PREFERENCE FOR INFORMATION, PERCEIVED CONTROL, COPING AND OUTCOMES FOLLOWING FIRST TIME OPEN HEART SURGERY IN OLDER ADULTS

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University

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ABSTRACT

Significance  Research on young and middle-aged adults has formed the basis of most nursing interventions aimed at stress reduction for cardiac surgery, and may not be appropriate for older adults because older adults differ from younger and middle adults in a number of ways. Cardiovascular disease is the number one killer of adults aged 65 years and older; it is expected to be the major cause of mortality well into the next century. Currently, over 55% of all coronary artery bypass surgeries (CABS) are performed on those over age 65. In many studies comparing younger and older adults, older adults have had more complications after CABS including longer hospital stays, more depression, more frequent readmission, and poorer functional outcomes. Outcomes after CABS have been linked to coping and factors which affect coping.

Educational interventions are the most important nursing interventions to reduce stress and facilitate coping, but nurses do not routinely assess for the patient’s preference for information. If a person has a low preference for information, providing detailed, intense information may inhibit coping. Given that older adults are known to have poorer outcomes and longer stays after CABS, it is possible that current nursing practices may be deterring coping, and thus contributing to poorer outcomes. No one had investigated the relationships among preference for information, perceived control, coping, and outcomes in older adults.
Method  A prospective pretest-posttest descriptive design was used. Participants aged 65 years and older who were having first-time CABS at three Midwest hospitals were eligible. Interviews were conducted in person preoperatively and by telephone 6 weeks postoperatively. Preference for information (measured with the Krantz Health Opinion Survey, KHOS), perceived control (Control Attitudes Scale, CAS), and coping (66-item Ways of Coping Questionnaire, WOCQ) were measured preoperatively. Depression (15-item Geriatric Depression Scale, GDS), and functional status (Medical Outcomes Study Short Form-12, MOS SF-12) were measured at baseline preoperatively and again six weeks later. Internal consistency reliabilities ranged from 0.55 to 0.74. Anecdotal notes were kept on participant’s experiences with each instrument. Canonical correlation analysis was used to examine the relationships among preference for information, perceived control, coping, demographics, and outcomes.

Results  The initial sample included 70 adults; complete data were collected on 63 adults. Participants averaged 71.97 years of age and were predominantly White (94.3%) and male (65.7%). They averaged 4.67 co-morbid conditions, 11.81 people they would call on for social support, 3.14 coronary artery bypasses, and stayed an average of 7.63 days of hospital stay including readmissions postoperatively. Age was not significantly related to any other study variable except postoperative physical function. Significant gender differences were found with women having greater depression, poorer physical function, and poorer mental function than men both preoperatively and postoperatively although their ages were similar. Participants preferred moderate levels of information, perceived moderate control, and used positive reappraisal more than any other coping strategy. Higher preference for information was significantly related to better postoperative
physical function. Perceived control was not related to other study variables. Greater use of the coping strategies seeking social support and positive reappraisal were significantly related to shorter postoperative length of stay. Greater use of the coping strategy escape-avoidance was significantly related to poorer postoperative mental function. Although depression was low overall, preoperative depression was significantly related to nine other variables: five coping strategies (confrontive coping, $r = 0.30$; accepting responsibility, 0.29; escape-avoidance, 0.48; seeking social support, -0.27; planful problem solving, -0.24), three functional status measures (preoperative physical function, -0.29 and mental function, -0.61; postoperative mental function, -0.42), and to postoperative depression ($r = 0.48$). While several statistically significant relationships were found between individual study variables, the canonical relationships were not statistically significant.

**Conclusion** The theoretical model drawn from research on young and middle-aged adults needs to be further tested for its effectiveness in describing the experiences of older adults. Further work is needed to develop reliable research instruments for this unique population. In this sample of adults aged 65 years and older, age per se was related to only one outcome after coronary artery bypass surgery. Depression had pervasive and persistent effects. Nurses caring for coronary artery bypass surgery patients need to be aware of gender differences and need to assess for depression.
Dedicated to the glory of God, my husband and son, my parents and family,
and to the giants on whose shoulders I stand.
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For I know the plans I have for you, says the Lord. They are plans for good and not for evil, to give you a future and a hope (Jer. 29:11).
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CHAPTER 1
INTRODUCTION

Research studies on young and middle-aged adults have formed the basis of most nursing interventions aimed at stress reduction for cardiac surgery. Until now, this was appropriate as the largest segment of the population was in their 30’s, 40’s, and 50’s age range. By 2010 the older members of this group will reach age 65; by 2030 the size of the population over age 65 will have effectively doubled. Older adults differ from younger and middle aged adults in a number of ways. Additionally, life expectancy is increasing dramatically. Technological and philosophical changes have resulted in the successful performance of major surgeries in older and older adults. While these surgeries improve the quality of life in younger adults, research was needed to describe older adults’ coping experiences, to guide nursing interventions, and to optimize outcomes.

Significance

Cardiovascular disease is the number one killer of adults aged 65 years and older. It is expected to be the major cause of mortality well into the next century (Greenland, 1996). Currently, over 55% of all coronary artery bypass surgeries (CABS) are performed on those over age 65. Compared to younger adults, these adults have more complications after CABS including longer hospital stays, more depression, more frequent readmission, and poorer functional outcomes (Rose, Gelfish, Jacobowitz, Kramer, Zisbrod, Acinapura
et al., 1985). In the United States, the average postoperative length of stay (PLOS) after CABS is 5-7 days (Artinian, Duggan, & Miller, 1993). PLOS in patients aged 65-80 years averaged 10.4 days postoperatively; for patients over 80 years this was 14.3 days (Peterson, Cowper, Jollis, Bebchuk, DeLong, Muhlbaier et al., 1995; Vaca, Lohmann, & Moskoff, 1994). Theory and research on young and middle-aged adults link these outcomes to coping, among other factors. Whether this is true for older adults remains unclear.

**Research Purpose and Questions**

In order to examine older adults’ experiences in coping with coronary artery bypass surgery, a theoretical model was developed from an extensive literature review on coronary artery bypass surgery, older adulthood, coping, preference for information, perceived control, depression, postoperative length of stay and readmission, functional status, race, gender, social support, and co-morbidity. Both quantitative and qualitative research studies were critically examined, and relevant concepts were included in the theoretical model. The specific aim of this research was to investigate the relationships between preference for information, perceived control, and coping in older adults having first-time coronary artery bypass surgery. Three research questions were developed from the literature review:

1. How much of the variability in outcomes is explained by variability in preference for information, perceived control, and coping after accounting for variability from demographic variables in older adults having first-time coronary artery bypass surgery?
2. How is preference for information related to coping in older adults having first-time coronary artery bypass surgery?
3. How is perceived control related to coping in older adults having first-time coronary artery bypass surgery?

Chapter two will present a review of the literature that supports the theoretical model designed to guide this study. Chapter three will present issues of instrument reliability in this sample and make recommendations about the instruments’ use in future research on older adults. Chapter four will present the methods used in and results of this study.
References


CHAPTER 2

PREFERENCE FOR INFORMATION, PERCEIVED CONTROL, COPING, AND OUTCOMES FOLLOWING FIRST-TIME OPEN HEART SURGERY IN OLDER ADULTS: A REVIEW OF THE LITERATURE

Research on young and middle-aged adults has formed the basis of most nursing interventions aimed at stress reduction for cardiac surgery. Until now, this was appropriate as the largest segment of the population was in their 30’s, 40’s, and 50’s age range. By 2010 the older members of this group will reach age 65; by 2030 the size of the population over age 65 will have doubled. In 1995, adults over age 85 years comprised only 1.4% of the general population. The United States Census Bureau estimates that this proportion will increase to 4.6% by the year 2050 (Day, 1996). The proportion of adults over 100 years of age is expected to increase from 53,000 to over 1 million during that same time period, a growth rate more than ten times as fast as the general population (Day, 1996). Additionally, life expectancy is increasing dramatically. Technological and philosophical changes have resulted in the successful performance of major surgeries in older and older adults. While these surgeries improve the quality of life in younger adults, a theoretical model is needed to guide research on older adults’ coping experiences and develop interventions to optimize their outcomes.

Cardiovascular disease is the number one killer of adults aged 65 years and older. It is expected to be the major cause of mortality well into the next century (Greenland, 1996). Currently, over 55% of all coronary artery bypass surgeries (CABS) are performed on
those over age 65. Compared to younger adults, these adults have more complications after CABS including longer hospital stays, more depression, more frequent readmission, and poorer functional outcomes (Rose, Gelfish, Jacobowitz, Kramer, Zisbrod, Acinapura et al., 1985).

Educational interventions are the most important nursing interventions to reduce stress and facilitate coping. Nursing practice standards call for nurses to provide information and education to prepare patients for all types of surgery. Often this information is provided the day before surgery. Preference for information is not routinely a part of nursing assessment. If a person has a low preference for information, the current standard of nursing intervention (providing detailed, intense information) may actually inhibit the patient’s ability to cope with the stress of surgery. Current nursing interventions were established based upon these research findings, and may not be appropriate for older adults. Given that older adults are known to have poorer outcomes and longer stays after CABS, it is possible that current nursing practices may be deterring coping, and thus contributing to poorer outcomes.

Functional and psychological outcomes after CABS have been well studied in young adults and middle-aged adults. Theory and research on young and middle-aged adults link these outcomes to coping and to factors which can affect coping. Whether this is true for older adults is unclear. No one has studied the relationship between preference for information, perceived control, coping, and outcomes (depression, postoperative length of stay, readmission, and functional status) in older adults. This review of literature will examine factors which affect older adults’ coping with first-time open heart surgery and discuss a theoretical model developed to guide further research.
Theoretical Model

The theoretical model (Figure 2.1) was drawn from several sources. Miller (1980) and colleagues developed the theory of preference for information. The concept of perceived control described by Wallston and colleagues (1983) has been applied to nursing research on cardiac patients. The appraisal theory of stress and coping was initially developed by Folkman and Lazarus (1980), and subsequently applied in numerous studies. Research on older adults informs the selection of relevant outcomes as well as provides reasons that a theoretical model, below, drawn from young and middle-aged adults needs to be tested in older adults. Research was needed to determine whether the concepts of high and low preference for information appropriately describe older adults’ information preferences, to describe the coping strategies they actually use, and to examine the effects of these factors on outcomes in older adults. The model and the studies that support the model are described below.

![Diagram of theoretical model]

Figure 2.1: Theoretical model of older adults’ coping with first-time CABS.

Literature Review

Preference for Information

Educational interventions are the most important nursing interventions to reduce stress and facilitate coping. In preparation for cardiac surgery, adults are given large
amounts of information. Miller (1980) described the cognitive trait of preference for information. Individuals with a high preference for information tend to seek information and novel input during stressful events. Individuals with a low preference for information tend to avoid information and prefer to distract themselves when stressed (Miller, 1980). Preference for information moderates coping. Individuals with a high preference for information are more vulnerable during stressful events (Miller, Combs & Stoddard, 1989), as they are unable to reduce arousal and concomitant anxiety. These individuals are considered to cope less well than those with a low preference for information during the short term. Male CABS patients (mean age 57.84, SD 5.94 years) who had a high preference for information experienced more emotional and social interaction difficulties one month postoperatively than lower preference for information patients (Mahler & Kulik, 1991). In the longer term however individuals with high preference for information tend to seek information and scan for internal cues (Miller, 1987), which result in better health practices. Individuals with a high preference for information were more likely to seek information actively (Andrew, 1970), perform self-exams, get preventative health care (Jacob, Penn, Kulik & Speith, 1992; Steptoe & Vogele, 1992), and visit the physician before symptoms grew severe (Miller, Brody & Summerton, 1988). These individuals were more accurate in their assessment of their own heart rate, skin conductivity, blood pressure, and respiratory rate (Steptoe & Vogele, 1992), compared to individuals with a low preference for information.

Individuals with a low preference for information, on the other hand, are adept at distracting themselves and thus reducing physiological arousal (Miller, 1980). These individuals had the lowest physiological arousal when not exposed to voluminous
information (Miller, 1987). While they cope more successfully in the short term, they have poorer long-term outcomes (Suls & Fletcher, 1985). Individuals with a low preference for information did not visit their primary care physician until their symptoms grew severe (Miller, Brody & Summerton, 1988). Overall, these studies have been done on young to middle adults. Out of over forty studies reviewed, only six studies reported inclusion of participants over age 65; these studies did not contrast the middle adult with the older adult.

Preference for information moderates coping (Miller, 1980; Lazarus & Folkman, 1984). Young and middle-aged adults cope with stress by reacting to information in either of two ways (Miller, 1980). Individuals with a high preference for information tend to seek information, prefer detailed explanations of what to expect, and have better physiologic outcomes (less anxiety and improved physical parameters) if information is provided. Individuals with a low preference for information prefer to avoid information and to distract themselves during stressful events. Those with low preference for information have better outcomes when lower amounts of information are given. In other words, people have better outcomes when the intervention strategy is tailored to their preferences (Andrew, 1970; Auerbach, Martelli & Mercuri, 1983; Miller & Mangan, 1983; Phipps & Zinn, 1986; Shipley, Butt, Horowitz & Farbry, 1978). Preference for information significantly predicted the use of medical services at one and four months after coronary artery bypass surgery in 83 male first-time CABG pts (age 38-69 years, mean age 57.84, SD 5.94 yrs) (Mahler & Kulik 1991).
Perceived Control

Perceived control is the belief that one can determine one’s own internal states and behavior, influence one’s environment, and/or bring about desired outcomes (Wallston, Alagna, Devillis, & Devillis, 1983). Perceived control, as a belief, varies among individuals and also within the same individual over time (Wallston, 1989). Perceived control mediates coping. The perceived controllability of the situation determines the use of coping strategies, and is predictive of psychosocial recovery following illness (Moser & Dracup, 1995).

Perceived control mediates coping. Perceived control is especially relevant to the individual who has a high preference for information. When a situation was perceived as controllable, more problem-focused coping was likely (Lazarus & Folkman, 1984), and the person was free to increase information seeking and decrease information avoidance (Miller, 1979). In this instance the individual who has a high preference for information will seek it, as information reduces uncertainty and increases confidence that the event can be endured. When an event is perceived as uncontrollable, the same individual will tend to avoid information. In this instance, providing information arouses a stress response since it forces the individual back into the presence of a danger he/she cannot avoid (Miller, Combs & Stoddard, 1989). Individuals who have a low preference for information will prefer to avoid information and employ emotion-focused coping strategies regardless of perceived control.

Perceived control has been studied in cardiac patients. CABS and myocardial infarction (MI) patients (mean age 64) who perceived higher control were less anxious, less hostile, and had better psychosocial adjustment at six months than those who felt low
control (Moser & Dracup, 1995). The relationship between perceived control and adjustment was independent of disease severity, age, gender, education level, and income (Moser & Dracup, 1995). Perceptions of control are amenable to nursing intervention through cognitive reframeing and other strategies (Moser & Dracup, 1995).

