITTLE HELPFUL	USUALLY HELPFUL	COMPLETELY HELPFUL
Spouse	1	2	3	4
Children	1	2	3	4
Other relatives	1	2	3	4
Friends	1	2	3	4

please continue with next page

NCS Trans Optic MOR 70416

NAME ______________________ DATE __________

SEX Male M Female F

Below is a list of words that describe feelings people have. Please read each one carefully. Then fill in ONE circle under the answer to the right which best describes HOW YOU HAVE BEEN FEELING DURING THE PAST WEEK INCLUDING TODAY.

The numbers refer to these phrases.

0 = Not at all
1 = A little
2 = Moderately
3 = Quite a bit
4 = Extremely

Col C OP O

IDENTIFICATION

	NOT AT ALL	A LITTLE	MODERATELY	QUITE A BIT	EXTREMELY
1. Friendly	0	1	2	3	4
2. Tense	0	1	2	3	4
3. Angry	0	1	2	3	4
4. Worn out	0	1	2	3	4
5. Unhappy	0	1	2	3	4
6. Clear-headed	0	1	2	3	4
7. Lively	0	1	2	3	4
8. Confused	0	1	2	3	4
9. Sorry for things done	0	1	2	3	4
10. Shaky	0	1	2	3	4
11. Listless	0	1	2	3	4
12. Peeved	0	1	2	3	4
13. Considerate	0	1	2	3	4
14. Sad	0	1	2	3	4
15. Active	0	1	2	3	4
16. On edge	0	1	2	3	4
17. Grouchy	0	1	2	3	4
18. Blue	0	1	2	3	4
19. Energetic	0	1	2	3	4
20. Panicky	0	1	2	3	4
21. Hopeless	0	1	2	3	4
22. Relaxed	0	1	2	3	4
23. Unworthy	0	1	2	3	4
24. Spiteful	0	1	2	3	4
25. Sympathetic	0	1	2	3	4
26. Uneasy	0	1	2	3	4
27. Restless	0	1	2	3	4
28. Unable to concentrate	0	1	2	3	4
29. Fatigued	0	1	2	3	4
30. Helpful	0	1	2	3	4
31. Annoyed	0	1	2	3	4
32. Discouraged	0	1	2	3	4
33. Resentful	0	1	2	3	4
34. Nervous	0	1	2	3	4
35. Lonely	0	1	2	3	4
36. Miserable	0	1	2	3	4
37. Muddled	0	1	2	3	4
38. Cheerful	0	1	2	3	4
39. Bitter	0	1	2	3	4
40. Exhausted	0	1	2	3	4
41. Anxious	0	1	2	3	4
42. Ready to fight	0	1	2	3	4
43. Good natured	0	1	2	3	4
44. Gloomy	0	1	2	3	4
45. Desperate	0	1	2	3	4
46. Sluggish	0	1	2	3	4
47. Rebellious	0	1	2	3	4
48. Helpless	0	1	2	3	4
49. Weary	0	1	2	3	4
50. Bewildered	0	1	2	3	4
51. Alert	0	1	2	3	4
52. Deceived	0	1	2	3	4
53. Furious	0	1	2	3	4
54. Efficient	0	1	2	3	4
55. Trusting	0	1	2	3	4
56. Full of pep	0	1	2	3	4
57. Bad-tempered	0	1	2	3	4
58. Worthless	0	1	2	3	4
59. Forgetful	0	1	2	3	4
60. Carefree	0	1	2	3	4
61. Terrified	0	1	2	3	4
62. Guilty	0	1	2	3	4
63. Vigorous	0	1	2	3	4
64. Uncertain about things	0	1	2	3	4
65. Bushed	0	1	2	3	4

MAKE SURE YOU HAVE ANSWERED EVERY ITEM

POM 021

PAIS

S·R

• SELF REPORT •

CLINICAL PSYCHOMETRIC RESEARCH

DO NOT WRITE IN THIS BLOCK

RESPONDENT'S NAME: ____	1. PT. ID. NO. ____ 2. STD. NO. ____
MEDICAL INSTITUTION: ____	3. Dx ____ 4. Dx Id. ____
TREATING DOCTOR'S NAME: ____	5. Rx ____ 6. Rx Id. ____
DATE FORM WAS COMPLETED: ____	7. Med. Dept. ____
AGE: ____ SEX: ____ EDUCATION: ____	8. Visit Id. ____ 9. [illegible] Stat. ____
OCCUPATION: ____	10. Tech. ____
MARITAL STATUS: ____	

INSTRUCTIONS

The present form contains a set of questions concerning the effects that your recent illness (or the illness of your spouse, child, etc.) has had on you. We are interested in knowing what effects it has had on your relationships and performance at home and on your job, as well as on family and personal relationships. Other questions deal with its effects on your social and leisure time activities, and how you have felt emotionally.

In answering each question, please put a check mark (✓) in the box alongside the answer that best describes your experience. Please answer all the questions and try not to skip any. If none of the answers to a question match your experience exactly, please choose the answer that comes closest to the experience you have had.

The time we would like you to refer to is the past 30 days, including today. Answer each question in terms of what your experience has been like during this time. In the event you are presently a patient in the hospital (or a hospitalized patient's relative), please report your experiences for the 30 days before entering the hospital.

Some questions on the form assume that you are married or have a steady partner you are close to. Other questions ask about family relationships. If these questions do not apply to you because you are unmarried, or you have no family or partner, please leave them blank. Try to answer all the questions that do apply to you, however.

Section II asks questions about your job performance. If you have either full-time or substantial part-time employment, please answer in terms of your job. If you are primarily a student, answer in terms of your school work. If you are a housewife, answer as though housework, neighbors, etc. are your work environment.

We appreciate the time you have taken to do this form. Please check again to make sure you have completed all the items. If you have any questions about the form, please ask. If you are responding by mail, please write them in the space provided below. Please return the form as soon as you have completed it.

Thank You

SECTION I

(1) Which of the following statements best describes your usual attitude about taking care of your health?

- ☐ a) I am very concerned and pay close attention to my personal health.
- ☐ b) Most of the time I pay attention to my health care needs.
- ☐ c) Usually, I try to take care of health matters but sometimes I just don't get around to it.
- ☐ d) Health care is something that I just don't worry too much about.

(2) Your present illness probably requires some special attention and care on your part. Would you please select the statement below that best describes your reaction.

- ☐ a) I do things pretty much the way I always have done them and I don't worry or take any special considerations for my illness.
- ☐ b) I try to do all the things I am supposed to do to take care of myself, but lots of times I forget or I am too tired or busy.
- ☐ c) I do a pretty good job taking care of my present illness.
- ☐ d) I pay close attention to all the needs of my present illness and do everything I can to take care of myself.

(3) In general, how do you feel about the quality of medical care available today and the doctors who provide it?

- ☐ a) Medical care has never been better, and the doctors who give it are doing an excellent job.
- ☐ b) The quality of medical care available is very good, but there are some areas that could stand improvement.
- ☐ c) Medical care and doctors are just not of the same quality they once were.
- ☐ d) I don't have much faith in doctors and medical care today.

(4) During your present illness you have received treatment from both doctors and medical staff. How do you feel about them and the treatment you have received from them?

- ☐ a) I am very unhappy with the treatment I have received and don't think the staff has done all they could have for me.
- ☐ b) I have not been impressed with the treatment I have received, but I think it is probably the best they can do.
- ☐ c) The treatment has been pretty good on the whole, although there have been a few problems.
- ☐ d) The treatment and the treatment staff have been excellent.

(5) When they are ill, different people expect different things about their illness, and have different attitudes about being ill. Could you please check the statement below which comes closest to describing your feelings.

