Factors Predicting Health Behaviors in Women with Coronary Heart Disease and Their Family Members

By

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ABSTRACT

TITLE: Factors Predicting Health Behaviors in Women with Coronary Heart Disease and Their Family Members

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Although heart disease is the major cause of death in women over the age of 40, until recently, little empirical data existed regarding women's experience with the illness. The purpose of this longitudinal, descriptive study was to describe the influences of family-related factors on the health behaviors of women with coronary heart disease (CHD) and their family members. The specific research questions were: What are the relationships among social support, conflict, value of health, family coping, and the health protection behaviors of diet, smoking cessation, exercise, and stress management for women with CHD and their family members?; What variables predict changes in health protection behaviors of women with CHD and their family members? A convenience sample of 74 women with CHD (34 with coronary artery bypass surgery (CABG) and 40 with coronary angioplasty) and 120 of their family members completed questionnaires at hospital discharge (T1) and 3 months later (T2). For both groups, social support, conflict, health value, and family coping did not change significantly over time. For the women, low fat diet, exercise, and stress management improved significantly during the first 3 months of recovery; smoking stage and carbohydrate diet did not change. For the family members, only low fat diet and exercise changed (improved) significantly. One- way ANOVAs of social support at T1 showed a significant effect by smoking stage for the women ($F(3,69)=4.05$, $p<.01$) and family members ($F(5,110)=3.06$, $p<.01$). In a series of hierarchical multiple regression equations for four T2 outcome behaviors (low fat diet, carbohydrate diet, exercise, stress management), T1 behaviors were entered at the first step because changes in behavior over time were of interest. The largest percent of variance was explained by the T1 behavior score for both groups. In the model for the women with CHD, other significant predictors at the last step were: for low fat diet, T1 and T2 conflict ($R^2 \Delta = 5\%$); for carbohydrate diet, complications and having CABG ($R^2 \Delta = 15\%$); for exercise, complications, participation in cardiac rehabilitation, and T1 health value ($R^2 \Delta = 22\%$); for stress management, T2 conflict ($R^2 \Delta = 5\%$). In the model for the family members, other significant predictors at the last step were: for low fat diet, female gender, living with the woman with CHD, T1 social support, and T1 conflict ($R^2 \Delta = 5\%$); for carbohydrate diet, T2 social support ($R^2 \Delta = 3\%$); for stress management, T2 social support ($R^2 \Delta = 4\%$). Findings of this study confirm the importance of the influence of family-related variables on health behavior changes and the need for clinicians to attend to issues of social support and conflict for women with CHD and their family members.

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CHAPTER I

INTRODUCTION

Although heart disease is the major cause of death in women over the age of 40, until recently, little empirical data existed regarding women's experience with the illness. The purpose of this dissertation was to describe the experiences of women with coronary heart disease (CHD) and their families related to specific factors that may predict changes in health protection behaviors. Because family members are a major source of support for women with heart disease and because family members share in the risk of heart disease, families as well as women were studied.

CHD is the number one cause of death for both women and men in the United States (American Heart Association, 1993). Coronary heart disease is defined as coronary artery obstruction resulting in inadequate myocardial perfusion. It is considered an epidemic largely due to the American lifestyle, which includes a high fat, high salt diet; cigarette smoking; multiple stressors; and sedentary behavior. Recent declines in the incidence of heart disease have been attributed to changes in this lifestyle emphasizing exercise, smoking cessation, and a lower fat, higher complex carbohydrate diet.

CHD in Women

One in 7 women between the ages of 45 and 64 in the United States has cardiovascular disease and this ratio increases to 1 in 3 women aged 65 or older (American Heart Association, 1993). In addition, the 23 million women who smoke and the one-half of adult women who have elevated serum cholesterol levels are at increased risk for developing heart disease.

A primary assumption of this investigation was that the female experience of heart disease is different from that of males. Morbidity and mortality related to

CHD differ in many ways for women compared to men. Although the overall national death rate for CHD declined in recent years, the death rate for women in Oregon increased by 7% between 1980 and 1988 (Oregon Heart Association, 1992). At the same time the death rate for men in Oregon declined by 12%. Women are more likely to die from myocardial infarctions (MI) than men, with that mortality rate being double in the first few weeks after MI. African-American women have the highest mortality rate from MI. When women with CHD are hospitalized, they are less likely to receive medical interventions such as thrombolytic therapy and coronary surgery than men (Maynard, 1991).

Despite the scope of the problem of CHD in women, CHD was considered a disease of males until recently, and most research related to the illness focused on men (Murdaugh, 1990). The reasons for the omission of women from studies of CHD are numerous, including the bias that few women have CHD, the avoidance of female subjects because of hormone variations, and the belief that findings from male subjects are generalizable to women. Researchers are now challenging these assumptions and including gender in their designs. Indeed, the inclusion of women in studies of diseases that affect them now is mandated by the National Institutes of Health.

Until very recently, clinical practice also was dominated by the perception that CHD is a disease of males. Medical regimens were based on existing research and on traditional medical teaching. Until findings from nursing research were applied to practice (Gilliss, 1989), cardiovascular nursing care was based largely on the medical model of CHD. Both lay and professional publications reflected a gender-biased view. If nurses are to address the needs of women with heart disease adequately, a stronger research base is needed. Such research should focus on how women experience cardiac illness.

CHD Prevention

A truly effective approach to heart disease should include health protection efforts aimed at preventing CHD and its manifestations. These efforts are directed toward reducing coronary risk factors through changes in diet, smoking, exercise, and stress behaviors. These risk factors are similar for men and women, yet less is known about risk reduction strategies and effects of these changes for women.

In addition to the identified cardiac patient, family members are at risk for heart disease because of the inherited tendency for CHD and because of shared lifestyles. Women often have the responsibility of facilitating the family's lifestyle related to diet and other coronary risk behaviors. Therefore nursing interventions aimed at coronary risk factor reduction should include family members as well as the female cardiac patient.

Families are important to consider in these nursing interventions because they can be sources of both support and stress for women with CHD. Women from racial and ethnic minorities or from rural settings may have special problems, including isolation and limited access to traditional support services, such as formal cardiac rehabilitation programs. Likewise, families of these women may experience extra burdens. Therefore a second major assumption of this investigation is that the family as well as the identified patient is affected by the diagnosis and need to adapt to heart disease. Family was defined as a social system comprised of two or more persons who coexist within the context of some expectation of reciprocal affection, mutual respect, and temporal duration.

Significance to Nursing

This study examined variables related to health protection behaviors within the context of families with an adult female member experiencing cardiac illness. The concepts chosen for investigation were drawn from this author's clinical

nursing experience with women with heart disease and their families, as well as the literature on women's and families' experience of illness. These concepts included social support, conflict, family coping, and value of health.

The long-term goal of this research was to provide the basis for nursing intervention related to health protection behaviors in families of women with CHD. In order to develop effective strategies for reducing cardiac risk behaviors in women and their families, a clear description of factors related to their experiences with the illness was needed. The design of the investigation was prospective and longitudinal in order to capture factors that predict how behaviors change. The information obtained from this study enables nurses to better counsel women and their families about what to expect when living with heart disease.

CHAPTER II

REVIEW OF LITERATURE AND THEORETICAL FRAMEWORK

This chapter presents a review of the literature related to social support, value of health, family coping, and family health protection behaviors in the context of women's and families' experience of cardiac illness. Because the growing body of literature on coronary heart disease in women does not adequately describe women's experiences or that of their families, data from women's experiences with other chronic illnesses and men's experience with heart disease were included to delineate concepts or questions that may be pertinent to include in research related to women. Two theoretical perspectives that guided the investigation are presented.

Social Support

Conceptualization

Numerous studies have demonstrated the effects of social support on health as well as recovery from hospitalization, surgery, and illness (Broadhead, James, Wagner, Schoenback, Grimson, Heyden, et al., 1983; Pilisuk & Parks, 1986). However, critiques of findings often point out the non-comparability of findings due to inconsistencies related to conceptualization and measurement of social support (Norbeck, 1988; Wortman & Lehman, 1985). Therefore, this discussion will begin by clarifying the issues related to the meaning of this multidimensional construct.

Wortman and Conway (1985) identified seven issues related to the conceptualization and measurement of social support that serve as the framework for this discussion. First, various components or types of social support have been identified. House's (1981) typology is most consistently used. House identified four types of supportive behaviors or acts. Emotional support

includes the provision of empathy, caring, love, and trust. Instrumental support entails directly helpful behaviors or resources, such as money, labor, and time. Informational support includes information directly applicable to coping with problems. Appraisal support includes affirmation, feedback, and social comparison. Different types of support may have different effects on women's experience of illness. Second, sources of support also vary, ranging from one close individual to a broad network, and including relatives, friends, health professionals, and others. Sources are identified through analysis of one's social network, measuring what Barrera (1986) calls social embeddedness. A third issue involves measuring the perspectives of both the recipient and provider of support. This is especially pertinent in the setting of chronic illness, when both may be affected by the illness. Barrera would add to this the distinction between perceived and enacted support. Many studies assume that social support is always positive, a position that is challenged by Wortman and Lehman (1985), Tilden and Galyen (1987), and others. Therefore, a fourth issue is that the negative aspects of social interactions also should be measured. Fifth, specific supportive behaviors, rather than global measures of the construct, should be assessed. For example, what specific information is helpful to women recovering from cardiac surgery? Sixth, determinants of support, that is, variables which determine whether social support is available, offered, or utilized, should be included. Gender is an important factor in this consideration. Finally, the costs and outcomes of providing support, for both the provider and recipient, are important to full consideration of the meaning of social support.

House (1981) summarized these considerations in his framework for measurement of social support: "who gets how much of what kinds of support from whom regarding which problems" (p. 39). Given the complexity of this

construct, it is not difficult to appreciate why measurement of social support varies so widely in the literature.

The stress-buffering model most often is used to explain the mechanisms by which social support works. Social support has both main effects and buffering effects on stress and health (House, 1981; Tilden, 1985). These effects may be mediated through the immune system (Pilisuk & Parks, 1986) or through effects on self-concept, including maintenance of a sense of continuity or permanence of life (Boyce, 1985). In addition to stress and coping theory, other frameworks used to study social support include attachment; role; social exchange; symbolic interactionism, such as Kaufman's (1990) feminist-interpretive framework; and ecological theories (Tilden, 1985). Although a life-course perspective is seldom used in support research (Schulz & Rau, 1985), this approach could be fruitful in examining women's experience of illness. Schulz and Rau distinguish between temporally and statistically normative and non-normative life events, and conclude that social network members are more likely to know what kind of support to provide for normative events and recipients are more likely to know what to expect during normative events. However, when younger women experience heart disease, a non-normative event, they and their networks are unprepared for the support needed.

Social Support and Women's Experience of Illness

In studies of men and women with heart disease, social support has been demonstrated effect the illness experience of patients and their families. Dhooper (1984) described the support received by families during the crisis of a heart attack. Families' social integration was positively related to the extent of emotional or instrumental help received. Adult children were the greatest source of emotional support, although the emotional support received at 1 month post-myocardial infarction was perceived by the spouse as less than adequate. Only

6 of the 40 patients in this study were women. In a study of male and female cardiac surgery patients and their spouses, patients reported significantly higher levels of perceived support from spouse, children, family, and friends at 1 and 3 months after surgery than did spouses (Rankin & Monahan, 1991). Social support did not act as a buffer or have a main effect on patients' health outcomes of mood disturbances or physical health status, but it did act as a buffer for spouses' mood disturbances. In a follow-up study of 49 wives 1 year after their husbands' coronary bypass surgery, wives reported that social support was significantly less than at the time of surgery and 6 weeks later (Artinian, 1992). At the same time, role strain was significantly greater and symptoms of stress remained. Qualitative data revealed that wives continued to make life adjustments related to their husbands' health status at 1 year. The prospective Framingham heart study revealed that working women in clerical jobs had the highest CHD risk for women, and those clerical women with nonsupportive bosses had the highest CHD risk in this group during 8 years of follow-up (Berkman, 1984).

Several studies have demonstrated the link between social support and individual health behavior changes. Social support accounted for 14% of the variance in senior citizens' (n=96) health practices, and 34% of the variance in health practices of 133 adults attending a health fair (Hubbard, Muhlenkamp, & Brown, 1984). Of interest, women had significantly higher scores than men on both measures of social support and health practices. Social support is a predictor of success in maintaining weight loss in both obese individuals (Brownell, 1984) and post-coronary patients (Finnegan & Suler, 1985). Informal social support for smoking cessation, along with belief in susceptibility to smoking-related diseases, explained the greatest differences between ex-smokers and smokers in a group of 82 hospitalized cardiovascular patients

(Giannetti, Reynolds, & Rihn, 1985). In a prospective study of 125 women who had just stopped smoking, partner facilitation accounted for 32% of the variance in outcomes of abstinence or resumption, and discriminated success and non-success in 85% of the cases (Coppotelli & Orleans, 1985).

In a qualitative study of the role of social networks in motivation for cardiovascular health behaviors, 17 male and 7 female participants in an outpatient cardiac rehabilitation program identified two interactive patterns: enabling and limiting (Fleury, 1993). Enabling patterns facilitated lifestyle changes and the accomplishment of valued goals. Network members demonstrated this by such behaviors as conveying a sense of shared values in heart healthy behaviors. Limiting patterns blocked achievement of lifestyle goals, and included two categories. Value conflict was manifested by network members through maintaining the status quo, negative communication patterns, and expressions of doubt. Boundary maintenance included fostering dependence and monitoring activities.

What are the patterns of social support for women experiencing illness? In a study of 80 women with congestive heart failure (CHF) aged 55 or older (Friedman, 1993), married women listed husbands first as sources of both emotional and tangible support. Unmarried women with children listed their children first as sources of both types of support. Unmarried women without children most frequently cited friends and neighbors as sources of emotional support, but other relatives as sources of tangible support. Perceived emotional support and its sources were significant predictors of positive affect in this group of older women with CHF, while source of tangible support predicted satisfaction with life. In a group of 125 women with stable breast cancer, diabetes mellitus, or fibrocystic breast disease (Primomo, Yates, & Woods, 1990), partners provided the greatest amount of all types of social support. Family provided more affective

support than did friends or others. Friends provided more affirmation support than did family and more affective support than did others. Women confided more to others, including health care workers, counselors, and clergy, than to family or friends. Affect, affirmation, and reciprocity from the woman's partner and family were significantly related to higher levels of family functioning.

The support that ill women receive may be ineffective or harmful (Wortman & Lehman, 1985). Support providers may respond inappropriately because they have negative feelings about the illness crisis, they are unsure of what to do, or they have misconceptions about correct illness behavior. Examples of unsupportive behavior include discouraging open communication and reliance on scripted responses. For the recipient, this results in feelings of isolation and insignificance (Wortman & Lehman).

The reports of 100 women with breast cancer, contrasted with 100 disease-free individuals, demonstrated the potential ineffectiveness of social support (Peters-Golden, 1982). Among the healthy individuals, 81% expected to be treated differently if they had cancer: 32% thought they would be pitied, 29% thought people would be nicer to them, and 15% thought they would be avoided. When asked on whom they would rely if they had cancer, 42% listed a combination of family, friends, and professionals; 29% said themselves; 13% listed spouse; and 13% said their physician. They projected the primary concern of breast cancer patients as cosmetic, related to the loss of a breast. For the breast cancer patients, 72% were treated differently after the diagnosis. Of these, 72% were misunderstood, 52% were avoided or feared, 14% pitied, and 3% said people were nicer to them. These reports were nearly the opposite of what healthy people expected. The examples of being misunderstood were consistent with Wortman and Lehman's explanations and included inappropriate comments, false optimism, and strained interactions. When asked on whom they

relied for support, 31% said no one, 22% listed their husbands, and 18% reported a combination of friends and professionals. Peters-Golden (1982) described this as the "evaporation of anticipated support" (p. 489). Only half of the women perceived their support as adequate and 26% found it inadequate. Ninety-nine percent of these women listed their primary concern as recurrence of the disease. These findings are also an example of the disparity between the culturally-given meaning, as described by healthy individuals, and the experientially-derived meaning of the experience of breast cancer.

Overprotectiveness is another aspect of the illness experience which may be potentially ineffective or harmful. Coyne and DeLongis (Coyne & DeLongis, 1986) described a curvilinear relationship between family functioning and family involvement with over-involvement leading to increased stress. Women with breast cancer found being babied too long was not helpful and delayed their returning to normal (Peters-Golden, 1982). Families of cardiac patients tend to take on a similar behavior described as monitoring the cardiac patient at home (Brown, Glazer, & Higgins, 1984) which is associated with increased family conflict (Gilliss, 1983; Jenkins, Stanton, Savageau, Denlinger, & Klein, 1983). However, of 111 myocardial infarction (MI) patients (26% female), those who reported being overprotected experienced better psychosocial adaptation than inadequately supported patients at 1 and 4 months after MI (Riegel & Dracup, 1992). Overprotection was operationalized as a positive discrepancy between social support received and support desired. These results challenged the prevailing theory that overprotection leads to cardiac invalidism, a negative outcome. Because the presence and effects of these patterns for female cardiac patients have not been fully described, it is unclear whether overprotection of women with heart disease is helpful or harmful.

Gender and Social Support

Women report asking for and receiving more social support than do men (Tilden, Nelson, & May, 1990a; Vaux, 1985). This is true for female college students, (Butler, Giordano, & Neren, 1985) as well as for women over the age of 50, who reported larger social networks and receiving larger numbers of supports than did men (Antonucci & Akiyama, 1987) Although some authors (e.g., Vaux) conclude that gender differences are more likely in the emotional forms of social support, with women perceiving and receiving more, others (Antonucci & Akiyama) report that the majority of both women and men give and receive all types of support. Of interest to this discussion of the experience of illness, 24% of women and 20% of men reported not talking about their health with anyone (Antonucci & Akiyama). Generally, however, women are more likely than men to confide in others (Antonucci & Akiyama; Vaux).

Significant gender differences do arise in the sources of support. Men are more likely to rely exclusively on their spouse for support, whereas women have a broader network, as reflected in receiving and providing more support to children and friends than men do (Antonucci & Akiyama, 1987). Companion networks reflect these differences, with men listing wives first and friends second, and women reporting the reverse: friends first, and spouse or children second (Connidis & Davies, 1990). The authors attribute some of these differences to the higher percentage of married men in this sample of adults over the age of 65. The composition of confidant networks also varies. Although women and men list children first, men list spouses second, while women list husbands fifth (Connidis & Davies).

Antonucci and Akiyama (1987) found that approximately half of married women did not receive reassurance from or confide in their husbands, and that these women were more likely to rely on their children not only as a confidant, but also for reassurance, respect, and care when ill. In a survey of 380 married

adults over the age of 50, men were significantly more satisfied with their marriage than were women (Antonucci & Akiyama, 1987). Women in the same age group perceive less social support in marriage than do men (Depner & Ingersoll-Dayton, 1985). These women reported receiving less conjugal support, measured as emotional support, respect, and health-related support, than men. They also provided less emotional and health support than did husbands. These authors found that the provision of conjugal support decreased with age, but there was no age-gender interaction. Coyne and DeLongis (1986) suggested that it is the quality of the marital relationship that is the determinant of conjugal social support, therefore marriage alone does not guarantee social support for women.

In studying gender differences in cardiovascular morbidity and mortality, Berkman, Vaccarino, and Seeman (1993) argue that elderly men and women do not differ in social network size, adequacy of emotional support, or reciprocity. For both women and men, emotional support is significantly and inversely related to mortality after MI. The authors suggest that additional dimensions of women's support should be investigated to explain the differences in cardiovascular morbidity and mortality experienced by women and men. Among these, they would include the fact that women's networks are more burdensome and conflict-laden.

Costs of Social Support and Conflict

There is consensus that the costs of social support are greater for women (Coyne & DeLongis, 1986; Kessler, McLeod, & Wethington, 1985; Vaux, 1985), with women reporting more conflict, more support, and more reciprocity than men (Tilden, et al., 1990a). Thus, although women appear to receive more support than men, they do not necessarily report less stress (Vaux). Perhaps this is because they do not receive the correct types of support, the support is

inappropriate (Wortman & Lehman, 1985), or, as Coyne and DeLongis suggest, quality of marital social support, rather than quantity, is crucial. Women are more burdened by the costs of caring than men (Kessler, McLeod, & Wethington). Reasons for these greater costs include women's greater awareness and involvement with life crises in their social network (Kessler, McLeod, & Wethington). In addition, women may have more nurturant role demands (Coyne & DeLongis). Belle (1982) described a support gap, defined as giving social support without receiving support in return, as a source of stress for women.

Individuals with heart disease and their families may experience conflict related to the illness (Fleury, 1993). In a study of almost 400 men after MI and their wives, men with low intimacy and high conflict marriages had greater pre-MI depression, and more negative assessment of their health status and greater mood disturbances 3 to 4 years after MI (Waltz, Badura, Pfaff, & Schott, 1988). These authors concluded that marital conflict indirectly affects emotional distress through its effect on negative health cognitions. Social support, measured as intimacy attachment, was believed to have a buffering effect on depression. Patterns of conflict for women with CHD, who are generally older and more likely to be widowed, have not been described.

In summary, social support plays a crucial role in women's experience of illness. While women generally report asking for and receiving more social support than men, they also describe greater costs and conflict related to that support. Major sources of support for older women with heart disease are adult children, spouses, other relatives, and friends. Social support facilitates health behavior changes and recovery from illness for women, yet members of the social network can also limit or block lifestyle changes. Social support is inversely related to mortality after myocardial infarction (MI) for both women and men. Conflict has been related to mood disturbances and negative health

cognitions in men after MI, and women's social networks are more conflict-laden than men's. Therefore, a description of social support and conflict patterns for women with CHD was needed in order to explore their importance for health protection behavior changes by these women.

Family members report receiving less social support than do patients. In addition, support declines over time for spouses of male cardiac patients. Social support is positively related to families' social integration after MI, and buffers spouses' mood disturbances after cardiac surgery. Family members are an important source of support and conflict for women with CHD, yet little is known about these families' social support efforts, needs, and costs, including conflict. Therefore a description of these patterns also was needed.

Value of Health

Value of health often is assumed rather than measured, yet its possible role in explaining health promoting behaviors and adjustment to illness deserves further exploration (Fleetwood & Packa, 1991; Harvey, 1992). Research exploring health value has revealed the following (Lau, Hartman, & Ware, 1986). Adults value health more highly than do children. Ulcer patients do not rate health more highly than do healthy adults. No health value differences exist between college freshman males and females, but among middle-aged adults, women rate health significantly more highly than do men (Lau, et al., 1986). Family health values or health values of women with CHD have not been reported.

Individuals who place a higher value on health undertake more preventive behaviors than those who value health less (Fleetwood & Packa, 1991; Parcel, Nader, & Rogers, 1980; Wallston, Maides, & Wallston, 1978). Fleury (1991) found that health locus of control and health value orientation explained 32% of the variance in wellness motivation of 52 males post-myocardial infarction.

Because women play a key role in influencing the health practices of the family, further research is needed regarding health values of women with heart disease and family patterns of health values.

Family Coping

Although individual coping with the stress of illness frequently is described, few reports of family coping with cardiac illness exist. A description of family coping after MI, based on interviews of 40 spouses, is an exception (Dhooper, 1983). The coping strategies and patterns related to the emotional health of family members, family financial management, household management, and children's needs were described. Families used multiple coping strategies for each area of need, including the use of social support. Wives of MI patients also reported the use of social support as a coping resource (Finlayson, 1976). The use of social support was an effective coping strategy for families and wives.

Containment was a strategy reported by families coping with vascular surgery and chronic vascular disease (Leavitt, 1990). Confirmed through both quantitative and qualitative data, containment was defined as a coping pattern by which family members limited the meaning and distress of the illness by focusing on present problems rather than on long-term implications. At 3 months after surgery, these families were not participating in risk factor management. Therefore this strategy may have long-term negative effects because the ill family member was not supported in efforts to prevent progression of the disease.

Introspective family coping, which included the use of feedback, reflection, and goal adjustment, was a strategy reported by families of women with chronic illnesses (Lewis, Woods, Hough, & Bensley, 1989). In a study of 48 fathers of school-age children whose wives had stable breast cancer, diabetes mellitus, or fibrocystic breast disease, higher levels of illness demands and marital adjustment led to increased use of introspective family coping. This family

coping behavior predicted the quality of the father-child relationship. Introspective family coping, level of marital adjustment, and quality of father-child relationship were positively related to family functioning (Lewis, Woods, Hough, & Bensley). For 111 child-rearing women with breast cancer, introspective family coping was a significant predictor of family functioning (Lewis & Hammond, 1992). Family coping strategies and patterns for families of women with CHD have not been described, yet may play an important role in developing effective interventions to facilitate changes in family health protection behaviors.

Health Protection Behaviors

Positive behaviors related to health can be defined as health promotive or as health protective (Pender, 1987) Health protection is behavior undertaken to decrease the probability of experiencing illness by protection against stressors or risk factors and early detection of illness. Health promotion is behavior undertaken to increase well-being and self-actualization of an individual or family. While the behaviors may be the same, such as exercise, the motivation differs. It is possible, moreover, for behaviors undertaken as health-protective to become health-promoting when they are perceived as contributing to a sense of overall well-being.

Only small numbers of women have been included in large clinical trials of cardiac risk factor reduction, therefore information from other trials of health behavior changes in women may be informative. The Women's Health Trial was designed to test the effect of a low fat diet on the incidence of breast cancer in high risk women (Gorbach, Morrill-LaBrode, Woods, Dwyer, Selles, Henderson, et al., 1990). Women (n=173) in the intervention group received information and behavior skill training for 1 year, at which time their total fat intake significantly decreased from 39% to 22%. This decrease was due to reduced intake of high fat foods; carbohydrate consumption did not increase.