**Coping**

Coping is defined as behavioral efforts to manage external and internal demands that are appraised as taxing or exceeding the resources of the person (Lazarus & Folkman, 1984). Appraisal is an evaluation of what an individual’s relationship to the environment implies for personal well-being (Lazarus, 1998). Appraisal involves the individual’s personal interpretation of the “facts” as they are perceived to exist in the stressful situation and depends on personal beliefs and goals (Smith & Lazarus, 2001). Appraisal begins with an evaluation of the stressor in terms of what is at stake (primary appraisal) and what resources are available for coping (secondary appraisal). During primary appraisal the individual decides whether the facts perceived have relevance to personal goals and how the situation relates to personal goal attainment. Appraisal of the situation as a threat to goal attainment generates negative emotions, while appraisal of the situation as supporting personal goal attainment generates positive emotions (Lazarus, 2003).

Coronary artery bypass surgery (CABS) is a stressful event, and coping varies depending on each person’s appraisal of this stressful situation. During primary appraisal the older adult may assess impending CABS rarely as benign or irrelevant, as challenging, or more commonly as threatening (involving harm or loss). Appraisal of CABS as involving threat or harm evokes emotions of fear and anxiety and a sense of
uncertainty, motivating the individual to cope in an adaptive manner to avoid, minimize, or alleviate harm (Smith & Lazarus, 2001) by focusing on the problem and on emotions arising from the problem (Lazarus & Folkman, 1984).

The outcome of coping may be favorable, unfavorable, or no resolution, with emotion being generated throughout the appraisal, coping, and outcome. Effective coping leads to favorable event outcomes, positive emotion, and cessation of coping activity. Insufficient coping leads to unfavorable resolution or no resolution, and may result in additional distress and require additional coping efforts (Folkman & Lazarus, 1988).

Problem-focused coping facilitates management of sources of stress through alteration of the troubled person-environment relationship (Lazarus & Folkman, 1984; Lazarus, 2003). Attention is directed outward in an attempt to assess, diagnose, and manage the source of trouble. Through problem-focused coping the individual attempts to learn more about the stressor and possible options available to reduce its stressfulness. Problem-focused coping strategies include taking action, seeking information, confrontive coping, and planful problem solving (Lazarus & Folkman, 1984). King (1985), in a study of 42 men and 8 women (mean age 50 years, range 40-70 years) undergoing CABS reported that the most frequently used coping strategy was information seeking, and that information seeking was most helpful during the postoperative phase.

Emotion-focused coping regulates intra-personal emotions arising from the troubled person-environment relationship (Folkman & Lazarus, 1988). Through emotion-focused coping the individual attempts to change the way an encounter is emotionally interpreted (Lazarus & DeLongis, 1983). Attention is directed inwardly rather than on the
problem. Emotion-focused coping strategies include attentional avoidance, detachment, denial, distraction, reinterpretation, magical/wishful thinking, and religious faith. King, Rowe, Kimble, and Zerwic (1998) studied coping in female coronary artery bypass surgery patients aged 39-85 years (mean age 62.6 years). The authors found that the use of avoidant coping strategies was consistently related to poorer psychological and functional outcomes.

Folkman and Lazarus (1988) further refined their coping model to both “reflect a greater complexity of human coping processes and to address their finding that certain processes served both emotion and problem management functions” (Folkman & Lazarus, 1988, p. 9). For example, “seeking advice serves a problem-focused function if the advice provides concrete information to help solve a problem. It also serves an emotion-focused function if the information helps the individual feel emotionally supported” (Ibid., p. 9). The original concept of two basic forms of coping (problem-focused and emotion-focused) was expanded into eight forms (confrontive coping, distancing, self-controlling, seeking social support, accepting responsibility, escape-avoidance, planful problem solving, and positive reappraisal). These eight subscales were based on research in married couples representing “a broad sample of both individuals and stressful encounters” (Ibid., p. 9). It is unclear whether the eight forms accurately represent the coping strategies of older adults.

Other Variables Affecting Coping

The literature also indicated that other variables such as age, minority status, gender, and social support influence coping with and outcomes from coronary artery bypass surgery. The presence of co-morbid diseases predisposes the individual to longer
recovery. Often these factors interact to affect coping. Literature addressing each of these factors will be presented.

**Age**

Age-related differences in coping have been investigated. Older adults used greater confrontive coping, distancing, and positive reappraisal compared to younger adults (Folkman, Lazarus, Pimley & Novacheck, 1987). Age accounted for 98% of the variance in distancing in men and women aged 40-64 with cardiovascular disease (Badger, 1992). In three groups of subjects in their 60’s, 80’s, and 100’s, avoidant coping increased with age (Martin, Poon, Clayton, Sil Lee, Fulks, & Johnson, 1992). However, Irion and Blanchard-Fields (1987) found that in a sample of 96 participants, middle aged (mean age 43.88 years) and older adults (mean age 66.21 years) used less hostile reaction, escape-avoidance, and self-blame strategies compared to young adults (mean age 20.13 years) and adolescents (mean age 15.54 years) in response to a self-defined threat. Adolescents used significantly greater confrontive coping and distancing, and young adults used more planful problem-solving. Other researchers have found to no age-related differences in the use of problem-focused and emotion-focused coping (McCrae, 1982).

Vaca, Lohmann, and Moskoff (1994) found age-related differences in preoperative cardiopulmonary function. Compared to 235 patients under age 80, a group of 235 patients over age 80 had a significantly higher incidence of angina, atrial arrhythmias, chronic obstructive pulmonary disease, and renal insufficiency before surgery, and a higher proportion of “urgent” surgeries. Age was significantly associated
with longer postoperative length of stay after coronary artery bypass surgery (Rose, Gelfish, Jacobowitz, Kramer, Zisbrod, Acinapura et al., 1985; King, Clark, Norsen, & Hicks, 1992; Rosen, Humphries, Muhlbaier, Kiefe, Kresowik, & Peterson, 1999).

Redecker and Wykpisz (1999) studied the effects of age on early postoperative activity patterns after first-time coronary artery bypass surgery in eight middle-aged (age less than or equal to 65 years; mean group age 57 years) and fourteen older adults (age greater than 65 years; mean group age 72 years). There were no significant preoperative differences between the groups on gender, New York Heart Association Functional Class, length of hospital stay, or pre-hospitalization history. Participants wore wrist accelerometers during the second through fifth days after surgery and completed the Sickness Impact Profile subscales for ambulation dysfunction and sleep-rest. Both groups steadily increased their activity, but the groups differed significantly on rate of activity progression. The younger group demonstrated their highest mean activity on day 4 postoperatively while the older group was maximally active on day 5. Age was not significantly associated with activity level, clinical activity, or ambulation. The researchers acknowledged that the study was limited by small sample size, but they did not discuss the potential impact of participants’ pain experience, pain medicine use, or restlessness on their results.

Cardiac surgery in the oldest segment of older adults has been studied. Retrospective records review was used to compare postoperative complications and mortality statistics in 235 cardiac surgery patients aged 80-88 years to those in 235 randomly-selected patients younger than age 80 (Vaca, Lohmann, & Moskoff, 1994). The older group contained significantly more females (52.3% versus 30.2%). Preoperatively
the older group had significantly more chronic obstructive pulmonary disease (6% versus 1.7% respectively) and more renal insufficiency (6.4% vs. 1.3%). The older group was significantly more likely to have surgery on an urgent versus elective basis than the younger group (35% versus 22% respectively), but less likely to have had a previous cardiac operation (4.7% vs. 11%). Compared to the younger group, older adults needed significantly more intravenous heparin (24.6% versus 12.3%) or nitroglycerin (23.5% vs. 6.0%) preoperatively. There were no differences between the groups on left ventricular ejection fraction, surgical procedures, or cardiopulmonary bypass time. Seventy four percent of older patients experienced postoperative complications compared to 43% of patients under age 80 years. Complications common in the older group included lower cardiac output, need for intra-aortic balloon support, re-operation for bleeding, arrhythmias, and renal and respiratory insufficiency. Mortality among the older group was over three times that of the younger group (17.5% versus 5.0%), and postoperative length of stay differed significantly as well (mean length of stay 14.7 days vs. 10.5 days). The risk factors for mortality were age greater than 78 years, New York Heart Association functional class, and presence of an intra-aortic balloon pump.

Bridges, Edwards, Peterson, Coombs, and Ferguson (2003) used the Society of Thoracic Surgeons National Cardiac Database (NCD) to retrospectively review data on over 662,000 cardiac surgery patients who had either isolated coronary artery bypass surgery or valve replacement surgery or both. Five patients were over 100 years of age, 1092 were aged 90-99 years, 59,576 patients were aged 80-89 years, and 621,360 patients were between 50 and 79 years of age. For the patients who had coronary artery bypass surgery only, operative mortality was significantly higher for adults over age 90 (11.8%)
compared to adults 80-89 years (7.1%) or those 50-79 years (2.3%). For the 1097 adults in the oldest age group (90+ years), 663 patients had isolated CABS only. The oldest group, 53.7% male, had relatively less family history, obesity, smoking, elevated cholesterol, and chronic lung disease than either of the other two age groups but more renal failure, arrhythmia, congestive heart failure, and left main artery disease. The three CABS-only groups had nearly equivalent left ventricular ejection fractions preoperatively and equivalent average number of vessels bypassed. Postoperative length of stay after CABS for the three groups averaged five days for the youngest group and seven days for each of the older two groups. Five risk factors significantly contributed to the odds ratio (OR) of operative CABS mortality in the oldest group: emergent need for surgery (OR 2.26), need for a balloon pump preoperatively (OR 2.79), renal failure (OR 2.08), peripheral vascular disease or cerebrovascular disease (OR 1.39) and mitral insufficiency (OR 1.50). A separate analysis of the adults over age 90 years who lacked any of the first four risk factors (57% of the sample) yielded an operative mortality of 7.2%; similar to that of adults aged 80-89 years (7.1%). The authors noted that the incidence of subjects in the oldest, middle, and youngest groups having one previous cardiac surgery was 3.9%, 6.5%, and 7.2% respectively and of having two or more previous cardiac surgeries was 0.2%, 0.5%, and 0.7% respectively, but they did not discuss the potential impact of previous surgery experience on their results. The authors also did not assess for hospital readmission in determining postoperative length of stay.

In one study, adults aged less than 65 years had poorer outcomes compared to those over age 65. In secondary analyses of age as a factor in readmission to the hospital after coronary artery surgery in 1,113 Yale University patients (Vaccarino, Lin, Kasl,
Mattera, Roumanis, Abramson, & Krumholz, 2003), researchers divided the sample into adults aged less than 65 years and those aged 65 and older. Of the 309 women studied, 91 (29.5%) and 394 of 804 males (49.0%) were younger than 65 years. While the age by gender interaction was not significant, younger women had more than twice the adjusted risk for readmission compared to younger men (19.7% versus 8.8% respectively). In contrast the differences were less marked for the older group where readmission for women did not differ significantly from men (20.4% vs. 12.8%). In younger men physical function improved at six weeks postoperatively while depressive symptoms declined, while in younger women the reverse occurred, i.e. physical functional declined and depression increased. This research study is further examined under the topic of gender below.

Race

In this section, the terms “Black” and “African-American” will be used interchangeably to refer to Americans of African descent. The terms “White” and “Caucasian” will be used to refer to Americans of European descent. Nearly all of the coronary artery bypass surgery research studies found compared the experiences of Blacks to Whites. There is a dearth of literature on the experiences of Hispanic or Native American individuals.

Minority status may play a paradoxical role in coping. Despite clearly documented socio-economic disadvantages for minority older adults (Whitbourne, Jacobo & Munoz-Ruiz, 1996), a crossover effect in survival rates has been found at 65 years of age. After the age of 65 years, African-Americans (but not Hispanics) have
longer life expectancy than Whites (Whitbourne, Jacobo & Munoz-Ruiz, 1996). Longer life expectancy may be a result of effective coping, although it is unclear what type of coping is more instrumental.

Racial differences in the use of coronary artery revascularization procedures have been well demonstrated. In a retrospective Duke University study of 12,402 Black or White coronary artery disease patients, 1275 (10.3%) were Black and 332 Blacks (2.6%) had coronary artery bypass surgery. Black patients with coronary disease were slightly younger than Whites and a higher proportion were female. They were more likely to have diabetes mellitus and hypertension but less likely to have hyperlipidemia. Regardless of the extent of their coronary disease, Blacks were significantly less likely to have coronary artery bypass surgery than Whites (26% versus 37%, respectively) (Peterson, Shaw, DeLong, Pryor, Califf & Mark, 1997). The differences in surgical referral were most pronounced in Black individuals who needed a greater number of vessels bypassed and so could potentially benefit most from the procedure. Furthermore, unadjusted and adjusted five year survival rates were significantly lower in Blacks than Whites.

Funk, Ostfeld, Chang and Lee (2002) found similar results in their retrospective study of 642 myocardial infarction (MI) patients in a Northeastern university-affiliated regional cardiac referral center. The sample consisted of 598 (93.1%) Whites and 44 (6.9%) Blacks. Of these patients, 70.6 % of Whites had revascularization procedures (either angioplasty or bypass surgery) compared to 31.6% of Blacks. Black MI patients were younger and more likely to have diabetes, chronic renal failure, pulmonary edema, and to be smokers. After controlling for demographic variables, Blacks were about a third as likely to undergo diagnostic coronary artery angiography and one fifth as likely to
have revascularization procedures. However, Black MI patients were significantly less likely to be transferred into the medical center where angiography and revascularization were available (4.5% of Blacks versus 29.3% of Whites), raising the question whether they were less likely to have the procedures because they were Black, because they were not transferred in, or both.

Bridges, Edwards, Peterson, and Coombs (2000) investigated the effects of race on CABS morbidity and mortality using the Society of Thoracic Surgeons National Cardiac Database (NCD). The NCD retrieves data from 47 states and 5 Canadian provinces; as of 2001, data from more than one million patients were included. In the NCD race is entered as one of five possible choices: White, Black, Hispanic, Native American, and other. The sample for this study contained data from 25,850 Blacks and 555,939 Whites who had coronary artery bypass surgery between 1994 and 1997. Blacks were younger than Whites (average ages 61.4 years and 64.8 years respectively) and more likely to be female; they had more hypertension (80.5% vs. 62.4%), diabetes (43.8% vs. 27.8%), morbid obesity (15.4% vs. 11.4%) and renal disease (6.4% vs. 2.3%) than Whites. Blacks did not have more severe coronary artery disease or worse left ventricular ejection fraction than Whites. Operative mortality was slightly but significantly higher statistically for Blacks compared to Whites (3.83% vs. 3.14%), with the odds ratio of mortality for Blacks compared to Whites being 1.23 (95% confidence interval 1.15-1.31). Blacks had higher rates of postoperative complications including stroke, re-operation for bleeding, prolonged ventilation, renal failure and deep sternal wound infection. The authors also found a significant gender by race interaction in mortality from CABS, with a significant difference between Black men and White men.
(3.30% vs. 2.64%). While the overall proportion of women who died was higher, Black women did not differ from White women (4.49% vs. 4.41%). Since this study did not exclude patients on the basis of first-time versus re-operative CABS, it is possible that individual subjects were counted more than one time and that the effects of needing surgery multiple times might have impacted the results. The size of the database would also contribute to findings of statistical significance.