- ☐ a) I am sure that I am going to overcome the illness and its problems quickly and get back to being my old self.
- ☐ b) My illness has caused some problems for me, but I feel I will overcome them fairly soon, and get back to the way I was before.
- ☐ c) My illness has really put a great strain on me, both physically and mentally, but I am trying very hard to overcome it, and feel sure that I will be back to my old self one of these days.
- ☐ d) I feel worn out and very weak from my illness and there are times when I don't know if I am really ever going to be able to overcome it.

(6) Being ill can be a confusing experience, and some patients feel that they do not receive enough information and detail from their doctors and the medical staff about their illnesses. Please select a statement below which best describes your feelings about this matter.

- ☐ a) My doctor and the medical staff have told me very little about my illness even though I have asked more than once.
- ☐ b) I do have some information about my illness but I feel I would like to know more.
- ☐ c) I have a pretty fair understanding about my illness and feel that if I want to know more I can always get the information.
- ☐ d) I have been given a very complete picture of my illness and my doctor and the medical staff have given me all the details I wish to have.

(7) In an illness such as yours, people have different ideas about their treatment and what to expect from it. Please select one of the statements below which best describes what you expect about your treatment.

- ☐ a) I believe my doctors and medical staff are quite able to direct my treatment and feel it is the best treatment I could receive.
- ☐ b) I have trust in my doctor's direction of my treatment; however, sometimes I have doubts about it.
- ☐ c) I don't like certain parts of my treatment which are very unpleasant, but my doctors tell me I should go through it anyway.
- ☐ d) In many ways I think my treatment is worse than the illness, and I am not sure it is worth going through it.

(8) In an illness such as yours patients are given different amounts of information about their treatment. Please select a statement from those below which best describes information you have been given about your treatment.

☐ a) I have been told almost nothing about my treatment and feel left out about it.
☐ b) I have some information about my treatment but not as much as I would like to have.
☐ c) My information concerning treatment is pretty complete, but there are one or two things I still want to know.
☐ d) I feel my information concerning treatment is very complete and up-to-date.

SECTION II

(1) Has your illness interfered with your ability to do your job (schoolwork)?

☐ a) No problems with my job
☐ b) Some problems, but only minor ones
☐ c) Some serious problems
☐ d) Illness has totally prevented me from doing my job

(2) How well do you physically perform your job (studies) now?

☐ a) Poorly
☐ b) Not too well
☐ c) Adequately
☐ d) Very well

(3) During the past 30 days, have you lost any time at work (school) due to your illness?

☐ a) 3 days or less
☐ b) 1 week
☐ c) 2 weeks
☐ d) More than 2 weeks

(4) Is your job (school)as important to you now as it was before your illness?

☐ a) Little or no importance to me now
☐ b) A lot less important
☐ c) Slightly less important
☐ d) Equal or greater importance than before

(5) Have you had to change your goals concerning your job (education) as a result of your illness?

☐ a) My goals are unchanged
☐ b) There has been a slight change in my goals
☐ c) My goals have changed quite a bit
☐ d) I have changed my goals completely

(6) Have you noticed any increase in problems with your co-workers (students, neighbors) since your illness?

☐ a) A great increase in problems
☐ b) A moderate increase in problems
☐ c) A slight increase in problems
☐ d) None

SECTION III

(1) How would you describe your relationship with your husband or wife (partner, if not married) since your illness?

☐ a) Good
☐ b) Fair
☐ c) Poor
☐ d) Very poor

(2) How would you describe your general relationships with the other people you live with (e.g., children, parents, aunts, etc.)?

☐ a) Very poor
☐ b) Poor
☐ c) Fair
☐ d) Good

(3) How much has your illness interferred with your work and duties around the house?

☐ a) Not at all
☐ b) Slight problems, easily overcome
☐ c) Moderate problems, not all of which can be overcome
☐ d) Severe difficulties with household duties

(4) In those areas where your illness has caused problems with your household work, how has the family shifted duties to help you out?

☐ a) The family has not been able to help out at all
☐ b) The family has tried to help but many things are left undone
☐ c) The family has done well except for a few minor things
☐ d) No problems

(5) Has your illness resulted in a decrease in communication between you and members of your family?

☐ a) No decrease in communication
☐ b) A slight decrease in communication
☐ c) Communication has decreased, and I feel somewhat withdrawn from them
☐ d) Communication has decreased a lot, and I feel very alone

(6) Some people with an illness like yours feel they need help from other people (friends, neighbors, family etc.) to get things done from day-to-day. Do you feel you need such help and is there anyone to provide it?

☐ a) I really need help but seldom is anyone around to help
☐ b) I get some help, but I can't count on it all the time
☐ c) I don't get all the help I need all of the time, but most of the time help is there when I need it
☐ d) I don't feel I need such help, or the help I need is available from my family or friends

(7) Have you experienced any physical disability with your illness?

☐ a) No physical disability
☐ b) A slight physical disability
☐ c) A moderate physical disability
☐ d) A severe physical disability

(8) An illness such as yours can sometimes cause a drain on the family's finances; are you having any difficulties meeting the financial demands of your illness?

☐ a) Severe financial hardship
☐ b) Moderate financial problems
☐ c) A slight financial drain
☐ d) No money problems

SECTION IV

(1) Sometimes having an illness can cause problems in a relationship. Has your illness led to any problems with your husband or wife (partner, if not married)?

☐ a) There has been no change in our relationship
☐ b) We are a little less close since my illness
☐ c) We are definitely less close since my illness
☐ d) We have had serious problems or a break in our relationship since my illness

(2) Sometimes when people are ill they report a loss of interest in sexual activities. Have you experienced less sexual interest since your illness?

☐ a) Absolutely no sexual interest since illness
☐ b) A marked loss of sexual interest
☐ c) A slight loss of sexual interest
☐ d) No loss of sexual interest

(3) Illness sometimes causes a decrease in sexual activity. Have you experienced any decrease in the frequency of your sexual activities?

☐ a) No decrease in sexual activities
☐ b) Slight decrease in sexual activities
☐ c) Marked decrease in sexual activities
☐ d) Sexual activities have stopped

(4) Has there been any change in the pleasure or satisfaction you normally experience from sex?

☐ a) Sexual pleasure and satisfaction have stopped
☐ b) A marked loss of sexual pleasure or satisfaction
☐ c) A slight loss of sexual pleasure or satisfaction
☐ d) No change in sexual satisfaction

(5) Sometimes an illness will cause an interference in a person's ability to perform sexual activities even though they are still interested in sex. Has this happened to you, and if so, to what degree.

☐ a) No change in my ability to have sex
☐ b) Slight problems with my sexual performance
☐ c) Constant sexual performance problems
☐ d) Totally unable to perform sexually

(6) Sometimes an illness will interfere with a couples' normal sexual relationship and cause arguments or problems between them. Have you and your partner had any arguments like this, and if so, to what degree?

☐ a) Constant arguments
☐ b) Frequent arguments
☐ c) Some arguments
☐ d) No arguments

SECTION V

(1) Have you had as much contact as usual (either personally or by telephone) with members of your family outside your household since your illness?

☐ a) Contact is the same or greater since illness
☐ b) Contact is slightly less
☐ c) Contact is markedly less
☐ d) No contact since illness

(2) Have you remained as interested in getting together with these members of your family since your illness?

☐ a) Little or no interest in getting together with them
☐ b) Interest is a lot less than before
☐ c) Interest is slightly less
☐ d) Interest is the same or greater since illness

(3) Sometimes, when people are ill, they are forced to depend on members of the family outside their household for physical help. Do you need physical help from them, and do they supply the help you need?

☐ a) I need no help, or they give me all the help I need
☐ b) Their help is enough, except for some minor things
☐ c) They give me some help but not enough
☐ d) They give me little or no help even though I need a great deal

(4) Some people socialize a great deal with members of their family outside their immediate household. Do you do much socializing with these family members, and has your illness reduced such socializing?