Involvement of families in health protection and health promotion is feasible and effective, and family-based interventions can lead to long-term changes in dietary habits (Nader, Nader, Sallis, Patterson, Abramson, Rupp, et al., 1989). In a study of 206 Mexican-American and Anglo-American families with a fifth or sixth grade child, improvement in eating habits persisted at one year after intervention (Nader et al.). The Family Heart Study used a family-based group approach to achieving dietary lifestyle change (Carmody, Istvan, Matarazzo, Connor, & Connor, 1986).

The family is an important focus for studying heart health protection behaviors because most lifestyle patterns are learned in the family. Moreover, women assume the primary responsibility for the health activities of the family (Litman & Venters, 1979). Further research is needed to demonstrate the efficacy of changing diet, smoking, exercise, and stress management behaviors within the families of women with CHD.

Women's Experience of Cardiac Illness

There is a growing body of literature on women and heart disease, and this section will focus on the recovery and rehabilitation of women with CHD. Female patients' (n=24) and male patients' (n=93) recovery from cardiac surgery have been compared (Rankin, 1990), and at 1 and 3 months after discharge, there were no significant differences on measures of sexuality, recreation, and return to work. Women, however, scored significantly lower on the anxiety, anger, and depression scales of the Profile of Mood States.

Three qualitative studies provide further understanding of women's recovery from heart disease. Seven women and 7 men described the process of adjustment after MI as a struggle to regain control (Johnson & Morse, 1990). Stages of this process included defending oneself, coming to terms, learning to live, and living again. Learning to live included three phases. Preserving a

sense of self involved balancing needs and supports. Minimizing uncertainty focused on perceptions of one's progress. Establishing guidelines for living included lifestyle modifications, on which women and men differed. Men viewed lifestyle modification as a joint venture with their spouses; women made lifestyle changes independently because they did not want to change or interrupt their families' routines.

Hawthorne (1993, 1994) identified seven themes in interviews with 10 women nine to 30 months after coronary artery bypass surgery and compared them to the experience of men, concluding that women's experience is different. Among the themes was the tendency for women to understate or minimize the impact of their surgery. Women also saw remapping of relationships as a major task which included ensuring that patient and family needs were met. Women used different cues for resumption of activities during recovery. These cues included family and home responsibilities and fatigue. Women did not place importance on their active role in risk factor modification.

Women recovering from an acute cardiac event described the process of healing, which could lead to new and positive health behaviors (Fleury, 1993). The stages of healing included surviving, originating, and patterning balance. Women described achieving a new status rather than returning to normal, changing their values and goals, and openness to possibilities.

Knowledge of the effects of cardiac rehabilitation for women is limited due to their exclusion from or small numbers in studies. Women, especially older women, are less likely to participate in cardiac rehabilitation programs, despite achieving comparable improvements in functional capacity (Ades, Waldmann, Polk, & Coflesky, 1992). Lower physician referral rates significantly predicted women's lower participation rates. Women have higher dropout rates from cardiac rehabilitation programs than men (O'Callaghan, Teo, O'Riordan, Webb,

Dolphin, & Horgan, 1984). The reasons for this difference have not been documented. Boogaard (1984) compared the cardiac rehabilitation experience of 10 females and 10 males after MI. Women felt guilty during recovery because they were unable to perform household roles, while men did not express guilt. Although women felt that their families viewed them as ill, families did not wait on them, as they did for men. Further knowledge of women's experience with CHD, particularly related to family-related concepts, is needed to design nursing interventions for changes in health protection behaviors.

Families' Experience of Cardiac Illness in Women

The literature indicates that the acute phase of cardiac illness is stressful for family members and spouses, regardless of gender (Gilliss, 1989). Families have a great need for information, both about hospital progress and home care, for which they do not feel prepared (Gilliss). The recovery phase remains a stressful one for spouses, and family conflict can occur (Gilliss). The support role of spouses during recovery has only been described for wives of cardiac patients. Family functioning has been described for 67 patient-spouse pairs during the 6 months after cardiac surgery (Gilliss, Neuhaus, & Hauck, 1990). At 3 months, a significant decrease in family functioning was reported by control and intervention patients and spouses. By 6 months, spouses in the control group and all patients reported increases. These authors concluded that most patients and spouses have returned to the old patterns of functioning by 6 months. It is of interest to note that some patients and spouses demonstrated divergent patterns of recovery of family functioning. After myocardial infarction, the crisis period was over by 3 months for most families (Dhooper, 1983). Spouses' anxiety and family financial concerns remained, however. The needs and experiences of female cardiac patients' partners and family members, the focus of this study, remain to be described.

Summary

The recently growing body of literature on women with CHD and their families suggests the fruitfulness of exploring this study's concepts. Literature related to healthy women, women with other chronic illnesses, men with heart disease, groups of women and men with heart disease, and their families strengthens the framework for this study.

Social support facilitates health behavior changes and recovery from illness for women, yet sometimes at the price of increased social network demands or the risk of negative effects, such as conflict or failed support attempts by others. Social support is a coping resource for families, yet apparently it diminishes over time following the acute crisis. Women value health more highly than do men, and health values are positively related to health protection behaviors. Families use multiple strategies, including social support, when coping with cardiac illness and the concomitant changes in lifestyle. Goal adjustment, based on shared values, is another example of a family coping strategy.

Adequate data exist to document the role of social support, conflict, value of health, and family coping in changing family health protection behaviors. However, these concepts have not been described sufficiently or at all for women with heart disease and their families, who are the focus of this study, and such information is needed to guide nursing care for this group.

Conceptual Framework

Choice of a conceptual framework for this study was guided by the major assumptions and goals underlying this author's approach to studying women with coronary heart disease and their families. There were two major assumptions underlying this investigation. First, the family as well as the identified patient is affected by the diagnosis and adaptation to heart disease.

This is a basic systems theory assumption, namely that change in one part of the system affects the whole system. Existing research, albeit limited, focuses primarily on the individual or dyad. The second assumption is that females' experience of heart disease is different from that of males. Existing literature which describes the male experience does not provide an adequate knowledge base to guide future research for women with heart disease.

The goals of this study flow from these assumptions. The primary immediate goal was to describe the experience of heart disease for women and their families. The long-term goal of this research was to provide the knowledge base for nursing interventions related to health protection behaviors in families of women with coronary heart disease.

Research related to behavioral changes is complex because at least three systems are involved, including the individual, family, and social systems (Montgomery, 1982). Therefore, no one theory is sufficient to guide this investigation, and, in the case of the clinical problem of interest, new theory is needed. Also, in view of pragmatism for what can be accomplished in a dissertation, some tradeoffs must be made regarding which systems to measure. This study focused on family-level concepts which might serve as predictors of behavioral changes.

The question remains as to which theoretical perspectives would allow such an approach. Relevant portions of two major family theories will be described, followed by conclusions regarding their applicability to this study.

Family Systems Theory

Family systems theory, sometimes referred to as family process theory, serves as a framework for the research topic because its unit of interest is the family system, whereas most other approaches focus on individuals or dyads within the family. Family systems have boundaries which determine the

elements belonging to the system and those in its environment. A family may be open or closed, depending on the permeability of its boundaries. Other family system characteristics are the degree of cohesion among family members and the degree of flexibility of family rules.

An input is a stimulus from the environment which enters the system. An output is a response from the system into the environment. This theory is concerned with how input is processed by the system to result in output. This is accomplished through rules of transformation or family rules. These rules are ordered in hierarchies of feedback and control. Family process is a set of feedback loops that provide stability (morphostasis) and change (morphogenesis). Family systems theory uses a model of circular, reflexive effects rather than one of linear causality. Feedback is defined by Broderick (1990) as "a circular process in which one family member's action has consequences which, in turn, influence his or her own future actions" (p. 180). This feedback may be positive, thus increasing the behavior, or negative, thus decreasing the behavior.

Montgomery (1982) discusses a value-behavior hierarchy in his process model of family crisis. Lower level behaviors support higher level values, and the family's lifestyle is "the behavioral manifestation of its basic values" (Montgomery, 1982, p. 77). Families strive to maintain value congruency, and competing values lead to instability. What would happen if an individual's new behavior, such as a new heart healthy lifestyle, were at odds with the family's values? The family might be willing to make the same lifestyle changes in order to maintain higher level values such as health or cohesion. On the other hand, disruption and instability might result if smoking and personal freedom are highly valued.

Double ABCX Model

The Double ABCX Model of family stress (McCubbin & McCubbin, 1987) focuses on the family's adjustment and adaptation to stress. The family's level of adjustment to a stressor depends upon the interaction over time of the stressor event (A), the family's existing resources (B), and the family's perception of the event (C). Crisis results when there is an imbalance of demands and capabilities for the family. The family's level of adaptation to the crisis is determined over time by the pile-up of demands on the family system (AA), the acquisition of new resources, including coping and social support (BB), and the family's perception of their demands, capabilities, and world view of themselves, including family values (CC). Adaptation is the degree of fit between demands and capabilities at the individual-to-family and family-to-community levels.

This model has been used frequently by nurse researchers and is applicable to the topic of this study. Families view coronary bypass surgery as a crisis (Gilliss, 1983), and spouses report more stress than patients do in the acute phase (Gilliss, 1984). This model accounted for 29% of the variance in family functioning 6 months after coronary artery bypass surgery (Gilliss, 1983). However, Gortner et al.'s (1988) clinical trial of a nursing intervention to improve recovery for couples after cardiac surgery, based on the Double ABCX model and self-efficacy theory, failed to demonstrate significant differences in family functioning between control and experimental groups. One explanation for absence of significant results was lack of fit of the model.

Conclusions

None of the theories described above is adequate to guide this study. Family systems has the strength of focusing on the family as a unit, but it has the limitation of difficulty of operationalizing the concepts, such as rules. The Double ABCX model better specifies concepts to be measured, such as social support as a resource. The Double ABCX model is limited by inadequate

operationalization of the "C" or perception factor, and by its shortcomings in Gortner et al.'s (1988) clinical trial with a cardiac group similar to this investigation. Because of their similar sociological bases, the two theories presented are compatible.

Therefore, the salient aspects of these theories helped to guide the choice of concepts and methodologies for this study. Quantitative approaches were utilized to measure social support, conflict, value of health, family coping, and health protection behaviors.

Purpose of Study

The purpose of this dissertation was to describe the experiences of women with CHD and their families. The specific research questions were:

1. What are the relationships among social support, conflict, value of health, family coping, and health protection behaviors for women with CHD and their family members?;

2. What variables predict health protection behaviors of women with CHD and their family members?

The specific aims of the study were to:

1. describe patterns of social support and conflict for women with CHD and their family members;

2. describe the health values of women with CHD and their family members;

3. describe family coping in families of women with CHD;

4. describe the health protection behaviors of diet, smoking cessation, exercise, and stress management for women with CHD and their family members;

5. describe the relationships among social support, conflict, value of health, family coping, and health protection behaviors for women with CHD and their family members.

6. describe the influences of social support, conflict, value of health, and family coping on health protection behaviors of women with CHD.

7. describe the influences of social support, conflict, value of health, and family coping on health protection behaviors of family members of women with CHD.

CHAPTER III

METHODS

This descriptive study used a prospective, longitudinal design to describe the experiences of women with CHD and their family members related to social support, conflict, value of health, family coping, and health protection behaviors. At Time 1, defined as hospitalization for CHD, subjects completed a battery of self-report instruments. At Time 2, defined as 3 months later, the same measures were repeated. A 3-month time period was chosen because recovery from cardiac illness may last as long as 3 months (Dhooper, 1983) . Table 1 presents an overview of the study subjects, data collection times, and methods.

Setting and Sample

Subjects were recruited from a 450-bed tertiary care hospital noted for its cardiac care program in Portland, Oregon. Approximately 600 women are admitted with the diagnosis of CHD per year and are drawn from a statewide referral base representing diverse socioeconomic and racial/ethnic backgrounds. Many of these women live in small towns and on farms and return home immediately after receiving acute intervention. Support of the heart institute at the hospital was obtained for this project (Appendix A). A university hospital was added as a second data collection site midway through data collection in order to recruit ethnic minority subjects. No eligible minority subjects were identified during 1 month of screening, and this site was dropped.

A total of 99 women were approached to participate in the study, and a convenience sample of 89 women consented. Eighty women returned the Time 1 questionnaire. Of these, 74 returned the Time 2 questionnaire within 28 days.

Table 1

Overview of Study Subjects, Data Collection Times, and Methods

Subjects	Time 1	Time 1 Measures	Time 2	Time 2 Measures
74 women with CHD (coronary heart disease) and 120 family members	Hospitalization for CHD	Questionnaires: Interpersonal Relationship Inventory Source and Satisfaction Questionnaire Health Value Survey Health Value Scale F-COPES Diet Habit Survey Smoking Questionnaire Health-Promoting Lifestyle Profile Demographic Questionnaire	3 months after discharge from hospital	Same as Time 1

Criteria for participation were as follows. Women with CHD undergoing intervention procedures, including percutaneous transluminal coronary angioplasty (PTCA) or coronary artery bypass graft surgery (CABG), were recruited. Women with the diagnosis of myocardial infarction without an intervention procedure were excluded because there were so few in this category. In order to obtain access to subjects, women were recruited while hospitalized for CHD. Women aged 75 and younger were included because cardiac risk factor modification in women over the age of 75 is controversial and because of different developmental needs of older families. Other criteria for the female CHD patients included: (a) able to read and speak English, and (b) at least one family member in addition to the patient consented to participate.

A convenience sample of 180 family members consented to participate. Four family members declined participation. Time 1 questionnaires were returned by 152 family members. Seven of these family members were dropped because the woman with heart disease did not return the Time 1 questionnaire. Of the 145 remaining subjects, 120 returned the Time 2 questionnaire within 45 days. Family members who consented to participate met the following criteria: (a) identified by the female CHD patient as a family member, (b) age 13 or older, and (c) able to read and speak English. A minimum age of 13 was set because the measures of study concepts were not appropriate for younger children. A maximum of three family members per female CHD patient were recruited in order to ensure that the sample of family members was sufficiently diverse to capture a broad range of respondent experiences.

A sample size of 78 female CHD patients and 78 families was determined by a power analysis (Cohen, 1977) and consideration of feasibility. Based upon prior research (Coppotelli & Orleans, 1985; Fleetwood & Packa, 1991; Hubbard,

et al., 1984; Kristiansen, 1985a; Kristiansen, 1985b; Lewis, et al., 1989), it was hypothesized that the study variables would explain 22.7% of the variance in health protection behaviors. The formula for effect size (f^2) is $R^2_{Y.B}/1-R^2_{Y.B}$ which yielded a moderate to large effect size (.29) according to Cohen's criteria. Thus given alpha = .05, f^2 = .29, U = df in numerator of F ratio = 9, and a desired power of .90, L = 19.83 and N = 78. Although some authors suggest a rule of 10 subjects for each predictor variable (Thorndike, 1978), with a large effect size this may not be necessary to achieve the desired power. This power estimate was for the overall R^2, and not for individual predictors. The feasibility of recruiting a large number of families was tempered by the difficulty experienced by other family researchers in recruiting vulnerable families (B. Stewart, personal communication, July 26, 1991; S. Rankin, personal communication, August 13, 1991).

Concepts and Their Measurement

The following instruments were used to measure the concepts of interest in this study. A booklet containing all instruments completed by subjects is contained in Appendix B. Scoring information for all quantitative measures is summarized in Appendix C. In general, higher scores indicated greater amounts of the variable. Table 2 lists the study concepts, variables, and measures.

Social Support and Conflict

The Interpersonal Relationship Inventory (IPRI) (Tilden, et al., 1990a; Tilden, Nelson, & May, 1990b) measures three dimensions of interpersonal relationships with three subscales: social support (13 items), reciprocity (13 items), and conflict (13 items). Because of concerns regarding the validity of the reciprocity subscale and the possibility of subject fatigue, the IPRI Short Form, containing only the social support and conflict subscales, was used. Social support is the perceived availability or enactment of helping behaviors by

Table 2
Concepts, Variables, and Measures

Concept	Variable	Measure
Social Support	Interpersonal support score	Tilden's Interpersonal Relationship Inventory
	Source and satisfaction score	Source and Satisfaction Questionnaire
Conflict	Conflict score	Tilden's Interpersonal Relationship Inventory
Value of Health	Health value ranking	Wallston's Health Value Survey
	Health value score	Lau, Hartman, and Ware's Health Value Scale
Family Coping	Familial introspection score	Lewis' Adapted F-COPES
Diet	Low fat diet score Carbohydrate diet score Total diet score	Connor et al.'s Diet Habit Survey
Smoking	Stage of self-change of smoking Self-efficacy rating	Smoking Questionnaire
Exercise	Exercise score	Walker, Sechrist, and Pender's Health-Promoting Lifestyle Profile
Stress Management	Stress management score	Walker, Sechrist, and Pender's Health-Promoting Lifestyle Profile
Demographics	Age, gender, marital status, years married, education, race/ethnicity, employment, household characteristics, income, religiosity	Demographic Questionnaire
Coronary Heart Disease (CHD)	Presenting syndrome, treatment, risk factors, coronary angiography, NYHA functional class	CHD Profile

members of the social network. Conflict is the perceived discord or stress in relationships due to others' behavior or absence of behaviors (Tilden, et al., 1990a). The IPRI was appropriate for this study not only because social support is positively related to health behaviors, but because conflict has been described in CHD patients. In addition, the demands of social support, which are likely to be captured by the conflict subscale, are greater for women. This self-report instrument contains items rated on a 5-point Likert scale. Subscale scores are considered separately and not combined for a total score.

In extensive reliability and validity assessment of the IPRI (Tilden, et al., 1990a; Tilden, et al., 1990b), internal consistency reliability of the subscales ranged from .83 to .92. Two-week test-retest reliability ranged from .84 to .91. Construct validity was tested by three approaches. With a theory testing approach, factor analysis confirmed the existence of three factors. In a multiple regression analysis of the ability of the subscales to predict psychological symptoms, only reciprocity had no effect. Criterion-related validity was confirmed by high correlations with the cohesion and expressiveness subscales of the Family Relationships Index ($r = .67$ and .46 respectively) and the Personal Resources Questionnaire ($r = .64$). In a contrasted groups approach, the instrument performed as expected. A multitrait-multimethod approach showed convergence and divergence, but failed to show discrimination between social support and conflict. Norms were established for the IPRI in a large sample representative of the general population.

Because sources of social support are not measured by the IPRI, three additional social support questions, adapted from Weinert's Personal Resources Questionnaire (Weinert, 1988), were asked (Appendix B). These situation-specific items were designed to capture anticipated (measured at Time 1) and realized sources of support, and satisfaction with support received. The latter

two items were measured at Time 2. Responses to these questions were used for descriptive purposes only.

Value of Health

Since measurement of health value in women with CHD and their families has not been reported, two different scaling approaches to measuring value of health were used in order to determine which scale was better able to detect variability of responses in this sample. A value was defined as "an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence" (Rokeach, 1973, p. 5).

The Health Value Survey (Wallston, et al., 1978) is an adaptation of Rokeach's (1973) Value Survey. The value, health, was added and nine of Rokeach's terminal values were chosen on the basis of those thought most likely to compete with health. Health was defined as physical and mental well-being. Respondents ranked each of the 10 values on the basis of importance to them. In order that the high scores from the resulting ordinal level data correspond to high health value, the ranking for health was subtracted from 11. Thus, high scores correspond to high health value. Four week test-retest reliability of .92 was reported in a sample of hypertensive adults (Pender, 1985). Evidence for construct validity was found in its ability to function as expected in theory-testing approaches with high health value related to participation in health behaviors (Fleetwood & Packa, 1991; Kristiansen, 1985a; Kristiansen, 1985b; Wallston, et al., 1978).

Lau, Hartman, and Ware's (1986) Health Value Scale also was used to measure health value. This 4-item Likert scale has the advantages of brevity and simplicity. Internal consistency reliability in several tests approached acceptability for a new and short scale (α =.63 to .72) and 6-week test-retest

reliability was .78 (Lau, et al., 1986). Construct validity was demonstrated through factor analysis and theory testing of the health belief model, and concurrent validity through a zero-order correlation with the Health Value Survey of .62 (Lau, et al., 1986). Evidence for criterion-related validity of the Health Value Scale was obtained by comparison to the more frequently used Health Value Survey.

Family Coping

Family coping was measured by the familial introspection subscale of Lewis' adapted version of F-COPES (Lewis, et al., 1989). Family coping was defined as utilization of cognitive and behavioral strategies by the family to manage demands on the family system. Introspective coping includes those strategies by which "...the family reflects on its own operations and negotiates its future directions" (Lewis, et al., 1989, p. 1263).

The Family Crisis Oriented Personal Evaluation Scale (F-COPES) is a 29-item self-report instrument (McCubbin, Olson, & Larsen, 1987) that measures cognitive and behavioral strategies used by families in difficult situations. The adapted version of F-COPES was developed by Lewis, Woods, and Ellison (personal communication, Nov. 4, 1992) for the Family Impact Study by adding 20 items. Factor analysis of the 49-item total scale revealed the presence of five factors: familial introspection, reliance on kith and kin, religious orientation, openness and flexibility, and belief in family strength. Stability coefficients were obtained for the first three factors. Internal consistency reliability for the familial introspection subscale was .84 to .93. Theory testing with women experiencing three types of chronic illnesses and their families provided evidence for construct validity of the familial introspection subscale, with familial introspection coping significantly predicting quality of the parent-child relationship (Lewis, et al., 1989). Lewis and colleagues operationalize family coping with the familial introspection

subscale because of its strong ability to predict outcomes across chronic illness samples (F. M. Lewis, personal communication, November 4, 1992). The familial introspection subscale consists of 16 items rated on a 5-point Likert scale.

Health Protection Behaviors

Diet. The Diet Habit Survey (DHS) (Connor, Gustafson, Sexton, Becker, Artaud-Wild, & Connor, 1992) was designed for family members to measure eating behaviors related to coronary heart disease prevention. The DHS was developed for the Family Heart Study and tested on 149 men and 138 women. It has subsequently been used for both clinical evaluation and for research. Factor analysis (n = 287) revealed two factors, cholesterol-saturated fat habits and carbohydrate habits. Because high scores corresponded to lower fat diets, the cholesterol-saturated fat habits scale was renamed the low fat diet score for this study. Two month test-retest reliability of the subscales was .87 and .80 respectively. Inter-rater reliability was .95 and .88. Construct validity was demonstrated by correlations with the 24-hour dietary recall and changes in plasma lipids. The 25-question research version of the DHS was used in this investigation.

Low fat diet scores and carbohydrate scores can be used to classify subjects' diets into categories of fat consumption since both are components of low fat diets. These categories are the present American diet (37% fat), Diet 1 (30% fat), Diet 2 (25% fat), and Diet 3 (20% fat) (Connor, et al., 1992). Criteria for categories are listed in Appendix C.

Smoking. An 8-item smoking questionnaire was developed by this author for use in the study. Items were written to reflect DiClemente and Prochaska's (1985; DiClemente, Prochaska, & Gibertini, 1985) stages of self-change of smoking: never, long-term quitter, recent quitter, relapser, contemplator, and

immotive (no intention to quit). Additional items were adapted from Taylor and colleagues' (Taylor, Houston-Miller, Killen, & DeBusk, 1990) nursing intervention protocol to measure self-efficacy for smoking cessation. A single item measures number of smokers in one's household. Content validity was assessed by two advanced practice nurses in the areas of health promotion and cardiac rehabilitation.

Exercise and Stress Management. The Health-Promoting Lifestyle Profile (HPLP) measures six dimensions of a health-promoting lifestyle, which is defined as "a multidimensional pattern of self-initiated actions and perceptions that serve to maintain or enhance the level of wellness, self-actualization, and fulfillment of the individual" (Walker, Sechrist, & Pender, 1987, p. 77). The six subscales include self-actualization, health responsibility, nutrition, interpersonal support, exercise, and stress management. The latter two subscales are appropriate for a cardiac population and were used in this investigation. Items were rated on a 4-point Likert scale.

The HPLP has demonstrated satisfactory psychometric properties. Internal consistency reliability for the 5-item exercise subscale was .81 and for the 7-item stress management subscale was .70 during initial psychometric evaluation (Walker, et al., 1987). Two week test-retest reliability ranged from .81 to .91 for the subscales (Walker, et al., 1987). Construct validity was demonstrated by factor analysis (Walker, et al., 1987) and by theory testing with the Health Promotion Model (Pender, Walker, Sechrist, & Frank-Stromborg, 1990).

Demographics and CHD Profile

Demographic variables included age, gender, marital status, years married or partnered, education, race/ethnicity, employment, household income, religiosity, geographic location, and two social network items. In addition, a

coronary heart disease (CHD) profile (Appendix D) was completed for all subjects. Information regarding presenting syndrome, treatment, risk factors, coronary angiography, and NYHA functional class was obtained through chart review at Time 1 and female subject interview at both times. Family members were interviewed regarding their history of CHD and risk factors at Time 1.

Summary

The questionnaire booklet (Appendix B) contained the self-report instruments used in this study. It was printed with two sections so that data collection could be divided into two sessions easily. All measures were the same for patients and family members and were the same at Time 1 and Time 2 except for the Social Support Sources and Satisfaction Questions and some demographic and CHD profile questions. A summary of the psychometric characteristics of the study instruments is contained in Appendix E.

Protection of Human Subjects

The rights of human subjects were protected according to federal guidelines as monitored by the Oregon Health Sciences University Committee on Human Research and the St. Vincent Hospital and Medical Center Institutional Review Board. Approval of both committees was obtained. Appendix F contains copies of the approved consent form and each institution's letter of approval.

Confidentiality of data was maintained by the following procedures. No names were attached to questionnaires or interviews, but identification was by code number only. Data were kept in a locked cabinet available only to the investigator. The signed consent forms and the list that connected names and code numbers were locked in a cabinet away from the information files. The list that connected names and code numbers was destroyed at the end of data analysis.

The risks to subjects for participation included possible fatigue and/or psychological discomfort related to disclosure of feelings or family dynamics. To eliminate or reduce these risks, subjects were advised to complete their questionnaires in private and in two or more sessions if they became tired. Subjects were reminded of their right to refuse to answer any questions and to decide to withdraw from the study without repercussions.