**Gender**

Gender differences in coping have been studied with mixed results. Healthy, community-dwelling males used greater self-control and less positive reappraisal than females (Folkman, Lazarus, Pimley & Novachek, 1987). Chronically ill males used more action-oriented, problem-focused coping while females used more escape or emotion-focused coping (Viney & Westbrook, 1984). In contrast, predominantly White middle-aged females with cardiovascular disease used more accepting responsibility, planful problem solving, and less positive reappraisal than males (Badger, 1992). Coping strategies became more similar between males and females as age progressed in a predominantly male sample (McCrae, 1982); however the low proportion of females in the study makes these results less powerful.

Several researchers have studied gender differences in recovery after coronary artery bypass surgery. King, Clark, Norsen and Hicks (1992) retrospectively reviewed charts from 465 female and 465 age-matched male patients to examine demographics, pre-operative risk factors and outcomes. The researchers examined differences between women aged less than and greater than 70 years, between men aged less than and greater
than 70 years, and between older women and men. The sample was predominantly White. The younger group averaged 59.3 years of age while the older group averaged 74.5 years of age. Significantly fewer older women than younger women were married. Both older males and females had more congestive heart failure and renal disease than younger adults, but they were less likely to be smokers. In comparison to younger women, older women had less diabetes; in contrast older men had more diabetes than younger men. There were no age differences in women for mortality but older men had significantly higher mortality than younger men. There were no gender differences in mortality in the older group.

King, Porter and Rowe (1994) studied functional disruption, mood, and life satisfaction in 186 male and female coronary artery bypass surgery patients, collecting data at 1, 4, and 12 months after surgery. In this sample women were significantly older than men (mean age 63.0 versus 60.1 years, respectively), more likely to be widowed or single and to live alone, earned less, and had more hypertension and diabetes. At both one and four months after surgery women had significantly more ambulation dysfunction than men, and higher disruption in home management than men. Men had more sleep/rest disruption one month after surgery than women. There were no gender differences in fatigue, depression, anxiety, or life satisfaction. This study could have been strengthened with pre-operative baseline measures of the variables of interest.

Artinian, Duggan, and Hillebrand (1995) measured physical recovery and psychological recovery in 47 females and 132 males (mean age 63.0 years, SD 9.16 years) at 1, 3, and 6 weeks after first-time coronary artery bypass surgery. Participants were predominantly White (92%) and married (82%). Female participants were
significantly more likely to be widowed or divorced, had more chronic illnesses and more cardiovascular risk factors but equivalent preoperative left ventricular ejection fraction preoperatively. There was no gender difference in number of arteries bypassed or time on cardiopulmonary bypass. Females needed significantly longer time on mechanical ventilation but they had equivalent length of stay in the intensive care unit and in the hospital after surgery. Though all participants improved their physical recovery over the six weeks following surgery, females had significantly greater ambulation dysfunction, reported more physical symptoms, and perceived poorer health than males at each time period. Psychological recovery also differed by gender. Depression in both groups improved over time, but women reported significantly greater depression than men at each time period and reported more difficulty than men in managing household activities. This study would have been strengthened by preoperative baseline measures of functional and psychological status.

One researcher purposively sampled equal numbers of males and females under and over age 65 in order to examine gender by age interactions in studying coronary artery bypass and heart valve replacement patients. King (2000) measured cardiac symptoms, resumption of roles, functional status, global health status, social support, self perceptions of life quality and satisfaction, and recovery. Participants were interviewed in person preoperatively and by telephone at 1, 2, and 3 months postoperatively. Preoperatively there were no gender differences in life quality, global health perception, or cardiac symptoms or risk factors but females reported significantly less functional status, life satisfaction, and social support than males. Females had equivalent lengths of stay in the intensive care unit and the hospital. While there were no gender differences in
functional status 1 and 2 months postoperatively, at the 3 month time point females were significantly less like to report that they had returned to what they considered their normal activities, although they reported returning to their traditional roles of homemaking activities. Females were more likely to experience shortness of breath but less likely to have angina one month after surgery. Compared to their baseline preoperative functional status, females demonstrated significantly greater improvement in functional status three months after surgery compared to males. Multiple regression of perceived recovery, functional status, and global health status at three months postoperatively as indicators of recovery indicated that only current perceived life quality, not gender or age, consistently significantly predicted recovery.

Female gender was associated with impaired quality of life one year after surgery in a Duke University study of 96 female and 184 male coronary artery bypass patients (Phillips-Bute, Mathew, Blumenthal, Welsh-Bohmer, White, Mark, Landolfo, & Newman, 2003). Female participants were slightly but significantly older than males (mean age 63.68 years versus 61.69 years). Females were significantly less likely to be married, less educated, more likely to be racial minorities, and more likely to be hypertensive and diabetic than males. Six measures of cognitive function and eight measures of quality of life were administered the day before surgery and then one year later. After adjusting for covariates (age, co-morbidity score, race, years of education, and marital status) preoperatively females did not differ from males cognitively. One year later, women showed greater improvement in figural memory than men but poorer attention and concentration. Every quality of life measure showed significant gender differences preoperatively. One year after their surgery many gender differences persisted
although the sample as a whole had improved quality of life. After controlling for covariates, postoperatively female participants had significantly poorer instrumental activities of daily living, work activities, and exercise capacity. Females also had significantly more cognitive difficulties and greater anxiety than males postoperatively. Social support, depression, and general health perception did not differ by gender one year after surgery. Women’s poorer status postoperatively was not explained by their poorer status preoperatively. The researchers did not discuss whether the measures were inter-correlated and did not discuss the potential impact of a heavy measurement burden on participants’ results.

Gender differences in hospital readmission, functional status, depression and social support were studied at Yale University (Vaccarino, Lin, Kasl, Mattera, Roumanis, Abramson, & Krumholz, 2003). Three hundred nine women (mean age 69.1 years) and 804 men (mean age 64.1 years) were interviewed in the post-operative period between their surgery and discharge from the hospital. Follow-up telephone interviews were conducted between weeks 6 and 8 post-surgery to assess for functional status, pain, infection, sleep disruption, dyspnea, and appetite. Female participants were significantly older, less likely to be married, more likely to live alone, and reported less social support than males. Females were significantly more likely to have CABS on an urgent compared to elective basis. They were more likely to have unstable angina, congestive heart failure, depression, and poorer functional status at baseline but a fewer number of diseased coronary arteries. Ejection fraction did not differ by gender. Females were almost twice as likely to need readmission to the hospital compared to males (22.0% versus 12.7%), with the most common reason in both genders being surgery-related infection. Women
were more than twice as likely as men to experience readmission for congestive heart failure or pneumonia (25.7% versus 12.2% respectively), but more men needed readmission for arrhythmias (20.0% vs. 8.1%). Six weeks postoperatively, women again differed significantly from men in having poorer physical function, greater depression, and less social support. Researchers did not report outcomes by race. The study would have been strengthened by preoperative measures of depression and functional status. Pain, sleep disruption, and other difficulties in the early postoperative period may have influenced baseline results.

The effects of gender on physical, psychological, and social quality of life were studied in 40 pairs of White male and female first-time CABS patients matched on body surface area and age (Keresztes, Merritt, Holm, Penckofer, & Patel, 2003). Baseline data were collected preoperatively. Postoperative data were collected at 1 and 3 months. Female and male participants averaged 62.7 years and 63.8 years of age respectively. The majority were married. Physically, women reported significantly greater shortness of breath and symptoms overall than men both preoperatively and at 1 and 3 months postoperatively, but no greater angina or fatigue. Women reported a significantly poorer quality of life at all three time periods. Psychologically, mean scores for both genders were unchanged across the three time periods but women reported significantly lower psychological quality of life than men preoperatively and three months postoperatively. Women had more depression preoperatively than men but not postoperatively at 1 or 3 months.

Five recent research studies have reported results from samples comprised solely of female participants. Self-reported functional recovery was compared to the objectively
measured activity patterns in 13 women (mean age 62 years, SD 10.76, range 43-78 years) who had undergone first time coronary artery bypass surgery (Redecker, Mason, Wykpisz & Glica, 1995). Age was significantly related to preoperative New York Heart Association classification ($r = 0.59, p = 0.03$) but not to any other study variable. Participants wore wrist accelerometers during 4 one-week periods: the first postoperative week (T1), the first week after hospitalization (T2), the sixth postoperative week (T3), and the first week of the sixth postoperative month (T4). At the end of each of these time periods, participants reported their perceptions of illness impact. The results indicated steady continuous improvement in activity and perceived recovery through the sixth month after surgery. Participants’ daytime activities increased and nighttime activity decreased, with statistically significant improvement occurring between the week after surgery and the first week at home (T1 to T2) and between the sixth week and sixth month postoperatively (T3 to T4). Self-reported illness impact decreased significantly from the first postoperative week to the sixth month after surgery (T1 and T4), between the first and sixth weeks at home (T2 and T3), and between the sixth week and sixth month postoperatively (T3 and T4), but not during the immediate postoperative weeks at home. This study would have been strengthened by a larger sample of participants and by baseline preoperative measures of both activity and sickness impact perception.

DiMattio and Tulman (2003) studied return to work, changes in functional status, and the influence of co-morbidity, household composition, fatigue, and surgical pain on functional status in a sample of 42 women (range 48-81 years, mean age 67.74 years) during their first 6 weeks at home following coronary artery bypass surgery. Participants were questioned about their pre-surgery functional status via an interview in person after
surgery but before discharge and then interviewed by telephone at 2, 4, and 6 weeks postoperatively. Participants were primarily White (percentage not reported), married (55%), and living with another person (54.8%). They averaged 3.88 co-morbid conditions, 2.9 coronary arteries bypassed, 1.67 days in the intensive care unit and 6.10 days in the hospital. Repeated measures analysis of variance showed significant increases in functional status at each postoperative measurement point, but participants did not return to the levels they had reported performing before surgery. By six weeks after surgery 64% who were paid employees had returned to work. All (100%) of those who reported caring for another person before surgery, and 87% of those who reported caring for children or grandchildren, had resumed these activities. While the authors acknowledged study limitations of small sample size, measurement burden, and some low instrument reliabilities, they failed to detect some important factors. The authors used a functional status instrument designed for use in adults aged 60 years and older, while half of their sample ranged in aged from 38-60. Readmission to the hospital was not counted in postoperative length of stay. Lastly, participants were asked to report their pre-surgery function during the early postoperative phase, when memory could possibly be affected by pain, sleep disruption, and other physical recovery problems.

Plach, Napholz, and Kelber (2003) studied depression by mailed survey in 155 women (range 40-86 years; mean age 66.2 years) who had undergone CABS, valve replacement, or atrial-septal defect repair within the previous five months. Participants were grouped by age into early middle-age (40-55 years, n = 26; 17%), midlife age (56-65 years, n = 45; 29%) and elderly age (66+ years, n = 84; 54%). Participants were predominantly White (97%), married (61%), and living with their spouse or family
(71%). Mean depression scores differed significantly by group, with the early middle-age group showing significantly greater depression than midlife or elderly women.

Older adult women aged at least 61 years who were referred to the hospital for elective CABS or were inpatients awaiting urgent CABS were the focus of research on physical and mental functional status in a Canadian study (Baldassarre, Arthur, DiCenso & Guyatt, 2002). During the week before surgery, 34 participants (mean age 69.3 years) were interviewed in person. A follow-up interview was conducted in person or by telephone 3 months postoperatively with 30 women. Participants’ physical and mental functional status scores were compared to those of the general United States population for healthy women over age 65 years, people with angina, people with myocardial infarction (MI), and people with congestive heart failure (CHF) (Ware, Kosinski, & Keller, 1998). Half of the participants were married and 64.7% lived with another person. Women referred for elective CABs were significantly younger (n = 15; mean age 66.4 years) than those awaiting urgent surgery (n = 19; 72.5 years) but there were otherwise no differences between the groups. Changes in physical and mental status between baseline and the three month point were statistically significant, with 21 individuals increasing and 7 individuals decreasing their physical status score. Eighteen individuals increased and 10 individuals decreased their mental status score. As a group, mean scores physical functional status improved 7.79 points while mean mental status scores improved 7.26 points. Results did not differ between women interviewed face-to-face versus by telephone.

Qualitative research methods were used to examine the experiences of 12 women aged 57-76 years who lived alone after recovering from CABS (Robinson, 1999).
Participants had their surgeries 7-29 months prior to the interviews, had recovered from the experience, and had lived alone for at least six months. Four themes emerged: survival relief and feelings of wonder at having survived, “going on” through a sense of obligation to regain control and normalize living, vulnerability and caution in physical and emotional responses, and self-affirmation and restoration of personal identity. Participants made little efforts during this time period to manage cardiac risk factors, a result supported by Allen’s (1999) finding that increased post-CABS cholesterol in women put them at increased risk for future coronary disease.

In summary, several researchers have studied gender differences and clear themes seem to be emerging. Women are generally older and functionally poorer preoperatively although they may not be physically sicker. Females clearly report greater depression; however reports of depression may be impacted by males’ reluctance to admit (or greater denial of) depressive feelings. The preoperative gender differences in physical and mental function persist in the postoperative recovery period; despite this, women report returning to paid work and other work obligations by six weeks postoperatively. One limitation common to most of these research studies is the lack of appropriate follow-up data on hospital readmission. Postoperative length of stay in the hospital where surgery is performed may not provide a complete picture of an individual’s actual need for medical resources after CABS.

**Social Support**

Social support, “the comfort, assistance, and/or information one receives through formal or informal contacts with individuals or groups” (Wallston, Alagna, Devillis &
Devillis, 1983, p. 369) clearly influences coping and survival in cardiac patients. Age-adjusted mortality from many causes, including ischemic heart disease, was higher in persons with fewer social connections (Berkman & Syme, 1979). In 2320 males, social isolation was related to increased total deaths and sudden cardiac deaths (Ruberman, Weinblatt, Goldberg & Chaudhary, 1984). Living alone was predictive of increased risk of cardiac death or recurrent MI (Case, Moss, Case, McDermott, & Eberly, 1992). Social support was associated with decreased preoperative anxiety and more rapid postoperative recovery as measured by discharge, use of pain medications, and level of ambulation after CABS in males ranging in age from 38 to 69 years (mean age 57.84, SD 5.94 years) (Mahler & Kulik, 1990). Cardiac patients who reported increased social support had less severe cardiac symptoms (Siegrist, Dittman, Rittner & Weber, 1982), better psychological adjustment (Ben-Sira & Eliezer, 1990), and less depression (Waltz, Bandura, Pfaff & Schott, 1988). Coping difficulties and poor social support were predictive of hospital readmission for a sample of older adult heart patients (Berkman & Syme, 1979). Female coronary artery bypass surgery patients aged 57-76 years who lived alone made little efforts to manage their cardiac risk factors (Robinson, 1999). Low emotional support from the social network was associated with higher anxiety in 207 patients awaiting coronary artery bypass grafting surgery (Koivula, Paunonen-Ilmonen, Tarkka, Tarkka & Laippala, 2002).