☐ a) Socializing with them has been pretty much eliminated
☐ b) Socializing with them has been reduced significantly
☐ c) Socializing with them has been reduced somewhat
☐ d) Little or no socializing, or slight or no effect of illness

(5) In general, how have you been getting along with these members of your family recently?

☐ a) Good
☐ b) Fair
☐ c) Poor
☐ d) Very poor

SECTION VI

(1) Are you still as interested in your leisure time activities and hobbies as you were prior to your illness?

☐ a) Same level of interest as previously
☐ b) Slightly less interest than before
☐ c) Significantly less interest than before
☐ d) Little or no interest remaining

(2) How about actual participation? Are you still actively involved in doing those activities?

☐ a) Little or no participation at present
☐ b) Participation reduced significantly
☐ c) Participation reduced slightly
☐ d) Participation remains unchanged

(3) Are you as interested in leisure time activities with your family (i.e., playing cards & games, taking trips, going swimming, etc.) as you were prior to your illness?

☐ a) Same level of interest as previously
☐ b) Slightly less interest than before
☐ c) Significantly less interest than before
☐ d) Little or no interest remaining

(4) Do you still participate in those activities to the same degree you once did?

☐ a) Little or no participation at present
☐ b) Participation reduced significantly
☐ c) Participation reduced slightly
☐ d) Participation remains unchanged

(5) Have you maintained your interest in social activities since your illness (e.g., social clubs, church groups, going to the movies, etc.)?

☐ a) Same level of interest as previously
☐ b) Slightly less interest than before
☐ c) Significantly less interest than before
☐ d) Little or no interest remaining

(6) How about participation? Do you still go out with your friends and do those things?

☐ a) Little or no participation at present
☐ b) Participation reduced significantly
☐ c) Participation reduced slightly
☐ d) Participation remains unchanged

SECTION VII

(1) Recently, have you felt afraid, tense, nervous, or anxious?

☐ a) Not at all
☐ b) A little bit
☐ c) Quite a bit
☐ d) Extremely

(2) Recently, have you felt sad, depressed, lost interest in things, or felt hopeless?

☐ a) Extremely
☐ b) Quite a bit
☐ c) A little bit
☐ d) Not at all

(3) Recently, have you felt angry, irritable, or had difficulty controlling your temper?

☐ a) Not at all
☐ b) A little bit
☐ c) Quite a bit
☐ d) Extremely

(4) Recently, have you blamed yourself for things, felt guilty, or felt like you have let people down?

☐ a) Extremely
☐ b) Quite a bit
☐ c) A little bit
☐ d) Not at all

(5) Recently, have you worried much about your illness or other matters?

☐ a) Not at all
☐ b) A little bit
☐ c) Quite a bit
☐ d) Extremely

(6) Recently, have you been feeling down on yourself or less valuable as a person?

☐ a) Extremely
☐ b) Quite a bit
☐ c) A little bit
☐ d) Not at all

(7) Recently, have you been concerned that your illness has caused changes in the way you look that make you less attractive?

☐ a) Not at all
☐ b) A little bit
☐ c) Quite a bit
☐ d) Extremely

D-4

The following is a list of statements which reflect how people sometimes feel when taking care of another person. After each statement, indicate how often you feel that way: never, rarely, sometimes, quite often, or nearly always. There are no right or wrong answers.

		NEVER	RARELY	SOME-TIMES	QUITE OFTEN	NEARLY ALWAYS
1.	Do you feel that your spouse asks for more help then he/she needs?	☐	☐	☐	☐	☐
2.	Do you feel that because of the time you spend with your spouse that you don't have enough time for yourself?	☐	☐	☐	☐	☐
3.	Do you feel stressed between caring for your relative and trying to meet other responsibilities for your family or work?	☐	☐	☐	☐	☐
4.	Do you feel embarrassed over your spouse's behavior?	☐	☐	☐	☐	☐
5.	Do you feel angry when you are around your relative?	☐	☐	☐	☐	☐
6.	Do you feel that your spouse currently affects your relationship with other family members or friends in a negative way?	☐	☐	☐	☐	☐
7.	Are you afraid what the future holds for your spouse?	☐	☐	☐	☐	☐
8.	Do you feel your spouse is dependent upon you?	☐	☐	☐	☐	☐
9.	Do you feel strained when you are around your spouse?	☐	☐	☐	☐	☐
10.	Do you feel your health has suffered because of your involvement with your spouse?	☐	☐	☐	☐	☐
11.	Do you feel that you don't have as much privacy as you would like because of your spouse?	☐	☐	☐	☐	☐
12.	Do you feel that your social life has suffered because you are caring for your spouse?	☐	☐	☐	☐	☐
13.	Do you feel uncomfortable about having friends over because of your spouse?	☐	☐	☐	☐	☐
14.	Do you feel that your spouse seems to expect you to take care of him/her, as if you were the only one he/she could depend on?	☐	☐	☐	☐	☐
15.	Do you feel that you don't have enough money to care for your spouse, in addition to the rest of your expenses?	☐	☐	☐	☐	☐
16.	Do you feel that you will be unable to take care of your spouse much longer?	☐	☐	☐	☐	☐
17.	Do you feel you have lost control of your life since your spouse's illness?	☐	☐	☐	☐	☐
18.	Do you wish you could just leave the care of your spouse to someone else?	☐	☐	☐	☐	☐
19.	Do you feel uncertain about what to do about your spouse?	☐	☐	☐	☐	☐
20.	Do you feel you should be doing more for your spouse?	☐	☐	☐	☐	☐
21.	Do you feel you could do a better job in caring for your spouse?	☐	☐	☐	☐	☐

22. Overall, how burdened do you feel in caring for your spouse?

☐ Not at all ☐ A little ☐ Moderately ☐ Quite a bit ☐ Extremely

POSTOPERATIVE SELF-REPORT

Patient Code _ _ _ _ Today's Date _ _/_ _/_ _
Administration (4, 12 weeks postop) _ _ Interviewer _ _ _
Sex __ (1=M, 2=F) Age ___

ACTIVITY

1. As compared to 6 months prior to surgery, is your recreational and leisure activity:

_______ more (1) _______ less (-1) _______ no change (0)

2. How many weeks after surgery did you return to work, or normal household routine? ______ weeks

3. As compared to 6 months prior to surgery, are you working at your job or hobbies, household jobs etc.

_______ more (1) _______ less (-1) _______ no change (0)

4. If no, have you chosen not to return to work or hobbies, household jobs etc. because of:

_______(1) retired before surgery
_______(2) not fully recovered at present
_______(3) chose to retire after surgery
_______(4) loss of job
_______(5) other, please explain

SMOKING

5. Which best describes your current smoking status?

______(0) non-smoker
______(1) stopped more than 1 month ago
______(2) stopped less than 1 month ago
______(3) presently smokes

6. ______(0-3) Number of packs per day
(0) Not applicable (1) 1 pack (2) 2 packs (3) 3 or more

SEXUAL ACTIVITY

Many people have questions about resuming sexual activity.