Procedure

Potential subjects were identified by the investigator's daily examination of the assignment sheets of the four cardiac units at the data collection site and by staff recommendation based on eligibility criteria. A screening form (Appendix G) was used to check eligibility criteria through chart review. In order to document both the response and refusal rates, and to note recruitment issues regarding women and families, these screening forms were retained and treated as confidential data. Once a patient was identified by the investigator as a potential subject on the basis of the eligibility criteria, the staff nurse caring for that patient asked the patient if the researcher may meet with her, using a suggested script (see Appendix H). An appropriate time to explain the study to the patient was agreed upon by the patient, nurse, and researcher. All patients were approached while hospitalized except those post-CABG patients who were members of a large health maintenance organization. Because they were transferred to another hospital early in their postoperative course, a modified procedure was used. The patient's nurse asked the patient if the investigator could phone her after discharge to explain the study and gave her a card with the investigator's name and phone number. These patients were called one to two days after their projected discharge date.

After introduction by the nurse, the researcher explained the purpose and meaning of participation to the patient and any family members present, and

answered any questions. The consent form was read by the researcher to those present, and willingness to participate asked individually. Signing of the consent form indicated consent to participate. The researcher made herself available by telephone or in person for any future concerns or questions. The female patient was asked to identify additional family members to be contacted for participation up to a maximum of three members per family. Those not present in the hospital were contacted by telephone. The study was explained by phone, and a packet containing the consent form and questionnaire booklet was mailed to those who agreed. Minors aged 13 and over were asked to participate only after parental consent was obtained.

After consent was obtained, the procedure for data collection was reviewed with subjects. Subjects were instructed to complete the questionnaire individually, and not to discuss answers until the forms were completed and returned. It was suggested that the questionnaire booklet would take approximately one hour to complete, but most subjects reported that it took 30 to 45 minutes. Subjects, particularly acutely ill patients, were encouraged to complete the forms in two or more sessions in order to avoid fatigue. Only two women subjects requested assistance from the investigator when completing the questionnaire. Time 1 questionnaires were completed in the hospital by 25% (n=20) of the women and 10% (n=14) of the family members and returned in sealed envelopes to a basket at the nurses' station. The remaining subjects completed the questionnaires at home and returned them by mail. At Time 2 (12 weeks after hospital discharge), the women with CHD were phoned to obtain 3-month CHD profile information, and questionnaire booklets were mailed to all subjects.

After the booklet was given or mailed, a modified Dillman procedure was used to increase the questionnaire response rate (Dillman, 1978). This

procedure consisted of the following steps: (a) a postcard was mailed 1 week later with a thank-you for responding or a reminder to do so; (b) if no response was received within 2 weeks, subjects were phoned to verify their receipt of the questionnaire and reminded of the importance of their response; (c) a second booklet was mailed at 3 weeks if no response; (d) after 4 weeks, the postcard was repeated.

To minimize the amount of missing data, the following procedures were used. Booklets returned in the hospital were scanned by the investigator for missing data. Subjects were then reminded of their right not to answer any question, but asked to complete unanswered questions if they had been overlooked or misunderstood. For booklets returned by mail with missing data, a letter with similar instructions was mailed along with photocopies of pages with the missing data. Approximately 10 percent of the Time 2 booklets were returned with two facing pages completely unanswered. This was judged to be a problem of pages sticking together when turned.

Data Analysis

Descriptive and inferential statistics were used to analyze quantitative data, using SPSS 4.0 for the Macintosh. A probability level of less than .05 was accepted for statistical significance.

Descriptive Analysis

Frequency distributions for all variables for the entire sample were reviewed for outliers, missing data, and normality, and judged satisfactory to proceed with scale formation.

Internal consistency reliabilities of the scales used in this study were examined by determination of Cronbach's coefficient alpha (see Table 3). These coefficients were based on all subjects who had returned booklets, i.e., no cases were yet dropped and no trimming of scales was done. In addition, item and

Table 3

Reliabilities of Scales

Scale	Cronbach's reliability coefficient alpha			
	Women		Family Members	
	Time 1 (n=80)	Time 2 (n=76)	Time 1 (n=145)	Time 2 (n=122)
IPRI: social support	.88	.91	.90	.90
IPRI: conflict	.92	.91	.88	.92
Health Value Scale	.60	.77	.64	.65
Health Value Survey	a	a	a	a
Adapted F-COPES: family coping	.95	.95	.91	.95
Diet Habit Survey: low fat	.87	.82	.86	.87
Diet Habit Survey: carbohydrate	a	a	a	a
Diet Habit Survey: total	a	a	a	a
Smoking Questionnaire	a	a	a	a
HPLP: exercise	.79	.76	.72	.68
HPLP: stress management	.74	.73	.71	.77

Note. IPRI indicates Interpersonal Relationship Inventory; F-COPES Family Crisis Oriented Personal Evaluation Scales; HPLP Health-Promoting Lifestyle Profile. [a] Cronbach's alpha is not an appropriate test of reliability.

scale means and variances were examined, as well as inter-item correlations. Comparisons of these results for women's scales and family members' scales were examined visually. The health value scale, a 4-item Likert-type scale, had alphas ranging from .60 to .77. This may be due to the fact that it was a relatively new, short scale not previously used with this population. Cronbach's alpha was not appropriate for the Health Value Survey, carbohydrate subscale, or Smoking Questionnaire.

Scales used in subsequent analyses were formed using substitution of the group or subject mean for missing item values when 75% of the items on a scale were answered. The amount of missing data was small. The group mean was used for the Health Value Scale, Adapted F-COPES, and HPLP exercise and stress management scales. The subject's mean was substituted in the Diet Habit Survey low fat diet scale and the IPRI social support and conflict scales. No substitution was needed for the carbohydrate scale of the Diet Habit Survey. Outliers on a scale were trimmed to a value of plus or minus 3 standard deviations.

In preparation for the family regression analyses, two additional sets of scores were formed. A family mean score for each scale was formed by averaging the scores of members within a family. A second set of scores was created by randomly selecting one family member per family. For families with only one subject, that one was selected. For families with 2 or 3 members, a random numbers table was used to select one subject per family.

Multiple Regression Analysis

Pearson's product-moment correlations were inspected for significant relationships among the study variables as well as to detect multicollinearity. Zero-order correlations between the predictor and outcome variables for the women and for the family members are displayed in Appendix I. There were

sufficient significant relationships to support the feasibility of multiple regression analyses. Two relationships were of particular interest. The correlation between social support and family coping at Time 1 for the women was .66, suggesting multicollinearity. The correlations between the Health Value Survey ranking and Health Value Scale ranged from .30 to .54 for the women and from .31 to .36 for the family members, indicating measurement of similar but not identical dimensions of the construct.

Regression equations were not calculated for the total diet scores because total diet was a linear combination of the low fat diet and carbohydrate scores and because the latter two outcomes were found to behave differently regarding changes over time and significant predictors.

Women with CHD. Hierarchical multiple regression analyses were performed in order to identify significant predictors of changes in the four Time 2 outcome behaviors with continuous data (low fat diet, carbohydrate, exercise, and stress management). Five sets of regression analyses were performed for the women's outcomes. In the first, only the women's scores were used as predictors. In the second and third sets, the family mean outcome score or the outcome score of one member per family chosen at random was added as the last step in order to determine what additional variance in the women's behavior could be explained by those scores. In the fourth and fifth sets, family mean scores or one member per family's scores were used as predictors of the women's outcomes.

Because changes in behavior over time were of interest in this study, Time 1 outcome was controlled for by entering it into the equation first. The order of the other predictors in the model was based on both temporal order and stability of the variable. Therefore, the women's procedure, CABG or PTCA, was entered after the Time 1 outcome, and cardiac rehabilitation and complications

were entered last. The latter two variables were added to the model after examination of residuals, and were scored dichotomously (0=no, 1=yes) based on the Time 2 CHD profile interview. Social support has been described more than the other variables and thus was considered to be more stable. Therefore it was entered before conflict. The Health Value Scale was an exploratory variable, and was entered third within each time wave.

In order to achieve a more parsimonious model, age, years of education, income adequacy, and history of heart disease were dropped after it was determined that they explained no variance in any of the outcomes. Family coping also was dropped because of concerns with multicollinearity with social support and with subjects' difficulty answering the scale. In addition, it explained no significant variance in any outcome in preliminary analyses. Finally, the Health Value Scale was retained as a single measure of health value because it contained more items than the Health Value Survey.

Family Members. Two sets of hierarchical multiple regression analyses were performed with the family members' data for family member outcomes. First, data from family members was aggregated to create a family score. Family scores were used because individual member scores cannot be assumed to be independent. Although various methods of obtaining a family score have been proposed (Uphold & Strickland, 1989), a family mean score was used in this analysis, as recommended by Ferketich & Mercer (1992). A series of analyses of variance for the predictor and outcome variables revealed that there was no association between the number of family scores used and the family means. In a second approach, individual family member scores for all family members were used in a set of multiple regression equations. Although independence of observations cannot be assumed, scores were treated as though they were independent observations.

One-way, random effects analysis of variance (ANOVA) was used to determine the proportion of variance in measured variables accounted for by the family and whether scores on those variables were dependent on membership in a family. Random effects ANOVA was chosen based on the following rationale. Although the family is thought of as having a systematic influence or effect on scores on variables, the opportunity for the family to participate in this particular study is conceptualized as determined by a random process (Hays, 1973). Hence the term random effect. Random effects ANOVA tests the null hypothesis that there is no family effect on scores of measured variables.

For this analysis, only families with two or three members participating were chosen since families with only one member would have variances of zero. Thirty- eight families with 89 members were included. The proportion of variance accounted for by families was calculated for each variable. As Shown in Table 4, six of the 22 variables had zero variance accounted for by families. The proportion of variance explained in the other 16 variables ranged from 2% to 29%. There was a significant effect of the family for three variables: exercise (25%) and carbohydrate diet (22%) at Time 1 and conflict (29%) at Time 2.

Rationale for entry of predictors in the family hierarchical multiple regression analyses was the same as that for the women. Likewise, family coping and the Health Value Survey were dropped. After preliminary analyses, three sociodemographic variables, gender, age, and living with the woman with CHD, were retained in the family members' model. Mean scores for these variables were not appropriate for the family mean model. Years of education, income adequacy, and family member's history of heart disease were never significant and therefore were dropped from the model. In the family mean

Table 4

Random Effects ANOVAs for 38 Families with Two or Three Participants

	Variables	% of variance accounted for by families	F	p
Time 1:	Family Coping	2	1.06	.42
	Social Support	6	1.16	.31
	Conflict	20	1.60	.06
	Health Value Scale	0	.90	.63
	Health Value Ranking	0	.67	.89
	Exercise	25	1.77*	.03
	Stress Management	0	.94	.57
	Smoking Stage	12	1.32	.18
	Lipid Diet	0	1.00	.50
	Carbohydrate Diet	22	1.67*	.04
	Total Diet	14	1.37	.15
Time 2:	Family Coping	13	1.34	.16
	Social Support	9	1.24	.24
	Conflict	29	1.96*	.02
	Health Value Scale	5	1.12	.35
	Health Value Ranking	0	.62	.93
	Exercise	8	1.21	.26
	Stress Management	0	.99	.50
	Smoking Stage	17	1.46	.11
	Lipid Diet	2	1.04	.45
	Carbohydrate Diet	16	1.44	.12
	Total Diet	6	1.15	.32

Note. *p<.05, 2-tailed.

model, the woman's Time 2 outcome was entered as the last predictor to determine what additional variance in the family's mean score it might explain. In the family members' regression model, outliers with standardized residuals greater than or equal to 3.0 were dropped from the final analysis. This resulted in dropping two cases from the lipid model, one from the carbohydrate model, and three from the exercise model.

Analysis of Variance. To determine if there were differences in social support, conflict, family coping, and health value, one-way analyses of variances (ANOVA) were done to test for main effects due to smoking stages. Because the numbers of women in the contemplator (n=1) and relapser (n=3) cells at Time 1 were small, these groups were combined for the analysis. As in the regression analyses, individual family members' scores were treated as independent observations. When significant effects were demonstrated, post hoc comparisons using Student-Newman- Keuls procedure were performed.

Summary

This study used a longitudinal descriptive design to describe the experiences of women with CHD and their family members related to social support, conflict, value of health, family coping, and health protection behaviors of diet, smoking cessation, exercise and stress management. Seventy-four women with CHD and 120 family members completed questionnaires at the time of hospitalization and again three months later. Descriptive and inferential statistics were used to analyze study data. To assess the effects of social support, conflict, health value, type of cardiac intervention (CABG or PTCA), cardiac rehabilitation, complications, and family health behaviors on changes in health protection behaviors in women with CHD, five sets of multiple regression models were tested. Two sets of hierarchical multiple regression analyses were performed for the family members' outcomes, using family mean scores or

individual family member scores. To determine if there were differences in social support, conflict, family coping, and health value, one-way analyses of variances (ANOVA) were done to test for main effects due to smoking stages.

CHAPTER IV

RESULTS

In this chapter, the results of data analysis are presented separately for the women and their family members. After the sample is described, findings of the descriptive analysis, multiple regression analysis, and analyses of variance are presented.

Description of the Sample

Women with Coronary Heart Disease (CHD)

The sample consisted of 74 women with CHD for whom complete data were available. Frequency distributions of all measured sociodemographic variables are displayed in Appendix J. The mean age was 63.2 years (SD 8.9). The sample of women was predominantly white, married, and educated at just above high school level. At Time 1, the majority of women were retired or homemakers, and 16 were employed full time, 3 employed part time, and one unemployed. At Time 2, 5 additional women considered themselves unemployed, one more listed retirement, and one considered herself disabled. The median household income level for the sample was $20,000 to $29,999, with the majority (73%) having an income under $30,000. The majority of women (n=58) stated they lived in or near a large city. Sixteen women (22%) at Time 1 and 14 (19%) at Time 2 lived alone.

During hospitalization (Time 1), 40 women (54%) underwent coronary angioplasty (PTCA) and 34 (46%) had coronary artery bypass surgery (CABG). Fifty women (68%) had a prior history of CHD with the mean length of the diagnosis 50.34 months (SD 54.81, range 0.5 - 168) and a median length of 24 months. Risk factors for CHD are listed in Table 5. Forty-five (61%) of the sample had completed menopause, although this number is probably higher since menopause status was missing for 16 subjects. At Time 1 hospitalization,

Table 5

Coronary Risk Factors in Sample of Women with CHD (n=74) and Family Members (n=120)

	Women		Family members	
Risk factors	n	%	n	%
Hyperlipidemia [a]	52	70	34	28
Smoking	30	41	33	27
Hypertension	42	57	22	18
Physical inactivity	22	30	24	20
Stress	44	60	63	52
Obesity	47	64	43	36
Family history	52	70	72	60
Diabetes	19	26	4	3

Note. CHD indicates coronary heart disease. [a] 7 women and 19 family members did not know their lipid status.

25 women (34%) were admitted with the diagnosis of acute myocardial infarction (MI), 18 (24%) with stable angina, 38 (51%) with unstable angina, 7 (10%) with congestive heart failure, and 5 (7%) with other cardiac diagnoses. The number of diseased coronary arteries were: 1 in 28 women (38%), 2 in 19 (26%), and 3 in 25 (34%). These numbers were unavailable for 2 women. NYHA classification was available in only three hospital records at Time 1. At 12 weeks after hospital discharge, all women were alive and 25 women (34%) reported recurrence of CHD symptoms, including stable angina, unstable angina, and congestive heart failure. Six women (8%) had at least one PTCA and one woman had CABG surgery between Time 1 and Time 2. A total of 9 women (12%) participated in an outpatient cardiac rehabilitation program. NYHA functional, which reflects cardiac symptoms, is shown in Table 6 for Time 2. Complications were reported by 14 women (19%) at Time 2. Complications were defined as problems requiring medical intervention or hospitalization, but not including PTCA or CABG. The most frequent complication included leg infection, edema, and/or pain.

Family Members

The sample of 120 family members included 62 females and 58 males for whom complete data were available. These individuals represented 66 families; thus 8 women had no family members in the final sample. Among the family members, 51 (43%) were daughters, 31 (26%) were husbands, 22 (18%) were sons, and the remaining were sisters, brothers, friends, daughters-in-law, and others. Frequency distributions of all measured sociodemographic variables are displayed in Appendix K. The mean age in years for husbands was 63.7 (SD=11.0), for daughters 37.5 (SD=8.7), for sons 38.7 (SD=7.7), and for others 56.4 (SD=14.6). The sample of family members was predominantly white, married, well educated, employed full or part time, and living in or near a large

Table 6

NYHA Functional Class of Women at Time 2 (n=70)

NYHA functional class	n	%
I	47	64
II	16	22
III	4	5
IV	3	4

Note. NYHA indicates New York Heart Association. Data missing for 4 cases.

city. The median household income for the family members was $30,000 to $39,999. At Time 1, 46 family members (38%) lived with the women with CHD. The majority of these were husbands (n=31), followed by daughters (n=9), sons (n=4), and others (n=2). Nineteen family members (16%) had a history of CHD, with 2 having undergone PTCA and 5 CABG. Of the 19 with a history of CHD, 9 were blood relatives, 9 were husbands, and 1 was other. One family member with a history of PTCA had CABG surgery between Time 1 and Time 2. Risk factors for CHD reported by family members are listed in Table 5.

Descriptive Analysis

Women with CHD

Women's scores for social support, conflict, the Health Value Scale, and family coping were not significantly different between Time 1 and Time 2. There was a trend ($t=1.80$, $p=.08$) for the Health Value Survey ranking to decrease over time, indicating a lessening in the value of health. The means, standard deviations, correlations, and paired t-tests for the women's predictor and outcome variables are listed in Table 7. The Pearson's r correlations reflect the degree of correlational stability over the 3 month time period. Most correlations were in the moderate range, indicating that shifting of subjects' relative positions on the measures had occurred. When compared to scale norms (Tilden, et al., 1990a), the women's scores for social support were significantly higher at both times. Conflict scores did not differ from the norms (see Table 8). Some women reported difficulty answering the F-COPES scale, stating that they had trouble answering for the family, particularly in situations where they perceived some members at one point on the scale and others at another.

T-tests comparing the CABG subjects with the PTCA subjects revealed no significant differences on the predictor and outcome variables, or on the variables of age, years of education, income adequacy, history of heart disease, or

Table 7

Means, Standard Deviations, Pearson's r Correlations, and Paired t-tests for Women's Predictor and Outcome Variables at Two Times (n=74)

Scales	Time 1 M (SD)	Time 2 M (SD)	r	n	t
IPRI: social support	54.52 (7.54)	53.91 (7.35)	.71	74	.93
IPRI: conflict	37.02 (10.94)	36.00 (10.54)	.74	73	1.13
Health Value Survey	9.32 (1.04)	9.00 (1.57)	.40	73	1.80
Health Value Scale	5.42 (1.41)	5.36 (1.55)	.65	72	.41
Adapted F-COPES: family coping	3.60 (.75)	3.52 (.75)	.42	68	.83
Diet Habit Survey: low fat	69.62 (13.40)	77.18 (11.84)	.58	74	-5.56***
Diet Habit Survey: carbohydrates	53.36 (20.81)	56.22 (19.58)	.55	74	-1.28
Diet Habit Survey: total	122.99 (27.15)	133.43 (26.06)	.61	74	-3.82***
Smoking stage	4.03 (.96)	4.03 (.95)	.92	72	.00
HPLP: exercise	1.69 (.63)	2.15 (.73)	.50	73	-5.75***
HPLP: stress management	2.47 (.55)	2.73 (.55)	.46	74	-4.04***

Note. IPRI indicates Interpersonal Relationship Inventory; F-COPES Family Crisis Oriented Personal Evaluation Scales; HPLP Health-Promoting Lifestyle Profile. *** $p<.001$, 2-tailed.

Table 8

Comparison of Social Support and Conflict Scores to Norms Using Z Scores

	Women (n=74)		Family Members (n=120)	
	Time 1	Time 2	Time 1	Time 2
Social support	Z=4.58**	Z=3.90**	Z=3.07**	Z=4.06**
Norm:				
M=50.44				
SD=7.67				
Conflict	Z=1.43	Z=0.28	Z=2.86**	Z=1.31
Norm:				
M=35.75				
SD=7.67				

Note. **p<.01, 2-tailed.

participation in cardiac rehabilitation. The CABG subjects did have significantly more complications (t= -2.71, p=.01).

In addition to the IPRI social support scale, women with CHD were asked about sources of and satisfaction with help related to their cardiac illness. Expected (Time 1) and realized (Time 2) sources of help are listed in Table 9. Major sources of help to the women, including children, friends, other relatives or family members, and spouse/significant other, were similar over time. Satisfaction with help was rated at Time 2. The mean rating was 4.76 (SD 1.58, range 1-6), indicating moderate satisfaction. Nineteen percent of the women were a little to very dissatisfied with the help received.

Women reported significantly higher scores on the low fat diet, total diet, exercise, and stress management scales at time 2, indicating improvements in these behaviors. The increase in carbohydrate scores was not significant and smoking stage did not change at all.

Categories of diet changes between Time 1 and Time 2 also were examined for the women (see Tables 10 to 12). Thirty-four women (46%) improved their diet categorization based on their low fat diet scores. The low fat diet categories of 6 women (8%) declined, yet remained in an acceptable category of 30% fat or less. Carbohydrate categories improved for 22 women (30%) and declined for 20 women (27%), with 12 of the latter in an acceptable category. Total diet categories improved for 18 women (24%) and declined for 3 women (4%).

Although mean smoking stage did not change significantly, it may be more meaningful to examine changes within stages. Germane to this study are those stages amenable to change, notably contemplator, relapser, and recent quitter. As seen in Table 13, one women improved from contemplator to relapser, one improved from relapser to recent quitter, three recent quitters at Time 1 became

Table 9

Sources of Help Related to Cardiac Illness for Women (n=74) and Family Members (n=120)

Source	Women		Family Members	
	Time 1 Expected (%)	Time 2 Realized (%)	Time 1 Expected (%)	Time 2 Realized (%)
Children	89	84	60	41
Friends	62	69	60	55
Relatives or family	58	58	65	60
Spouse/significant other	55	55	62	58
Neighbor	35	35	31	27
Spiritual advisor	32	20	29	18
Parent	16	8	30	21
Professional	15	18	23	12
Other	10	1	7	5
Self-help group	3	1	2	0
Agency	1	3	3	3
No one available	1	1	1	0
Prefer to handle it alone	1	3	1	2

Table 10

Cross Tabulations of Low Fat Diet Categories for Women (n=74)

	Time 2			
Time1	37% fat [a]	30% fat	25% fat	20% fat
37% fat [a]	5	7	7	1
30% fat		6	6	3
25% fat		4	20	10
20% fat			2	3

[a] 37% fat represents the present American diet (Connor, Gustafson, Sexton, Becker, Artaud-Wild, & Connor, 1992).

Table 11

Cross Tabulations of Carbohydrate Categories for Women (n=74)

	Time 2			
Time1	37% fat [a]	30% fat	25% fat	20% fat
37% fat [a]	14	9	3	2
30% fat	8	12	5	1
25% fat		7	4	2
20% fat		2	3	2

[a] 37% fat represents the present American diet (Connor, Gustafson, Sexton, Becker, Artaud-Wild, & Connor, 1992).

Table 12

Cross Tabulations of Total Diet Categories for Women (n=74)

	Time 2		
Time1	37% fat [a]	30% fat	25% fat
37% fat [a]	42	15	1
30% fat	2	11	2
25% fat		1	

[a] 37% fat represents the present American diet (Connor, Gustafson, Sexton, Becker, Artaud-Wild, & Connor, 1992).

Table 13

Cross tabulations of Smoking Stages for Women (n=72)

	Time 2			
Time 1	Relapser	Recent quitter	Long-term quitter	Never
Contemplator	1			
Relapser	2	1		
Recent quitter	3	12	2	
Long-term quitter			22	1
Never			2	26

Note. Data missing for 2 subjects.

relapsers, and two recent quitters became long-term quitters. Thus 4 women improved and 3 relapsed. The 3 subjects who shifted between long-term quitter and never were interpreted to be very long-term quitters who at times consider themselves as never having smoked.

Family Members

Family members' scores for social support, the Health Value Scale, and family coping did not change significantly between Time 1 and Time 2. There were trends for conflict scores to decrease ($t=1.80$, $p=.07$) and for Health Value Survey ranking to increase ($t=-1.81$, $p=.07$) during that same time. The means, standard deviations, correlations, and paired t-tests for the family member's predictor and outcome variables at two times are listed in Table 14. Family members' social support scores at Time 1 and Time 2 and conflict scores at Time 1 were significantly higher than the norms (see Table 8). Conflict scores at both times did not differ depending on whether the family member lived with the woman with CHD.

As with the women, family members listed expected (Time 1) and realized (Time 2) sources of help related to the female member's cardiac illness (see Table 9). Major sources of help for family members were similar to those for the women with CHD, although in a different rank order. That is, the number of family members listing each source differed. The mean rating of satisfaction with help received was 4.56 (SD 1.45, range 1-6), indicating moderate satisfaction, but slightly lower than the women's score of 4.76. Twenty percent of family members reported dissatisfaction with the help received (a little dissatisfied to very dissatisfied), similar to the women's 19%.