Researchers associated with the 5-year prospective Mediators of Social Support (MOSS) project at Duke University studied 430 individuals who had at least 75% stenosis in at least one coronary artery by conducting an extensive social support interview at the time of the participants’ diagnostic cardiac catheterization (Brummett,
Barefoot, Siegler, Clapp-Channing, Lytle, Bosworth, and colleagues, 2001). Additional MOSS data were collected prospectively at 3 and 6 months, 1 year, and annually thereafter. Social support network size was the sum of individuals named in response to questions about daily and crisis situations. Dichotomous results were reported comparing those individuals termed “socially isolated” (reporting 3 or fewer persons in their social support network; n = 51) and those termed “non-isolated” (reporting more than 3 persons; n = 379). Isolated and non-isolated participants were demographically similar for age (61.7 years versus 63.9 years, respectively), gender (70.6% vs. 66.8% male), education, race indicated as White versus non-White (85.4% vs. 75.1%), depression, and number of diseased vessels and co-morbid conditions. Isolated participants had significantly lower income and more isolated individuals reported being smokers (23.5% vs. 11.8%). Isolated individuals were significantly more hostile. Four indicators of disease severity (ejection fraction, congestive heart failure, number of diseased vessels, and co-morbidity) did not successfully predict social isolation, thus isolation was not a result of illness severity. After controlling for number of diseased vessels, left ventricular ejection fraction, congestive heart failure, age, and co-morbidity, the relative risk of cardiac mortality for socially isolated individuals was 2.47 (95% confidence interval, 1.52 – 3.29). The inclusion of smoking status and income did not significantly weaken the relative risk model.

Co-morbidity

Co-morbidity is the coexistence of noncardiac illness in any of the following categories: cancer, pulmonary disease, diabetes, renal disease, gastrointestinal disease, arthritis, or acquired immune deficiency syndrome (Charlson, Pompei, Ales &
MacKenzie, 1987). The presence of co-morbid conditions may cause additional challenge for the older adult’s physical and psychological recovery after CABS. Older patients have more co-morbid conditions than younger patients. In 1473 patients admitted for isolated coronary artery bypass surgery, 21.9% of those over age 70 had diabetes mellitus compared to 12% of those under age 70 (Rose, et al., 1985). Co-morbidity was predictive of mortality at one year in 559 medical patients, after controlling for number and seriousness of conditions (Charlson, Pompei, Ales, & MacKenzie, 1987).

_Depression_

Depression, an emotional condition that affects an individual’s ability to cope with stressful situations, has been widely associated with CABS (Artinian, Duggan, & Miller, 1993; Levine, Covino, Slack, Safran, Safran, Boro et al., 1996). Depression occurred in 19% of CABS patients (Levine et al., 1996). Depression occurred in 18.9% of a sample of 132 older adult CABS patients (mean age 67.1, SD 6.6 years) (Ben-Noun, 1999). The risk factors for depression in older adults are illness and disability (Bruce & McNamara, 1992). Depression is also a common side effect of cardiac medications, especially beta-blockers (Waal, 1967; Avorn, Everitt & Weiss, 1986; Bright & Everitt, 1992). Reduction of depression in older adults is a target goal in Healthy People 2000. Several investigators have compared the coping styles of depressed and non-depressed individuals. These investigators consistently suggest that depressed individuals use more avoidance and focus on emotional aspects of the situation, compared to non-depressed individuals (Billings & Moos, 1984; Coyne, Aldwin, & Lazarus, 1981; Folkman & Lazarus, 1984).
Depression impedes psychological and physical recovery after CABS, resulting in longer PLOS and need for readmission. Even with severity of illness controlled, mild or major depression in CABS patients (mean age 64) predicted six or nine additional days of stay respectively (Levine et al., 1996). In a longitudinal study of patients with coronary heart disease, depression was associated with increased risk of reinfarction and sudden death (Bruce & McNamara, 1992). In a sample of 222 men and women (age not reported) major depression or depressive symptoms were associated with 2.67 or 3.32 odds ratios respectively of a repeat cardiac event postoperatively (Frasure-Smith, Lesperance, & Talajic, 1995). Depression accounted for 11% of the variance in return to general activities eight weeks postoperatively in 156 cardiac surgery patients (mean age 59.2, SD 9.8 years) (Ruiz, Dibble, Gilliss & Gortner, 1992). In 817 Duke University CABS patients, individuals who had moderate to high depression before surgery and mild to severe depression persisting six months post-operatively had twice the rate of mortality compared to those no depression, after controlling for extraneous factors (Blumenthal, Lett, Babyak, White, Smith, Mark, Jones, Mathew & Newman, 2003).

Conflicting results are reported regarding depression in older CABS patients. Depression varied inversely with age in 46 male patients nine weeks after CABS, percutaneous transluminal angiography (PCTA) or MI (Yates & Belknap, 1991). Patients over age 70 had less depression 6 months after cardiac surgery than patients 31 to 50 years of age or patients 51 to 69 years of age (Gortner, Gilliss & Shinn, 1988). A decline in functional ability as a consequence of cardiac surgery was directly associated with persistent depressive symptoms (Oxman & Hull, 1997).
Depression is depicted by a double-ended arrow in the theoretical model. Depression may be a pre-existing condition or a new condition that develops as an outcome after CABS. Preoperative depression can be expected to negatively impact the individual’s ability to cope with the experience of CABS, and can subsequently affect all other outcomes. Postoperatively, depression can be an outcome after CABS. Depression is a common side-effect of cardiac medications as well as a result of coping with changes in life style necessitated by CABS. Thus it is difficult to determine a specific direction of the relationship between depression, coping, and other outcomes; however, the prevalence of depression in older adults and its potential impact on coping and outcomes support its inclusion in the model.

Coping Influences Outcomes

Functional Status

Functional status, a measure of the older adult’s ability to independently perform self-care activities, is included in the theoretical model to indicate an individual’s physical and psychological recovery from the stressful CABS event. The return to self-care and independence after surgery is a gradual process. Most post-CABS subjects agreed that the first two months post-surgery are the most difficult (Zyzanski, Stanton, Jenkins & Klein, 1981). Arrhythmias are frequent in the first few weeks, and incisional discomfort occurs for up to 3 months (Lovvorn, 1982). Chest pain, incisional pain, sore legs, gastrointestinal problems, and decreased activity were the most frequently reported problems during the first three months after CABS (Nicklin, 1986). Pain was the most frequently reported problem post-CABS in 72 patients (Tack & Gilliss, 1990). Subjects
were predominantly male (81.3%), White (90.7%); mean age was 60 years. Pain remained high during the first 6 weeks in 56% of subjects. Difficulty coping with the recovery process was the next most frequent problem, followed by activity intolerance and sleep problems.

Functional status recovery (ambulation, body care/movement, sleep, and cardiac symptoms) after first time CABS in 184 adults aged 35-60, 60-70, and over 70 years has been studied (Artinian, Duggan, & Miller, 1993). The sample was predominantly male (72.9%), White (92%), and married (83%); mean age was 63 years. All age groups improved over time. However, the oldest group had had longer hospital stays and poorer functional status at each data collection point.

Postoperative Length of Stay and Readmission

Postoperative length of stay (PLOS) is included in the theoretical model as an indicator of the older adult’s physical recovery and need for supportive health care resources. Older adults who undergo CABS have longer PLOS than younger adults and when readmitted, stay longer (Rose et al., 1985). In the United States, the average PLOS after CABS is 5-7 days (Artinian, Duggan, & Miller, 1993). PLOS in patients aged 65-80 years averages 10.4 days postoperatively, and patients over 80 years stay an average of 14.3 days (Peterson, Cowper, Jollis, Bebchuk, DeLong, Muhlbaier et al., 1995; Vaca, Lohmann, & Moskoff, 1994).

The clinical factors of age, female gender, history of chronic obstructive pulmonary disease, cerebrovascular disease, or mitral valve disease, elevated blood urea nitrogen, and preoperative placement of intra-aortic balloon pump significantly predicted increased postoperative lengths of stay in 3605 first-time CABS Medicare patients in 28
southern hospitals (Rosen, Humphries, Muhlbaier, Kiefe, Kresowik & Peterson, 1999). However, significant hospital-level variations in PLOS persisted after controlling for both preoperative demographics and postoperative complications and death. In this sample, mean age was 72.1 years and 34.7% were female. The researchers did not describe race as a variable.

Coronary artery bypass surgery is often performed in a regional surgery center specializing in cardiac surgery; however, readmission and subsequent care may be to a more local facility. Longer stays both postoperatively and on readmission result from multiple complex interacting variables. These variables directly affect PLOS and readmission by affecting the individual’s ability to cope with the stressor of CABS. Lengthy hospital stays are costly and not without risk to the patient.

*Additional Challenges in Older Adulthood*

Older adults differ from younger and middle-aged adults in a number of additional physiologic and psychological ways. While chronological age is at best a poor indicator of an adult’s trajectory of aging, normal age-related changes in the brain, immune system, cardiovascular system, senses, reproductive system, appearance, and in movement affect older adults’ health and health care experiences. These physiologic and cognitive changes place older adults at greater risk for when they experience critical illness or major surgery.

While the central neurological structures undergo gradual predictable changes, age-related decline in overall cognitive ability is not expected. The changes in neurological structures result in gradual slowing which is not noticeable until very old age in most healthy people. The neuron’s dendrite section begins to deteriorate, which
affects the dendrite’s ability to transmit chemical signals from other neurons, impairing older adult’s ability to process information (Duara, London & Rappaport, 1985). Researchers differ on whether the dendrites are lost progressively with age (Scheibel, 1982) or can re-grow throughout life (Buel & Coleman, 1979). The neuron’s axon section may twist to form neurofibrillary tangles (Duara, London & Rappaport, 1985) as a result of normal aging. Dopamine, acetylcholine, and serotonin – chemicals released from the neuron’s terminal branches - all decrease with age. The two natural opposing processes of synapse death and synapse formation result in no net loss of synapses, but the way the synapses and neurons are organized changes with age. Older adults process information more slowly, show decreased learning skills with increasing age (Hartke, 1991), and have more limited formal education of their generation. Contextual factors in the physical and interpersonal environment also affect older adults’ ability to understand health information. Older adults may limit information seeking due to lack of time, energy, and accessible resources. Factors such as comfortable familiar surroundings, and ample time which facilitate information exchange between client and health professional are often lacking in hospitals or physicians’ offices. The hurried, impersonal hospital environment might particularly negatively impact older adults. Furthermore, factors common in the critical care environment - noxious levels of noise and activity, attitudes of ageism, restriction of visitors, painful procedures - specifically place older adults at risk for more sleep deprivation and delirium (Tullman & Dracup, 2000).

The older adult’s immune system is made up of several types of cells that form a network of interacting parts: T cells, B lymphocytes, and monocytes and neutrophils. Each of these components changes with age (Cavanaugh, 1997). The numbers of the
cells do not change appreciably but their ability to function decreases over time. Older adults’ immune systems take longer to build up defenses against specific diseases, even after immunizations (Cavanaugh, 1997). Older adults are thus more susceptible to bacterial and some viral infections. Levels of antibodies differ across age. For example, tetanus toxoid antibody levels decrease with age, especially in women (Nagel & Adler, 1988). Lastly, the body’s ability to recognize its own cells declines with age. Sometimes the immune system produces antibodies against your own body’s cells. This process, called “autoimmunity” is thought by some to be responsible for aging in us all (Nagel & Adler, 1988).

The cardiovascular system goes through two important natural changes with aging. Structurally, the myocardium becomes stiffer and some fat deposits accumulate by the late 40’s and early 50’s (Cavanaugh, 1997). Stroke volume declines from about 5 liters per minute at age 20 to about 3.5 liters per minute at age 70. Arterial walls stiffen, resulting in higher blood pressure. About 35% of people between ages 25 and 74 have high blood pressure (Cavanaugh, 1997). These combined changes result in a lessened ability to tolerate physical stress and work. These changes can be minimized or delayed by exercise.

The five senses – sight, smell, taste, hearing, and touch – change with age in differing degrees. Natural vision changes include loss of ability to read or see fine detail (macular degeneration), the need for more light in order to see clearly, trouble seeing at night or in bright glare, difficulty distinguishing flashing lights, and more difficulty adjusting to changes in lighting conditions (Kline & Scheiber, 1985). Gradual stiffening in the lens results in greater far-sightedness. The older adult needs materials printed in
large dark bold font (Miller, 2000). Visual changes also have important implications for the older adult’s ability to drive safely. Loss of vision is second only to cancer as the most feared consequence of aging (Verrillo & Verrillo, 1985).

Age-related hearing impairment begins to accelerate when in the 40’s (Corso, 1984). Hearing loss is greatest for high pitched tones like consonants. Hearing loss results from changes in four systems: sensory (atrophy of sensory cells), neural (loss of auditory neurons), metabolic (decreased nutrients to receptor cells) and mechanical (stiffening of the vibrating structures in the ear). Older adults can hear a slow, deep, clear voice better than higher-pitched faster speech (Miller, 2000).

The number of taste cells does not naturally decline, and changes in taste are minimal if at all. However, nutritional habits and weight change with aging possibly as a result of social, physical, and sensory changes. Many older adults eat alone or do not bother to fix big meals if enough people are not around. The aroma of food cooking is a powerful appetite stimulant; if appetizing aromas are not present, the individual is less likely to eat. Although people vary widely in their abilities to sense smells, this sense remains normal until the 60’s and then begins to decline rapidly (Murphy, 1986). Issues with finances, transportation, and mastication (masseter muscle strength and oral dentition) affect older adults’ abilities to obtain and ingest healthy food. In addition to these nutritional challenges, age-related declines in muscle and bone mass (osteoarthritis) result in predictable loss of body weight beginning at about age 50 (Shepard, 1978).

The senses of touch and balance change with age. The ability to feel things decreases on the smooth parts of the skin, but the hair-covered parts maintain their sensation levels throughout life (Axelrod & Cohen, 1961). Sensitivity to vibration
decreases in the lower but not the upper parts of the body (Kenshalo, 1977). The older adult’s ability to sense active (self-initiated) movements does not change, but their ability to sense passive (other-initiated) movements declines especially in the knees and hips. The sense of balance may be quite affected by aging. Dizziness and vertigo are common complaints (Ochs, Newberry, Lenhardt, & Harkins, 1985). Older adults normally have more body sway than younger adults. Age-related decline in muscle mass and bone strength also contribute to falling. The incidence of falling increases with age especially after age 75 (Ochs et al., 1985).

Physical age-related changes in the reproductive system and in appearance affect both women and men, but the desire for sexual intimacy does not decline with age. For women, cessation of estrogen production (menopause) begins with irregular menses in their 40’s and is usually complete by age 55 (Rykken, 1987). Menopause results in vaginal and skin dryness. Stress incontinence may increase during sneezing, coughing, laughing especially in multiparous women. Some individuals voluntarily limit their fluid intakes to decrease unexpected or frequent urination, increasing their risk for dehydration. For men sperm production declines about 30% between age 25 and age 60 (Solnick & Corby, 1983). Normal, age-related benign prostatic hypertrophy affects the older male’s ability to completely empty his bladder, resulting in a weaker stream, more night awakenings to empty the bladder, and increased risk for bladder infection.

Appearance normally changes with aging. The skin becomes thinner and more wrinkled with age, and sweat gland function declines, resulting in poorer integumentary protection and thermoregulation. In males, hair thinning may begin in the 20’s. Intervertebral discs flatten with age, resulting in shorter trunk stature and limbs which look long. These
Changes in physical appearance have important social implications in our Western, youth-oriented society.