7. Have you been able to resume your sexual activities to your satisfaction? ___ (1) yes ___ (2) no

8. As compared to 6 months prior to surgery, is the frequency

_______ more (1) _______ less (-1) _______ no change (0)

MEDICATIONS
(Please code medications: 0 = no 1 = yes

9. __ Nitrates 10. __ Calcium blocker
11. __ Diuretics 12. __ Digoxin
13. __ Anticoagulants 14. __ Aspirin
15. __ Beta blockers 16. __ Antiarrhythmics
17. __ Antihypertensives (not including beta blockers)
18. __ Dipyridamole 19. __ Other ________________
(specify)

20. Are you satisfied with your medication regimen?
____ (1) yes ____ (2) no

DISCOMFORTS OR SYMPTOMS

21. How is your physical comfort compared to 6 months prior to surgery:

________ ________ ________
better (1) worse (-1) no change (0)

22. Do you have anginal discomfort? ___ (1) yes ___ (0) no

23. If yes, as compared to before surgery, is it

________ ________ ________
better (1) worse (-1) no change (0)

Do you have discomfort related to:

24. chest incision ___ (1) yes ___ (0) no
25. leg incision ___ (1) yes ___ (0) no
26. back ___ (1) yes ___ (0) no
27. back ___ (1) yes ___ (0) no
28. neck ___ (1) yes ___ (0) no

29. Do you have swelling in your hands or feet first thing in the morning? ___ (1) yes ___ (0) no

30. Do you have shortness of breath? ___(1) yes ___(0) no
31. If yes, at rest ___(1) yes ___(0) no
32. with exertion ___(1) yes ___(0) no
33. awakens me at night ___(1) yes ___(0) no
34. first thing in the morning ___(1) yes ___(0) no

35. As compared to 6 months prior to surgery, is this

________ ________ ________
more or worse (-1) less or better (1) no change (0)

HEALTH CARE VISITS

(Questions and answers should reflect what has happened since the last contact with the patient, i.e., since discharge or since 1 month postoperative phone call)

36. Routine medical visit ___(1) yes ___(0) no
37. Visited M.D. because of new problem ___(1) yes ___(0) no
    What? ____________________

38. Have you been rehospitalized? ___(1) yes ___(0) no
    For what? ____________________

39. How many times _____

NEW YORK HEART STATUS

40. Class 1: No symptoms ___(1)
    Class 2: Comfortable at rest but with symptoms with ordinary activity ___(2)
    Class 3: Comfortable at rest but with symptoms with less than ordinary activity ___(3)
    Class 4: Inability to carry on any physical activity without discomfort. Sx may be present at rest. ___(4)

RECOVERY

41. To what degree do you believe you have recovered your health as of this date?

0 1 2 3 4 5 6 7 8 9 10

42. How would you rate your quality of life as of this date?

0 1 2 3 4 5 6 7 8 9 10

43. How satisfied are you with your quality of life?

0 1 2 3 4 5 6 7 8 9 10

INTERVIEWER COMMENTS

Code # 231
Date

CAREGIVER INTERVIEW

1. Some spouses have mentioned that caring for a recovering spouse has affected various segments of their own lives. What have you noticed about the following areas:

a. helping your spouse with daily activities such as bathing, dressing?

b. helping your spouse manage certain activities related to his cardiac problems?

medications

diet

exercise

2. Have you noticed that you have more responsibilities now?

How has this affected your daily life? For example, do you have less time for your self? What have you done about this?

3. How has your spouse's recovery affected your relationship with each other? What have you done about this?

4. How has caring for your spouse affected your ability to do:

a. your family related activities and responsibilities? How have you managed this?

b. your job related activities and responsibilities? How have you handled these?

c. your economic responsibilities? How have you handled these?

5. What would you expect your spouse to do for you if you were the one who needed care?

6. What benefits do you get from caring for your spouse?

Code #
Date

CARE-RECIPIENT

1. What is your spouse doing now to help you with your recovery?

2. What types of things did your spouse do the first month you were home from the hospital?

3. What are the difficulties involved in recovering at home from cardiac surgery?

4. What have you done to help your and support your spouse during your recovery?

5. What are the most frequent sources of disagreement in the caregiving and care-receiving relationship?

D-7

FAMILY & DEMOGRAPHIC PROFILE

Code_ _ _ _ Age _ _ Sex __ (M=1; F=2)
Date_ _/ _ _/ _ _ Interviewer _ _ _ Type of surgery _
(1=valve; 2=CABG; 3=combination; 4=other ____________)

1. Please list whom you consider to be the members of your family. You may include any of those individuals with whom you have a consistent, caring, and ongoing relationship. It is not necessary that they live in the same household.

NAME	RELATIONSHIP	# OF YEARS IN RELATIONSHIP	AGE
--------------------	------------	-------	---
--------------------	------------	-------	---
--------------------	------------	-------	---
--------------------	------------	-------	---
--------------------	------------	-------	---
--------------------	------------	-------	---

2. Does your spouse, or the person who will be caring for you at the time of discharge, have health problems? __ (1)yes; __ (2)no

If YES, please describe ______________________________

3. When you consider other difficult experiences your family has had, how would you compare the anticipation of heart surgery?

___ (1) the least difficult ___ (2) among the least difficult
___ (3) among the most difficult ___ (4) the most difficult

4. Does your spouse, or the person who will be caring for you, work? __ (1)yes; __ (2)no. If YES, what is the nature of his/her work?

____

5. What is your occupation? If retired, please state occupation before retirement. ______________________________

6. If you are not retired at the present do you plan to return to work? __ (1)yes; __ (2)no.
If NO, why not? ______________________________

7. Education:

1-6 grades	___	(1)
1-9 grades	___	(2)
1-11 grades	__	(3)
High school graduate	___	(4)
Partial college educ.	___	(5)
College graduate	___	(6)
Graduate school degree	___	(7)

8. Religious preference:
Protestant ___ (1)
Catholic ___ (2)
Jewish ___ (3)
Other ___ (4)
Decline to state ___ (5)

9. How would you rate the quality of your life at this time?

____
0 1 2 3 4 5 6 7 8 9 10

10. New York Heart Association classification

___ (1) Class I No symptoms
___ (2) Class II Comfortable at rest but with symptoms with ordinary activity
___ (3) Class III Comfortable at rest but with symptoms with less than ordinary activity
___ (4) Class IV Inability to carry on any physical activity without discomfort. Symptoms may be present at rest.

11. How long has it been since you've know you had symptoms related to your heart? ____ years and/or ____ months

12. Address and phone number of family if not on consent form.
Address Phone

____________________________ ____________________

____

13. Name and address of family member or close friend who will always know where the patient and spouse are.
Address Phone

____________________________ ____________________

____

____

MEDICAL RECORD DATA FORM

Subcode _ _ _ _ _   Date _ _/_ _/_ _   Interv _ _
Block _ _ _   Age _ _   Sex __ (M=1; F=2)   Status __ (C=1; E=2)

---

1. Date of Admission _ _/_ _/_ _
2. Date of Surgery _ _/_ _/_ _
3. Date of ICU Trans _ _/_ _/_ _
4. Date of Discharge _ _/_ _/_ _
5. __(0-9) Type of Surgery:
   (1) CABG   (6) redo Valve
   (2) Valve   (7) redo C+V
   (3) CABG+Valve   (8) redo Dbl Valve
   (4) Double Valve   (9) Septal
   (5) redo CABG   (0) Other
6. __(0-7) Valve replaced
   (0) Not Applicable
   (1) AV   (4) PV
   (2) MV   (5) MV/TV
   (3) TV   (6) AV/MV
   (7) Plasty
7. __(0-2) Type of Valve
   (0) Not Applicable
   (1) Bioprosthetic C-E/I-S/H
   (2) Mechanical S-J/B-S
8. New York Heart Association
   __(1) Class 1: No sx
   __(2) Class 2: Comfortable at rest but w/ sx ordinary activity
   __(3) Class 3: Comfortable at rest but w/ sx < ordinary activity
   __(4) Class 4: Inability to carry on any physical activity w/out discomfort. Sx may be present at rest.
9. Surgical Priority:
   __(1) Elective
   __(2) Urgent, 1-6 Days after Cath when delay judged to be unwarranted
   __(3) Emergency, Day of Cath
10. __(1-5) Ethnicity
    (1) Cauc; (2) Black; (3) Hisp.; (4) Asian; (5) Other
11. __(1-7) Occupation: Obtain from pre-op interview.
12. __(1-7) Education: Obtain from pre-op interview.