Family members reported significantly higher scores on the low fat diet and exercise scales at Time 2 than Time 1, indicating improvements in these behaviors. There was a trend for smoking stage to decrease ($t=1.78$, $p=.08$) over

Table 14

Means, Standard Deviations, Pearson's r Correlations, and Paired t-tests for Family Member's Predictor and Outcome Variables at Two Times (n=120)

Scales	Time 1 M (SD)	Time 2 M (SD)	r	n	t
IPRI: social support	52.59 (7.73)	53.28 (7.24)	.68	117	-1.23
IPRI: conflict	37.75 (8.80)	36.67 (9.22)	.74	116	1.80
Health Value Survey	8.23 (2.20)	8.54 (1.82)	.59	117	-1.81
Health Value Scale	5.16 (1.23)	5.11 (1.29)	.62	115	.51
Adapted F-COPES: family coping	3.50 (.59)	3.46 (.72)	.47	114	.66
Diet Habit Survey: low fat	61.22 (13.47)	63.96 (14.54)	.78	119	-3.19**
Diet Habit Survey: carbohydrates	50.35 (17.97)	50.51 (17.64)	.54	118	-.10
Diet Habit Survey: total	111.70 (25.06)	114.70 (25.24)	.70	118	-1.66
Smoking stage	3.80 (1.46)	3.71 (1.56)	.94	114	1.78
HPLP: exercise	1.96 (.67)	2.08 (.64)	.62	119	-2.14*
HPLP: stress management	2.40 (.51)	2.47 (.58)	.63	119	-1.63

Note. IPRI indicates Interpersonal Relationship Inventory; F-COPES Family Crisis Oriented Personal Evaluation Scales; HPLP Health-Promoting Lifestyle Profile. * $p<.05$, ** $p<.01$, 2-tailed.

time, a negative change in behavior. Carbohydrate, total diet, and stress management scores did not change significantly.

Although mean smoking stage did not change significantly, several family members did move among the stages between Time 1 and Time 2. As seen in Table 15, most of the changes were in the less favorable direction. The only positive movement was that of 3 contemplators who became relapsers, indicating that they had attempted to quit smoking.

Categories of diet changes were examined separately for female and male family members based on different daily caloric intakes (see Tables 16-21). Categories for the 62 female family members are shown in Table 16, 18, and 20. Low fat diet categories improved in 16 (26%) and declined in 2 (3%), carbohydrate categories improved in 16 (26%) and declined in 11 (18%), and total diet categories improved in 5 (8%) and declined in 4 (6%) females.

The results for the male family members are shown in Tables 17, 19, and 21. Low fat diet categories improved in 9 (16%) and declined in 6 (10%), carbohydrate categories improved in 10 (17%) and declined in 5 (9%), and total diet categories improved in 2 (3%) but declined in 4 (7%) male family members. These results indicated less change in diet for family members compared to the women with CHD.

Women's and family mean scores on the predictor and outcome variables were compared in a series of paired t-tests (see Table 22). At Time 1, women reported significantly higher social support and ranked health significantly higher than did the family members. Women's low fat diet and total diet scores at both times and their stress management scores at Time 2 were significantly higher, while their exercise scores at Time 1 were significantly lower, as would be expected.

Table 15

Cross tabulations of Smoking Stages for Family Members (n=114)

	Time 2					
Time 1	Immotive	Contem-plator	Relapser	Recent quitter	Long-term quitter	Never
Immotive	3					
Contem-plator	1	7	3			
Relapser	1	2	8			
Recent quitter			3	2		
Long-term quitter		1	1		31	2
Never				1		48

Note. Data missing for 6 subjects.

Table 16

Cross Tabulations of Low Fat Diet Categories for Female Family Members (n=62)

	Time 2			
Time1	37% fat [a]	30% fat	25% fat	20% fat
37% fat [a]	25	4	2	1
30% fat	1	7	6	1
25% fat		1	8	2
20% fat				4

[a] 37% fat represents the present American diet (Connor, Gustafson, Sexton, Becker, Artaud-Wild, & Connor, 1992).

Table 17

Cross Tabulations of Low Fat Diet Categories for Male Family Members (n=57)

	Time 2			
Time1	37% fat [a]	30% fat	25% fat	20% fat
37% fat [a]	21	4	1	
30% fat	4	7	4	
25% fat		2	12	
20% fat				2

[a] 37% fat represents the present American diet (Connor, Gustafson, Sexton, Becker, Artaud-Wild, & Connor, 1992).

Table 18

Cross Tabulations of Carbohydrate Categories for Female Family Members (n=62)

	Time 2			
Time1	37% fat [a]	30% fat	25% fat	20% fat
37% fat [a]	16	11	2	
30% fat	4	15	2	
25% fat		6	3	
20% fat		1	1	1

[a] 37% fat represents the present American diet (Connor, Gustafson, Sexton, Becker, Artaud-Wild, & Connor, 1992).

Table19

Cross Tabulations of Carbohydrate Categories for Male Family Members (n=56)

	Time 2		
Time1	37% fat [a]	30% fat	25% fat
37% fat [a]	40	7	1
30% fat	4	1	2
25% fat	1		

[a] 37% fat represents the present American diet (Connor, Gustafson, Sexton, Becker, Artaud-Wild, & Connor, 1992).

Table 20

Cross Tabulations of Total Diet Categories for Female Family Members (n=62)

	Time 2		
Time1	37% fat [a]	30% fat	25% fat
37% fat [a]	49	5	
30% fat	4	3	
25% fat			1

[a] 37% fat represents the present American diet (Connor, Gustafson, Sexton, Becker, Artaud-Wild, & Connor, 1992).

Table 21

Cross Tabulations of Total Diet Categories for Male Family Members (n=56)

	Time 2	
Time1	37% fat [a]	30% fat
37% fat [a]	49	2
30% fat	4	1

[a] 37% fat represents the present American diet (Connor, Gustafson, Sexton, Becker, Artaud-Wild, & Connor, 1992).

Table 22

Pearson's r and t-test Comparisons between Women's and Family Mean Scores at Two Time Periods (n=66)

	Time 1		Time 2	
Scales	r	t	r	t
IPRI: social support	.28	2.09*	.33	1.07
IPRI: conflict	.12	-.73	.21	-.22
Health Value Survey	.08	4.46***	.03	1.84
Health Value Scale	.35 [a]	1.88	.24	1.59
Adapted F-COPES: family coping	.16 [b]	1.45	.39 [c]	.50
Diet Habit Survey: low fat	.25	4.84***	.41	8.34***
Diet Habit Survey: carbohydrates	.37	1.25	.20 [a]	1.94
Diet Habit Survey: total	.41	3.70***	.33 [a]	5.62***
Smoking stage	.21 [b]	1.65	.24	1.53
HPLP: exercise	.19	-2.70**	.05 [a]	.39
HPLP: stress management	.09	1.01	.22	2.72**

Note. IPRI indicates Interpersonal Relationship Inventory; F-COPES Family Crisis Oriented Personal Evaluation Scales; HPLP Health-Promoting Lifestyle Profile. All significant t-tests indicate higher scores for the women except for Time 1 exercise. [a] n=65. [b] n=64. [c] n=63. *p<.05, **p<.01, *** p<.001, 2-tailed.

Multiple Regression Analysis

Zero-order correlations were examined prior to the multiple regression analyses (see Appendix I). The correlations between the Health Value Scale and the outcome variables demonstrated an unexpected pattern. For the women, the significant correlations of Time 1 health value with Time 2 exercise (r=-.25) and stress management (r=-.27) were the opposite of what was expected.

The sign of the beta weight for some Time 1 predictors is opposite from what may be expected, but is attributable to a statistical pattern rather than alternative theory. With longitudinal data, if the Time 1 and Time 2 measures of the predictor variables are positively correlated, the beta weight of the Time 1 predictor may change from positive to negative (or vice versa) when the Time 2 predictor enters the equation.

Women with CHD

Aim 6 was to describe the influences of social support, conflict, value of health, and family coping on the health protection behaviors of women with CHD.

Women's Model. The women's model contained 10 predictors for each of the four outcomes. As seen in Table 23, the variables in the model explained a significant amount of variance in each outcome, with the total adjusted R^2 ranging from .35 to .50. For each outcome, the largest amount of variance was explained by the Time 1 outcome score. After controlling for the other predictors in the equation, the following were significant predictors in addition to the Time 1 behavior. Time 1 and Time 2 conflict explained 5% of the variance in low fat diet scores. Specifically, declines in conflict were associated with improvements in a low fat diet, and vice versa. In the carbohydrate model, complications explained 12% and having CABG 3%. Those experiencing complications had lower carbohydrate scores, and women who had CABG surgery had higher scores. Complications, participation in cardiac rehabilitation,

Table 23

Hierarchical Multiple Regression for Women's Outcomes with Women's Predictors (n=74)

	Time 2 Outcomes							
	Low fat diet		Carbohydrate		Exercise		Stress management	
Predictors	Beta	R^2 Δ	Beta	R^2 Δ	Beta	R^2 Δ	Beta	R^2 Δ
T1 outcome	.55***	.33***	.56***	.30***	.46***	.25***	.33**	.21***
CABG	-.00	.00	.30**	.03	.10	.00	.05	.00
T1 social support	.02	.00	-.04	.00	-.13	.00	.15	.02
T1 conflict	.32*	.00	.12	.00	-.07	.01	.20	.01
T1 health value	-.16	.00	-.16	.01	-.29*	.04	-.11	.02
T2 social support	.03	.01	.13	.01	.11	.00	.02	.00
T2 conflict	-.37*	.05*	-.04	.00	.11	.01	-.36*	.05*
T2 health value	.26	.04*	.15	.00	.23	.02	.02	.00
Cardiac rehab.	.03	.00	.20	.01	.37***	.06*	.15	.02
Complications	-.01	.00	-.40***	.12***	-.39***	.12***	.02	.00
Total R^2		.43		.49		.50		.35
Adjusted R^2		.34		.41		.42		.25
F		4.83***		6.04***		6.30***		3.37**

Note. Beta indicates standardized beta at final step, T1 time 1, T2 time 2, rehab. rehabilitation. *p<.05, **p<.01, ***p<.001, 2-tailed.

and Time 1 health value explained 22% of the variance in exercise. Women who had complications exercised less, Time 1 health value also was inversely related to exercise, and those who participated in cardiac rehabilitation exercised more. Time 2 conflict accounted for 5% of the variance in stress management behaviors, with higher amounts of conflict associated with lower stress management scores. Social support was not significant in any model. Tables of standardized beta weights at each step for the women's low fat diet and exercise models are shown in Appendix L.

Women Plus Family Models. In order to answer the question in aim 6 of how much additional variance in women's outcomes could be explained by family members' scores, four sets of regression equations were analyzed. In the first set, the family mean outcome scores were added as the last predictor in the women's model. In the second set, the scores of one family member chosen at random were added as the last predictor. As seen in Tables 24 and 25, these two methods had similar effects. The only significant changes occurred in the low fat diet equations, where the family mean outcome and the one family member's outcome explained a significant amount of variance in low fat diet with the other variables in the equation held constant. Interestingly, the beta weights (.27) and R^2 changes (.06) were identical. Thus, the finding was the same regardless of which family score was used. As the low fat diet of the family members improved, so did the women's. When the family mean outcome was added, the beta weights for Time 1 and Time 2 conflict were no longer significant, and the beta weight for Time 2 health value became significant. In the low fat diet equation with one family member's outcome added, only Time 1 conflict was no longer significant. Only minor changes in beta weights occurred in the carbohydrate, exercise, and stress management equations.

Table 24

Hierarchical Regression for Women's Outcomes with Women's Scores and Family Mean Outcomes as Predictors (n=74)

Time 2 Outcomes

	Low fat diet		Carbohydrate		Exercise		Stress management	
Predictors	Beta	R^2 Δ	Beta	R^2 Δ	Beta	R^2 Δ	Beta	R^2 Δ
T1 outcome	.51***	.33***	.55***	.30***	.47***	.25***	.30**	.21***
CABG	.01	.00	.31**	.03	.08	.00	.06	.00
T1 social support	-.04	.00	-.03	.00	-.15	.00	.20	.02
T1 conflict	.26	.00	.12	.00	-.08	.01	.23	.01
T1 health value	-.22	.00	-.15	.01	-.31*	.04	-.11	.02
T2 social support	.04	.01	.12	.01	.13	.00	-.02	.00
T2 conflict	-.26	.05*	-.03	.00	.10	.01	-.38*	.05*
T2 health value	.28*	.04*	.14	.00	.24	.02	.02	.00
Cardiac rehab.	.01	.00	.20	.01	.39***	.06*	.15	.02
Complications	-.02	.00	-.39***	.12***	-.38***	.12***	.01	.00
Family mean outcome	.27**	.06**	.08	.01	-.10	.01	.15	.02
Total R^2		.49		.49		.51		.37
Adjusted R^2		.40		.40		.42		.26
F		5.51***		5.52***		5.84***		3.30**

Note. Beta indicates standardized beta at final step, T1 time 1, T2 time 2, rehab. rehabilitation. *p<.05, **p<.01, ***p<.001, 2-tailed.

Table 25

Hierarchical Regression for Women's Outcomes with Women's Scores and One Member's Outcome as Predictors (n=74)

	Time 2 Outcomes							
	Low fat diet		Carbohydrate		Exercise		Stress management	
Predictors	Beta	R^2 Δ	Beta	R^2 Δ	Beta	R^2 Δ	Beta	R^2 Δ
T1 outcome	.53***	.33***	.55***	.30***	.46***	.25***	.32**	.21***
CABG	.01	.00	.30**	.03	.09	.00	.05	.00
T1 social support	-.03	.00	-.03	.00	-.14	.00	.17	.02
T1 conflict	.28	.00	.12	.00	-.08	.01	.21	.01
T1 health value	-.23	.00	-.16	.01	-.30*	.04	-.11	.02
T2 social support	.00	.01	.12	.01	.11	.00	-.02	.00
T2 conflict	-.31*	.05*	-.04	.00	.11	.01	-.38*	.05*
T2 health value	.27	.04*	.15	.00	.24	.02	.01	.00
Cardiac rehab.	.-.02	.00	.20	.01	.38***	.06*	.16	.02
Complications	.01	.00	-.39***	.12***	-.39***	.12***	.01	.00
One member's outcome	.27**	.06**	.06	.00	-.04	.00	.12	.01
Total R^2		.49		.49		.50		.36
Adjusted R^2		.40		.40		.41		.25
F		5.50***		5.47***		5.67***		3.20**

Note. Beta indicates standardized beta at final step, T1 time 1, T2 time 2, rehab. rehabilitation. *p<.05, **p<.01, ***p<.001, 2-tailed.

In the last two sets of equations, family scores were used as predictors of women's outcomes. In both the set using family mean scores and the set using one member per family's scores, the overall adjusted R^2 was significant for the low fat diet and carbohydrate equations, with similar amounts of total explained variance (see Tables 26 and 27). Significant family mean predictors of low fat diet were Time 1 low fat diet when it entered and Time 2 low fat diet with the other variables in the equation held constant. Again, improvements in family mean low fat diet were associated with improvements in women's low fat diet habits. For carbohydrate, Time 1 carbohydrate, Time 2 conflict, and Time 2 health value were significant predictors at the final step. As the family mean carbohydrate score improved, so did the women's. As the family mean conflict and health value scores at Time 2 increased, the women's carbohydrate scores decreased, and vice versa. (See Appendix L for standardized beta weights at each step of women's carbohydrate from family means model.) Using the scores of one member per family, Time 1 conflict and Time 2 low fat diet were significant predictors of low fat diet, controlling for other predictors in the equation. That is, as the family member's Time 1 conflict score decreased and the Time 2 low fat diet score increased, the women's low fat diet score increased. Time 1 health value was a significant predictor of carbohydrate when it entered, and was inversely related to the women's carbohydrate scores. Time 1 carbohydrate was significant when controlling for other variables in the equation. The family member's Time 1 carbohydrate habits were positively associated with improvements in women's carbohydrate diet. These results indicate that neither method of computing a family score was better than the other.

Table 26

Hierarchical Multiple Regression for Women's Outcomes with Family Mean Scores as Predictors (n=66)

	Time 2 Outcomes							
	Low fat diet		Carbohydrate		Exercise		Stress management	
Predictors	Beta	R^2 Δ	Beta	R^2 Δ	Beta	R^2 Δ	Beta	R^2 Δ
T1 outcome	-.16	.07*	.37*	.10**	.10	.01	-.11	.01
T1 social support	.17	.02	-.27	.03	-.27	.01	.10	.00
T1 conflict	-.20	.03	.25	.00	-.09	.04	-.03	.01
T1 health value	.02	.01	.17	.01	.36*	.00	.14	.00
T2 social support	-.02	.00	.05	.00	.15	.01	-.06	.00
T2 conflict	.08	.00	-.36*	.05	-.11	.01	.17	.00
T2 health value	-.03	.00	-.36*	.07*	-.50**	.13**	-.11	.00
T2 outcome	.52**	.09**	-.03	.00	-.00	.00	.35	.05
Total R^2		.22		.26		.20		.08
Adjusted R^2		.13		.17		.10		.00
F		2.35*		2.91**		2.05		0.73

Note. Beta indicates standardized beta at final step, T1 time 1, T2 time 2. *p<.05, **p<.01, ***p<.001.

Table 27

Hierarchical Multiple Regression for Women's Outcomes with One Member per Family's Scores as Predictors (n=74)

	Time 2 Outcomes							
	Low fat diet		Carbohydrate		Exercise		Stress management	
Predictors	Beta	R^2 Δ	Beta	R^2 Δ	Beta	R^2 Δ	Beta	R^2 Δ
T1 outcome	-.28	.04	.44**	.10**	.07	.01	-.01	.01
T1 social support	.25	.02	-.23	.01	-.38*	.01	.11	.01
T1 conflict	-.39*	.06*	.04	.00	-.22	.05	.05	.01
T1 health value	-.18	.01	-.13	.08*	.26	.01	.13	.01
T2 social support	-.19	.01	.06	.00	.24	.02	.08	.01
T2 conflict	.14	.01	-.23	.01	-.03	.00	.12	.01
T2 health value	.04	.00	-.27	.04	-.47**	.11**	-.02	.00
T2 outcome	.54**	.10**	-.11	.01	-.05	.00	.18	.02
Total R^2		.26		.25		.19		.07
Adjusted R^2		.17		.16		.09		.00
F		2.86**		2.73*		1.95		.66

Note. Beta indicates standardized beta at final step, T1 time 1, T2 time 2. *p<.05, **p<.01, ***p<.001.

Family Members

Aim 7 sought to describe the influences of social support, conflict, value of health, and family coping on the health protection behaviors of family members of women with CHD.

Family Mean Model. The family mean model contained 8 predictors for each of the four outcomes for the 66 families. As seen in Table 28, the variables in the model explained a significant amount of variance in each outcome, with the total adjusted R^2 ranging from .35 to .66. The largest amount of variance was explained by the Time 1 outcomes. Controlling for the other predictors in the model, social support at Time 2 was a significant predictor of exercise and stress management, and there was a trend toward significance in the carbohydrate (beta =.22, p=.09) equation. Specifically, as social support increased, exercise, stress management, and carbohydrate scores improved. Time 2 health value explained a significant amount of variance in stress management. As Time 2 health value increased, so did stress management behaviors. The woman's Time 2 outcome score explained a significant amount of variance in low fat diet, and there was a trend toward significance (beta=.16, p=.06) with stress management. Similar to the women's results, women's low fat diet improvements were associated with the same for the family members. Conflict was not significant in any family equation.

Family Members' Model. The family members' model contained 10 predictors for each of the four outcomes for 120 individual family members. As seen in Table 29, the variables in the model explained a significant amount of variance in each outcome, with the total adjusted R^2 ranging from .30 to .70. As in the previous models, the largest amount of variance was explained by the Time 1 outcome scores. Controlling for the other predictors in the model, social support at Time 2 explained a significant amount of variance in every outcome

Table 28
Hierarchical Multiple Regression for Family Mean Outcomes with Family Means and Women's Outcome as Predictors (n=66)

	Time 2 Outcomes							
	Low fat diet		Carbohydrate		Exercise		Stress management	
Predictors	Beta	R^2 Δ	Beta	R^2 Δ	Beta	R^2 Δ	Beta	R^2 Δ
T1 outcome	.71***	.60***	.57***	.32***	.55***	.40***	.58***	.43***
T1 social support	-.15	.01	-.07	.01	-.10	.01	-.17	.00
T1 conflict	-.01	.00	.18	.00	.06	.01	.15	.00
T1 health value	.06	.02*	-.22	.04*	-.09	.00	-.21	.00
T2 social support	.08	.00	.22	.03	.28*	.05*	.25*	.04*
T2 conflict	.01	.00	-.20	.01	-.24	.02	-.17	.01
T2 health value	.11	.01	.07	.00	.16	.01	.28*	.05*
Women's outcome	.20*	.03*	-.02	.00	-.00	.00	.16	.03
Total R^2		.69		.42		.52		.56
Adjusted R^2		.66		.35		.46		.50
F		18.41***		5.94***		8.72***		10.22***

Note. Beta indicates standardized beta at final step, T1 time 1, T2 time 2. *p<.05, **p<.01, ***p<.001.

Table 29
Hierarchical Multiple Regression for All Family Members' Outcomes with Family Members' Predictors (n=120)

	Time 2 Outcomes							
	Low fat diet (n=118)		Carbohydrate (n=119)		Exercise (n=117)		Stress management	
Predictors	Beta	R^2 Δ	Beta	R^2 Δ	Beta	R^2 Δ	Beta	R^2 Δ
T1 outcome	.74***	.66***	.52***	.28***	.69***	.50***	.61***	.39***
Gender	.21***	.01	.07	.01	.07	.00	.04	.00
Age	.04	.00	-.08	.01	-.08	.00	.10	.01
Live with woman	.13*	.01	.05	.00	.10	.00	.03	.00
T1 social support	-.19**	.01	-.07	.01	-.14	.00	-.18	.00
T1 conflict	-.16*	.02**	.07	.00	-.04	.01	.06	.00
T1 health value	.03	.00	-.04	.01	.11	.01	-.07	.00
T2 social support	.12	.01	.22*	.03*	.17	.02*	.26**	.04**
T2 conflict	.03	.00	-.06	.00	-.08	.00	-.00	.00
T2 health value	.07	.00	-.13	.01	-.02	.00	.14	.01
Total R^2		.73		.36		.55		.45
Adjusted R^2		.70		.30		.50		.40
F		22.58***		6.08***		12.95***		8.97***

Note. Beta indicates standardized beta at final step, T1 time 1, T2 time 2. *p<.05, **p<.011, ***p<.001.

except for low fat diet (beta =.12, p=.07) and exercise (beta=.17, p=.06), where there were trends toward significance. The direction of the social support results was the same as in the family mean model. Female gender, living with the woman with CHD, Time 1 social support, and Time 2 conflict were significant predictors of low fat diet after controlling for the other predictors in the model. Female gender and living with the woman were positively associated, and Time 1 conflict was inversely related to family members' low fat diet. Surprisingly, Time 1 social support was inversely related to low fat diet. (See Appendix L for standardized beta weights at each step for family members' low fat diet model.) Age and health value were not significant in any equation. The advantage of the family members' model was the inclusion of variables which cannot be averaged, such as gender.

Analysis of Variance

Women with CHD

A one-way ANOVA at Time 1 showed significant differences in mean social support by smoking stage (Table 30). Post hoc tests revealed that recent quitters had significantly lower social support than long-term quitters and those who had never smoked, and the combined group of relapsers and contemplators also were significantly lower in support than long-term quitters and those who had never smoked (Figure 1).

Mean conflict at Time 1 also differed significantly by smoking stage (Table 31 and Figure 2). Post hoc tests using the LSD procedure revealed that those who had never smoked had significantly lower mean conflict than recent quitters and the combined group of relapsers and contemplators (at the p=.05 level). There were no significant effects for social support and conflict at Time 2, or for family coping and health value at either time.

Table 30

Summary of ANOVA of Social Support by Smoking Stages at Time 1 for Women with CHD (n=73)

Group	n	M	SD
Contemplators and relapsers	4	46.25	11.73
Recent quitter	17	51.27	9.15
Long-term quitter	23	55.96	5.23
Never	29	56.55	6.46

Source	D.F.	Sum of squares	Mean squares	F	p
Between groups	3	620.47	206.82	4.05	.01
Within groups	69	3520.90	51.03		
Total	73	4141.37			

Figure 1. Mean Social Support for Women at Time 1 by Smoking Stages

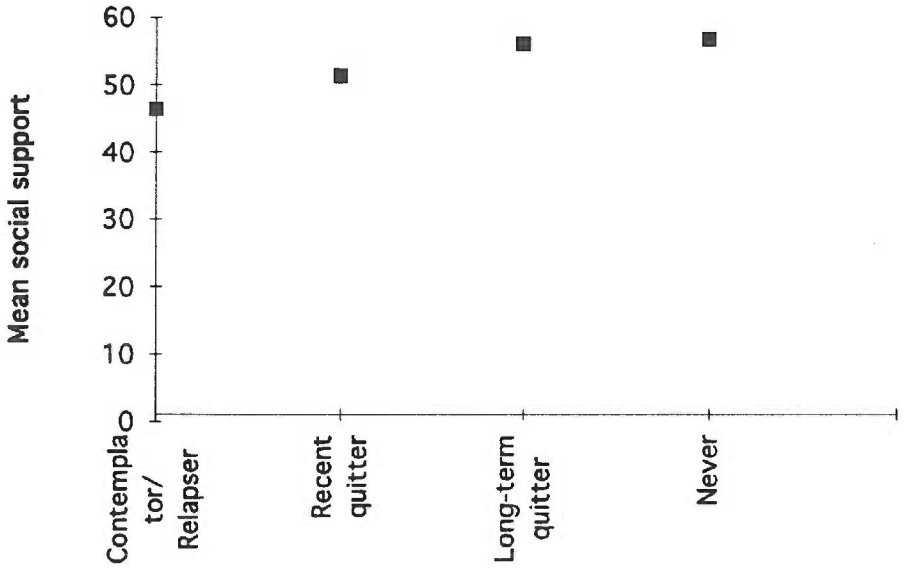


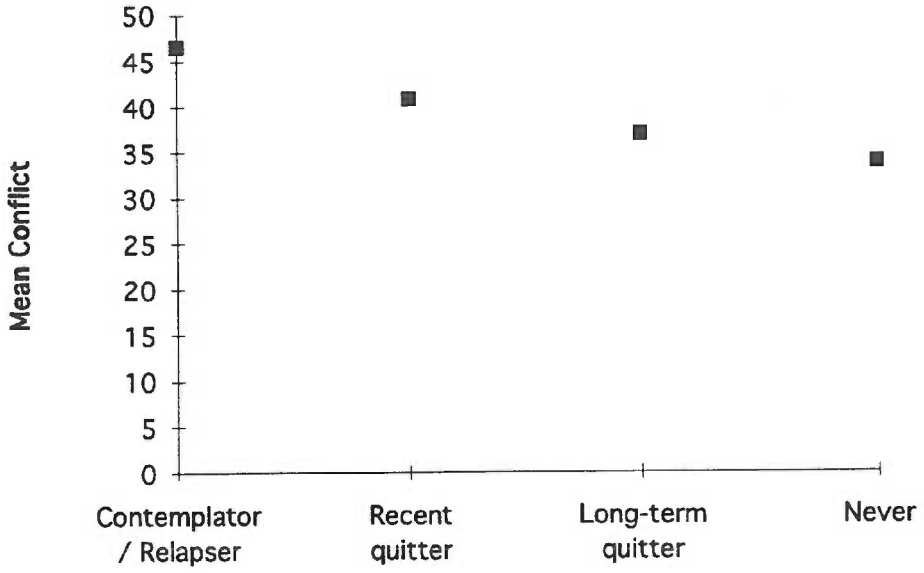
Table 31

Summary of ANOVA of Conflict by Smoking Stages at Time 1 for Women with CHD (n=72)

Group	n	M	SD
Contemplators and relapsers	4	46.56	10.02
Recent quitter	17	40.77	13.68
Long-term quitter	23	36.84	9.86
Never	28	33.70	9.12

Source	D.F.	Sum of squares	Mean squares	F	p
Between groups	3	6912.29	304.10	2.69	.05
Within groups	68	7678.79	112.92		
Total	72	8591.08			

Figure 2. Mean Conflict for Women at Time 1 by Smoking Stages



Family Members

As with the women, mean social support at Time 1 was significantly different by smoking group (Table 32). Post hoc tests demonstrated that the mean social support of those who had never smoked was significantly higher than the mean social support of the relapsers and long-term quitters (Figure 3). There were no significant effects for any other family members' scales.