In summary, normal age-related changes in nearly every physical system affect the older adult’s health care experience and needs. Their ability to absorb, process and learn new information is adversely affected. However, “the degree of each deficit, the age at which they become evident, the strategies for dealing with them, the emotions connected with them, and the situations in which they arise” (Lazarus, 1998) are highly individualized. Older adults are addressing the developmental issues of loss and mortality, thus they may have different perspectives on the meaning of a stressful, potentially life-ending (or life-extending) surgery.

Summary

Preoperative patient education and preparation are the nurse’s prime objectives in efforts to assist the patient to cope most effectively with the stress of cardiac surgery. Research has shown that these interventions are most effective if the intervention is tailored to the patient’s preference for information. When information is provided to patients who prefer it, coping and outcomes are improved (Lazarus & Folkman, 1984; Gattuso, Litt & Fitzgerald, 1992; Miller, 1980). Interventions that oppose preferences increase anxiety and impair coping. Perceived control influences the choice of coping strategy, especially for those individuals with a high preference for information. The current standard of nursing intervention involves the provision of detailed written and visual information to all patients in the preoperative period before CABS, however, the individual patient’s preference for this information is not routinely a part of nursing assessment. Furthermore, older adults differ from younger and middle-aged patients due
to normal age-related physiologic, psychologic, and social changes. These changes impact their health care needs. A theoretical model on coping with CABS was drawn from research and literature describing mostly young and middle-aged adults. Research on older adults’ preference for information, perceived control, and coping in the preoperative phase would build upon these studies. Psychological outcomes (depression) and physical outcomes (functional status, and PLOS and readmission) relevant to the older adult population were included in the model as outcome measures. Demographic measures such as age, gender, race, comorbidity, and social support may also affect outcomes. The theoretical model can be used to guide nursing research on older adults’ experiences with coronary artery bypass surgery. The research will add to nursing knowledge about older adults and guide interventions designed to optimize functional recovery.
References


CHAPTER 3

MEASURING OLDER ADULTS’ PREFERENCE FOR INFORMATION, PERCEIVED CONTROL, COPING AND OUTCOMES FOLLOWING FIRST TIME OPEN HEART SURGERY

In this investigation testing a theoretical model of older adults’ coping with coronary artery bypass surgery, measures of preference for information, perceived control, coping, depression, functional status, and postoperative length of stay were performed. Efforts were made to obtain valid and reliable instruments appropriate for this specific developmental cohort’s experience with this specific health stressor as reported in previous studies. Selected instruments included the Krantz Health Opinion Survey (KHOS; Krantz, Baum & Wideman, 1980) to measure preference for information, the Control Attitudes Scale (CAS; Moser & Dracup, 1995) to measure perceived control, the Ways of Coping Questionnaire (WCQ; Lazarus & Folkman, 1984) to measure coping, the Geriatric Depression Scale Short Form (GDS, Sheikh & Yesavage, 1986) to measure depression, and the Medical Outcomes Study Short Form-12 (MOS SF-12, Ware, Kosinski & Keller, 1996) to measure functional status. Difficulties existed because numerous researchers who have used these instruments – especially the short forms – have reported pre-study validity and reliability figures from the longer versions or previous research, a methodologic error termed “reliability induction” (Vacha-Haase, Kogan & Thompson, 2000). The reliability and validity of a longer instrument form cannot be transferred to the shorter form unless the sample composition and score
variability are comparable between the previous and current samples (Vacha-Haase, Kogan & Thompson, 2000). Other researchers have reported reliabilities after altering the instrument (e.g., Folkman, 1997; Santavirta, Kettunen, & Solovieva, 2001). Reliability is less the property of an instrument than it is a measurement of the instrument administered to a specific sample in a specific situation (Polit & Hungler, 1995). Numerous researchers have not reported reliability results from their own studies (e.g., Gooteratne, Weaver, Cater, Pack, Arner, Greenberg & Pack, 2003; Irion & Blanchard-Fields, 1987; King, Norsen, Robertson, & Hicks, 1987; Ludwick-Rosenthal & Neufeld, 1993; Osborn, Fletcher, Smeeth, Stirling, Bulpitt, Breeze, et al., 2003; Sheikh & Yesavage, 1986; Vaccarino, Lin, Kasl, Mattera, Roumanis, Abramson, et al., 2003) thus failing to impart valuable information about the instrument’s unique performance in their samples. Information about an instrument’s reliability guides decisions about future use. This paper will report on each instrument’s prior reliability, examine reliability in the current study, report anecdotal notes about participants’ experiences with the instrument, and make recommendations about the instrument’s future use in research on older adults.

**Theoretical Model**

The theoretical model (Figure 3.1), methods, and sample are briefly described below. The results component of this paper will be presented in five sections representing the five concepts (preference for information, perceived control, coping, depression, and functional status) in the theoretical model. Each section will contain the conceptual definition, the operational definition, the instrument used, and the instrument’s reliability history. The instrument’s reliability in the current study will be reported. Anecdotal reports of participants’ practical responses to the study and instruments are presented to
augment the instruments’ psychometric properties. The advantages of using anecdotal notes in research on older adults includes requiring little time or effort reading or writing on the part of the participant and they are of short duration; the disadvantages are that recordings are somewhat subjective and time-consuming (Burnside, Preski, & Hertz, 1998. Each section will conclude with recommendations for the instruments’ future use in older adults. A composite of the instrument analyses and recommendations are presented in Table 3.8 on page 88.

![Diagram of a theoretical model of coping with CABS for older adults.]

Figure 3.1: A theoretical model of coping with CABS for older adults.

The theoretical model (Figure 3.1) was drawn from several sources. Miller (1980) and colleagues have developed the theory of preference for information. The concept of perceived control described by Wallston and colleagues (1983) has been applied to nursing research on cardiac patients and others. The appraisal theory of stress and coping was initially developed by Folkman and Lazarus (1980), and subsequently applied in numerous studies. Preference for information moderates coping, and perceived control mediates coping. Research on older adults informed the selection of relevant outcomes. Each instrument’s reliability in the current study was analyzed in detail. Evidence for
current reliability was examined via Ryan-Wenger’s method (Table 3.1; unpublished manuscript, 2004).

<table>
<thead>
<tr>
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<th>Standard</th>
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<td><strong>Internal Consistency Reliability</strong></td>
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</tr>
<tr>
<td>1. Evaluate Cronbach’s alpha coefficient.</td>
<td>0.80 for decisions involving individuals (Nunnally &amp; Bernstein, 1994).</td>
</tr>
<tr>
<td></td>
<td>0.70 for decisions involving groups (“modest reliability”) (Nunnally &amp; Bernstein, 1994; Robinson, Shaver, &amp; Wrightsman, 1991).</td>
</tr>
<tr>
<td></td>
<td>0.60 for exploratory research (Robinson, Shaver, &amp; Wrightsman, 1991).</td>
</tr>
<tr>
<td>2. Evaluate inter-item correlations.</td>
<td>Each item should correlate at least 0.30 with at least one other item (Ferketich, 1991).</td>
</tr>
<tr>
<td>3. Evaluate redundancy.</td>
<td>No item should correlate 0.90 with other items (Strickland, 1996).</td>
</tr>
<tr>
<td>4. Determine the extent to which response set bias affects variability.</td>
<td>The p statistic associated with an F test of the between versus within subjects variation should be &lt;.05, which indicates lack of response set bias (Ryan-Wenger, unpublished manuscript, 2004).</td>
</tr>
<tr>
<td>5. Evaluate effect on alpha of deleting items.</td>
<td>(SPSS 11.0)</td>
</tr>
</tbody>
</table>

| Reliability based on Internal Structure | |
| 1. Determine item analysis. | Both raw scores and summated scores are used in item analysis procedures (Ferketich, 1991; Nunnally & Bernstein, 1994). |
| 2. Evaluate variability of item scores. | 1. Full range of response options used. |
| | 2. Response mean not dramatically skewed high or low. |
| 3. Evaluation corrected item-total correlations. | Corrected item-total correlations should range from .30-.70 (Ferketich, 1991). |


Table 3.1: Method and standards for examining instrument reliabilities.

**Method**

**Sample**

The sample consisted of 70 individuals aged 65-84 years (mean age 71.97, SD 5.71 years) who were preparing for first-time coronary artery bypass surgery by one
group of cardiac surgeons in three Midwestern hospitals. Participants were predominantly White (94.3%) and male (65.7%). Sample criteria included ability to speak and read English, scheduled for non-emergent first-time CABS, and residing in the community preoperatively including independent living in a retirement community. Preoperatively participants had an average of 4.67 (SD 2.13) other co-morbid conditions and reported having 11.81 (SD 9.22) people they would call on for social support. Surgically, participants had an average of 3.14 (SD 1.18) coronary artery bypasses.

Procedure

Preoperatively, measurements of preference for information (Krantz Health Opinion Survey, KHOS; 16 items), perceived control (Control Attitudes Scale, CAS; 4 items), coping (Ways of Coping Questionnaire, WCQ; 66 items), demographic variables, and baseline measures of depression (Geriatric Depression Scale, GDS; 15 items) and functional status (Medical Outcomes Study Short Form-12, MOS SF-12; 12 items) were carried out (in that order). Written materials and scripts were provided in 14 point bold Arial font for ease of readability; additionally, the nurse researcher read the instruments aloud as the participant read them if they wished. Response cards were used to help the participant remember the choices available in each instrument. Postoperatively, participants were contacted by phone about two weeks after discharge to arrange for postoperative interview and data collection. Postoperative data collection interviews were carried out by telephone about six weeks after discharge. At this time, repeat measures of depression and functional status were performed and readmission data were collected.
Results

Preference for Information

Preference for information was conceptually defined as an individual’s desire for information (Miller, 1980). Individuals with a high preference for information tend to seek information and novel input during stressful events while those with low preference for information tend to distract themselves and avoid information (Miller, 1980). Overall, previous studies of preference for information have been done on young to middle adults. Out of over forty studies reviewed, only six studies reported inclusion of participants over age 65. Participants’ preference for information was operationally defined as their score on the Krantz Health Opinion Survey-Information subscale (Krantz, Baum & Wideman, 1980).

Krantz Health Opinion Survey (KHOS)

The Krantz Health Opinion Survey (KHOS; Krantz, Baum & Wideman, 1980) was used to measure preference for information. In prior research, principal components analysis using varimax rotation identified two subscales: a preference for information (KHOS-I) subscale and a preference for behavioral involvement (KHOS-B) subscale. Of the 16 items on the instrument, preference for information was represented through seven items measuring the desire to ask questions and wanting to be informed about medical decisions. Participants rated each item in a summated rating format from 1 (“strongly disagree”) to 7 (“strongly agree”). Some items were reverse scored. Summed scores could range from 7 – 49. Higher scores represented favorable attitudes toward self-directed or informed treatment. Initial discriminant validity for the KHOS was
determined by administering the test to 100 male and 100 female undergraduates at the University of Southern California. Predictive, discriminant, and construct validity were established in student groups (Krantz et al., 1980) and non-student groups (Smith, Wallston, Wallston, Forsberg & King, 1984). Factor analysis in a sample of non-emergent CABS patients showed three significant loadings: preference for information, trust in the healthcare provider, and preference for choice (King, Norsen, Robertson & Hicks, 1987). The KHOS-I in a binary yes/no response format had a Kuder-Richardson 20 reliability of 0.74 (Krantz et al., 1980). The KHOS-I in summated rating format has been used with cardiac catheterization patients (Ludwick-Rosenfeld & Neufeld, 1993; Garvin & Kim, 2000) and renal transplant patients (Christensen, Ehlers, Raichle & Bertolaus, 2000) (Table 3.2). Microsoft Word XP version indicated that the KHOS has a Flesch-Kincaid grade literacy level of 3.6.
Table 3.2: Prior reliabilities of the Krantz Health Opinion Survey - Information subscale (chronologic order).

Reliability in the Current Study: KHOS

In this study, the KHOS-I had a Cronbach’s alpha coefficient of 0.64. Each item correlated at least 0.30 with one or more other items, with no redundancy. There were no indications of response set bias. Internally, the full range of item response options was used. Both item and summated scores demonstrated satisfactory variability; standard deviations were smaller than the mean scores. Corrected item to total correlations exceeded 0.30 for five of the seven items (#10 and 16 did not). Statistical projections indicated that the alpha would increase from 0.64 to 0.66 if one item (#16) was deleted.
Anecdotal Notes: KHOS

Anecdotally, many participants expressed difficulty understanding the KHOS, expressing frustration with the multiple functions required in order to respond to each item. The participants had to read and understand the intent of the statement, e.g., “I usually don’t ask the doctor or nurse many questions about what they’re doing during a medical exam”, and then select an option on a seven-point scale indicating the extent of their agreement or disagreement (1, “Strongly Disagree” to 7, “Strongly Agree”) to the statement. Some items contain a double statement, e.g., “Except for a serious illness it is better to take care of your own health than to seek professional help” which required the participant to define the specifics of the item. Participants were then required to determine if they agreed (or disagreed), and then determine the correct response number to select to accurately indicate their feelings. Subsequent questions on the KHOS might ask the same question in reverse, e.g., “Recovery is usually quicker under the care of a doctor or nurse than when patients take care of themselves”. Many participants expressed confusion about the intent of several items, saying “this is tricky” and “didn’t I answer that before” and looking back to their previous responses in attempts to understand current items.

Discussion and Recommendations: KHOS

The KHOS was somewhat tedious and frustrating for this group of older adult participants, and the information subscale had low reliability (0.64). Instrument reliabilities of 0.70 are considered acceptable in group studies (Nunnally & Bernstein, 1994). The KHOS requires complex mental processing tasks to decode and understand the intent of the questions and potential response meanings. Due to the combination of
low reliability and frustrations that participants expressed, the KHOS was rated “poor”: recommended for future use in older adults only with great caution. Nurses need to develop a more appropriate tool for assessing preference for information.

Perceived Control

Conceptually, perceived control is the belief that one can determine one’s own internal states and behavior, influence one’s environment, and/or bring about desired outcomes (Wallston, Alagna, Devillis, & Devillis, 1983). The perceived controllability of the situation determines the use of coping strategies. A participant’s level of perceived control was operationally defined as their score on the Control Attitudes Scale (Moser & Dracup, 1995).

Control Attitudes Scale (CAS)

The Control Attitudes Scale (CAS; Moser & Dracup, 1995) was used to measure the degree to which patients felt they had control (and conversely helplessness) related to their cardiac disease. The four items on the CAS were ranked by subjects on a 1-7 scale according to the degree to which they agreed/disagreed with a given statement. Two items were reverse-scored. A response of 1 indicated “not at all” while a response of 7 indicated “very much”. Scores could range from 4 – 28. Higher scores indicated higher perceived control. Previously, construct validity was established in a sample of 325 cardiac patients (mean age 63.9 years; Moser & Dracup, 1995). Internal consistency reliability was high in the preliminary sample and acceptable in a second sample of 228 patients (Moser & Dracup, 1995) (Table 3.3). The CAS has been used in studies of spouses of recovering cardiac patients (Moser & Dracup, 2000) and women recovering
from cardiac events (Gallagher, McKinley & Dracup, 2003). Microsoft Word XP version indicated that the CAS has a Flesch-Kincaid 6.9 grade literacy level.