<u>Presenting Symptoms on Admission</u>

13. Angina __(0=no; 1=yes)
14. Syncope __(0=no; 1=yes)
15. Paroxysmal nocturnal dyspnea __(0=no; 1=yes)
16. Orthopnea __(0=no; 1=yes)
17. Shortness of breath __(0=no; 1=yes)
18. Weight: ____lbs.

<u>Medical History</u>

19. History of congestive heart failure __(0=no; 1=yes)
20. Peripheral edema __(0=no; 1=yes)
21. Subacute bacterial endocarditis __(0=no; 1=yes)
22. COPD __(0=no; 1=yes)
23. Cancer __(0=no; 1=yes)
24. Other current medical problems __(0=no; 1=yes)
    Please List: ________________________________

<u>Coronary Risk Factors</u>

25. Hypertension __(0=no; 1=yes)
26. Diabetes mellitus __(0=no; 1=yes)
27. Serum cholesterol level _ _ _mg/dl
28. History of elevation __(0=no; 1=yes)
29. Family history of CAD __(0=no; 1=yes)
30. Which family member had cardiovascular disease:
    ___(1) father ___(2) mother ___(3) brother ___(4) sister
    ___(5) other:________________________

31. __(0-3) Cigarette smoking
(0) never smoked
(1) former, i.e. stopped over a month ago
(2) former, i.e. stopped less than one month ago
(3) presently a smoker

History of Myocardial Infarction

32. __(0=no; 1=yes) Confirmed MI
33. __(0-3) # of MI's (0=NA; 1=one; 2=two; 3=more than two)
34. _ _/_ _/_ _ Date of most recent MI

Myocardial Function

35. Ejection fraction (LV) _ _%
36. Cardiac Output _ _ _

Extent of Valve Disease

37. Calculated valve orifice size _ _ _cm^2
38. Regurgitation (0-4) ___ (see chart)

Extent of Vessel Disease

39. Left main _ _ _%
40. Left anterior descending_ _ _%
41. Circumflex _ _ _%
42. Right coronary _ _ _%

Vessels Bypassed

43. Graft to posterior descending __(0=no; 1=yes)
44. Graft to left anterior descend. __(0=no; 1=yes)
45. Graft to circumflex __(0=no; 1=yes)
46. Graft to right coronary __(0=no; 1=yes)
47. Graft to obtuse marginal __(0=no; 1=yes)
48. Graft to diagonal __(0=no; 1=yes)
49. Other __(0=no; 1=yes)

50. __(0-7) Total number of vessels bypassed (count above)
51. __(0-3) Vessels used for bypass (see below)
(0) Not Applicable
(1) internal mammary
(2) saphenous
(3) both
52. Pump time: Time on _ _:_ _ Time off _ _:_ _
53. __(0-7) Number of vessels bypassed in previous surgery.
54. _ _/_ _/_ _ Date of previous cardiac surgery.

Medications Prior to Surgery

55. __(0=no; 1=yes) Nitrates
56. __(0=no; 1=yes) Calcium blocker
57. __(0=no; 1=yes) Diuretic
58. __(0=no; 1=yes) Digoxin (Lanoxin)
59. __(0=no; 1=yes) Anticoagulants
60. __(0=no; 1=yes) Aspirin
61. __(0=no; 1=yes) Beta blocker
62. __(0=no; 1=yes) Antiarrhythmics
63. __(0=no; 1=yes) Antihypertensive (not including Beta blockers)
64. __(0=no; 1=yes) Persantine (Dipyridamole)

Post-Operative Course

65. __(0=no; 1=yes) ICU stay over 4 days Reason:____________________
____
66. __(0=no; 1=yes) Pacemaker implant
67. __(0=no; 1=yes) Prolonged dysrrhythmia requiring Rx.
68. __(0=no; 1=yes) Return to ICU 24 hours after discharge to floor

Local medical physician for post-hospital follow-up:

Name: ____________________________

Address:____________________________ Phone:____________________

____

APPENDIX E

Descriptive Statistics for the Profile of Mood States

APPENDIX E

DESCRIPTIVE STATISTICS FOR THE PROFILE OF MOOD STATES

Table E-1

Patients at Baseline (0), 1 Month (1) and 3 Months (3) Postoperative

Variable	N	Mean	Standard Deviation	Minimum	Maximum
Tension0	107	14.238	7.741	1.000	33.000
Tension1	86	9.895	6.909	0.000	35.000
Tension2	78	9.019	7.243	0.000	32.000
Anger0	107	7.131	8.895	0.000	48.000
Anger1	86	5.060	7.560	0.000	43.000
Anger2	78	6.042	7.854	0.000	36.000
Vigor0	107	15.158	5.901	2.000	29.000
Vigor1	86	15.266	6.522	0.000	32.000
Vigor2	78	19.299	6.286	1.000	32.000
Fatigue0	107	9.584	6.878	0.000	28.000
Fatigue1	86	9.597	6.860	0.000	28.000
Fatigue2	78	6.474	5.980	0.000	23.800
Confusion0	107	7.073	5.322	0.000	26.000
Confusion1	86	5.186	4.734	0.000	28.000
Confusion2	78	5.375	5.132	0.000	20.000
Depression0	107	10.499	10.963	0.000	50.000
Depression1	86	8.194	9.583	0.000	46.000
Depression2	78	7.897	10.658	0.000	44.000
GlobalPOMS0	107	33.368	37.473	-21.750	167.000
GlobalPOMS1	86	22.667	35.902	-28.000	157.000
GlobalPOMS2	78	15.508	38.120	-31.000	137.000

Table E-2

Caregivers at Baseline (0), 1 Month (1) and 3 Months (3) Postoperative

Variable	N	Mean	Standard Deviation	Minimum	Maximum
Tension0	104	15.802	8.885	1.000	36.000
Tension1	84	9.474	6.305	0.000	33.000
Tension2	74	8.335	6.704	0.000	33.000
Anger0	104	6.667	9.175	0.000	43.200
Anger1	84	5.358	6.255	0.000	28.000
Anger2	74	5.253	6.960	0.000	31.000
Vigor0	104	16.496	6.589	0.000	29.000
Vigor1	84	17.864	6.161	0.000	31.000
Vigor2	74	18.588	5.995	3.000	32.000
Fatigue0	104	9.971	7.451	0.000	26.000
Fatigue1	84	7.839	5.795	0.000	24.500
Fatigue2	74	6.463	6.045	0.000	26.000
Confusion0	104	7.068	5.391	0.000	26.250
Confusion1	84	5.212	4.305	0.000	19.000
Confusion2	74	4.601	4.056	0.000	19.000
Depression0	104	11.869	12.126	0.000	55.909
Depression1	84	7.134	8.829	0.000	46.000
Depression2	74	6.694	8.798	0.000	40.000
GlobalPOMS0	103	35.337	40.459	-27.000	164.651
GlobalPOMS1	84	17.154	30.821	-30.000	130.015
GlobalPOMS2	73	12.934	32.586	-27.000	112.000

APPENDIX F

Repeated Measures ANOVA by Gender and Age Group for Patients

APPENDIX F

REPEATED MEASURES ANOVA BY GENDER AND AGE GROUP FOR PATIENTS

Perceived Social Support by Source: Spouse

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Men	3.91	0.29	3.94	0.24	3.91	0.38
Women	3.67	0.71	3.56	1.33	3.78	0.67

Source	df	MSS	F	p
Between Ss	41			
Gender	1	1.35	2.32	0.14
Error	40	0.58		
Within Ss	84			
Time	2	0.008	0.08	NS
Gender x Time	2	0.11	1.17	NS
Error	80	0.10		

Quality of Life as Reported by Patient

Means and Standard Deviations

	Baseline		1 Month		3 Months	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Young	7.56	2.74	7.00	2.00	7.67	2.40
Middle-Age	7.33	2.86	7.48	2.08	7.96	2.16
Old	7.10	3.07	7.20	1.99	8.10	1.52