Summary

The sample consisted of 74 women with CHD and 120 family members in 66 families who completed questionnaires at Time 1 (hospitalization for PTCA or CABG) and again three months later (Time 2). There were no changes in scores in either the women or family members over time on the predictor variables of social support, conflict, family coping, and health value. Social support scores for both groups at both times were higher than the norm, and family members' conflict at Time 1 was higher than the norm. Women scored higher than family members on social support and health value ranking at Time 1, stress management at Time 2, and low fat diet and total diet at both times. Women scored lower than family members on exercise at Time 1. Women significantly improved their low fat diet, total diet, exercise, and stress management scores between Time 1 and Time 2. Carbohydrate and smoking stage did not change. For family members, only low fat diet and exercise scores improved significantly over time. There were significant differences in mean social support by smoking stage at Time 1 for both the women and family members.

In an attempt to identify predictors of health behavior changes, a series of multiple regression models were tested. Time 1 behaviors predicted the largest amounts of variance in both groups. After controlling for Time 1 behaviors and

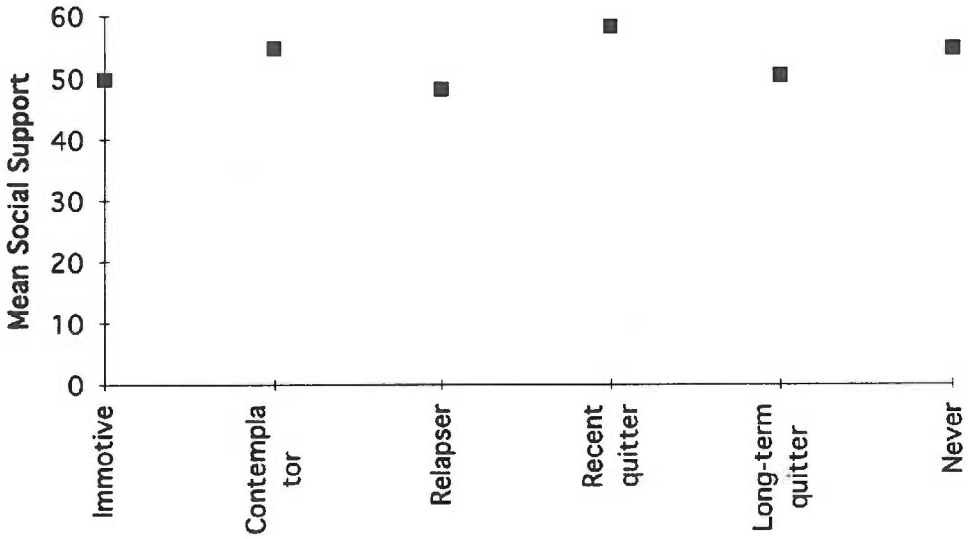
Table 32

Summary of ANOVA of Social Support by Smoking Stages at Time 1 for Family Members (n=116)

Group	n	M	SD
Immotive	3	49.67	2.52
Contemplator	11	54.73	6.42
Relapser	12	48.17	7.16
Recent quitter	5	58.20	7.19
Long-term quitter	36	50.32	6.99
Never	49	54.51	8.02

Source	D.F.	Sum of squares	Mean squares	F	p
Between groups	5	834.80	166.96	3.06	.01
Within groups	110	5997.36	54.52		
Total	115	6832.16			

Figure 3. Mean Social Support for Family Members at Time 1 by Smoking Stages



other predictors in the equations, conflict, having CABG, complications, Time 1 health value, and cardiac rehabilitation were significant predictors in the some of the women's models. Adding a family score added a significant amount of variance only to the women's low fat diet outcome. Using a family score to predict the women's scores yielded a significant model only for low fat diet and carbohydrate behaviors. When family mean scores were used to predict family members behaviors, Time 2 social support was significant in the exercise and stress management equations, with Time 2 health value also significant in the latter. Adding the women's outcome scores was significant in the low fat diet model only. When individual family members' scores were used, Time 2 social support was the most consistent predictor. Female gender, living with the woman with CHD, Time 1 social support, and Time 1 conflict also were significant predictors of some family member behaviors.

CHAPTER V

DISCUSSION

In this chapter, the findings are discussed in light of the literature and their implications for nursing research, practice, and theory. A summary of the study follows.

Women with CHD

The sample of women with CHD represents women who are referred to a tertiary care center for interventional treatment of CHD, specifically PTCA or CABG. One expects a group of women with CHD to be in the older age group because the onset of CHD occurs about 10 years later in women than men. The mean age of this sample was 63.2 years, and was limited by an upper age cutoff of 75 for participation in this study. These women were at risk for heart disease, as reflected in their self-reported risk factors, and two-thirds of them had a history of heart disease. The majority were admitted to the hospital at Time 1 with an acute myocardial infarction or unstable angina, indicating that their intervention (PTCA or CABG) was performed for an acute problem. Twelve weeks after hospital discharge, 34% reported recurrence of CHD symptoms. While this is typical of the PTCA population, this sample also included CABG patients for whom this rate might not be expected. Consistent with the findings of others (Ades, et al., 1992; O'Callaghan, et al., 1984), the rate of participation in cardiac rehabilitation for this sample was low (12%).

Aims 1 to 4 of this study were to describe patterns of social support, conflict, health value, family coping, and the health protection behaviors of diet, smoking cessation, exercise, and stress management. Social support was operationalized as perceived availability or enactment of the dimensions of emotional, instrumental, appraisal, and information support. The women with CHD reported high mean levels of social support that did not change between

hospitalization and three months later. However, correlations over time suggested some shifting of relative positions of women on social support. Consistent with their age group (Friedman, 1993), the major sources of support, in order, were children, friends, other relatives, and spouses. In contrast with Peters-Golden's (1982) findings with women with breast cancer, the women with CHD experienced consistency between expected and realized sources of support from these major sources, with 5% fewer children as realized sources but 7% more friends. Thus, at least during the first three months after hospitalization, social support for these women did not evaporate. Of concern, however, are those 19% of women who expressed dissatisfaction with the support received. Contrary to the findings of others (Brownell, 1984; Finnegan & Suler, 1985; Hubbard, et al., 1984), social support was not a significant predictor of women's health behaviors. Perhaps this was because their social support scores were too high to allow sufficient variability, an intermediate variable was not included in this study, or because the support they received was the wrong type or inappropriate, as Wortman and Lehman (1985) suggest often happens during illness.

Conflict reflected discord or stress in one's relationships. For this sample, the mean amount of reported conflict was stable over time and did not differ from that described in the general population (Tilden, et al., 1990a). Therefore, it appears that women's experience of heart disease does not increase conflict in their social network during the early months of recovery. In this group, however, the greater the conflict the less the women improved their low fat diet and stress management behaviors. Conflict scores of the family members predicted women's low fat and carbohydrate diet habits. Thus conflict in the social network is an important concept in the understanding of women's experience of CHD.

Other negative aspects of social support, such as a support gap (Belle, 1982) or overprotection (Riegel & Dracup, 1992), were not measured in this study.

One might expect that health would be rated highly by those with a serious illness ((Lau, et al., 1986). For this sample, health ranking was high at the time of hospitalization, but tended to decrease in relation to other values 3 months later. Mean responses to the Health Value Scale were only moderately high and were stable over time. Therefore, health value was rated moderately high by this sample during the first 3 months of recovery. The Health Value Survey ranking did not exhibit enough variance to be of predictive value for the women or their family members and therefore was not used in multiple regression analyses. The Health Value Scale was only moderately helpful, with mixed findings of positive and negative correlations with health behaviors. Alternative approaches to measuring and analyzing health value on a family subgroup or family level should be developed before pursuing this concept in future studies.

As reflected by their mean scores, women's views of family coping were moderately high and did not change over time. Their scores did not differ from those of their family members. Although the F-COPES has functioned well in some studies (Lewis & Hammond, 1992), this study and the work of Tilden (personal communication, April 20, 1994) revealed problems with its use. Several of the women with CHD expressed difficulty completing it because they perceived different members of their families at different points on the scale or they found themselves at a different point than the rest of their family. In at least three cases, this resulted in missing data on the F-COPES. Because precisely these situations may be helpful in understanding the experience of women with CHD and their families, different approaches to measuring family coping should be developed. These might include qualitative interviews with family members both separately and as a family unit.

In addition to describing patterns of the study concepts, Aim 5 sought to describe relationships among those concepts for women with CHD and their family members. Aims 6 and 7 were to describe the influences of social support, conflict, value of health, and family coping on the health protection behaviors of women with CHD and their family members, respectively. For reasons described above, family coping was not included in multiple regression analyses.

Recommendations for achieving a lower-fat diet include decreasing the total amount of fat consumed and increasing complex carbohydrate consumption (Connor, et al., 1992). At 3 months after hospitalization, the women in this study significantly improved their low fat diet scores but not their carbohydrate diet scores. The low fat diet improvements were enough to yield significant changes in total diet. This pattern of decreasing fat intake before increasing carbohydrate intake is similar to that reported by Gorbach and colleagues (1990) and may also reflect clinical practice with its strong, singular emphasis on lowering fat intake for people with CHD. Women's low fat and total diet habits were better than those of their family members at both times.

Women's low fat diet habits clearly were influenced inversely by conflict in their social network, whether it was the women's or a family member's scores that were used as predictors. This is particularly interesting in light of the fact that as the low fat diet of the family or one family member improved, so did the woman's. Thus family members both positively and negatively influenced the low fat diet habits of the women in this study. These findings were consistent with family systems theory.

Carbohydrate diet habits, on the other hand, were influenced by individual clinical factors. Having CABG surgery was associated with improvements in carbohydrate consumption, and complications during recovery were negatively related. If complications delay recovery, then attempts to change carbohydrate

habits, which probably come later than low fat changes, might be delayed. It is puzzling, then, why those women who had CABG surgery, with its more frequent complications, had higher carbohydrate scores than women who underwent PTCA. A significant proportion of the women's carbohydrate habits was predicted by the family mean model. The inverse relationship between the family mean conflict score and women's carbohydrate behaviors may be a manifestation of what Fleury (1993) described as value conflict, a social network factor that limited health behavior changes in that study. The inverse relationship between the family mean health value score and women's carbohydrate diet was the opposite of what was expected. Why did the women's carbohydrate consumption decrease as the family's health value increased? Perhaps it was because the family's health value did not include high carbohydrate consumption. Indeed, the general public still holds the misconception that carbohydrates are unhealthy because they associate them with weight gain. It is also possible that this was a chance finding, especially given the measurement concerns with the Health Value Scale.

Since patients with CHD are not allowed to smoke in the hospital, it is the clinical practice of professionals in the data collection site to give patients the message that they have quit smoking. Because 17 of 21 women who smoked within the 6 months prior to their PTCA or CABG viewed themselves as recent quitters at Time 1 and the remaining 4 had attempted to quit or were contemplating quitting, these women can be viewed as already changing their smoking behavior. Therefore it is desirable that smoking stage did not change during the time period of this study. Indeed, only 3 subjects admitted they declined to a less favorable smoking stage. It is possible that social desirability influenced the self-report measures of smoking.

Social support facilitates smoking cessation (Coppotelli & Orleans, 1985; Giannetti, et al., 1985) and was found to differ by smoking stage at Time 1 in this study, with contemplators having the lowest amount of social support and those who had never smoked the highest. It is interesting to note that those who had never smoked had more social support than women in all other stages of smoking. While it appears that women in this study had enough social support to maintain their smoking cessation behaviors for three months, it is unknown whether the levels would be enough to sustain behaviors over a longer period of time. The findings related to conflict were the inverse of those for social support, as would be expected, and highlight the need to pursue both concepts when studying women's attempts to stop smoking.

It is not surprising that the women with CHD had lower exercise scores at Time 1 than did their family members, given the women's clinical status. However at Time 2 they had significantly improved their exercise habits to a score similar to their families', which also had improved. Therefore the women's exercise scores may represent prevention efforts in addition to resumption of pre-illness activity levels. The individual clinical factors of complications and participation in cardiac rehabilitation were significant predictors of exercise as one would expect. The inverse relationship between Time 1 health value and Time 2 exercise is puzzling, but may reflect what Fleury (1993) described as women's pattern of changing their values and goals during recovery from a cardiac event. Perhaps the relative importance of competing values changes during the first 3 months of recovery. It appears that women's changes in exercise were not influenced by the exercise habits of their family members. However we do not know whether this sample's regular exercise habits were influenced by their family responsibilities and resumption of household activities, as Boogard (1984) and Hawthorne (1993) suggest.

Finally, the women in this study significantly improved their stress management behaviors during the first three months of recovery. Consistent with theory and prior research, conflict helped to explain these changes, with the greater the conflict, the lower the women's stress management scores. The stress management behaviors of the family did not contribute to the women's behaviors.

Family Members

The family members who completed this study reflect the social network of women with CHD, with the majority children and the next largest group husbands. It should be kept in mind that subjects were nominated by the women with CHD, and therefore do not represent all possible family members. As expected based on heredity and shared lifestyles, a substantial percentage of the family members were at risk for heart disease, and 16% had a history of CHD.

Family members reported high mean levels of social support that did not change over time. At Time 1, however, their social support was lower than that of the women with CHD, while at Time 2 it was not different. Rankin and Monahan (1991) reported that spouses perceived less social support than did patients at 1 and 3 months after cardiac surgery. In contrast with the women with CHD, family members experienced fewer sources of help than expected. Thus, they experienced evaporation of sources of support during the first 3 months of recovery. It was interesting that social support was an important predictor of health behavior changes in both individual family members and family groups (mean scores), but not for women with CHD.

Conflict was high for family members at Time 1 and not significantly different from that of the women with CHD at either time. Thus it appears that early adjustment to the women's heart disease involves high levels of conflict for family members. Since there was a trend for conflict to decrease over time for

family members, adjustment at 3 months does not involve increased conflict. Family members' conflict was helpful in predicting only their low fat diet habits . Thus conflict was not as strong a predictor for family members as it was for the women with CHD.

Family members' rating of health value on both scales was lower than that of the women with CHD, but was only significantly so at Time 1 for the health value ranking. One would expect that the ratings of persons with a life-threatening illness would be higher. Interestingly, the health value ranking of the family members increased between Time 1 and Time 2. These findings contribute to our understanding of the impact of a family member's illness on health value ratings. Health value was a significant predictor only of stress management behaviors , and therefore was not as strong a predictor as expected.

Perceptions of family coping were stable over time and similar to those of the women with CHD. Lewis and colleagues (1989) found that increased illness demands led to increased use of introspective family coping by husbands of women with chronic illnesses. Family members in the current study may already have rallied their use of family coping skills at Time 1. As with the women with CHD, family coping was not a helpful concept in explaining health behaviors. Perhaps this was due to measurement difficulties with the F-COPES or an intermediate variable was missing from the model.

Family members improved their low fat diet habits over time, but not their carbohydrate or total diet scores, demonstrating the same pattern as women with CHD of changing low fat diet habits first. Which individual family members were better able to change their low fat diet? Better Time 1 low fat diet habits, female gender, living with the women with CHD, lower social support at Time 1, and lower conflict at Time 1 were associated with better low fat diet habits at Time 2.

Social support at Time 2 was positively associated with low fat diet habits. The Time 1 social support finding is surprising, and points out the need for a better understanding of the dimensions of social support for family members. Is it that family members receive less social support because they are initiating a lifestyle change that others may not support? The conflict findings may confirm this view. Another possible explanation is that family members with less social support had fewer social ties that included social eating, and this may make it easier to change their diet. The women's Time 2 low fat diet habits predicted the same habits in their families. These findings and those of the women with CHD illustrate the influence that women with CHD and their family members have on each other's diet habits. They also confirm the family systems theory assumption of change in one member influencing the family.

Smoking stages were less stable among family members than among the women with CHD, with more moving to less desirable stages by three months. Like the women, mean social support at Time 1 differed by smoking group. At both times, recent quitters had the highest social support, although the numbers in the groups were too small to draw any conclusions. Recent quitters among the women with CHD did not have the highest social support. Additional information is needed about how much and what type of social support is needed by family members to improve their smoking cessation behaviors. It would also be interesting to explore why social support differs by family members' smoking group at Time 1 but not Time 2. Is their social network more aware of smoking and heart disease closer to the woman's cardiac event?

Family members improved their exercise habits over time and social support at Time 2 was helpful in explaining those changes. It would be interesting to explore who were the sources of support for family members' exercise efforts. Although family members made this lifestyle change during the

period of the women's recovery from heart disease, the behavior of one did not explain the behavior of the other. Does this reflect what Johnson and Morse (1990) described as the tendency of women to make lifestyle changes independently in order not to disrupt their families?

Unlike the women with CHD, the family members did not improve their stress management behaviors, despite the fact that 52% of them identified stress as a risk factor for heart disease.

Conclusions

During the first three months of recovery from acute intervention for heart disease, this sample of women improved their health behaviors aimed at secondary prevention of CHD. This was in the situation of usual care, except for those who participated in cardiac rehabilitation. Of the concepts central to this study, lower conflict and the family's diet behaviors were helpful in the women's attempts to change their lifestyles. These findings reflect family systems theory and the use of feedback to influence family members' behaviors.

In response to the women's intervention for CHD, family members improved some of their health behaviors, although not as many as the women themselves. Helpful factors for the family members' efforts were social support and the women's diet habits. Of concern was the tendency for smoking behaviors to worsen over time.

The following conclusions can be drawn for both the women with CHD and their family members. Social support was high during the first three months of recovery. Conflict in the social network, whether reported by the women or their families, was related to the women's health behavior changes. The women and their family members influenced each other's diet habits. Social support differs by smoking stages and is associated with smoking cessation, but with different patterns for women and family members.

Family Measurement

Family members were chosen as the unit of measurement for this study because family group measures of the study concepts were not available and because it was not feasible to include all family members in this investigation. Because of concern regarding non-independence of individual family member responses, family mean scores were formed. The family mean findings reflect family subgroup aggregation (Ferketich & Mercer, 1992) and should not be generalized to families. Both the family mean model and the individual family members' models were significant for all four outcomes. Although health value and conflict functioned differently in each model, neither model was superior in explaining total variance.

The results of predicting women's behaviors from family mean responses and the response of one family member chosen at random were compared. When entered as the last step of the women's models, the results were the same. When used as the only predictors of the women's outcomes, the results were similar. Taken together, these results indicate that both methods of analysis add to our understanding of factors predicting health behaviors in women with CHD, and neither method was preferable over the other.

Limitations

The limitations to this study include threats to internal and external validity. The internal validity of this study refers to the accuracy of the relationships among the variables (Woods & Mitchell, 1988). Time 1 measures were meant to reflect the opinions of subjects at the time of hospitalization, that is, before beginning the recovery and lifestyle changes at home. However, only 25% of the women with CHD completed their questionnaires in the hospital, and the mean number of days to return the booklets for the women was 8.7 (range 0-28) and for the family members was 11.5 (range 0-38). Therefore the Time 1 scores

cover a longer time period than planned. Similarly, Time 2 scores do not all reflect exactly 3 months of progress toward health behavior changes. The tradeoffs related to allowing a range of return times included concern for acutely ill subjects, mailing time to send and receive booklets, and the decision to keep a larger family member sample.

Another threat to internal validity was selection of the sample. Although the number who declined participation were few, they may have differed from the sample in ways such as greater emotional distress or greater family conflict. Loss of participants at each data collection time was a concern for the same reasons, and also affects external validity. Measurement concerns included the use of self-report instruments only, particularly for the outcome variables of health behaviors. Of the measures for which internal consistency was appropriate, all had acceptable Cronbach's alpha coefficients, except for the Health Value Scale, which was marginal and limited its usefulness. Family measurement issues arose with the F-COPES, where some of the women with CHD found it difficult to answer for the family. The decision not to analyze the particular effects of particular relationships was another family measurement limitation.

External validity refers to generalizability of the findings, and threats to external validity included issues of the sample and setting. The sample was a convenience sample of women admitted to one tertiary care hospital for acute cardiac intervention, namely PTCA or CABG. Therefore the sample does not represent the experiences of all women with CHD. The sample of both women with CHD and their family members was overwhelmingly white, and well-educated. In addition, the family members were nominated for participation by the women with CHD and do not constitute the entire family or all family members residing with the women. Hence, the findings of this study should not

be generalized to all family members of women with CHD or to families of other ethnic or cultural backgrounds. The sample does, however, include a broader range of relationships than previously described in the literature, which has been limited to spouses or partners.

Implications for Nursing Theory

This study has implications for existing theory, newly-generated theory, and needed theory. In addition to findings in the literature, this study was guided by two family theories. The findings of shared behaviors, particularly the ability to predict women's and family members' low fat diet habits from each other, support one of the basic assumptions of family systems theory. Montgomery (1982) described a value-behavior hierarchy for families, but this study demonstrated the difficulty of measuring values. The findings of this study underscore the importance of individual, family, and social systems to health behavior changes. The Double ABCX Model of family stress (McCubbin & McCubbin, 1987) suggests alternative analysis strategies not used in this study, such as the use of interaction terms, since the model emphasizes the interaction of factors affecting adaptation to stress. Difficulties related to this model include using individual assessments of family characteristics, such as family coping.

The following hypotheses were generated from the findings of this study.

1. Women with CHD improve some health protection behaviors during the first three months of recovery after PTCA or CABG.

2. The lower the conflict in their social network, the greater the improvements in health protection behaviors of women after PTCA or CABG.

3. Family members of women undergoing PTCA or CABG improve fewer health protection behaviors during the first three months of recovery.

4. The greater the social support, the greater the improvements in health protection behaviors of family members of women undergoing PTCA or CABG.

5. Women after PTCA or CABG and their family members experience high levels of social support for the first three months of recovery.

6. Women after PTCA or CABG and their family members influence each other's diet habits.

7. Social support differs by smoking stage in generally favorable patterns, but with different patterns for women after PTCA or CABG and their family members.

The findings of this study confirm the importance of the measured concepts, particularly social support and conflict, and direct the pursuit of additional theory to predict and explain the health behavior changes of women with CHD and their family members. The conceptual framework tested in this study may be under- specified, indicating that additional variables should be added. For example, social support may be indirectly related to women's health behaviors through a direct relationship to an unspecified variable. Interaction terms may also be important to include. Additional theory must be generated in order to identify those missing variables. In particular, additional information is needed about dimensions of social support that are critical to the health behavior changes of women with CHD and their family members. A qualitative approach to generating this needed theory is warranted.

Implications for Nursing Practice

The findings of this study offer suggestions for clinical practice related to primary and secondary prevention of heart disease in women with CHD and their family members. The findings also support the importance of focusing on families as the unit of care. Assessment of families experiencing cardiac illness should include the type and amount of social support and conflict. Women with CHD, because they are older, are more likely to live alone and count on adult children for support. Recent quitters and those attempting to quit smoking in both

groups may have special social support needs. Sources and types of social support for both women with CHD and family members can be assessed by nurses during hospitalization and recovery at home and in the community.

Implications for teaching women with CHD and their family members can be drawn for each of the health behaviors studied, as well as social support and conflict. The current approaches to teaching low fat diet principles appear to be effective, and should be continued. In addition, however, information about the importance of increasing complex carbohydrate consumption in addition to decreasing fat intake should be added to standardized teaching. Family members should be included in education efforts, for the women's benefits as well as their own. Health care professionals should continue their strong smoking cessation messages, including the concept that former smokers have quit since entering the hospital. Family members should receive equally strong messages. Nurses can expect that patients who experience complications will not increase their exercise as expected, and may need reinforcement of exercise protocols once their physical status has improved, or referral to cardiac rehabilitation. Women can be taught that their family may not participate in the same exercise efforts. The same is true for stress management activities. Patient and family education should also include information regarding decreasing family conflict and mobilizing social support. Both groups should be encouraged to identify sources and types of support that have been helpful in the past.

Although cardiac rehabilitation was not originally included as a study concept, its importance for predicting women's exercise habits emerged. Nurses should encourage women to participate in a formal cardiac rehabilitation program if available, and primary health care providers can provide exercise prescriptions to those for whom it is not.