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<th>First Author, Year. Sample.</th>
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<th>Race</th>
<th>α</th>
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<td>63.9 (9.5)</td>
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<td>nr</td>
<td>.77</td>
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<td>59 (10.5)</td>
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<td>90.8%</td>
<td>.88</td>
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<td>Gallagher et al. (2003). Women following a cardiac event.</td>
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<td>67.0 (9.0)</td>
<td>100</td>
<td>nr</td>
<td>.72</td>
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<tr>
<td>This study</td>
<td>70</td>
<td>72.0 (5.7)</td>
<td>34.3</td>
<td>94.3% White</td>
<td>.63</td>
</tr>
</tbody>
</table>

*Note.* nr = not reported. α = Cronbach’s alpha.

Table 3.3: Prior reliabilities of the Control Attitudes Scale (chronologic order).

Reliability in the Current Study: CAS

In this study, the CAS had reliability of 0.63. Three of the four items correlated at least 0.30 with one or more other items (#2 did not), with no redundancy. There were no indications of response set bias. Internally, the full range of item response options was used. Both item and summated scores demonstrated satisfactory variability; standard deviations were smaller than the mean scores. Corrected item to total correlations exceeded 0.30 for two of the four items (#1 and 2 did not). Statistical projections indicated that the alpha would increase from 0.63 to 0.66 if item #1 was deleted and to 0.68 if item #2 was deleted. Anecdotally, the CAS did not produce difficulty for this group.

Discussion and Recommendations: CAS

The CAS was easy for participants to use, but its short 4-item format may have contributed to its low reliability (0.63) in this sample of older adults, and there are relatively few research studies using the CAS to allow for comparison. Instrument
reliabilities of 0.70 are considered acceptable in group studies (Nunnally & Bernstein, 1994). The CAS was rated “Fair”: recommended with caution for future research on older adults.

_Coping_

Coping was conceptually defined as behavioral efforts to manage stressful situations like coronary artery bypass surgery (CABS), which depended on the individual’s personal interpretation of the “facts” they perceived to exist in the stressful situation and on the individual’s personal beliefs and goals (Smith & Lazarus, 2001). Appraisals involving threat or harm evoke emotions which motivate the individual to cope in an adaptive manner to avoid, minimize, or alleviate harm (Smith & Lazarus, 2001) by focusing on the problem and on emotions arising from the problem (Lazarus & Folkman, 1984). A participant’s coping was operationally defined as their scores on each of the eight subscales of the Ways of Coping Questionnaire (Lazarus & Folkman, 1984).

_Ways of Coping Questionnaire (WCQ)_

The 66-item, revised Ways of Coping Questionnaire (WCQ; Lazarus & Folkman, 1984), considered the gold standard for coping (Schwarzer & Schwarzer, 1996), was used to measure coping strategies. Participants indicated their degree of using each strategy on a 4-point scale (0-3). A response of 0 indicated “does not apply and/or not used” while a response of 3 indicated “used a great deal”. Prior factor analysis of the responses of healthy older adults and undergraduate students produced problem-focused and emotion-focused subscales (Lazarus & Folkman, 1984) however confirmatory factor analysis indicated that an eight-factor solution yielded the best fit (Edwards & O’Neill, 1998). These eight subscales consisted of Confrontive Coping (represented in 6 items, scores...
could range from 0-18), Distancing (6 items, scores could range from 0-18), Self-Controlling (7 items, scores could range from 0-21), Seeking Social Support (6 items, scores could range from 0-18), Accepting Responsibility (4 items, scores could range from 0-12), Escape-Avoidance (8 items, scores could range from 0-24), Planful Problem Solving (6 items, scores could range from 0-18), and Positive Reappraisal (7 items, scores could range from 0-21). The eight subscales produced moderate to acceptable reliabilities (Folkman, 1997; Santavirta, Kettunen & Solovieva, 2001) (Table 3.4). Microsoft Word XP version indicates that the WCQ has a Flesch-Kincaid grade literacy level of 5.9. The eight WCQ subscales and their reliabilities will be discussed individually. The eight WCQ subscales were highly inter-correlated in this study.
First Author, Year. Sample.

Irion et al. (1987). Adolescents (AD), young adults (YA), middle-aged adults (MA), and older adults (OA).

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<td></td>
<td>YA 20.1</td>
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<td></td>
<td>MA 43.9</td>
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<td></td>
<td>OA 66.2</td>
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<td>3</td>
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<td>(8) .83</td>
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Santavirta et al. (2001). Spouses of acute myocardial infarction patients.

<table>
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<td>(7) .67</td>
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<td>(8) .64</td>
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</table>

Note: two items (#7, #51) deleted from instrument.

This study

<table>
<thead>
<tr>
<th>N</th>
<th>Age (SD)</th>
<th>% Female</th>
<th>Race</th>
<th>Alpha</th>
</tr>
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<tr>
<td>70</td>
<td>72.0 (5.7)</td>
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<td>94.3% White</td>
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<td>(8) .69</td>
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</tbody>
</table>


Table 3.4: Prior reliabilities of the Ways of Coping Questionnaire (chronologic order).

Reliability in the Current Study: WCQ

Confrontive Coping (subscale 1; comprised of items #6, 7, 17, 28, 34, and 36) had a Cronbach’s alpha of 0.69. Four of the six items on this subscale correlated at least 0.30 with one or more other items (#7 and #36 did not), with no redundancy. There were no indications of response set bias. Internally, the full range of item response options was used. Both item and summated scores demonstrated satisfactory variability but standard deviations were larger than the mean scores. Corrected item to total correlations exceeded
0.30 for all six items. Statistical projections indicated that the alpha would increase from 0.69 to 0.70 if item #36 was deleted.

Distancing (subscale 2; items #12, 13, 15, 21, 41, and 44) had a Cronbach’s alpha of 0.66. Five of six items correlated at least 0.30 with one or more other items (#15 did not), with no redundancy. There were no indications of response set bias. Internally, the full range of item response options was used. Both item and summated scores demonstrated satisfactory variability however standard deviations were equal to larger than the mean scores in all but two items. Corrected item to total correlations exceeded 0.30 for four of the six items (#12 and 15 did not). Statistical projections indicated that deleting any items would reduce the alpha.

Self-Controlling (subscale 3; items #10, 14, 35, 43, 54, 62, and 63) had a Cronbach’s alpha of 0.61. All items correlated at least 0.30 with one or more other items, with no redundancy. There were no indications of response set bias. Internally, the full range of item response options was used. Both item and summated scores demonstrated satisfactory variability; standard deviations were equal to or larger than the mean scores. Corrected item to total correlations exceeded 0.30 for five of the seven items (#10 and 43 did not). Statistical projections indicated that deleting any items would decrease the alpha.

Seeking Social Support (subscale 4; items #8, 18, 22, 31, 42, and 45) had a Cronbach’s alpha of 0.58. Five of the six items correlated at least 0.30 with one or more other items (#18 did not), with no redundancy. There were no indications of response set bias. Internally, the full range of item response options was used. Both item and summated scores demonstrated satisfactory variability but four of the six standard
deviations were equal to or larger than the mean scores. Corrected item to total
correlations exceeded 0.30 for three of the six items (#18, 22, and 42 did not). Statistical
projections indicated that deleting items would not improve the alpha.

Accepting Responsibility (subscale 5; items #9, 25, 29, and 51) had a Cronbach’s
alpha of 0.65. Three of the four items correlated at least 0.30 with one or more other
items (#29 did not), with no redundancy. There were no indications of response set bias.
Internally, the full range of item response options was used. Both item and summated
scores demonstrated satisfactory variability but standard deviations exceeded the mean
scores. Corrected item to total correlations exceeded 0.30 for three of the four items (#29
did not). Statistical projections indicated that deleting item #29 would increase the alpha
from 0.65 to 0.68.

Escape-Avoidance (subscale 6; items #11, 16, 33, 40, 47, 50, 58, and 59) yielded
a Cronbach’s alpha of 0.64. Two of the eight items (#33 and 47) correlated at 0.31 with
each other but no other items reached the 0.30 correlation threshold. Items #58 and 33
correlated 0.2972, and #58 correlated with #50 at 0.2986. There was no evidence of
redundancy or response set bias. Internally, the full range of item response options was
used. Both item and summated scores demonstrated satisfactory variability; standard
deviations were equal to or larger than the mean scores. Corrected item to total
correlations exceeded 0.30 for seven of the eight items, with the eighth item (#11)
correlating at 0.2971. Statistical projections indicated that deleting any items would
decrease the alpha.

Planful Problem Solving (subscale 7; items #1, 26, 39, 48, 49, and 52) had a
Cronbach’s alpha of 0.60. Five of the six items correlated at least 0.30 with one or more
other items (#48 did not), with no redundancy. There were no indications of response set bias. Internally, the full range of item response options was used. Both item and summated scores demonstrated satisfactory variability; standard deviations were equal to or larger than the mean scores. Corrected item to total correlations exceeded 0.30 for three of the six items (#1, 39, and 48 did not). Statistical projections indicated that deleting any items would decrease the alpha.

Positive Reappraisal (subscale 8; items #20, 23, 30, 36, 38, 56, and 60) had a Cronbach’s alpha of 0.69. All items correlated at least 0.30 with one or more other items, with no redundancy. There were no indications of response set bias. Internally, the full range of item response options was used. Both item and summated scores demonstrated satisfactory variability but standard deviations exceeded the mean scores in all but one item (#60). Corrected item to total correlations exceeded 0.30 for six of the seven items with the seventh (#20) correlating at 0.2960. Statistical projections indicated that deleting any items would decrease the alpha.

*Anecdotal Notes: WCQ*

Anecdotally, participants were initially skeptical about the WCQ’s length but they quickly perceived that the individual items were more straightforward and the response choices were easier to understand than the KHOS. Two items on the WCQ produced frustration, specifically items #7 “I tried to get the person responsible to change his or her mind” and #51 “I promised myself that things would be different the next time” as participants attempted to define who was responsible and expressed their hopes that there wouldn’t be a next bypass surgery. Other researchers deleted these items from the WCQ before administration because of their potential to cause confusion (Santavirta, Kettunen
& Solovieva, 2001). Two items intended to assess for Positive Reappraisal, i.e. items #36 “I found new faith” and #38 “I rediscovered what is important in life” sometimes produced participant responses of “0” and verbalizations that faith had always been present or the participant already knew what was important in life, thus the overall use of Positive Reappraisal may be under-reported. Item #33 “I tried to make myself feel better by eating, drinking, smoking, using drugs, or medications, etc.” contained many choices of possible healthy and unhealthy coping responses but was perceived by this group as suggesting illegal activity (“using drugs”) and produced rapid negative verbal responses.

Discussion and Recommendations: WCQ

The WCQ was easier to understand and presented little difficulty for participants, however some questions were misinterpreted. Reliabilities were low for all eight subscales (0.58 to 0.69). Instrument reliabilities of 0.70 are considered acceptable in group studies (Nunnally & Bernstein, 1994). The subscales were significantly intercorrelated (Table 3.5), introducing the threat of multicollinearity (Hair, Anderson, Tatham & Black, 1998). The 66-item WCQ was rated as “Fair”: recommended for use with caution in older adult samples.
Subscale  1   2   3   4   5   6   7   8
1    1.00  .412** .581** .319** .674** .533** .512** .482**
2    1.00  .567** .041  .490** .418** .258*  .265*
3    1.00  .222  .507** .324** .465** .564**
4    1.00  .188  .027  .407** .296*
5    1.00  .526** .347** .558**
6    1.00  .063  .388**
7    1.00  .427**
8    1.00

Note. * p < 0.05. ** p < 0.01.

Table 3.5. Pearson product-moment correlation coefficients between WCQ subscales.

**Depression**

Depression was conceptually defined as a mood marked by diminished interest or pleasure in daily activities (Better Elder Care, 2002); sadness or dejection (Ebersole & Hess, 2001). Depression, a common side effect of cardiac medications especially beta-blockers (Waal, 1967; Avorn, Everitt & Weiss, 1986; Bright & Everitt, 1992) occurred in almost 20% of all CABS patients including older adults (Levine Covino, Slack, Safran, Safran, Boro & colleagues, 1996; Ben-Noun, 1999). Participants’ depression was operationally defined as their score on the 15-item version of the Geriatric Depression Scale (Sheikh & Yesavage, 1986).

**Geriatric Depression Scale (GDS)**

The 15-item short form self-report Geriatric Depression Scale (GDS; Sheikh & Yesavage, 1986) measured the number of depressive symptoms in older adults both before and six weeks after CABS. The scale had a “yes” or “no” format; some items were
reverse scored. Summed scores could range from 0-15; higher scores indicated a greater number of symptoms. Prior research on constructing the short form involved selecting the 15 items with the highest correlation with depressive symptoms in validation studies of the longer 30-item form (Sheikh & Yesavage, 1986). Validity of the short form was established by its ability to differentiate depressed from non-depressed male and female patients over age 55 (r = .84, p<.001) (Yesavage & Brink, 1996). Convergent validity was established through positive correlation (r = .84) with known rating scales for depression. The GDS has been used internationally with older adults living in the community, veterans living in long term care, post-stroke and CABS patients, and older adults who have lost their partners; however none of the researchers reported their reliabilities (Table 3.6). Microsoft Word XP version indicates that the GDS has a Flesch-Kincaid grade literacy level of 5.0.
<table>
<thead>
<tr>
<th>First Author, Year. Sample.</th>
<th>N</th>
<th>Age (SD)</th>
<th>% Female</th>
<th>Race</th>
<th>α</th>
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</thead>
<tbody>
<tr>
<td>Sheikh et al. (1986). Depressed and non-depressed elders.</td>
<td>35</td>
<td>&gt;55</td>
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<td>nr</td>
<td>nr</td>
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<tr>
<td>Lelito et al. (2001). Veterans living in long-term nursing care.</td>
<td>91</td>
<td>75.2</td>
<td>0</td>
<td>82.4% White, 15.4% Black, 2.2% Native American</td>
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<tr>
<td>Schreiner et al. (2001). Japanese post-stroke patients.</td>
<td>101</td>
<td>69.4</td>
<td>45</td>
<td>100% Japanese</td>
<td>nr</td>
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<td>Gooteratne et al. (2003). Older adults with daytime sleepiness.</td>
<td>114</td>
<td>77.7 (5.98)</td>
<td>74</td>
<td>87.7% White</td>
<td>nr</td>
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<tr>
<td>Osborn et al. (2003). Community-dwelling adults aged 75 years or older in the United Kingdom.</td>
<td>14,271</td>
<td>nr</td>
<td>61</td>
<td>nr</td>
<td>nr</td>
</tr>
<tr>
<td>Vaccarino et al. (2003). Female and male CABS patients.</td>
<td>1,113</td>
<td>Male 64.1 (10.9) Female 69.1 (11.0)</td>
<td>28</td>
<td>nr</td>
<td>nr</td>
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<tr>
<td>Schriener et al. (2003). Depressed and non-depressed Japanese adults.</td>
<td>ND 74 D 37</td>
<td>ND 60.0 (6.3) D 63.6 (12.8)</td>
<td>ND 55; D 57</td>
<td>100% Japanese</td>
<td>nr</td>
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<td>Yip et al. (2003). Chinese adults aged 60 years or older.</td>
<td>917</td>
<td>71 (nr)</td>
<td>51.5</td>
<td>100% ethnic Chinese</td>
<td>nr</td>
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<td>Stek et al. (2004). Depressed and non-depressed adults aged 85 and older in Leiden, Netherlands.</td>
<td>500</td>
<td>“85 years or older”</td>
<td>63</td>
<td>nr</td>
<td>nr</td>
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<tr>
<td>Vinkers et al. (2004). Adults aged 85 and older in Leiden, Netherlands who had/had not lost their partners.</td>
<td>64</td>
<td>“85 years or older”</td>
<td>63</td>
<td>nr</td>
<td>nr</td>
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<tr>
<td>This study</td>
<td>70</td>
<td>72.0 (5.7)</td>
<td>34.3</td>
<td>94.3% White</td>
<td>(1) .71 (2) .74</td>
</tr>
</tbody>
</table>

Note. nr = not reported. Alpha = Cronbach’s alpha. ND = non-depressed, D = depressed. (1) = Preoperatively, (2) = Postoperatively.