Source	df	MSS	F	p
Between Ss	66			
Age Group	2	0.49	0.06	NS
Error	64	8.55		
Within Ss	134			
Time	2	7.80	1.85	NS
Age Group x Time	4	0.76	0.18	NS
Error	128	4.22		

APPENDIX G

Comparison of Patients by Gender

APPENDIX G

COMPARISON OF PATIENTS BY GENDER

Table G-1

Comparison of Patients by Gender Using Independent T-Tests

Dependent Variable		Group 1 Male Patients	Group 2 Female Patients	T-Tests	
APGAR score at baseline for pts.					
	N	87	21	T	-3.10
	Mean	16.776	18.857	DF	106
	S.D.	2.849	2.330	P	0.0025
APGAR score at 1 month					
	N	32	10	T	-0.81
	Mean	17.438	18.200	DF	40
	S.D.	2.793	1.751	P	0.4222
APGAR score at 3 months					
	N	65	13	T	-0.67
	Mean	16.277	16.981	DF	76
	S.D.	3.389	3.948	P	0.5080
Marital satisfaction score preop.					
	N	36	12	T	2.42
	Mean	19.722	18.167	DF	46
	S.D.	1.799	2.290	P	0.0195
Marital satisfaction 1 month					
	N	33	10	T	1.07
	Mean	19.333	18.100	DF	11.00
	S.D.	2.072	3.479	P	0.3094
Marital satisfaction 1 month					
	N	35	10	T	0.98
	Mean	18.800	17.100	DF	10.94
	S.D.	3.160	5.238	P	0.3496
Perceived social support at baseline					
	N	37	12	T	-0.64
	Mean	3.169	3.313	DF	47
	S.D.	0.722	0.490	P	0.5249
Perceived social support at 1 month					
	N	74	14	T	-1.58
	Mean	3.145	3.464	DF	86
	S.D.	0.672	0.790	P	0.1171
Perceived social support at 3 months					
	N	66	12	T	-1.15
	Mean	3.121	3.375	DF	76
	S.D.	0.706	0.678	P	0.2530

Table G-1 (continued)

Dependent Variable	Group 1 Male Patients	Group 2 Female Patients	T-Tests	
Anxiety/Tension subscale at baseline				
N	87	20	T	2.28
Mean	15.040	10.750	DF	105
S.D.	7.940	5.757	P	0.0247
Anxiety/Tension subscale at 1 month				
N	72	14	T	0.61
Mean	10.097	8.857	DF	84
S.D.	7.254	4.833	P	0.5420
Anxiety/Tension subscale at 3 months				
N	65	13	T	2.55
Mean	9.578	6.225	DF	43.36
S.D.	7.694	3.268	P	0.0145*
Hostility/Anger subscale at baseline				
N	87	20	T	5.41
Mean	8.299	2.050	DF	102.99
S.D.	9.421	2.502	P	0.0000*
Hostility/Anger subscale at 1 month				
N	72	14	T	2.43
Mean	5.556	2.513	DF	54.03
S.D.	8.073	3.055	P	0.0186*
Anger/Hostility subscale at 3 months				
N	65	13	T	3.33
Mean	6.819	2.154	DF	44.63
S.D.	8.265	3.436	P	0.0017*
Depression subscale at baseline				
N	87	20	T	4.59
Mean	11.845	4.646	DF	84.25
S.D.	11.589	4.276	P	0.0000*
Depression subscale at 1 month				
N	72	14	T	1.33
Mean	8.593	6.143	DF	35.73
S.D.	10.195	5.231	P	0.1922*
Depression subscale at 3 months				
N	65	13	T	2.12
Mean	8.612	4.325	DF	38.37
S.D.	11.329	5.263	P	0.0409*
Fatigue subscale at baseline				
N	87	20	T	1.33
Mean	10.008	7.742	DF	105
S.D.	7.034	5.966	P	0.1853

Table G-1 (continued)

Dependent Variable		Group 1 Male Patients	Group 2 Female Patients	T-Tests	
Fatigue subscale at 1 month					
	N	72	14	T	1.04
	Mean	9.935	7.857	DF	84
	S.D.	7.039	5.763	P	0.3025
Fatigue subscale at 3 months					
	N	65	13	T	1.06
	Mean	6.794	4.872	DF	76
	S.D.	6.180	4.731	P	0.2929
Vigor subscale at baseline					
	N	87	20	T	0.55
	Mean	15.309	14.500	DF	105
	S.D.	6.099	5.034	P	0.5827
Vigor subscale at 1 month					
	N	72	14	T	1.06
	Mean	15.595	13.571	DF	84
	S.D.	6.215	7.968	P	0.2908
Vigor subscale at 3 months					
	N	65	13	T	1.01
	Mean	19.620	17.692	DF	76
	S.D.	6.356	5.893	P	0.3160
Global POMS score at baseline					
	N	87	20	T	3.70
	Mean	37.425	15.721	DF	66.12
	S.D.	39.614	18.109	P	0.0005*
Global POMS score at 1 month					
	N	72	14	T	0.97
	Mean	23.850	16.584	DF	29.45
	S.D.	37.952	22.659	P	0.3423*
Global POMS score at 3 months					
	N	65	13	T	1.81
	Mean	17.758	4.261	DF	35.96
	S.D.	40.550	19.756	P	0.0779*
Health care orientation subscale (PAIS)					
	N	33	11	T	1.70
	Mean	4.485	3.065	DF	31.34
	S.D.	3.438	1.932	P	0.0990*
Vocational environment subscale (PAIS)					
	N	31	8	T	1.30
	Mean	8.835	7.225	DF	21.74
	S.D.	4.795	2.522	P	0.2075*

Table G-1 (continued)

Dependent Variable	Group 1 Male Patients	Group 2 Female Patients	T-Tests	
Domestic environment subscale (PAIS)				
N	33	11	T	-0.56
Mean	5.147	5.662	DF	42
S.D.	2.671	2.624	P	0.5809
Relationship to spouse and sexual activity				
N	33	11	T	-0.87
Mean	4.455	5.673	DF	42
S.D.	4.116	3.628	P	0.3873
Family relationships subscale (PAIS)				
N	33	11	T	-0.87
Mean	1.159	1.727	DF	42
S.D.	1.922	1.679	P	0.3870
Social activity subscale (PAIS)				
N	33	11	T	-1.38
Mean	5.424	7.636	DF	42
S.D.	4.514	4.925	P	0.1759
Distress caused by illness subscale (PAIS)				
N	33	11	T	0.31
Mean	4.606	4.273	DF	42
S.D.	3.288	2.284	P	0.7573
Total PAIS score at 1 month postop				
N	33	11	T	0.06
Mean	33.576	33.291	DF	42
S.D.	15.660	11.236	P	0.9559
Network social support at baseline				
N	37	12	T	-0.97
Mean	3.676	3.833	DF	35.03
S.D.	0.709	0.389	P	0.3369*
Network social support at 1 month				
N	74	14	T	-0.32
Mean	3.811	3.857	DF	86
S.D.	0.488	0.535	P	0.7488
Network social support at 3 months				
N	66	12	T	-1.87
Mean	3.712	3.917	DF	29.99
S.D.	0.576	0.289	P	0.0713*

APPENDIX H

Descriptive Statistics for APGAR

APPENDIX H

DESCRIPTIVE STATISTICS FOR APGAR

Table H-1

Patient APGAR Scores at Baseline (0), 1 Month (1) and 3 Months (3) Postoperative

Variable	N	Mean	Standard Deviation	Minimum	Maximum
APGAR0	108	17.181	2.867	10.000	20.000
APGAR1	42	17.619	2.585	10.000	20.000
APGAR2	78	16.394	3.471	3.000	20.000