When identifying expected outcomes for women undergoing PTCA or CABG, it is realistic to expect significant improvements in health behaviors aimed at preventing progression of heart disease by 3 months of recovery. Family members can expect to make similar improvements, which can benefit their own health and that of their female family members with CHD.

Implications for Nursing Research

Implications for nursing research include recommendations for future research related to health behavior changes in women with CHD and their family members. These include ideas for quantitative and qualitative approaches as well as for specific content areas.

In planning a quantitative study, the following considerations should be addressed. As mentioned in the section on implications for nursing theory, the conceptual framework should include additional variables related to changes in health behaviors, which include the individual, family, and social systems. These variables might include self-efficacy and a better measure of socio-economic status. A longer period of assessment, such as following women and family members for one year of recovery, is needed. Only PTCA or CABG patients should be studied, or enough subjects included in each group to allow for separate analyses as well as comparisons. There is also a need to recruit samples with ethnic diversity, and to study women with CHD who do not undergo intervention such as PTCA or CABG. Methods should be developed to increase retention of family members as subjects as well as to facilitate data collection at the time of hospitalization. B. Levine (personal communication, April 8, 1994) utilized a structured interview with cardiac surgery patients at the time of discharge and questionnaires for their partners at that time and mailed questionnaires for both groups three months later. Couples' response rates using these methods were 92% at Time 1 and 88% at Time 2. Additional

measures of social support, exercise, and stress management that are specific to this illness should be sought. A study with a large sample and such situation-specific measures might allow for the use of covariance structure modeling, which might identify additional relationships among the variables of interest. Interaction terms could also be included in analyses.

The finding of this study, as well as the literature on women with CHD and their families, highlight the need for a greater understanding of the dimensions and effects of social support and conflict. This information would best be generated through a naturalistic design using qualitative data. Such a study should focus on the supportive and unsupportive aspects of relationships and changes in health behaviors, and include both women and family members. Such an approach would be similar to Fleury's (1993) study of the roles of social networks in motivation of cardiac rehabilitation participants. The proposed study, however, would focus on women with CHD, would include family members, and would not be limited to the cardiac rehabilitation setting. Similarities in findings would be helpful in building theory related to health behavior changes in women with CHD and their family members.

This study has implications for several research content areas. Intervention studies for health behavior changes in women with CHD and family members should include measures of social support and conflict in order to further examine their contributions. Factors influencing women's participation in cardiac rehabilitation should be investigated for the purpose of developing effective strategies to increase participation. Longitudinal studies of patterns of diet changes would help to identify if and when individuals and families change carbohydrate habits. They might also answer the question of whether it is easier for people to focus on one aspect of change first, such as low fat, or whether changing low fat habits is related to how patients and families are taught. Family

patterns of ranking values competing with health might contribute to our knowledge of family behavior patterns. Finally, family members need to be included in more nursing research related to the experience of women with CHD.

Study Summary

Introduction

Although heart disease is the number one cause of death in women, until recently, little was known about women's experience with the illness. The purpose of this dissertation was to describe the experiences of women with coronary heart disease (CHD) and their families related to specific factors that may predict changes in health protection behaviors. A truly effective approach to heart disease should include health protection efforts aimed at preventing CHD and its manifestations. These effort are usually directed toward reducing coronary risk factors through changes in diet, smoking, exercise, and stress behaviors. Because family members are a major source of support for women with CHD and because family members share in the risk of heart disease, families as well as women were studied. The long-term goal of this research was to provide the basis for nursing interventions related to improving the health protection behaviors of women with CHD and their families.

Review of the Literature

Social support plays a crucial role in women's experience of illness. While women generally report asking for and receiving more social support than men, they also describe greater costs and conflict related to that support (Tilden, et al., 1990a). Major sources of support for older women with heart disease are adult children, spouses, other relatives, and friends (Friedman, 1993). Social support facilitates health behavior changes and recovery from illness for women, yet members of the social network can also limit or block lifestyle changes (Fleury, 1993). Social support is inversely related to mortality after myocardial infarction

(MI) for both women and men (Berkman, et al., 1993). Family members report receiving less social support than do patients (Rankin & Monahan, 1991). In addition, support declines over time for spouses of male cardiac patients (Artinian, 1992). Social support is positively related to families' social integration after MI (Dhooper, 1984), and buffers spouses' mood disturbances after cardiac surgery (Rankin & Monahan, 1991). Conflict has been related to mood disturbances and negative health cognitions in men after MI (Waltz, et al., 1988). Women's social networks are more conflict-laden than men's (Berkman, et al., 1993).

Individuals who place a higher value on health undertake more preventive behaviors than those who value health less (Fleetwood & Packa, 1991; Parcel, et al., 1980; Wallston, et al., 1978). Although health value orientation was related to wellness motivation of men after MI (Fleury, 1991), the role of health value in changing health behaviors of women with CHD and their families has not been described.

Families of men with MI used multiple family coping strategies, including the use of social support (Dhooper, 1983). Families of women with chronic illnesses used introspective family coping, which included the use of feedback, reflection, and goal adjustment (Lewis, et al., 1989).

Involvement of families in health protection and health promotion is feasible and effective, and family-based interventions can lead to long-term changes in dietary habits (Carmody, et al., 1986; Nader, et al., 1989). Women assume the primary responsibility for the health activities of the family (Litman & Venters, 1979).

Three qualitative studies provided understanding of women's experience of cardiac illness. Johnson & Morse (1990) described the process of adjustment after MI for men and women as a struggle to regain control. Among the themes

described by women after coronary artery bypass surgery (CABG) were remapping of relationships as a major task and the use of different cues for resumption of activities (Hawthorne, 1993). Women recovering from an acute cardiac event described the process of healing, which could lead to new and positive health behaviors (Fleury, 1993). The experience of cardiac illness is stressful for spouses and family members (Gilliss, 1989), and family adjustment to heart disease can last up to six months or more.

Conceptual Framework

Choice of a conceptual framework was guided by two major assumptions. First, the family as well as the identified patient is affected by the diagnosis and adaptation to heart disease. Second, females' experience of heart disease is different from that of males. Research related to behavioral changes is complex because at least three systems are involved, including the individual, family, and social systems (Montgomery, 1982). Therefore, no one theory is sufficient, and, in the case of the clinical problem of interest, new theory is needed. This study focused on family-level concepts which might serve as predictors of behavioral changes. Family systems theory supports the first assumption, thus guiding the focus on families. Montgomery's (1982) value-behavior hierarchy suggests the relationship between health value and health behaviors. The Double ABCX Model of family stress (McCubbin & McCubbin, 1987) predicts that resources such as social support and family coping are related to adjustment to cardiac illness, including changes in health behaviors.

Based upon the review of the literature and the salient aspects of these theories, the following research questions guided this investigation. What are the relationships among social support, conflict, value of health, family coping, and the health protection behaviors of diet, smoking cessation, exercise, and stress management for women with CHD and their family members? What variables

predict health protection behaviors of women with CHD and their family members?

Design and Methods

This study used a prospective, longitudinal design to describe the experiences of women with CHD and their family members related to social support, conflict, value of health, family coping, and health protection behaviors. Subjects were followed for 3 months, with Time 1 as discharge from the hospital and Time 2 as 3 months later.

Subjects were recruited from a 450-bed tertiary care hospital noted for its cardiac care program in Portland, Oregon. A sample size of 78 female CHD patients and 78 families was determined by power analysis (Cohen, 1977).

The following instruments were used to measure the study concepts. Cronbach's alpha coefficients results for this study are reported in parentheses. Social support was defined as the perceived availability or enactment of helping behaviors by members of the social network, and measured by the Interpersonal Relationship Inventory (IPRI) (Tilden, et al., 1990a) (α=.88-.91). Social support Source and Satisfaction Questions were added. Conflict was defined as the perceived discord or stress in relationships due to others' behavior or absence of behaviors, and was measured by the IPRI (α=.88-.92). Health value was measured by two scales, the Health Value Survey and the Health Value Scale (α =.60-.77). Family coping was measured by the familial introspection subscale of Lewis' adapted version of F-COPES (Lewis, et al., 1989) (α=.91-.95). Introspective family coping includes the use of feedback, reflection, and goal adjustment. The Diet Habit Survey (Connor, et al., 1992) measures two factors, low fat diet habits (α=.82-.87) and carbohydrate habits. A smoking questionnaire was developed for this study to measure stages of self-change of smoking and self-efficacy for smoking cessation. The Health-Promoting Lifestyle Profile

(Walker, et al., 1987) scales for exercise (α=.68-.79) and stress management (α=.71-.77) were used in this study. A demographic questionnaire also was included. All self-report instruments were printed in a booklet. A CHD profile also was completed for all subjects.

The rights of human subjects were protected according to federal guidelines as monitored by the Oregon Health Sciences University Committee on Human Research and the St. Vincent Hospital and Medical Center Institutional Review Board. Written consent was obtained from all subjects. Procedures were implemented to maintain confidentiality of data and to eliminate or reduce the potential risks of fatigue and psychological discomfort.

The procedures for data collection included three steps: screening, explanation and consent, and data collection sessions. Women who had undergone percutaneous transluminal coronary angioplasty (PTCA) or coronary artery bypass graft surgery (CABG) were recruited while hospitalized. Other selection criteria included aged 75 or younger, able to read and speak English, and at least one family member in addition to the patient consented to participate. After introduction by the patient's nurse, the researcher explained the purpose and meaning of participation to the patient and any family members present, answered any questions, read the consent form, and individually asked willingness to participate. The female patient was asked to identify up to three family members to be contacted for participation. Those not present in the hospital were contacted by phone. Criteria for family member selection were identification by the female CHD patient as a family member, age 13 or older, and able to read and speak English.

At Time 1, subjects were given questionnaire booklets to complete and return in a sealed envelope to the nurses' station, or by mail. At Time 2,

booklets were mailed to all subjects. Follow-up procedures were used to increase response rates.

Descriptive and inferential statistics were used to analyze study data, using SPSS 4.0 for the Macintosh.

Results

The sample consisted of 74 women with CHD for whom complete data were available. The mean age was 63.2 years, and the sample was predominantly white, married, and educated at just above high school level. Forty women underwent PTCA and 34 had CABG during hospitalization (Time 1). At Time 2, all women were alive and 34% reported recurrence of CHD symptoms. Complications were reported by 19% at Time 2. Twelve percent participated in cardiac rehabilitation.

The sample of family members (n=120) included 62 females and 58 males for whom complete data were available. These individuals represented 66 families. The largest groups were daughters (n=51; mean age=37.5), husbands (n=31; mean age=63.7), and sons (n=22; mean age=38.7). The mean age was 46.9 years, and the sample was predominantly white, married, and well educated. At Time 1, 46 family members (38%) lived with the women with CHD. Nineteen family members (16%) had a history of CHD.

The mean scores of both the women and family members did not change over time on the predictor variables of social support, conflict, family coping, and health value. Social support scores for both groups at both times were higher than the norm, and family members' conflict at Time 1 was higher than the norm. Women scored higher than family members on social support and health value ranking at Time 1, stress management at Time 2, and low fat diet and diet at both times. Women scored lower than family members on exercise at Time 1. Women significantly improved their low fat diet, total diet, exercise, and stress

management scores between Time 1 and Time 2. Carbohydrate and smoking stage did not change. For family members, only low fat diet and exercise scores significantly improved over time. There were significant differences in mean social support by smoking stage at Time 1 for both the women and family members.

Hierarchical multiple regression analyses were performed in order to identify significant predictors of changes in the four outcome behaviors with continuous data (low fat diet, carbohydrate diet, exercise, and stress management). Because changes in behavior over time were of interest in this study, Time 1 behavior was controlled for by entering it into the equation first. In order to achieve a more parsimonious model, family coping and the Health Value Survey ranking were dropped from the models.

Time 1 behaviors predicted the largest amounts of variance in both groups. After controlling for Time 1 behaviors and other predictors in the equations, conflict, having CABG, complications, Time 1 health value, and cardiac rehabilitation were significant predictors in the some of the women's models. Adding a family score added a significant amount of variance only to the women's low fat diet outcome. Using a family score to predict the women's scores yielded a significant model only for low fat diet and carbohydrate behaviors. When family mean scores were used to predict family members behaviors, Time 2 social support was significant in the exercise and stress management equations, with Time 2 health value also significant in the latter. Adding the women's outcome scores was significant in the low fat diet model only. When individual family members' scores were used, Time 2 social support was the most consistent predictor. Female gender, living with the woman with CHD, Time 1 social support, and Time 1 conflict also were significant predictors of some family member behaviors.

Discussion

The sample of women with CHD consisted of women who were referred to a tertiary care center for interventional treatment of CHD, namely PTCA or CABG. Of the predictor variables, conflict was most helpful in explaining women's changes in health behaviors. This finding was consistent with the literature which describes women's social networks as more conflict laden than men's, and with Fleury's (1993) description of value conflict in cardiac patients' social network. Of surprise was the failure of social support to predict women's behaviors. Possible explanations included insufficient variability in social support scores, omission of an intermediate variable in the model, or because the support received was the wrong type or inappropriate (Wortman & Lehman, 1985). Because social support was found to differ by smoking stage, it remains as an important concept in understanding women's experience of cardiac illness. While it appears that women in this study had enough social support to maintain their smoking cessation behaviors for 3 months, it is unknown whether the levels would be enough to sustain behaviors over a longer period of time. The inverse relationship between Time 1 health value and Time 2 exercise was puzzling, but may reflect what Fleury (1993) described as women's pattern of changing their values and goals during recovery from a cardiac event.

The use of family member or family mean responses to predict women's behaviors showed the influence of the family on women's low fat diet habits. The inverse relationship between the family mean health value score and women's carbohydrate diet was the opposite of what was expected.

The family members who completed this study reflect the social network of women with CHD. Social support was an important predictor of family members' health behaviors. Family members reported less social support at Time 1 than the women with CHD, but similar amounts at Time 2. Rankin and Monahan

(1991) reported lower levels for spouses at both 1 and 3 months after cardiac surgery. Early adjustment to heart disease involved high levels of conflict for family members, which tended to decrease over time. Conflict was not as strong a predictor for family members as it was for women. Family members' low fat diet habits were influenced by the women with CHD, thus both groups influence each other's diet habits. Smoking stages were less favorable among family members than among the women with CHD, with more moving to less desirable stages by three months. The role of social support in family members' smoking cessation efforts should be explored further.

The limitations to this study included threats to internal and external validity. Threats to internal validity included the wide range of booklet return times, selection of the sample, loss of participants at each data collection time, and measurement concerns, including the use of self-report measures. The convenience sample of women with PTCA or CABG who were white and well-educated affects external validity. Similarly, the family members do not represent all family members of women with CHD. Hence the findings of this study cannot be generalized to all women with CHD and their family members.

Implications for Nursing Theory, Practice, and Research

The findings of this study underscore the importance of individual, family, and social systems to health behavior changes. Several hypotheses were generated from the results of this study, which also pointed out the need for additional theory to predict and explain the health behavior changes of women with CHD and their family members. In particular, additional information is needed about dimensions of social support and conflict that are critical to the health behavior changes of women with CHD and their family members.

Thus among the recommendations for future research is the need for a qualitative study focusing on relationships and changes in health behaviors in

both women with CHD and family members. Future quantitative studies of women with CHD and their family members should include additional variables, longer follow-up times, and strategies to increase retention of family members as subjects. Additional information is needed regarding factors influencing women's participation in cardiac rehabilitation, patterns of diet changes, and families' ranking of values in addition to health.

The findings of this study offer suggestions for clinical practice related to primary and secondary prevention of heart disease in women with CHD and their family members. Both groups should be assessed for the types and amounts of social support and conflict, and patient and family education should include information regarding decreasing family conflict and mobilizing social support. Additional implications for patient and family education include teaching the importance of increasing complex carbohydrate consumption and continuing strong smoking cessation messages. When identifying expected outcomes for women undergoing PTCA or CABG, it is realistic to expect significant improvements in health behaviors aimed at preventing progression of heart disease by 3 months of recovery. Family members can expect to make similar improvements, which can benefit their own health and that of their female family members with CHD.

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Appendix A

Letter of Support

ST. VINCENT HOSPITAL & MEDICAL CENTER
9155 SOUTHWEST BARNES ROAD, SUITE 236
PORTLAND, OREGON 97225
PHONE: (503) 291-2088
FAX: (503) 291-2112

SISTERS OF PROVIDENCE
SERVING IN THE WEST SINCE 1856

THE HEART INSTITUTE
ALBERT STARR, M.D., DIRECTOR
PETER C. BLOCK, M.D., ASSOCIATE DIRECTOR

July 30, 1991

Anne G. Rosenfeld, R.N., M.S.
19615 Derby Court
West Linn, OR 97068

Dear Anne,

I am writing to express St. Vincent's support of your National Research Service Award application and the research objectives you have identified.

As you know, Dr. Starr and the Heart Institute have developed and now maintain a large observational database on all cardiac surgery and angioplasty patients treated at St. Vincent. The database includes over 20,000 patients treated since 1960, and we now accrue approximately 1400 surgical, 1200 angioplasty, and 3000 diagnostic catheterization patients each year.

For over 30 years, Heart Institute staff have maintained annual contact with every surviving cardiac surgery patient by means of mail questionnaires with phone follow-up. Since 1988, we have also conducted six-month and annual follow-up of all angioplasty patients. We maintain over 90% completeness on all follow-up, with staff support provided by two full-time data managers and a research staff of 12 professionals.

This large database has supported over 250 published studies in the scientific literature. Yet, like so much of contemporary clinical research in heart disease, Heart Institute studies have reflected the predominance of males in our population. Though we have had a special interest in issues of anticoagulation and heart valve prosthesis selection for pregnant women, we have not made a systematic effort to assess the experiences of women and their families facing heart disease and its treatments. We would be very pleased to support your efforts in this area.

We are also eager to expand our support of nursing research activity. CORE staff are now providing consultation to Providence Medical Center's Robert Wood Johnson demonstration project in innovative nursing strategies, which includes extensive patient health status and functional assessments. At St. Vincent, we have assisted in the evaluation of a nursing case management program directed at cardiac and pulmonary patients. In addition, several nursing study groups have been conducting

quality improvement studies examining the care processes for CABG and carotid endarterectomy patients. The Heart Institute, as a multi-disciplinary management model, is strongly committed to inclusion of nursing perspectives in all planning activities, and will benefit greatly from participation in your research program.

Women account for approximately 25% of all St. Vincent heart patients, and these patients represent a broad cross-section of Oregon's population. Though located in the Portland metropolitan area, over 40% of Heart Institute patients travel from outside the Portland area to receive service here, often through referrals from one of 26 affiliated community hospitals in Oregon and Southwest Washington. Over 40% of all St. Vincent patients are Medicare beneficiaries, and HCFA has rated St. Vincent's overall patient acuity among the highest of U.S. hospitals (ranking in the top 60 based on DRG case-mix). As a Catholic hospital, St. Vincent's commitment to serving all patients regardless of income is reflected in the $9,000,000 in charity care provided annually.

Your research interests have great importance for improving the quality of care provided to our patients and for making a significant contribution to the field of nursing research. The Heart Institute will be pleased to assist you in any appropriate way as you develop and implement your research program.

Sincerely,

David Lansky, Ph.D.
Director, Center for Outcomes Research and Education

cc: Albert Starr, M.D.
John Fletcher

Appendix B

Measures

F-COPES

Interpersonal Relationship Inventory

Social Support Source and Satisfaction Questions

Health Value Survey

Health Value Scale

Smoking Questionnaire

Health-Promoting Lifestyle Profile

Diet Habit Survey

Demographic Questionnaire

Women, Families, and Heart Disease Study

Anne Rosenfeld, R.N., M.S.
19615 Derby Court
West Linn, Oregon 97068

DIRECTIONS

Thank you very much for filling out this questionnaire. Read each question and mark the answer that best matches your opinion. There are no right or wrong answers. Please do not consult with family members before answering the questions. It is your opinion that is requested.

It should take about one hour to answer this questionnaire. You may want to take two or three blocks of time to complete it.

If you have any comments on any specific questions, feel free to write in the blank space around the questions or on the back cover.

When you are done with the questionnaire, please return it to me in the enclosed stamped envelope.

QUESTIONS?

If you have any questions about this questionnaire, please call Anne Rosenfeld, R.N., M.S. at (503)635-6933.

ID# _____

FAMILY COPING

Please **CIRCLE** the number that best fits your situation.

In the past month, when we faced the most important challenge or problem in our family, we responded by:

	Never	Seldom	Sometimes	Frequently	Almost Always
1. Thinking about how best to respond to the important events affecting us.	1	2	3	4	5
2. Viewing events we experienced as solvable.	1	2	3	4	5
3. Working on ways to handle our family routines.	1	2	3	4	5
4. Identifying ways to help us be happier as a family.	1	2	3	4	5
5. Doing things as a family that added to our positive feelings about each other.	1	2	3	4	5
6. Taking stock of what we have done as a family.	1	2	3	4	5
7. Deciding whether or not we handled the situation well.	1	2	3	4	5
8. Considering the consequences of how we handled a situation.	1	2	3	4	5
9. Considering the long-term effects of how we solved the problem.	1	2	3	4	5
10. Allowing ourselves time and energy to work through something new.	1	2	3	4	5

Continue on next page

In the past month, when we faced the most important challenge or problem in our family, we responded by:

	Never	Seldom	Sometimes	Frequently	Almost Always
11. Giving each other feedback about how we handled the problem or challenge.	1	2	3	4	5
12. Re-thinking our priorities as a family.	1	2	3	4	5
13. Modifying our goals as a family.	1	2	3	4	5
14. Reviewing our family goals or wishes.	1	2	3	4	5
15. Changing the priorities we hold as a family.	1	2	3	4	5
16. Defining the family problem in a more positive way so that we do not become too discouraged.	1	2	3	4	5

Continue on next page

INTERPERSONAL RELATIONSHIP INVENTORY

Most relationships with people we feel close to are both helpful and stressful. Below are statements that describe close personal relationships. Please read each statement and **CIRCLE** the number that best fits your situation. There are no right or wrong answers.

These first statements ask you to disagree or agree.

	STRONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE
1. I know someone who makes me feel confident in myself	1	2	3	4	5
2. Some people I care about share similar views with me	1	2	3	4	5
3. There is someone I can turn to for helpful advice about a problem	1	2	3	4	5
4. I can talk openly about anything with at least one person I care about	1	2	3	4	5
5. There is someone I could go to for anything	1	2	3	4	5
6. Some people in my life are too pushy	1	2	3	4	5
7. I can count on a friend to make me feel better when I need it	1	2	3	4	5
8. There is someone in my life who gets mad if we have different opinions	1	2	3	4	5
9. It's safe for me to reveal my weaknesses to someone I know	1	2	3	4	5
10. Someone I care about stands by me through good times and bad times	1	2	3	4	5
11. I have the kind of neighbors who really help out in an emergency	1	2	3	4	5
12. There is someone I care about that I can't count on	1	2	3	4	5
13. If I need help, all I have to do is ask	1	2	3	4	5
14. I have enough opportunity to talk things over with people I care about	1	2	3	4	5

These next statements ask you how often something happens.

	NEVER	ALMOST NEVER	SOMETIMES	FAIRLY OFTEN	VERY OFTEN
15. I have enjoyable times with people I care about	1	2	3	4	5
16. I spend time doing things for others when I'd really rather not	1	2	3	4	5
17. Some people I care about invade my privacy	1	2	3	4	5
18. I am embarrassed by what someone I care about does	1	2	3	4	5

Continue on next page

Most relationships with people we feel close to are both helpful and stressful. Below are statements that describe close personal relationships. Please read each statement and **CIRCLE** the number that best fits your situation. There are no right or wrong answers.

	NEVER	ALMOST NEVER	SOMETIMES	FAIRLY OFTEN	VERY OFTEN
19. Someone I care about tends to take advantage of me	1	2	3	4	5
20. Some people I care about are a burden to me	1	2	3	4	5
21. I wish some people I care about were more sensitive to my needs	1	2	3	4	5
22. People I care about make me do things I don't want to do	1	2	3	4	5
23. There is tension between me and someone I care about	1	2	3	4	5
24. I have trouble pleasing some people I care about	1	2	3	4	5
25. At least one person I care about lets me know they believe in me	1	2	3	4	5
26. Some people I feel close to expect too much of me	1	2	3	4	5

27. In relation to your or your family member's cardiac illness, who has been a source of help during the past 3 months? (**CIRCLE** the number before the person(s) who helped you. You may circle more than one.)

1. Parent
2. Child or children
3. Spouse or significant other
4. Relative or family member
5. Friend
6. Neighbor
7. Spiritual advisor *(minister, priest, etc.)*
8. Professional *(nurse, counselor, etc.)*
9. Agency
10. Self-help group
11. No one (no one available)
12. No one (prefer to handle it alone)
13. Other (explain)_____

28. To what extent do you feel satisfied with the help you received during the past 3 months in relation to your or your family member's cardiac illness?

1. Very dissatisfied
2. Fairly dissatisfied
3. A little dissatisfied
4. A little satisfied
5. Fairly satisfied
6. Very satisfied

Continue on next page

VALUE SURVEY

Below you will find a list of ten values listed in alphabetical order. Please arrange them in order of their importance to YOU, as guiding principles in YOUR life.

Study the list carefully and pick out the one value which is the most important for you. Write the number 1 in the space to the left of the most important value. Then pick out the value which is second most important to you. Write the number 2 in the space to the left. Then continue in the same manner for the remaining values until you have included all ranks from 1 to 10. Each value would have a different number.

Some people may find it difficult to distinguish the importance of some of these values. Do the best you can, but please rank all 10 of them. The end result should truly show how YOU really feel.

_____A COMFORTABLE LIFE (a prosperous life)

_____AN EXCITING LIFE (a stimulating, active life)

_____ FREEDOM (independence, free choice)

_____HAPPINESS (contentedness)

_____HEALTH (physical and mental well-being)

_____INNER HARMONY (freedom from inner conflict)

_____PLEASURE (an enjoyable, leisurely life)

_____SELF-RESPECT (self-esteem)

_____A SENSE OF ACCOMPLISHMENT (lasting contribution)

_____SOCIAL RECOGNITION (respect, admiration)

Continue on next page

HEALTH VALUE SCALE

Please read each statement and **CIRCLE** the number that best fits your thoughts.