Table 3.6: Prior reliabilities of the 15-item Geriatric Depression Scale.

Reliability in the Current Study: GDS
In this research study, the GDS was administered before surgery and six weeks after surgery. Preoperative GDS had a reliability of 0.71. Twelve of the fifteen items correlated at least 0.30 with one or more other items (#2, 9, and 13 did not), with no redundancy. There were no indications of response set bias. Internally, options for response were “yes” or “no”; the full range of item response options was used. Both item and summated scores demonstrated satisfactory variability but standard deviations exceeded the mean scores in all items. Corrected item to total correlations exceeded 0.30 for eleven of the fifteen items (#2, 9, 13, and 14 did not). Statistical projections indicated that deleting items #2, 9, and 14 would increase the alpha from 0.71 to 0.74, 0.75, and 0.72 respectively.

Postoperatively, the GDS had a Cronbach’s alpha of 0.74. Fourteen of the fifteen items correlated at least 0.30 with one or more other items (#10 did not), with no redundancy. There were no indications of response set bias. Internally, the full range of item response options was used. Summated scores demonstrated satisfactory variability but standard deviations exceeded the mean scores in all but one item (#13). Corrected item to total correlations exceeded 0.30 for nine of the fifteen items (#6, 9, 10, 11, 14, and 15 did not). Statistical projections indicated that the alpha would not be improved by deleting items. Anecdotally, the GDS with its simple “yes”/“no” format did not produce any difficulty for this group, although some participants asked if they could respond “sometimes” to some items.

Discussion and Recommendations: GDS

The GDS was well received by participants. This instrument met psychometric thresholds for acceptable reliability (0.71, 0.74). Instrument reliabilities of 0.70 are
considered acceptable in group studies (Nunnally & Bernstein, 1994). The GDS is rated as “Good”: recommended for future research on older adults.

*Functional Status*

Functional status was conceptually defined as the ability to carry out basic self-care activities to ensure overall health and well-being (Lueckenotte, 2000). Both physical and mental abilities are needed for an individual to function independently. An individual’s functional status was operationally defined as their scores on the physical and mental component subscales of the Medical Outcomes Study Short Form-12 (Ware, Kosinski & Keller, 1998).

*Medical Outcomes Study Short Form-12 (MOS SF-12)*

The Medical Outcomes Study Short Form-12 (MOS SF-12; Ware, Kosinski & Keller, 1998) was used to measure functional status both preoperatively and six weeks postoperatively. The MOS SF-12 scored six health concepts: physical functioning, role-physical, role-emotional, and mental health using two items each and four health concepts: bodily pain, general health, vitality, and social functioning using one item each. The participants checked a box to indicate their selection of answers from those available. Indicator variables (0 if the box was not checked or 1 if the box was checked) were used to encode the participant’s answers. Each indicator variable was multiplied by its respective regression weight in the physical and mental subscales, and the products were summed to produce a Physical Subscale score and a Mental Subscale score. Content and empirical validity for the SF-12 was established by comparing its representation of health concepts to those in the SF-36 and its ability to discriminate between groups of patients (Ware, Snow, Kosinski, & Gandek, 1993; Ware, Kosinski, & Keller, 1994; Ware,
Kosinski, & Keller, 1996). In prior research the 12-item form was derived from the longer 36-item form by using ten items from the SF-36 scales that reproduced at least 90% of the variance in both the Physical Health and Mental Health subscales, and adding two more items (Ware, Kosinski & Keller, 1998). The authors estimated MOS SF-12 reliability by correlating scale scores from repeated administrations of the 36-item version two weeks apart using product-moment correlations between scale scores. This procedure produced MOS SF-12 test retest reliabilities of 0.89 for the physical subscale and 0.76 for the mental subscale (Ware, Kosinski & Keller, 1998). The MOS SF-12 has been used with older adults living in extended care facilities (Sood, Cisek, Zimmerman, Zaleski & Fillmore, 2003) and the community (Sarkisian, Hays, Berry & Mangione, 2002), and older adults who have diabetes (Brown, Gross, Gutierrez, Jiang, Shapiro & Mangione, 2003) and asthma (Balkrishnan, Christensen & Bowton, 2002); in people with mobility disabilities (Andresen, Vahle, & Lollar, 2001), spinal cord injury (Putzke, Richards & DeVivo, 2001), anxiety (Sanderson, Andrews & Jelsma, 2001), and mental illness (Salyer, Bosworth, Swanson, Lamb-Pagone & Osher, 2000) (Table 3.7). Microsoft Word XP version indicates that the MOS SF-12 has a Flesch-Kincaid 6.2 grade literacy level.
<table>
<thead>
<tr>
<th>First Author, Year, Sample.</th>
<th>N</th>
<th>Age (SD)</th>
<th>% Female</th>
<th>Race</th>
<th>α</th>
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</thead>
<tbody>
<tr>
<td>Finkelstein (2000). Primary care patients in Canada.</td>
<td>564</td>
<td>Age range 45-74</td>
<td>60.5</td>
<td>nr</td>
<td>nr</td>
</tr>
<tr>
<td>Salyer et al. (2000). People with severe mental illness.</td>
<td>946</td>
<td>42.3(10.1)</td>
<td>35.2</td>
<td>47.1% White 44.6% Black</td>
<td>nr</td>
</tr>
<tr>
<td>Andresen et al. (2001). Persons with mobility disability and their proxies.</td>
<td>131</td>
<td>53.8(18.2)</td>
<td>49</td>
<td>84% White</td>
<td>nr</td>
</tr>
<tr>
<td>Putzke et al. (2001). Patients with spinal cord injury caused or not caused by gunshot.</td>
<td>222</td>
<td>G 34.8(10.3) 35.6(10.2)</td>
<td>G 15 NG 21</td>
<td>G 23% White NG 82% White</td>
<td>nr</td>
</tr>
<tr>
<td>Salyer et al. (2000). People with severe mental illness.</td>
<td>946</td>
<td>42.3(10.1)</td>
<td>35.2</td>
<td>47.1% White 44.6% Black</td>
<td>nr</td>
</tr>
<tr>
<td>Andresen et al. (2001). Persons with mobility disability and their proxies.</td>
<td>131</td>
<td>53.8(18.2)</td>
<td>49</td>
<td>84% White</td>
<td>nr</td>
</tr>
<tr>
<td>Sanderson et al. (2001). Australians attending anxiety clinic for the first time.</td>
<td>137</td>
<td>Nr</td>
<td>Nr</td>
<td>100% Australian</td>
<td>nr</td>
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<td>Tate et al. (2001). Women with spinal cord injury.</td>
<td>2887</td>
<td>39.1</td>
<td>20.1</td>
<td>nr</td>
<td>nr</td>
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<td>Amir et al. (2002). Primary care patients in Israel. Note: Hebrew version of SF-12.</td>
<td>3230</td>
<td>39.1(14.3)</td>
<td>54.4</td>
<td>100% Israeli</td>
<td>nr</td>
</tr>
<tr>
<td>Balkrishnan et al. (2002). Older adults with asthma.</td>
<td>129</td>
<td>71.8 (8.0)</td>
<td>60.1</td>
<td>nr</td>
<td>nr</td>
</tr>
<tr>
<td>Sarkisian et al. (2002). Community-dwelling aging adults.</td>
<td>429</td>
<td>76</td>
<td>54</td>
<td>76% White</td>
<td>nr</td>
</tr>
<tr>
<td>Brown et al. (2003). Older adults with diabetes mellitus, incomes &lt; or &gt; $20,000.</td>
<td>301</td>
<td>*74.2(4.7) **75.7(6.6)</td>
<td>34 62</td>
<td>64% White</td>
<td>nr</td>
</tr>
<tr>
<td>Sood et al. (2003). Nursing home residents.</td>
<td>14</td>
<td>80.8 (7.0)</td>
<td>43</td>
<td>79% White</td>
<td>nr</td>
</tr>
<tr>
<td>This study</td>
<td>70</td>
<td>72.0(5.7)</td>
<td>34.3</td>
<td>94.3% White</td>
<td>(1) (2)</td>
</tr>
<tr>
<td>Note.</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>nr = not reported. α = Cronbach’s alpha. * = data for those with incomes &gt;$20,000, ** incomes &lt;$20,000. G = data for gunshot group, NG = non-gunshot group. (1) = Preoperatively, (2) = Postoperatively. P = Physical component subscale, M = Mental component subscale.</td>
<td></td>
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</tbody>
</table>

Table 3.7: Prior Reliabilities of the Medical Outcomes Study Short Form-12 (chronologic order).
Reliability in the Current Study: MOS SF-12

In the absence of published directions, subscale reliabilities for this study were calculated by creating a variable that represented the participant’s beta weight for each of the 12 questions on the MOS SF-12. For example, the respondent might select “Good” in response to the five possible choices for the first question, “In general, would you say your health is …Excellent, Very Good, Good, Fair, or Poor?” The indicator variable for “Good” would be coded “1” and the others coded “0”. The summed products of the products of each item’s indicator variable and its respective physical beta weight, i.e. 

\[(0)(0)+(0)(-1.31872)+(1)(-3.02396)+(0)(-5.56461)+(0)(-8.37399) = -3.02396\]

equalled the retained physical beta weight (-3.02396) for the selected choice (“Good”) in the first question. The procedure was repeated for each of the 12 items and for each subscale to allow for internal consistency reliability analysis.

Reliability analysis on the preoperative physical component subscale showed a Cronbach’s alpha of 0.64. All items correlated at least 0.30 with one or more other items, with no redundancy. There were no indications of response set bias. Internally, the full range of item response options was used. Both item and summated scores demonstrated satisfactory variability but standard deviations exceeded the mean scores in four items (#6, 7, 9, and 11). Corrected item to total correlations exceeded 0.30 for seven of the twelve items (#6, 7, 9, 11, and 12 did not). Statistical projections indicated that deleting items #6, 7, 9, 11, and 12 would increase the alpha from 0.64 to 0.68, 0.66, 0.68, 0.68, and 0.65 respectively.

The preoperative mental component subscale showed a Cronbach’s alpha 0.64. All items correlated at least 0.30 with one or more other items, with no redundancy.
There were no indications of response set bias. Internally, the full range of item response options was used. Both item and summated scores demonstrated satisfactory variability but standard deviations exceeded the mean scores in five items (\#1, 6, 7, 8, and 11). Corrected item to total correlations exceeded 0.30 for six of the twelve items (\#2, 3, 4, 5, 8, and 10 did not). Statistical projections indicated that deleting items \#2, 3, 4, 5, and 8 would increase the alpha from 0.64 to 0.68, 0.66, 0.65, 0.66, and 0.67 respectively.

Postoperatively, the physical component subscale had a Cronbach’s alpha of 0.57. All items correlated at least 0.30 with one or more other items, with no redundancy and no indications of response set bias. Internally, the full range of item response options was used. Both item and summated scores demonstrated satisfactory variability but standard deviations exceeded the mean scores in six items (\#6, 7, 8, 9, 11, and 12). Corrected item to total correlations exceeded 0.30 for eight of the twelve items (\#1, 7, 11, and 12 did not). Statistical projections indicated that deleting items \#6, 7, 9, and 11 would increase the alpha from 0.57 to 0.62, 0.59, 0.61, and 0.59 respectively.

The postoperative mental component subscale had a Cronbach’s alpha of 0.55. All items correlated at least 0.30 with one or more other items, with no redundancy and no indication of response set bias. Internally, the full range of item response options was used. Both item and summated scores demonstrated satisfactory variability but standard deviations exceeded the mean scores in seven items (\#1, 6, 7, 8, 10, 11, and 12). Corrected item to total correlations exceeded 0.30 for seven of the twelve items (\#1, 2, 3, 5, and 8 did not). Statistical projections indicated that deleting items \#2, 3, 4, 5, and 8 would increase the alpha from 0.55 to 0.63, 0.58, 0.60, 0.59, and 0.57 respectively.
Anecdotal Notes: MOS SF-12

Anecdotally, three items on the Medical Outcomes Study Short Form-12 (MOS SF-12) produced some difficulty for this group of older adults. Items #6 and #7 assess for the effects of low mood on activities by questioning “problems with work or other regular daily activities as a result of any emotional problems such as feeling depressed or anxious”. Participants responded negatively to a suggestion that they might have “emotional problems”, often needing the researcher’s clarification that the question asked if they were feeling depressed or anxious, and whether that affected their activities. Item #8 asked about amount of pain and its effects on activities, “including work outside the home and housework”. Many participants asked if pain unassociated with the current cardiac problem (e.g., arthritis, back pain, or pain from reduced mobility) qualified as pain in the item. In order to best describe the individual’s response to this item, the researcher recorded anecdotal notes about sources of pain if the participant indicated having pain. In a few instances, participants indicated negative responses to this question because they denied doing housework.

Discussion and Recommendations: MOS SF-12

The MOS SF-12 was generally easy for participants to use. However, participants reacted negatively to some specific words in individual items and their reactions influenced their responses, in other words they may have responded on the basis of their reaction and not to the intent of the item. While the instrument was fairly user-friendly, it was difficult for the researcher to analyze. Other researchers have reported test-retest reliability (Ware, Kosinski & Keller, 1998; Salyer, et al., 2000; Amir, Lewin-Epstein, Becker, & Buskila, 2002). This paper represents the first known attempt to define an
internal consistency reliability coefficient for the subscales. Using researcher-developed methods the reliabilities were low for both subscales preoperatively (0.64, 0.64) and postoperatively (0.57, 0.55). Instrument reliabilities of 0.70 are considered acceptable in group studies (Nunnally & Bernstein, 1994). The MOS SF-12 was rated as “Fair”: recommended for cautious use in future research on older adults.

Discussion

When researchers do not report their instrument reliabilities, this presents serious difficulty for future scientists who are searching for effective instruments. Even though an instrument may be widely used internationally, future researchers may not assume that the instrument will perform reliably in a new sample or situation. Relying on reliability figures from the original instrument designer or on longer forms of an instrument is not appropriate.