Spouse APGAR Scores at Baseline (0), 1 Month (1) and 3 Months (3) Postoperative

Variable	N	Mean	Standard Deviation	Minimum	Maximum
APGAR0	106	16.585	3.147	4.000	20.000
APGAR1	39	16.000	3.078	9.000	20.000
APGAR2	73	15.658	3.461	6.000	20.000

APPENDIX I

Descriptive Statistics for Marital Satisfaction (KMS)

APPENDIX I

DESCRIPTIVE STATISTICS FOR MARITAL SATISFACTION (KMS)

Table I-1

Patient Scores at Baseline (0), 1 Month (1) and 3 Months (2) Postoperative

Variable	N	Mean	Standard Deviation	Minimum	Maximum
KMS0 (total)	48	19.333	2.025	14.000	21.000
KMS1 (total)	43	19.047	2.478	9.000	21.000
KMS2 (total)	45	18.422	3.720	6.000	21.000
Satisfaction with the marriage0 (individual item on KMS)	48	6.458	0.713	4.000	7.000
Satisfaction with the marriage1 (individual item on KMS)	43	6.372	0.817	3.000	7.000
Satisfaction with the marriage2 (individual item on KMS)	45	6.200	1.217	2.000	7.000
Satisfaction with one's mate0 (individual item on KMS)	48	6.521	0.618	5.000	7.000
Satisfaction with one's mate1 (individual item on KMS)	42	6.429	0.801	3.000	7.000
Satisfaction with one's mate2 (individual item on KMS)	45	6.067	1.405	1.000	7.000
Relationship satisfaction0 (individual item on KMS)	48	6.354	0.887	3.000	7.000
Relationship satisfaction1 (individual item on KMS)	42	6.310	0.869	3.000	7.000
Relationship satisfaction2 (individual item on KMS)	45	6.156	1.242	1.000	7.000

Table I-2

Caregiver Scores at Baseline (0), 1 Month (1) and 3 Mos. (2) Postoperative on KMS

Variable	N	Mean	Standard Deviation	Minimum	Maximum
KMS0 (total)	47	19.064	2.408	11.000	21.000
KMS1 (total)	39	18.718	2.492	12.000	21.000
KMS2 (total)	40	18.425	2.571	12.000	21.000
Satisfaction with the marriage0 (individual item on KMS)	47	6.404	0.712	4.000	7.000
Satisfaction with the marriage1 (individual item on KMS)	39	6.231	0.872	4.000	7.000
Satisfaction with the marriage2 (individual item on KMS)	40	6.125	0.853	4.000	7.000
Satisfaction with one's mate0 (individual item on KMS)	47	6.404	0.970	2.000	7.000
Satisfaction with one's mate1 (individual item on KMS)	39	6.308	0.922	4.000	7.000
Satisfaction with one's mate2 (individual item on KMS)	40	6.225	0.891	4.000	7.000
Satisfaction with the relationship0 (individual item on KMS)	47	6.255	0.896	3.000	7.000
Satisfaction with the relationship1 (individual item on KMS)	39	6.179	0.823	4.000	7.000
Satisfaction with the relationship2 (individual item on KMS)	40	6.075	0.944	4.000	7.000

APPENDIX J

Descriptive Statistics for Perceived Social Support

APPENDIX J

DESCRIPTIVE STATISTICS FOR PERCEIVED SOCIAL SUPPORT

Table J-1

Total Social Support as Perceived by Patients at Baseline (0), One (1) and Three Months (2) Postoperative and Perceived Social Support by Source (Spouse, Child, Relatives, Friends)

Variable	N	Mean	Standard Deviation	Minimum	Maximum
Soc. Support0	49	3.204	0.671	1.000	4.000
Soc. Support1	88	3.196	0.697	1.750	4.000
Soc. Support2	78	3.160	0.704	1.250	4.000
Soc. Support from spouse at baseline (individual item)	49	3.837	0.426	2.000	4.000
Soc. Support from spouse at 1 month (individual item)	88	3.807	0.658	0.000	4.000
Soc. Support from spouse at 3 months (individual item)	78	3.846	0.458	2.000	4.000
Soc. Support from child at baseline (individual item)	49	3.224	1.279	0.000	4.000
Soc. Support from child at 1 month (individual item)	88	3.068	1.302	0.000	4.000
Soc. Support from child at 3 months (individual item)	78	2.923	1.384	0.000	4.000
Soc. Support from relatives at baseline (individual item)	49	2.735	1.335	0.000	4.000
Soc. Support from relatives at 1 month (individual item)	88	2.773	1.293	0.000	4.000
Soc. Support from relatives at 3 months (individual item)	78	2.705	1.340	0.000	4.000
Soc. Support from friends at baseline (individual item)	49	3.020	0.989	0.000	4.000
Soc. Support from friends at 1 month (individual item)	88	3.136	0.937	0.000	4.000
Soc. Support from friends at 3 months (individual item)	78	3.167	0.999	0.000	4.000

Table J-2

Mean Size of Patient Social Support Network at Times 0, 1, 2

Variable	N	Mean	Standard Deviation	Minimum	Maximum
Network SS0	49	3.714	0.645	1.000	4.000
Network SS1	88	3.818	0.492	2.000	4.000
Network SS2	78	3.744	0.545	2.000	4.000

Table J-3

Total Social Support as Perceived by Caregivers at Baseline (0), One (1) and Three Months (2) Postoperative and Perceived Social Support by Source (Child, Relatives, Friends)

Variable	N	Mean	Standard Deviation	Minimum	Maximum
Soc. Support0	46	3.000	0.969	0.000	4.000
Soc. Support1	84	2.710	0.903	0.000	4.000
Soc. Support2	75	2.707	0.885	0.000	4.000
Soc. Support from child at baseline (individual item)	46	3.065	1.436	0.000	4.000
Soc. Support from child at 1 month (individual item)	84	2.869	1.306	0.000	4.000
Soc. Support from child at 3 months (individual item)	75	2.867	1.234	0.000	4.000
Soc. Support from relatives at baseline (individual item)	46	2.717	1.471	0.000	4.000
Soc. Support from relatives at 1 month (individual item)	84	2.321	1.381	0.000	4.000
Soc. Support from relatives at 3 months (individual item)	75	2.240	1.282	0.000	4.000
Soc. Support from friends at baseline (individual item)	46	3.217	1.153	0.000	4.000
Soc. Support from friends at 1 month (individual item)	84	2.940	1.068	0.000	4.000
Soc. Support from friends at 3 months (individual item)	75	3.013	0.951	0.000	4.000

Table J-4

Mean Size of Caregiver Social Support Network

Variable	N	Mean	Standard Deviation	Minimum	Maximum
Network SS0	48	2.583	0.767	0.000	3.000
Network SS1	85	2.729	0.585	0.000	3.000
Network SS2	75	2.773	0.583	0.000	3.000

APPENDIX K

Individual, Family, and Social Support Variables Correlation Tables

APPENDIX K

INDIVIDUAL, FAMILY, AND SOCIAL SUPPORT VARIABLES CORRELATION TABLES

All correlations have 50 degrees of freedom. The P-values shown are 2 tailed values.