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
1. If you don't have your health you don't have anything.	1	2	3	4	5	6	7
2. There are many things I care about more than my health.	1	2	3	4	5	6	7
3. Good health is of only minor importance in a happy life.	1	2	3	4	5	6	7
4. There is nothing more important than good health.	1	2	3	4	5	6	7

Continue on next page

SMOKING QUESTIONNAIRE

1. Have you ever smoked cigarettes?
   1. No (Skip to question 8.)
   2. Yes

2. If YES, which of the following statements best describes your present stage of smoking?
   1. I no longer smoke. (Go next to question 3.)
   2. I currently smoke. (Go next to question 5.)

3. How long has it been since you quit smoking?
   1. Less than 6 months.
   2. 6 months or more.

4. How confident are you that you will NOT start smoking again?

   Place an X on the line which corresponds to your confidence.

   0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
   no confidence total confidence

5. Have you tried to quit smoking in the past year
   1. Yes
   2. No

6. Do you intend to quit smoking in the next year? (Circle one answer.)

1. Definitely No	2. Probably No	3. Possibly No	4. Possibly Yes	5. Probably Yes	6. Definitely Yes

7. How confident are you that you can stop smoking in the next year?

   Place an X on the line which corresponds to your confidence.

   0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
   no confidence total confidence

8. How many people in your household smoke? _____
   Total number **not** including you.

Continue on next page

LIFESTYLE PROFILE

DIRECTIONS: This questionnaire contains statements regarding your present way of life or personal habits. Please respond to each item as accurately as possible, and try not to skip any item. Indicate the regularity with which you engage in each behavior by **circling**:

1 for never, **2** for sometimes, **3** for often, or **4** for routinely.

	Never	Sometimes	Often	Routinely
1. Perform stretching exercises at least 3 times per week.	1	2	3	4
2. Take some time for relaxation each day..	1	2	3	4
3. Am aware of the sources of stress in my life..	1	2	3	4
4. Exercise vigorously for 20-30 minutes at least 3 times per week..	1	2	3	4
5. Participate in supervised exercise programs or activities..	1	2	3	4
6. Practice relaxation or meditation for 15-20 minutes daily..	1	2	3	4
7. Check my pulse rate when exercising..	1	2	3	4
8. Consciously relax muscles before sleep..	1	2	3	4
9. Engage in recreational physical activities (such as walking, swimming, soccer, bicycling)..	1	2	3	4
10. Concentrate on pleasant thoughts at bedtime..	1	2	3	4
11. Find constructive ways to express my feelings..	1	2	3	4
12. Use specific methods to control my stress..	1	2	3	4

You are now about halfway through this booklet. If you are tired, now would be a good time to take a break. Please remember to come back later and finish the rest of the questions.
Thank you.

Continue on next page

THE DIET HABIT SURVEY

DIRECTIONS: For each question, place a check in the spaces to the left of the choices or fill in the blanks to the left of the choices that best describe your eating habits during the last month. YOU MAY SELECT MORE THAN ONE CHOICE FOR A QUESTION. Ignore the word "score" in the right hand margin.

MEAT, FISH, AND POULTRY

For each question, check as many spaces as apply.

1. Which type of ground beef do you usually eat?
   - ____ Regular hamburger (30% fat)
   - ____ Lean ground beef (25% fat)
   - ____ Extra lean/ground chuck (20% fat)
   - ____ Super lean/ground round (15% fat)
   - ____ Ground sirloin (10% fat) or **eat no ground beef**

   Score_____

2. Which best describes your typical lunch?
   - ____ Cheeseburger, typical cheeses, egg dishes (egg salad, quiche, etc.)
   - ____ Sandwiches (lunch meat, hot dog, hamburger, fried fish, etc.) or entree of meat or chicken (plain or fried)
   - ____ Tuna sandwich, fish entree (not fried), entree with small bits of chicken or meat in a soup or casserole
   - ____ Peanut butter sandwich, tuna sandwich with fat-free mayonnaise
   - ____ Salad, yogurt, cottage cheese, vegetarian dishes (without high-fat cheeses or egg yolk)

   Score_____

3. Check all of the choices that reflect the entree at your main meal.
   - ____ Cheese (Cheddar, Jack, etc.), eggs, liver, heart or brains *once a week or more*
   - ____ Beef, lamb, pork or ham *once a week or more*
   - ____ Very lean red meat (top round or flank steak), veal, venison, or elk *once a week or more*
   - ____ Chicken, turkey, rabbit, crab, lobster or shrimp *twice a week or more*
   - ____ Fish, scallops, oysters, clams, or meatless dishes containing no egg yolk or high fat cheese *twice a week or more*

   Score_____

4. Estimate the number of ounces of meat, cheese, fish **and** poultry you eat in a typical day. Include all meals and snacks.

   To guide you in your estimate:

4 strips bacon	*= 1 oz.*	*1 chicken thigh*	*= 2-3 oz.*
1 small burger patty	*= 3-4 oz.*	*half chicken breast*	*= 3 oz.*
meat in most sandwiches	*= 2-3 oz.*	*1 average T-bone steak*	*= 8 oz.*
1 slice cheese	*= 1 oz.*	*1-inch cube cheese*	*= 1 oz.*

   - ____ Eleven or more ounces a day
   - ____ Nine to 10 ounces a day
   - ____ Six to 8 ounces a day
   - ____ Four to 5 ounces a day
   - ____ Not more than 1 ounce of cheese, or 3 ounces of red meat, poultry, shrimp, crab, or lobster, or not more than 6 ounces of fish, clams, oysters, scallops a day

   Score_____

Continue on next page

5. Which of these have you eaten in the past month?
   - ____ Bacon, sausage, bologna and other lunch meats, pepperoni, beef or pork wieners
   - ____ Canadian bacon, turkey wieners
   - ____ Turkey ham and other poultry lunch meats
   - ____ Soy products (breakfast links)
   - ____ None

Score___

DAIRY PRODUCTS AND EGGS

For each question, check as many spaces as apply.

6. Which kind of milk do you usually use for drinking or cooking?
   - ____ Whole milk
   - ____ Two percent milk
   - ____ One percent milk, buttermilk
   - ____ Skim milk, nonfat dry milk or **none**

Score_____

7. Which toppings do you use?
   - ____ Sour cream (real or imitation including IMO), whipped cream
   - ____ Light sour cream
   - ____ Nondairy toppings (Cool Whip or Dream Whip)
   - ____ Regular cottage cheese, whole milk yogurt
   - ____ Low-fat cottage cheese, nonfat or low-fat yogurt, nonfat sour cream, or **none**

Score_____

8. Which frozen desserts are you most likely to eat at least once a month?
   - ____ Ice Cream
   - ____ Ice milk, most soft ice cream, Tofutti, Frozen yogurt (cream added)
   - ____ Sherbet, Low-fat frozen yogurt, Lite Lite Tofutti
   - ____ Nonfat frozen yogurt, Sorbets, Ices, Popsicles, or **none**

Score_____

9. Which kind of cheese do you use for snacks or sandwiches?
   - ____ Cheddar, Swiss, Jack, Brie, feta, American, cream cheese, regular cheese slices or cheese spreads
   - ____ Part-skim mozzarella, Lappi, light cream cheese or Neufchatel, part-skim Cheddar (Kraft Light, Green River, Olympia's Low Fat or Heidi Ann Low-Fat Ched-Style Cheese)
   - ____ Low-cholesterol "filled" cheese (Scandic Mini Chol, Hickory Farms Lyte or imitation Mozzarella)
   - ____ **No cheese**, fat-free cheese, nonfat cream cheese,. Lite part-skim Mozzarella, Low-fat Ricotta, Reduced Calories Laughing Cow, Dorman's Light, Weight Watchers or the Lite-line series of cheeses

Score_____

Continue on next page

10. Which kind of cheese do you use in cooking (casseroles, vegetables, etc.)?
    - ____ Cheddar, Swiss, Jack, Brie, feta, American, cream cheese, processed cheese
    - ____ Part-skim mozzarella, Lappi, light cream cheese, part-skim Cheddar, (Green River, Olympia's Low Fat, Kraft Light or Heidi Ann Low-Fat Ched-Style Cheese)
    - ____ Low-cholesterol "filled" cheese (Scandic Mini Chol, Hickory Farms Lyte or imitation Mozzarella)
    - ____ **No cheese**, fat-free cheese, Lite part-skim Mozzarella, Low-fat Ricotta, Dorman's Light, Weight Watchers or the Lite-line series of cheeses, or nonfat cream cheese

Score_____

11. Check the type and number of "visible" eggs you eat.
    - ____ Six or more whole eggs *a week*
    - ____ Three to five whole eggs *a week*
    - ____ One to two whole eggs *a week*
    - ____ One whole egg *a month*
    - ____ Egg white, egg substitute such as Egg Beaters, Scramblers, Second Nature, or **none**

Score_____

12. Check the type of eggs usually used in food prepared at home or bought in grocery stores (baked goods, such as cakes and cookies, potato and pasta salads, pancakes, etc.)
    - ____ Whole eggs or mixes containing whole eggs (complete pancake mix, slice-and-bake cookies, etc.)
    - ____ Combination of egg white, egg substitute, and whole egg
    - ____ Egg white, egg substitute or **none**

Score_____

FATS AND OILS

For each question, check as many spaces as apply.

13. Which kinds of fats are used most often to cook your food (vegetables, meats, etc.)?
    - ____ Butter, shortening (all brands except Crisco or Fluffo) or lard, bacon grease, chicken fat or eat in restaurants at least *4 times a week*
    - ____ Soft shortening (Crisco or Fluffo) or inexpensive stick margarine (remains hard at room temperature)
    - ____ Tub or soft-stick margarine, vegetable oil (including olive oil)
    - ____ **None** or use nonstick pan or spray

Score_____

14. How much of these "added" fats do you eat in the typical <u>day</u>: peanut butter, margarine, mayonnaise, or salad dressing (including those made with olive oil)?
    <u>Examples of amounts people often use:</u>

on toast	*2 tsp. margarine*	*on salads*	*12 tsp. salad dressing (do not include low cal or fat free dressing)*
on sandwiches	*6 tsp. mayonnaise* *2 tsp. margarine* *6 tsp. peanut butter*	*on potatoes, vegetables, pasta, rice*	*3 tsp. margarine*

    - ____ Ten teaspoons or more
    - ____ Eight to 9 teaspoons
    - ____ Six to 7 teaspoons
    - ____ Four to 5 teaspoons
    - ____ Three teaspoons or less

Score_____

Continue on next page

15. How often do you eat potato chips, corn or tortilla chips, fried chicken, fish sticks, French fries, doughnuts, other fried foods, croissants or Danish pastries?

____ Two or more times *a day*
____ Once *a day*
____ Two to 4 times *a week*
____ Once *a week*
____ Less than twice *a month*

Score_____

16. Which best describes the amount of margarine, peanut butter, mayonnaise, or cream cheese that you put on breads, muffins, bagels, etc.?

____ Average (1 teaspoon or more per serving)
____ Lightly spread (can see through it)
____ "Scrape" (can barely see it)
____ **None**

Score_____

17. Which kind of salad dressings do you use?

____ Real mayonnaise
____ Miracle Whip, Ranch, French, Roquefort, blue cheese, and vinegar and oil dressings
____ Light mayonnaise, Miracle Whip Light, Thousand Island dressing
____ Russian and Italian dressings, Ranch Salad Dressing made with buttermilk and light mayonnaise or Miracle Whip Light
____ Fat-free (mayonnaise, Miracle Whip or salad dressing), low-calorie dressing, vinegar, lemon juice, Ranch Dressing made with buttermilk and low-fat yogurt or **use no salad dressing**

Score_____

SWEETS AND SNACKS

For each question, check as many spaces as apply.

18. How often do you eat dessert or baked goods (sweet rolls, doughnuts, cookies, cakes, etc.)?

____Three or more times *a day*
____Two times *a day*
____Once *a day*
____Four to 6 times *a week*
____Three or 4 times *a week or less*

Score_____

19. Which of the following are you most likely to select as a dessert choice?

____ Croissants, pies, cheesecake, carrot cake
____ Typical cakes, cupcakes, cookies
____ Low-fat muffins, desserts from low-fat cookbooks
____ Fruits, low-fat cookies (fig bars and ginger snaps), angel food cake or **none**

Continue on next page

Score_____

20. Which snack items are you most likely to eat in an average month?

____ Chocolate
____ Potato chips, corn or tortilla chips, nuts, party/snack crackers, doughnuts, French fries, peanut butter, cookies
____ Lightly buttered popcorn (1 tsp. for 3 cups), pretzels, low-fat crackers (soda, graham), "home" baked corn chips, low-fat cookies (gingersnaps, fig bars)
____ Fruit, vegetables, very low-fat snacks, or **none**

Score_____

CHOLESTEROL–SATURATED FAT SCORE(QUESTIONS 1–20)_____

GRAINS, BEANS, FRUITS AND VEGETABLES

For this part of the questionnaire, list the number of servings of the following foods you eat each day or week, as specified.

21. How many pieces of fruit or cups of fruit juice do you consume *a day* (not "fruit-flavored" drinks)?
____cups or pieces

Score_____

22. How many cups of vegetables do you eat *a day* (tossed salad, cooked vegetables, etc.)?
A typical serving size for tossed salad is 1-1½ cups.
____cups

Score_____

23. How many cups of legumes do you eat *a week* (refried beans, split peas, navy beans, lentils, chili, etc.)?
____ cups

Score_____

Continue on next page

24. How many servings of cereal, bread, crackers and popcorn do you eat each *week*? A typical cereal bowl holds 1 to 2 cups and people typically eat 9 to 12 cups of popcorn. In the right column, list the number of servings you eat per *week*.

List the number of Servings eaten per WEEK

cooked cereal	_____half-cups/week
ready-to-eat cereal	_____cups/week
slice of bread or toast	_____slices/week
English muffin	_____halves/week
four-inch pancake	_____pancakes/week
hamburger bun	_____halves/week
Pita or pocket bread	_____halves/week
six-inch tortilla	_____tortillas/week
dinner or hard roll	_____rolls/week
slices of French bread	_____slices/week
small piece of cornbread	_____pieces/week
bagel	_____halves/week
muffin	_____muffins/week
low-fat crackers (5 per serving)	_____servings/week
plain popcorn (3 cups per serving)	_____servings/week
pretzels	_____cups/week

Score_____

25. How many servings of grains and potatoes do you eat each *week*?

List the number of Servings eaten per WEEK

macaroni, spaghetti and other pastas	_____cups/week
mashed potato	_____cups/week
baked potato	_____large potato/week
rice, corn, bulgur, barley,and other grains	_____cups/week

Score_____

CARBOHYDRATE SCORE (Questions 21-25) _____

Continue on next page

A Few Last Questions About You and Your Family

1. Your age in years _____

2. Your gender
    1. WOMAN
    2. MAN

3. Your marital status. (Circle the one that best describes you.)
    1. SINGLE (NEVER MARRIED)
    2. PARTNERED, NOT MARRIED
    3. MARRIED
    4. DIVORCED OR SEPARATED
    5. WIDOWED

4. Years married or partnered _____

5. Your education. (Circle the one that best describes your situation.)
    1. FINISHED GRADES 0 - 8
    2. FINISHED GRADES 9 - 11
    3. FINISHED HIGH SCHOOL
    4. SOME COLLEGE
    5. FINISHED COLLEGE
    6. FINISHED GRADUATE SCHOOL

6. Total number of school years completed _____

7. Your employment. (Circle the one that best describes your situation.)
    1. EMPLOYED FULL-TIME (more that 30 hours per week)
    2. EMPLOYED PART-TIME (30 hours per week or less)
    3. UNEMPLOYED
    4. HOMEMAKER
    5. RETIRED
    6. STUDENT - EMPLOYED
    7. STUDENT - UNEMPLOYED

8. Your race or ethnic background. (Circle the one that best describes you.)
    1. ASIAN
    2. AFRICAN-AMERICAN
    3. HISPANIC
    4. NATIVE AMERICAN INDIAN
    5. WHITE
    6. OTHER (Describe _____)
    7. PREFER NOT TO ANSWER

Continue on next page

9. Total household income last year. (Circle the <u>one</u> that best describes your situation.)
    1. UNDER $10,000
    2. $10,000 - $19,999
    3. $20,000 - $29,999
    4. $30, 000 - $39,999
    5. $40, 000 - $49,999
    6. $50,000 - $74,999
    7. $75,000 - $99,999
    8. $100,000 OR ABOVE

10. Which of the following four statements describes your ability to get along on your income?
    1. I CAN'T MAKE ENDS MEET.
    2. I HAVE JUST ENOUGH; NO MORE.
    3. I HAVE ENOUGH WITH A LITTLE EXTRA SOMETIMES.
    4. I ALWAYS HAVE MONEY LEFT OVER.

11. To what extent do you consider yourself to be religious?
    1. NOT AT ALL
    2. A LITTLE
    3. SOME
    4. QUITE A BIT
    5. EXTREMELY

12. Do you live in or near a large city, such as Portland, Salem, Eugene, and Longview-Kelso?
    1. YES
    2. NO

13. How many people live with you in your household? _____

14. How many of your close relatives live within 50 miles of you? _____

Is there anything else you would like to add? If so, please use this space for that purpose.

We really appreciate your participation in this study. If you would like a summary of results, please print your name and address on the back of the return envelope (NOT on this questionnaire). Thank you!

Appendix C

Scoring Information

Interpersonal Relationship Inventory

Social support scale = Items 1, 2, 3, 4, 5, 7, 9, 10, 11, 13, 14, 15, 25.

Conflict scale = Items 6, 8, 12, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26.

All items scored as 1=1, 2=2, 3=3, 4=4, 5=5.

Scale scores = summation of item scores.

Possible range = 13-65.

High scores represent higher social support or conflict.

Social Support Sources and Satisfaction

Item 27: Frequencies for each option.

Item 28: Code item as 1=6, 2=5, 3=4, 4=3, 5=2, 6=1.

Health Value Survey

Subtract ranking for health from 11.

Possible range = 1-10.

High scores represent high health value.

Health Value Scale

Code items 1 and 4 as 1=1, 2=2, 3=3, 4=4, 5=5, 6=6, 7=7.

Code items 2 and 3 as 1=7, 2=6, 3=5, 4=4, 5=3, 6=2, 7=1.

Scale score = mean of item codes.

Possible range = 1-7.

High scores represent greater health value.

F-COPES

Familial Introspection Scale = Items 2, 4, 6, 12, 14, 16, 18, 20, 22, 31, 33, 35, 37, 39, 41, 43.

All items scored as 1 = 1, 2 = 2, 3 = 3, 4 = 4. 5 = 5.

Scale scores are calculated as the mean response.

Possible range = 1-5.

High scores indicate more family coping.

Diet Habit Survey

Low fat diet (cholesterol-saturated fat) scale: items 1-20 are scored as the number corresponding to the option selected. If more than one option is selected, the score is the mean of the options selected.

Carbohydrate scale: items 21-24 are scored as 5 points per serving per day. The score for question 24 is the number of servings x 5 divided by 7 (number of servings x 0.7). Item 25 is scored as 10 per cup of mashed potato, macaroni, spaghetti, and other pastas divided by 7 (number of cups x 1.5) and 15 per large baked potato or cup of rice, corn, bulgur, barley and other grains divided by 7 (number of servings x 2).

Total scale score is a summation.

Higher scores correspond to lower fat diets on each scale.

Categorization of scores for 2000 calories (women and children):

Score	Present American Diet (37% fat)	Diet 1 (30% fat)	Diet 2 (25% fat)	Diet 3 (20% fat)
Low fat habits	< 60.0	60.0-70.5	70.6-86.5	86.6-100.0
Carbohydrate	< 45.0	45.0-64.5	64.6-82.5	82.6-102
Total	< 141	141.0-177.5	177.6-221.0	221.1-265.0

Categorization of scores for 2800 calories (men and teens):

Score	Present American Diet (37% fat)	Diet 1 (30% fat)	Diet 2 (25% fat)	Diet 3 (20% fat)
Low fat habits	<58.0	58.0-69.0	69.1-86.0	86.1-98.0
Carbohydrate	<70.0	70.0-95.5	95.6-126.5	126.6-160.0
Total	<164	164.1-207.0	207.1-263.0	263.1-321.0

Smoking Questionnaire

Items 1, 2, 3, 5, 6 used to determine subjects stage of self-change:

STAGE	RESPONSES
Never	1=no
Long-term quitter	2=1, 3=2
Recent quitter	2=1, 3=1
Relapser	2=2, 5=1
Contemplator	2=2, 5=2, 6=4-6
Immotive	2=2, 5=2, 6=1-3

Stages coded as immotive=0, contemplator=1, relapser=2, recent quitter=3, long-term quitter=4, never=5.

Items 4 and 7 used for prediction: item 4 for long-term quitter and recent quitter; item 7 for relapser, contemplator, and immotive.

Item 8: calculate mean response.

Health-Promoting Lifestyle Profile

Exercise scale = items 4, 13, 22, 30, 38.

Stress management scale = items 6, 11, 27, 36, 40, 41, 45.

Items coded as Never(N)=1, Sometimes(S)=2, Often(O)=3, Routinely(R)=4.

Scale scores are calculated as the mean response.

Possible range = 1-4.

High scores represent more exercise or stress management.

CHD Profile

Frequencies for all items.

NYHA Functional Class: I = No symptoms

II = Symptoms with ordinary physical activity

III =Symptoms with less than ordinary physical activity

IV = Symptoms at rest

Appendix D

CHD Profile

ID_____

	Prior History		Current Admission		Between T1 & T2	
Presenting Syndrome	Yes	No	Yes	No	Yes	No
Acute MI	❐	❐	❐	❐	❐	❐
Stable angina	❐	❐	❐	❐	❐	❐
Unstable angina	❐	❐	❐	❐	❐	❐
CHF	❐	❐	❐	❐	❐	❐
Other _____	❐	❐	❐	❐	❐	❐
	If yes, length of dx. (mos.) ___					
CHD Treatment						
Medical	❐	❐	❐	❐	❐	❐
PTCA	❐	❐	❐	❐	❐	❐
CABG	❐	❐	❐	❐	❐	❐
Cardiac rehab	❐	❐	❐	❐	❐	❐
Other _____	❐	❐	❐	❐	❐	❐
CHD Risk Factors						
Hyperlipidemia	❐	❐				
Smoking	❐	❐				
Hypertension	❐	❐				
Physical inactivity	❐	❐				
Stress	❐	❐				
Obesity	❐	❐				
Family history	❐	❐				
Diabetes mellitus	❐	❐				
Coronary angiography	❐	❐	❐	❐	❐	❐
If yes, number of diseased vessels:			0 1 2 3			
NYHA Class			I II III IV		I II III IV	

Appendix E

Psychometric Properties

Summary of Psychometric Properties of Study Instruments

Title	Author	Date	Constructs	Reliability		Validity
IPRI (Interpersonal Relationship Inventory)	Tilden et al.	1990		Alpha (n=235) 2wk)	Test-retest (n-=97;	Construct validity 1. Theory testing a. Factor analysis: 3 factors, inc. reciprocity b. Multiple regression with psych. symptoms c. Criterion-related validity: mod-high correlations with FRI and PRQ 2. Contrasted groups approach (as expected) 3. Multitrait-multimethod did not discriminate Norms Established (n=531)
			Social Support Conflict	.92 .91	.91 .81	
Health Value Survey	Wallston	1978	Health Value		Test-retest (4 week) .92	Construct validity 1. Theory testing a. Fleetwood & Packa, 1991 b. Kristiansen, 1985a,b
Health Value Scale	Lau, Hartman, & Ware	1986	Health Value	Alpha .63-.72	Test-retest (6 week) .78	Construct validity 1. Factor analysis: 1 factor 2. Theory testing of health belief model Concurrent validity 1. Zero-order correlation with Health Value Survey = .62

Appendix F

Consent Form and Letters of Approval

Title	Author	Date	Constructs	Reliability		Validity
F-COPES (Adapted)	Lewis, Woods, & Ellison	1992	Family Coping Familial introspection	Alpha .84-.93	Test-retest .51-.67	Construct validity 1. Factor analysis: 5 factors, including familial introspection 2. Theory testing in families with chronically ill mothers a. Predicted quality of father-child relationship
Diet Habit Survey	Connor et al.	1992	Cholesterol-Saturated Fat Habits Carbohydrate Habits	Interrater .95 .88	Test-retest (n=19; 2mo) .87 .80	Construct validity 1. Factor analysis: 2 factors 2. Correlation with 24 hour dietary recall: For cholesterol-saturated fat, r = .33-.42 3. Plasma lipid changes predicted
Smoking Questionnaire	Rosenfeld	1992	Stage of Self-change of Smoking Self-efficacy for Smoking Cessation			Content validity evaluated.
Health-Promoting Lifestyle Profile	Walker, Sechrist, & Pender	1987	Exercise Stress Management	Alpha .81 .70	Test-retest (n=63;2wk) .81-.91	Construct validity 1. Factor analysis: 6 factors, including exercise and stress management 2. Theory testing with Health Promotion Model (Pender et al., 1990)

February 25, 1993

OREGON HEALTH SCIENCES UNIVERSITY

Informed Consent

TITLE	Factors Predicting Health Behaviors in Women with CHD and Their Family Members
PRINCIPAL INVESTIGATOR	Anne Rosenfeld, R.N., M.S. Doctoral Student, School of Nursing (503) 635-6933 Under the supervision of: Dr. Virginia Tilden, D.N.Sc., R.N. Professor, School of Nursing (503) 494-3857
PURPOSE	The purpose of this research is to describe what helps women with heart disease and their families change their health habits during the months after diagnosis or treatment for heart disease. This information may help nurses who teach women and their families about ways of living with and preventing heart disease.
PROCEDURES	You are asked to complete a questionnaire about your current health habits and situations in your life and your family which might affect those health habits. It takes about one hour to answer all the questions. You are asked to complete this questionnaire twice: once during the next two weeks and again in three months. A total of 78 women with coronary heart disease and their families will be asked to participate in this study.
RISKS AND DISCOMFORTS	It might be uncomfortable for you to answer questions about your feelings about heart disease and your family. You might get tired answering the questions.
BENEFITS	This study is not designed to benefit you directly but the information you share may help women with heart disease and their families in the future.
CONFIDENTIALITY	The information you provide will be confidential. Neither your name nor your identity will be used for publication or publicity purposes. The questionnaires will be identified by a code number. They will be kept in a locked cabinet. The signed consent forms and the list that connects your name and code number will be locked in a cabinet away from the information files.