	PGLOBAL0	PGLOBAL1	PGLOBAL2	SGLOBAL0	SGLOBAL1	SGLOBAL2	PAPGAR0	PAPGAR2	SAPGAR0	SAPGAR2	PSSSP1A1	PSSSP1A2	CSSSP1A1	CSSSP1A2	ZARIT1	ZARIT2
PGLOBAL0	1.0000	0.6361	0.5714	0.4850	0.3693	0.3656	-0.1306	-0.2548	0.1426	0.0986	-0.1509	-0.2527	-0.1737	0.0968	0.3161	0.2612
	0.0000	0.0000	0.0000	0.0003	0.0070	0.0077	0.3562	0.0683	0.3133	0.4868	0.2854	0.0707	0.2181	0.4946	0.0224	0.0614
PGLOBAL1	0.6361	1.0000	0.6955	0.2891	0.3839	0.3616	-0.1587	-0.3732	-0.0120	0.0407	-0.0323	-0.1968	-0.1144	0.0852	0.3588	0.2332
	0.0000	0.0000	0.0000	0.0377	0.0050	0.0084	0.2612	0.0064	0.9327	0.7743	0.8201	0.1620	0.4195	0.5480	0.0090	0.0961
PGLOBAL2	0.5714	0.6955	1.0000	0.2280	0.2829	0.3486	-0.1031	-0.3577	0.1581	-0.0781	0.0619	-0.2372	-0.0264	-0.0055	0.3528	0.4134
	0.0000	0.0000	0.0000	0.1040	0.0421	0.0113	0.4672	0.0092	0.2629	0.5820	0.6631	0.0905	0.8527	0.9693	0.0103	0.0023
SGLOBAL0	0.4850	0.2891	0.2280	1.0000	0.6871	0.6531	-0.1043	-0.2310	0.0571	0.0650	-0.1942	-0.3469	-0.2304	-0.0407	0.5117	0.4890
	0.0003	0.0377	0.1040	0.0000	0.0000	0.0000	0.4619	0.0995	0.6877	0.6469	0.1677	0.0118	0.1003	0.7743	0.0001	0.0002
SGLOBAL1	0.3693	0.3839	0.2829	0.6871	1.0000	0.6890	-0.0087	-0.2168	-0.0358	-0.1234	-0.2096	-0.2489	-0.1240	-0.0107	0.7071	0.6452
	0.0070	0.0050	0.0421	0.0000	0.0000	0.0000	0.9512	0.1226	0.8010	0.3835	0.1359	0.0752	0.3810	0.9401	0.0000	0.0000
SGLOBAL2	0.3656	0.3616	0.3486	0.6531	0.6890	1.0000	-0.0342	-0.2365	-0.0387	-0.1928	-0.0708	-0.1627	-0.3196	-0.1240	0.6385	0.7263
	0.0077	0.0084	0.0113	0.0000	0.0000	0.0000	0.8097	0.0914	0.7852	0.1708	0.6181	0.2493	0.0209	0.3811	0.0000	0.0000
PAPGAR0	-0.1306	-0.1587	-0.1031	-0.1043	-0.0087	-0.0342	1.0000	0.4348	0.2854	0.4687	0.2484	0.0880	0.0287	0.0202	0.0360	-0.2444
	0.3562	0.2612	0.4672	0.4619	0.9512	0.8097	0.0000	0.0013	0.0403	0.0005	0.0758	0.5351	0.8401	0.8869	0.8001	0.0808
PAPGAR2	-0.2548	-0.3732	-0.3577	-0.2310	-0.2168	-0.2365	0.4348	1.0000	0.1750	0.3181	0.3055	0.3398	0.2492	0.2336	-0.1114	-0.1820
	0.0683	0.0064	0.0092	0.0995	0.1226	0.0914	0.0013	0.0000	0.2146	0.0215	0.0277	0.0137	0.0748	0.0956	0.4317	0.1966
SAPGAR0	0.1426	-0.0120	0.1581	0.0571	-0.0358	-0.0387	0.2854	0.1750	1.0000	0.4872	0.0943	0.1017	0.2485	0.2162	-0.1052	-0.0046
	0.3133	0.9327	0.2629	0.6877	0.8010	0.7852	0.0403	0.2146	0.0000	0.0003	0.5063	0.4732	0.0757	0.1237	0.4578	0.9741
SAPGAR2	0.0986	0.0407	-0.0781	0.0650	-0.1234	-0.1928	0.4687	0.3181	0.4872	1.0000	0.2232	0.2106	0.3283	0.4380	-0.1971	-0.4054
	0.4868	0.7743	0.5820	0.6469	0.3835	0.1708	0.0005	0.0215	0.0003	0.0000	0.1117	0.1341	0.0175	0.0012	0.1613	0.0029
PSSSP1A1	-0.1509	-0.0323	0.0619	-0.1942	-0.2096	-0.0708	0.2484	0.3055	0.0943	0.2232	1.0000	0.6490	0.3757	0.3795	0.0782	-0.0673
	0.2854	0.8201	0.6631	0.1677	0.1359	0.6181	0.0758	0.0277	0.5063	0.1117	0.0000	0.0000	0.0061	0.0055	0.5815	0.6355

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         PGLOBAL0 PGLOBAL1 PGLOBAL2 SGLOBAL0 SGLOBAL1 SGLOBAL2 PAPGAR0  PAPGAR2  SAPGAR0  SAPGAR2  PSSSP1A1 PSSSP1A2 CSSSP1A1 CSSSP1A2 ZARIT1   ZARIT2
SSSP1A2  -0.2527  -0.1968  -0.2372  -0.3469  -0.2489  -0.1627   0.0880   0.3398   0.1017   0.2106   0.6490   1.0000   0.4291   0.4575  -0.0840  -0.1181
          0.0707   0.1620   0.0905   0.0118   0.0752   0.2493   0.5351   0.0137   0.4732   0.1341   0.0000   0.0000   0.0015   0.0007   0.5538   0.4043

SSSP1A1  -0.1737  -0.1144  -0.0264  -0.2304  -0.1240  -0.3196   0.0287   0.2492   0.2485   0.3283   0.3757   0.4291   1.0000   0.6990  -0.0415  -0.1026
          0.2181   0.4195   0.8527   0.1003   0.3810   0.0209   0.8401   0.0748   0.0757   0.0175   0.0061   0.0015   0.0000   0.0000   0.7700   0.4690

SSSP1A2   0.0968   0.0852  -0.0055  -0.0407  -0.0107  -0.1240   0.0202   0.2336   0.2162   0.4380   0.3795   0.4575   0.6990   1.0000   0.0289  -0.1671
          0.4946   0.5480   0.9693   0.7743   0.9401   0.3811   0.8869   0.0956   0.1237   0.0012   0.0055   0.0007   0.0000   0.0000   0.8389   0.2363

ARIT1     0.3161   0.3588   0.3528   0.5117   0.7071   0.6385   0.0360  -0.1114  -0.1052  -0.1971   0.0782  -0.0840  -0.0415   0.0289   1.0000   0.6394
          0.0224   0.0090   0.0103   0.0001   0.0000   0.0000   0.8001   0.4317   0.4578   0.1613   0.5815   0.5538   0.7700   0.8389   0.0000   0.0000

ARIT2     0.2612   0.2332   0.4134   0.4890   0.6452   0.7263  -0.2444  -0.1820  -0.0046  -0.4054  -0.0673  -0.1181  -0.1026  -0.1671   0.6394   1.0000
          0.0614   0.0961   0.0023   0.0002   0.0000   0.0000   0.0808   0.1966   0.9741   0.0029   0.6355   0.4043   0.4690   0.2363   0.0000   0.0000
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egend

PGLOBAL 0, 1, 2- Global Mood Disturbance (POMS) score for patient at baseline, one and three months post discharge

SGLOBAL 0, 1, 2- Global Mood Disturbance (POMS) score for spouse/caregiver at baseline, one and three months post discharge

PAPGAR 0, 2- Patient Family APGAR score for patient during preoperative (baseline) and 3 months post discharge

SAPGAR 0, 2- Spouse/caregiver Family APGAR score during preoperative and 3 months post discharge

PSSSP1A 1, 2- Patient Perceived Social Support at one and three months post discharge

CSSSP1A 1, 2- Caregiver Perceived Social Support at one and three months post discharge

ZARIT 1, 2- Caregiver scores on Zarit Caregiving Burden Inventory at one and three months post discharge