COSTS

There will be no costs to you for being in this study.

LIABILITY

It is not the policy of the U.S. Department of Health and Human Services or any agency funding the research project in which you are participating to compensate or provide medical treatment for human subjects in the event the research results in physical injury.

The Oregon Health Sciences University, as an agency of the State, is covered by the State Liability Fund. If you suffer any injury from the research project, compensation would be available to you only if you establish that the injury occurred through the fault of the University, its officers or employees. If you have further questions, please call Dr. Michael Baird at (503) 494-8014.

QUESTIONS

You are encouraged to ask questions at any time about this study and your part in it. Mrs. Anne Rosenfeld will gladly answer these questions and can be reached at (503) 635-6933.

VOLUNTARY PARTICIPATION

Your participation in this study is voluntary. You may refuse to participate, or you may withdraw from this study at any time without affecting your relationship with or treatment at St. Vincent Hospital and Medical Center. You may withdraw by simply saying so to Mrs. Anne Rosenfeld. If there are significant new findings developed during the course of this study which may relate to your willingness to continue in the study, they will be shared with you.

CONSENT

I have carefully read and understand the foregoing. Mrs. Rosenfeld has answered all my questions and has agreed to answer any additional questions I may have. I hereby voluntarily consent to my participation in the study procedures described above. I have received a copy of the Informed Consent signed by myself and Anne Rosenfeld, R.N., M.S. who is an authorized study investigator.

_____ _____ _____ _____

Participant's Signature Date Witness' Signature Date

FOR MINORS

_____ _____ _____ _____

Minor's Signature Date Parent's Signature Date

ST. VINCENT HOSPITAL & MEDICAL CENTER
9205 SOUTHWEST BARNES ROAD
PORTLAND, OREGON 97225
PHONE: (503) 297-4411

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February 4, 1993

Sylvia McSkimming, RN, PhD
Associate Director of Nursing
Research and Education
St. Vincent Hospital and Medical Center

Dear Sylvia:

The following study received the approval of the Institutional Review Board effective January 28, 1993:

Factors Predicting Health Behaviors in Women
with Coronary Heart Disease and Their Family Members

Conducted by: Anne G. Rosenfeld, MS, RN

The IRB understands that this study is funded and involves patient interviews post hospitalization. The accompanying informed consent has been reviewed and the issues of confidentiality, especially with regard to tape recorded conversations, has been adequately addressed. It is also our understanding that patients will not be recruited to participate in this study without the consent of their physician.

At the conclusion of this study, please forward a copy of Ms. Rosenfeld's findings and conclusions to the IRB.

Sincerely,

INSTITUTIONAL REVIEW BOARD

Keith Ironside Jr.

Keith Ironside, Jr., M.D.
Chairman

cc: Anne Rosenfeld, MS, RN

OREGON
HEALTH SCIENCES UNIVERSITY
3181 S.W. Sam Jackson Park Road, Portland, OR 97201-3098
Mail Code L106, (503) 494-7887 Fax (503) 494-7787
Institutional Review Board/Committee on Human Research

DATE: September 12, 1991

TO: Anne Rosenfeld, RN L-456
Virginia Tilden, RN, DNSc
FROM: Committee on Human Research, L-106
MacHall Rm. 2160, Ext. 7887
SUBJECT: Review Status of Your Project, ORS# 2896
TITLE: Experience of Heart Disease: Women and Their Families.

Date of Review: September 6, 1991 Period of Approval: One year

Type of Review: ✓ Initial _____ Annual _____ ReReview

The Committee reviewed your protocol and/or consent form at its meeting on the above date, and its decision was as follows:

✓ 1. To approve the protocol and consent form as presented.

_____ 2. To approve the protocol and consent form with the following revisions:

_____ 3. To disapprove the protocol/consent form for the following reasons:

_____ 4. To defer approval of the protocol/consent form for the following reasons:

If consent form changes have been requested, please submit the revision with the changes highlighted. A formal letter of Committee approval will be issued to the Investigator upon receipt of a consent form which conforms to Committee recommendations and requirements. It is a violation of Federal law to enter subjects into this study prior to receipt of formal approval by the Committee.

If the protocol and consent form are both approved, the Committee requests that the date of review be put on the top right corner of the consent form. Approval by the Committee on Human Research does not, in and of itself, constitute approval for implementation of this project. Other levels of review and approval may be required, and the project should not be started until all required approvals have been obtained. Also, studies funded by external sources must be covered by an agreement signed by the sponsor and the Oregon Board of Higher Education.

If this project involves the use of an Investigational New Drug, a copy of the protocol and consent form must be forwarded to the Pharmacy and Therapeutics Committee, Dr. Emmet Keeffe, Chairman.

If you have any questions, please contact Nancy White, Administrative Assistant or Ann Wheeler at x4-7887. (rev_stat 7/91)

Appendix G

Screening Forms

Screening Form: Patient

Name _____ ID_____

Med. Rec. # _____ Date of admission _____

Age (yrs.) _____

English speaking Yes No

Family Consent Yes No

CHD Yes No

Access Yes No

Reason _____

Explanation date Pt._____ Family _____

Consent: Yes No

Date _____ Reason (if given) _____

		Consent	
Family Members	1. _____	Yes	No
	2. _____	Yes	No
	3. _____	Yes	No
	4. _____	Yes	No
	5. _____	Yes	No

Mailing Address _____

_____

Phone Number _____

Screening Form: Family

Name _____ ID _____

Age (yrs.) _____

English speaking Yes No

Access Yes No

Reason _____

Explanation date Pt._____ Family _____

Consent: Yes No

Date _____ Reason (if given) _____

Mailing Address _____

_____

Phone Number _____

Appendix H

Script for Staff Nurse

Anne Rosenfeld is a registered nurse and graduate student at Oregon Health Sciences University. Anne would like to meet with you to explain her study involving women with heart disease and their families. In the U.S., doctors and nurses have done a great deal of research on *men* with heart disease. However, very little research has been done on *women* with heart disease. After she tells you about her study, you will be able to tell her whether you would like to be in her study or if you'd rather not participate. Are you agreeable to meeting her?

If yes: Would now be OK, or when would be a good time for you?

If no: Would you be willing to meet with her at another time?

If yes: When would be a good time for me or another nurse to check back with you?

If no: Would you be agreeable to her calling you after you've gone home?

If yes: I will let Anne know.

If no, do not ask further..

Appendix I

Correlation Tables for Scales

Correlations Among Women's Time 1 Scales (n=74)

	F-COPES	IPRI: Social support	IPRI: conflict	Health Value Survey	Health Value Scale	HPLP: exercise	HPLP: stress mgmt.	Smoking stage	DHS: low fat	DHS: carbohyd-rate	DHS: total
F-COPES	1.00										
IPRI: Social support	.66**	1.00									
IPRI: conflict	-.13	-.28*	1.00								
Health Value Survey	-.12	-.17	.03	1.00							
Health Value Scale	-.11	-.19	.10	.54**	1.00						
HPLP: exercise	.24*	.23*	-.12	.04	-.11	1.00					
HPLP: stress mgmt.	.44**	.43**	-.12	-.32**	-.21	.30**	1.00				
Smoking Stage	.27*	.36**	-.33**	-.10	-.13	.14	.19	1.00			
DHS: low fat	.14	.14	-.14	.01	.10	.17	.14	.40**	1.00		
DHS: carbohyd-rate	.13	.10	-.04	.02	-.08	.32**	.25*	.18	.22	1.00	
DHS: total	.17	.14	-.10	.02	-.02	.33**	.26*	.33**	.66**	.88**	1.00

Note. F-COPES indicates Family Crisis Oriented Personal Evaluation Scales; IPRI Interpersonal Relationship Inventory; HPLP Health-Promoting Lifestyle Profile; DHS Diet Habit Survey; mgmt. management. *p<.05, **p<.01, 2-tailed.

Correlations Among Women's Time 2 Scales (n=74)

	F-COPES	IPRI: Social support	IPRI: conflict	Health Value Survey	Health Value Scale	HPLP: exercise	HPLP: stress mgmt.	Smoking stage	DHS: low fat	DHS: carbohyd-rate	DHS: total
F-COPES	1.00										
IPRI: Social support	.49**	1.00									
IPRI: conflict	-.10	-.25*	1.00								
Health Value Survey	.05	.11	-.16	1.00							
Health Value Scale	.09	-.00	.01	.43**	1.00						
HPLP: exercise	.10	.14	-.11	.18	-.04	1.00					
HPLP: stress mgmt.	.26*	.26*	-.32**	-.15	-.11	.25*	1.00				
Smoking Stage	.02	.19	-.15	.10	.02	.12	.01	1.00			
DHS: low fat	.08	.21	-.20	.19	.23*	.22	.27*	.25*	1.00		
DHS: carbohyd-rate	.10	.23*	-.18	.27*	-.04	.34**	.29*	.06	.33**	1.00	
DHS: total	.11	.27*	-.23	.29*	.07	.36**	.34**	.16	.70**	.90**	1.00

Note. F-COPES indicates Family Crisis Oriented Personal Evaluation Scales; IPRI Interpersonal Relationship Inventory; HPLP Health-Promoting Lifestyle Profile; DHS Diet Habit Survey; mgmt. management. *p<.05, **p<.01, 2-tailed.

Correlations Among Women's Time 1 and Time 2 Scales (n=74)

	Time 2										
	F-COPES	IPRI: Social support	IPRI: conflict	Health Value Survey	Health Value Scale	HPLP: exercise	HPLP: stress mgmt.	Smoking stage	DHS: low fat	DHS: carbohyd-rate	DHS: total
Time 1											
F-COPES	.42**	.50**	-.08	-.05	-.11	.08	.35**	.16	.12	.14	.15
IPRI: Social support	.38**	.71**	-.17	-.00	-.07	.10	.34**	.32**	.10	.12	.14
IPRI: conflict	-.04	-.21	.74**	-.06	-.04	-.16	-.21	-.33**	-.08	-.04	-.07
Health Value Survey	.06	-.06	.03	.40**	.49**	-.04	-.34**	-.14	-.02	-.01	-.02
Health Value Scale	-.17	-.14	.14	.30**	.65**	-.25*	-.27*	-.15	.03	-.18	-.12
HPLP: exercise	.08	.29*	-.15	.16	-.03	.50**	.17	.19	.24*	.14	.22
HPLP: stress mgmt.	.09	.29*	-.11	-.08	-.12	.22	.46**	.19	.19	.17	.21
Smoking Stage	.09	.22	-.17	.06	.03	.15	.06	.92**	.27*	.03	.15
DHS: low fat	-.03	.23	-.06	.20	.17	.00	.04	.36**	.58**	.09	.33**
DHS: carbohyd-rate	-.05	.22	-.24*	.13	-.04	.14	.23*	.24*	.38**	.55**	.59**
DHS: total	-.05	.28*	-.21	.20	.06	.11	.20	.36**	.57**	.46**	.61**

Note. F-COPES indicates Family Crisis Oriented Personal Evaluation Scales; IPRI Interpersonal Relationship Inventory; HPLP Health-Promoting Lifestyle Profile; DHS Diet Habit Survey; mgmt. management. *p<.05, **p<.01, 2-tailed.

Correlations Among Family Members' Time 1 Scales (n=120)

	F-COPES	IPRI: Social support	IPRI: conflict	Health Value Survey	Health Value Scale	HPLP: exercise	HPLP: stress mgmt.	Smoking stage	DHS: low fat	DHS: carbohyd-rate	DHS: total
F-COPES	1.00										
IPRI: Social support	.48**	1.00									
IPRI: conflict	-.12	-.27**	1.00								
Health Value Survey	.06	-.07	.11	1.00							
Health Value Scale	.10	-.09	-.07	.31**	1.00						
HPLP: exercise	.29**	-.02	-.15	.20*	-.01	1.00					
HPLP: stress mgmt.	.46**	.46**	-.23*	.02	.01	.30**	1.00				
Smoking Stage	.07	.11	-.12	.04	.06	.23*	-.02	1.00			
DHS: low fat	.07	-.05	-.29**	.01	.08	.34**	.09	.19*	1.00		
DHS: carbohyd-rate	.13	-.02	-.11	.07	.03	.12	.07	-.02	.24**	1.00	
DHS: total	.14	-.04	-.24**	.06	.06	.26**	.09	.08	.70**	.86**	1.00

Note. F-COPES indicates Family Crisis Oriented Personal Evaluation Scales; IPRI Interpersonal Relationship Inventory; HPLP Health-Promoting Lifestyle Profile; DHS Diet Habit Survey; mgmt. management. *p<.05, **p<.01, 2-tailed.

Correlations Among Family Members' Time 2 Scales (n=120)

	F-COPES	IPRI: Social support	IPRI: conflict	Health Value Survey	Health Value Scale	HPLP: exercise	HPLP: stress mgmt.	Smoking stage	DHS: low fat	DHS: carbohyd-rate	DHS: total
F-COPES	1.00										
IPRI: Social support	.36**	1.00									
IPRI: conflict	-.06	-.20*	1.00								
Health Value Survey	-.04	-.09	.02	1.00							
Health Value Scale	.15	-.07	-.02	.33**	1.00						
HPLP: exercise	.26**	.19*	-.21*	.03	.17	1.00					
HPLP: stress mgmt.	.38**	.31**	-.10	-.05	.14	.47**	1.00				
Smoking Stage	-.02	.08	-.03	.09	.07	.26**	.03	1.00			
DHS: low fat	.09	.03	.26**	-.01	.23*	.31**	.16	.15	1.00		
DHS: carbohyd-rate	.08	.22*	-.07	-.01	-.11	.28**	.26**	.10	.23*	1.00	
DHS: total	.12	.18*	-.19*	-.03	.05	.36**	.28**	.16	.73**	.83**	1.00

Note. F-COPES indicates Family Crisis Oriented Personal Evaluation Scales; IPRI Interpersonal Relationship Inventory; HPLP Health-Promoting Lifestyle Profile; DHS Diet Habit Survey; mgmt. management. *p<.05, **p<.01, 2-tailed.

Correlations Among Family Members' Time 1 and Time 2 Scales (n=120)

	Time 2										
	F-COPES	IPRI: Social support	IPRI: conflict	Health Value Survey	Health Value Scale	HPLP: exercise	HPLP: stress mgmt.	Smoking stage	DHS: low fat	DHS: carbohyd-rate	DHS: total
Time 1											
F-COPES	.47**	.40**	-.06	-.03	.14	.22*	.39**	.12	.06	.11	.12
IPRI: Social support	.11	.67**	-.19*	-.04	-.10	.07	.24**	.13	-.12	.07	-.01
IPRI: conflict	-.11	-.26**	.74**	.04	-.05	-.21*	-.11	-.10	-.29**	-.02	-.18
Health Value Survey	-.04	-.18	.04	.59**	.36**	.12	.03	.09	.00	.05	.02
Health Value Scale	.08	-.07	-.01	.34**	.62**	-.01	.02	.12	.12	-.14	-.02
HPLP: exercise	.23*	.01	-.16	.13	.19*	.62**	.27**	.24**	.28**	.11	.23*
HPLP: stress mgmt.	.31**	.32**	-.16	-.13	.06	.27**	.63**	-.00	.09	.20*	.19
Smoking Stage	-.07	.06	-.03	.09	.07	.26**	.02	.94**	.17	.10	.17
DHS: low fat	-.00	.00	-.30**	.06	.19*	.25**	.11	.20*	.78**	.20*	.58**
DHS: carbohyd-rate	.04	.08	-.11	.05	.04	.17	.17	..01	.30**	.54**	.54**
DHS: total	.02	.06	-.24**	.07	.13	.26**	.18*	.12	.63**	.50**	.70**

Note. F-COPES indicates Family Crisis Oriented Personal Evaluation Scales; IPRI Interpersonal Relationship Inventory; HPLP Health-Promoting Lifestyle Profile; DHS Diet Habit Survey; mgmt. management. *p<.05, **p<.01, 2-tailed.

Appendix J

Sociodemographic Characteristics of the Sample of Women at Time 1 (n=74)

	n	%	M (SD)	Range
Age (years)			63.2 (8.9)	38-75
Race				
White	72	97		
African American	1	1		
Asian	1	1		
Marital status				
Married	44	59		
Widowed	19	26		
Divorced	10	14		
Partnered	1	1		
Years married [a]			34.6 (13.9)	3-53
Years of education			12.4 (2.4)	7-18
Educational level				
Finished grade 8	6	8		
Finished grade 11	14	19		
Finished high school	18	24		
Some college	25	34		
Finished college	8	11		
Finished grad school	3	4		

(table continues)

	n	%	M (SD)	Range
Employment status				
Retired	36	49		
Homemaker	18	24		
Full time	16	22		
Part time	3	4		
Unemployed	1	1		
Income level [b]				
Under $10,000	13	18		
$10,000 to 19,999	14	19		
$20,000 to 29,999	22	30		
$30,000 to 39,999	9	12		
$40,000 to 49,999	3	4		
$50,000 to 74999	3	4		
$75,000 to 99,999	3	4		
Income adequacy				
Can't make ends meet	7	10		
Have just enough; no more	20	27		
Have enough with a little extra sometimes	24	32		
Always have money left over	20	27		
Religiosity				
Not at all	5	7		
Little	9	12		
Some	16	22		
Quite a bit	30	41		
Extremely	12	16		

(table continues)

	n	%	M (SD)	Range
Live in or near city	58	78		
Number in household			1.3 (1.1)	0-6
Relatives within 50 miles			8.3 (10.0)	0-60

[a] Includes responses from married, divorced, and widowed subjects. [b] Data missing for 7 subjects.

Appendix K

Sociodemographic Characteristics of the Sample of Family Members at Time 1 (n=120)

	n	%	M (SD)	Range
Age (years)			46.9 (15.3)	16-84
Gender				
Female	62	52		
Male	58	48		
Race				
White	118	98		
African American	1	1		
Asian	1	1		
Marital status				
Married	99	74		
Widowed	1	1		
Divorced	12	10		
Partnered	7	6		
Single	11	9		
Years married [a]			21.1 (16.3)	.5-63
Years of education			13.8 (2.7)	8-24
Educational level				
Finished grade 8	3	3		
Finished grade 11	7	6		
Finished high school	28	23		
Some college	55	46		

(table continues)

	n	%	M (SD)	Range
Finished college	17	14		
Finished grad school	10	8		
Employment status				
Retired	21	17		
Homemaker	13	11		
Full time	67	55		
Part time	14	12		
Unemployed	3	3		
Student	2	2		
Income level [b]				
Under $10,000	9	8		
$10,000 to 19,999	16	13		
$20,000 to 29,999	19	16		
$30,000 to 39,999	23	19		
$40,000 to 49,999	11	9		
$50,000 to 74999	17	14		
$75,000 to 99,999	10	8		
$100,000 or above	10	8		
Income adequacy				
Can't make ends meet	7	6		
Have just enough; no more	22	18		
Have enough with a little extra sometimes	59	49		
Always have money left over	31	26		

(table continues)

	n	%	M (SD)	Range
Religiosity				
Not at all	10	8		
Little	27	23		
Some	40	33		
Quite a bit	31	26		
Extremely	11	9		
Live in or near city	95	79		
Number in household			2.2 (1.3)	0-6
Relatives within 50 miles			5.8 (6.5)	0-40
Number of families per number of family member participants				
0 participants	8	11		
1 participant	28	38		
2 participants	25	34		
3 participants	13	17		

[a] Includes responses from married, divorced, and widowed subjects. [b] Data missing for 5 subjects.

Appendix L

Standardized Beta Weights at Each Step for Selected Models

Standardized Beta Weights at Each Step in Women's Low Fat Diet Model (n=74)

Step	r	1	2	3	4	5	6	7	8	9	10
1 T1 low fat	.58**	.58***	.58***	.57***	.58***	.58***	.56***	.58***	.56***	.55***	.55***
2 CABG	.02	.04	.04	.04	.04	.04	.04	.05	-.01	-.00	-.00
3 T1 social support	.10	.03	.02	.02	.02	.02	-.07	.01	.03	.02	.02
4 T1 conflict	-.08	.00	.01	.01	.01	.01	.01	.29	.31*	.32*	.32*
5 T1 health value	.03	-.02	-.02	-.01	-.02	-.02	-.01	.01	-.17	-.15	-.15
6 T2 social support	.21	.09	.08	.13	.13	.13	.13	.04	.02	.03	.03
7 T2 conflict	-.20	-.16	-.16	-.16	-.37*	-.37*	-.36*	-.36*	-.37*	-.37*	-.37*
8 T2 health value	.23*	.14	.13	.14	.14	.27*	.26	.26*	.26*	.26	.26
9 Cardiac rehab	.13	.03	.03	.03	.04	.03	.07	.07	.03	.03	.03
10 Complica-tions	.15	.05	.05	.05	.05	.05	.06	.06	.00	-.01	-.01

Note. r indicates zero-order correlations with Time 2 low fat diet; T1 Time 1; T2 Time 2; CABG coronary artery bypass graft surgery; rehab rehabilitation. *p<.05, **p<.01, ***p<.001, 2-tailed.

Standardized Beta Weights at Each Step in Women's Exercise Model (n=74)

Step	r	1	2	3	4	5	6	7	8	9	10
1 T1 exercise	.50**	.50***	.50***	.51***	.50***	.49***	.48***	.49***	.49***	.44***	.46***
2 CABG	.03	-.00	-.00	.00	-.01	-.03	-.03	-.03	-.07	-.01	.10
3 T1 social support	.10	-.02	-.02	-.02	-.05	-.07	-.09	-.11	-.10	-.15	-.13
4 T1 conflict	-.15	-.09	-.09	-.10	-.10	-.10	-.10	-.19	-.17	-.11	-.07
5 T1 health value	-.24*	-.19	-.19	-.20	-.20	-.20	-.20	-.20	-.32*	-.22	-.29*
6 T2 social support	.14	-.00	-.00	.02	.02	.02	.02	.04	.02	.13	.11
7 T2 conflict	-.11	-.04	-.04	-.04	.08	.11	.12	.12	.11	.10	.11
8 T2 health value	-.04	-.03	-.03	-.03	-.03	.18	.18	.17	.17	.10	.23
9 Cardiac rehab	.36**	.30**	.31**	.31**	.30**	.27*	.30**	.29**	.27*	.27*	.37***
10 Complica-tions	-.18	-.21	-.24*	-.24*	-.23*	-.23*	-.24*	-.24*	-.31**	-.40***	-.40***

Note. r indicates zero-order correlations with Time 2 exercise; T1 Time 1; T2 Time 2; CABG coronary artery bypass graft surgery; rehab rehabilitation. *p<.05, **p<.01, ***p<.001, 2-tailed.

Standardized Beta Weights at Each Step in Women's Carbohydrate Diet Outcome from Family Means Model (n=66)

Step	r	1	2	3	4	5	6	7	8
1 T1 carbo-hydrate	.32**	.32**	.28*	.28*	.28*	.27*	.31**	.35**	.37*
2 T1 social support	-.25*	-.19	-.19	-.19	-.20	-.25	-.21	-.27	-.27
3 T1 conflict	.07	.02	-.01	-.01	-.03	-.03	.24	.24	.24
4 T1 health value	-.04	-.05	-.07	-.07	-.07	-.07	-.05	.18	.17
5 T2 social support	-.09	-.08	.08	.08	.07	.07	.02	.04	.05
6 T2 conflict	-.06	-.13	-.17	-.36*	-.36*	-.35	-.35	-.35*	-.36*
7 T2 health value	-.16	-.21	-.26*	-.26*	-.36*	-.36*	-.36*	-.36*	-.36*
8 T2 carbo-hydrate	.18	.00	.03	.03	.00	-.01	-.06	-.03	-.03

Note. r indicates zero-order correlations with Time 2 carbohydrate diet; T1 Time 1; T2 Time 2. *p<.05, **p<.01, ***p<.001, 2-tailed.

Standardized Beta Weights at Each Step in Family Member's Low Fat Diet Model (n=118)

Step	r	1	2	3	4	5	6	7	8	9	10
1 T1 low fat	.81**	.81***	.81***	.80***	.80***	.80***	.75***	.75***	.75***	.75***	.74***
2 Gender	.16	.10	.10	.13*	.17**	.18**	.21**	.21***	.21***	.21**	.21***
3 Age	.07	.01	.07	.07	.05	.04	.03	.03	.03	.04	.04
4 Live with	-.00	.04	.12	.11	.11	.11	.13*	.13*	.13*	.13*	.13*
5 T1 social support	-.11	-.06	-.06	-.07	-.07	-.07	-.12*	-.11*	-.19**	-.19**	-.19**
6 T1 conflict	-.32**	-.09	-.11*	-.11	-.11*	-.15**	-.15**	-.15*	-.14*	-.16*	-.16*
7 T1 health value	.13	.06	.13	.07	.08	.07	.06	.06	.07	.07	.03
8 T2 social support	.04	.04	.05	.03	.03	.14*	.12	.12	.12	.13	.12
9 T2 conflict	-.28**	-.04	-.10	-.06	-.06	-.08	.03	.02	.03	.03	.03
10 T2 health value	.23*	.08	.15	.09	.09	.08	.08	.07	.07	.07	.07

Note. r indicates zero-order correlations with Time 2 low fat diet; T1 Time 1; T2 Time 2;. *p<.05, **p<.01, ***p<.001, 2-tailed.