The reliabilities and recommendations for the Krantz Health Opinion Survey, the Control Attitudes Scale, the Ways of Coping Questionnaire, the Geriatric Depression Scale Short Form, and the Medical Outcomes Study Short Form-12 are summarized in Table 3.8. The instruments’ reliabilities were unexpectedly low, ranging from 0.55 to 0.74. The 0.70 threshold of acceptable reliability (Nunnally & Bernstein, 1994) was achieved on only one of the five instruments: the 15-item Geriatric Depression Scale. Other instruments performed in the range of 0.60 to 0.70, which may be acceptable for the exploratory nature of this study (Robinson, Shaver, & Wrightsman, 1991) given that the instruments met other psychometric standards (Ryan-Wenger, unpublished manuscript) and were easy for this sample of older adults to understand and use. On the fourth coping subscale and the postoperative Medical Outcomes Study Short Form-12,
inadequate reliabilities of 0.58 and 0.55 respectively were obtained. Overall, the GDS was rated “Good”; the CAS, WCQ, and MOS SF-12 were rated “Fair”; and the KHOS was rated “Poor” for use in future research studies on older adults.

Measurement in older adults presents unique problems. Reasons for these low reliability figures in this sample may be complex. In addition to factors within the instruments themselves, the low reliabilities may have been related to participant characteristics, method of administration, or environmental conditions. Each of these possibilities bears discussion.

The low reliabilities may have been related to factors within the individual instruments. When valid, reliable short forms of instruments (i.e. the Geriatric Depression Scale and the Medical Outcomes Study 12-item version) were available they were used in efforts to reduce measurement burden, an important consideration in research on older adults because they fatigue easily (Burnside, Preski, & Hertz, 1998). Since reliability may be a function of the number of items in an instrument (Hair, Anderson, Tatum, & Black, 1998), increasing the length of the instrument (e.g., the 4-item CAS) might increase its reliability.

Participant characteristics such as lack of understanding, weariness, frustration (Burnside, Preski, & Hertz, 1998) or educational level may have contributed to low reliability. The participant’s level of understanding and educational level were not assessed. The KHOS, CAS, WCQ, GDS, and MOS SF-12 have Flesch-Kincaid grade literacy levels of 3.6, 6.9, 5.9, 5.0, and 6.2 respectively. It is also possible that measurement burden was still excessive for some participants. Low reliability may reflect
the greater heterogeneity in the older adult population. As adults age greater variability rather than greater commonality is often the rule (Cavanaugh, 1997).

The methods used to collect data may have affected reliability. In some cases respondents reacted to specific words in an item rather than an item’s intent. The order of the instruments may have presented difficulty. Anecdotal recordings indicate that this sample had difficulty with specific instruments (e.g., the KHOS) and specific items on other instruments. Encountering the frustrating KHOS as the first instrument may have discouraged participants from effectively responding to subsequent instruments. The face-to-face interview format used to gather preoperative data was helpful in allowing the researcher to keep anecdotal notes, assess participant understanding and frustration, and provide clarification and encouragement.

Factors in the interview environment may have contributed to low reliability. Some preoperative interviews were conducted at home and some in the hospital. Older adults are especially vulnerable to hospital environment (Tullman & Dracup, 2000). However, statistical analysis indicated no difference in study results related to site of preoperative interview.

Summary

Instruments well-tested with the older adult population and with coronary artery surgery patients were sought for this study. Although the instruments were selected on the basis of their acceptable validity and reliability in prior research studies, four of the five instruments did not produce the expected satisfactory reliabilities in this sample of older adults. The study’s results, reported elsewhere, must be tempered by the low reliability of the instruments. Some of these instruments had not been widely used in
older adults, and this study represented the first known combination of these instruments in a sample of older adult coronary artery bypass surgery patients.
### Table 3.8: Reliability analysis of the Krantz Health Opinion Survey (KHOS), the Control Attitudes Scale (CAS), the Ways of Coping Questionnaire (WCQ), the Geriatric Depression Scale (GDS), and the Medical Outcomes Study Short Form-12 (MOS) and recommendations for future use in older adults.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>α</th>
<th>IIC &gt; .3</th>
<th>Red.</th>
<th>RSB</th>
<th>α † if items deleted</th>
<th>Raw, Sum Scores Used</th>
<th>Full Var.</th>
<th>CITC .3-.7</th>
<th>Anecdotal reports</th>
<th>Future use on older adults</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard</strong></td>
<td>&gt; .70</td>
<td>All</td>
<td>No</td>
<td>No</td>
<td>None</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Easy to understand and use.</td>
<td></td>
</tr>
<tr>
<td>KHOS-I</td>
<td>.64</td>
<td>All</td>
<td>No</td>
<td>No</td>
<td>1/7</td>
<td>Yes</td>
<td>Yes</td>
<td>5 of 7</td>
<td>Frustrating, tricky.</td>
<td>Poor</td>
</tr>
<tr>
<td>CAS</td>
<td>.63</td>
<td>3 of 4</td>
<td>No</td>
<td>No</td>
<td>2 of 4</td>
<td>Yes</td>
<td>Yes</td>
<td>2 of 4</td>
<td>Easy to use.</td>
<td>Fair</td>
</tr>
<tr>
<td>WCQ</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>.69</td>
<td>4 of 6</td>
<td>No</td>
<td>No</td>
<td>1 of 6</td>
<td>Yes</td>
<td>Yes</td>
<td>All</td>
<td>Long but easy to use; some reaction to words.</td>
<td>Fair</td>
</tr>
<tr>
<td>2</td>
<td>.66</td>
<td>5 of 6</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>4 of 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>.61</td>
<td>All</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>5 of 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>.58</td>
<td>5 of 6</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>3 of 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>.65</td>
<td>3 of 4</td>
<td>No</td>
<td>No</td>
<td>1 of 4</td>
<td>Yes</td>
<td>Yes</td>
<td>3 of 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>.64</td>
<td>4 of 8</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>All</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>.60</td>
<td>5 of 6</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>All</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>.69</td>
<td>All</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>All</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDS</td>
<td>.71-.74</td>
<td>12-14 of 15</td>
<td>No</td>
<td>No</td>
<td>3 of 15</td>
<td>Yes</td>
<td>Yes</td>
<td>9/15</td>
<td>Easy to use.</td>
<td>Good</td>
</tr>
<tr>
<td>MOS P</td>
<td>.57-.64</td>
<td>all</td>
<td>No</td>
<td>No</td>
<td>4-5 of 12</td>
<td>No</td>
<td>Yes</td>
<td>7-8 of 12</td>
<td>Fairly easy; some reaction to words.</td>
<td>Fair</td>
</tr>
<tr>
<td>MOS M</td>
<td>.55-.64</td>
<td>all</td>
<td>No</td>
<td>No</td>
<td>5 of 12</td>
<td>Yes</td>
<td>Yes</td>
<td>6-7 of 12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. α = Cronbach’s alpha. IIC = Inter-item correlations. Red. = redundancy. RSB = Response set bias. Var. = variability. CITC = Corrected item-total correlations. P = Physical component subscale. M = Mental component subscale. For instruments with multiple administrations the ranges are shown.

Rating of “Good” = recommended for future use in research on older adults. Rating of “Fair” = instrument did not perform well in this sample; recommended for cautious use in future research. Rating of “Poor” = instrument did not perform well in this sample; not recommended for future use in older adults.

Table 3.8: Reliability analysis of the Krantz Health Opinion Survey (KHOS), the Control Attitudes Scale (CAS), the Ways of Coping Questionnaire (WCQ), the Geriatric Depression Scale (GDS), and the Medical Outcomes Study Short Form-12 (MOS) and recommendations for future use in older adults.
Additional research is needed to determine the appropriateness of these instruments. Longer forms of the instruments will increase reliability (Hair, Anderson, Tatham, & Black, 1998) but also increase measurement burden. Subsequent studies should compare the long and short forms in this population. Participant literacy levels should be assessed. The existing instrument for measuring preference for information did not demonstrate acceptable reliability in this sample of older adults having first-time coronary artery bypass surgery. Further instrument development is needed for this population. The 4-item Control Attitudes Scale and 66-item Ways of Coping Questionnaire need further testing in this population. The Geriatric Depression Scale performed reliably in this study and it remains the most appropriate short measure of depression in older adults. The Medical Outcomes Study Short Form-12 is visually attractive and user-friendly but difficult to analyze. Lastly, recording older adult participants’ anecdotal responses to the study process and instruments is essential to fully understanding their experiences.
References


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CHAPTER FOUR

RESULTS OF A PROSPECTIVE STUDY TO DESCRIBE OLDER ADULTS’ COPING WITH HEART SURGERY: PREFERENCE FOR INFORMATION, PERCEIVED CONTROL, COPING AND OUTCOMES FOLLOWING FIRST TIME OPEN HEART SURGERY

Research on functional and psychological outcomes in young and middle-aged adults has formed the basis of most nursing interventions aimed at stress reduction for coronary artery bypass surgery (CABS), and these interventions may not be appropriate for older adults. Currently, over 55% of all CABS are performed on those over age 65. Older adults have more complications after CABS including longer hospital stays, more depression, more frequent readmission, and poorer functional outcomes (Rose, Gelfish, Jacobowitz, Kramer, Zisbroad, Acinapura et al., 1985). Research on younger and middle-aged adults has linked these outcomes to coping and factors which affect coping, among other things.

Current practice standards call for nurses to provide information and education in attempts to support informed consent, to reduce stress, and to facilitate coping. Often this information is provided the day before surgery. However, preference for information is not routinely a part of nursing assessment. If a person has a low preference for information, the current standard of nursing intervention may actually inhibit the patient’s ability to cope with the stress of surgery. Given that older adults are known to have poorer outcomes and longer stays after CABS, it is possible that current nursing practices may be deterring coping, and thus contributing to poorer outcomes. Research was needed
to increase knowledge of older adults’ coping experiences with coronary artery bypass surgery and develop interventions to optimize their outcomes. This paper will report the results of a study on the relationships among preference for information, perceived control, coping, and outcomes in older adults.

**Review of Literature**

The theoretical model (Figure 4.1) was drawn from several sources. The studies that support the model and the concepts’ operational definitions are briefly described below. Additionally, the literature indicated that other variables affecting older adults’ coping with CABS (age, minority status, gender, social support, and co-morbidity) were important to include in data collection and analysis.

![Figure 4.1: Theoretical model of coping with CABS for older adults.](image)

The theoretical model (Figure 4.1) was drawn from several sources. Miller (1980) and colleagues have developed the theory of preference for information. The concept of perceived control described by Wallston and colleagues (1983) has been applied to nursing research on cardiac patients and others. The appraisal theory of stress and coping was initially developed by Folkman and Lazarus (1980), and subsequently applied in

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numerous studies. Preference for information moderates coping, and perceived control mediates coping. Research on older adults informed the selection of relevant outcomes.

**Preference for Information**

Preference for information was conceptually defined as an individual’s desire for information (Miller, 1980). Individuals with a high preference for information tend to seek information and novel input during stressful events while those with low preference for information tend to distract themselves and avoid information (Miller, 1980). Individuals with a high preference for information are more vulnerable during stressful events but tend to cope better in the long term (Miller, 1980; Miller, Combs & Stoddard, 1989). In contrast, individuals with a low preference for information cope better in the short term because they are adept at distracting themselves and reducing physiological arousal (Miller, 1980) when not exposed to voluminous information (Miller, 1987). People have better outcomes when the intervention strategy is tailored to their preferences (Andrew, 1970; Auerbach, Martelli & Mercuri, 1983; Miller & Mangan, 1983; Phipps & Zinn, 1986; Shipley, Butt, Horowitz & Farbry, 1978). In this study, an individual’s preference for information was operationally defined as their score on the 7-item Krantz Health Opinion Survey-Information subscale (KHOS-I; Krantz, Baum, & Wideman, 1980).

**Perceived Control**

Perceived control is the belief that one can determine one’s own internal states and behavior, influence one’s environment, and/or bring about desired outcomes (Wallston, Alagna, Devillis, & Devillis, 1983). The perceived controllability of the
situation determines the use of coping strategies. When individuals who prefer greater information also perceive a high degree of control, they are free to seek information (Miller, 1979) as information reduces uncertainty and increases confidence that the event can be endured. When an event is perceived as uncontrollable, the same individual will tend to avoid information. In this instance, providing information arouses a stress response since it forces the individual back into the presence of a danger he/she cannot avoid (Miller, Combs & Stoddard, 1989). Individuals who have a low preference for information prefer to avoid it without regard to feelings of control. CABS and myocardial infarction (MI) patients (mean age 64) who perceived higher control were less anxious, less hostile, and had better psychosocial adjustment at six months than those who felt low control (Moser & Dracup, 1995). An individual’s level of perceived control was operationally defined as their score on the 4-item Control Attitudes Scale (CAS; Moser & Dracup, 1995).

Coping

Coping was conceptually defined as behavioral efforts to manage stressful situations like coronary artery bypass surgery (CABS), which depended on the individual’s personal interpretation of the “facts” they perceived to exist in the stressful situation and on the individual’s personal beliefs and goals (Smith & Lazarus, 2001). Appraisals involving threat or harm evoke emotions which motivate the individual to cope in an adaptive manner to avoid, minimize, or alleviate harm (Smith & Lazarus, 2001) by focusing on the problem and on emotions arising from the problem (Lazarus & Folkman, 1984). Coronary artery bypass patients reported that the most frequently used coping strategy was information seeking (King, 1985). Using avoidant coping strategies
was consistently related to poorer psychological and functional outcomes (King, Rowe, Kimble, and Zerwic, 1998). Coping was operationally defined as individuals’ scores on the eight subscales of the 66-item Ways of Coping Questionnaire (Folkman & Lazarus, 1988).

**Depression**

Depression was conceptually defined as a mood marked by diminished interest or pleasure in daily activities (Better Elder Care, 2002); sadness or dejection (Ebersole & Hess, 2001). Depression, a common side effect of cardiac medications especially beta-blockers (Waal, 1967; Avorn, Everitt & Weiss, 1986; Bright & Everitt, 1992), occurred in almost 20% of all CABS patients including older adults (Levine, Covino, Slack, Safran, Safran, Boro & colleagues, 1996; Ben-Noun, 1999). Depressed individuals used more avoidance and focused on emotional aspects of the situation (Billings & Moos, 1984; Folkman & Lazarus, 1980) and needed longer stays in the hospital (Levine et al., 1996). Depression impeded physical recovery (Oxman & Hull, 1997; Ruiz, Dibble, Gilliss & Gortner, 1992) and was associated with increased risk of reinfarction and sudden death (Bruce & McNamara, 1992; Frasure-Smith, Lesperance, & Talajic, 1995; Blumenthal, Lett, Babyak, White, Smith, Mark, & colleagues, 2003). However, depression varied inversely with age in some cardiac patients (Gortner, Gilliss & Shinn, 1988; Yates & Belknap, 1991). Depression was operationally defined as an individual’s score on the 15-item Geriatric Depression Scale Short Form (Sheikh & Yesavage, 1986).

**Functional Status**

Functional status was conceptually defined as the ability to carry out basic self-care activities to ensure overall health and well-being (Lueckenotte, 2000).
self-care and independence after surgery is a gradual process. Most post-CABS subjects agreed that the first two months post-surgery are the most difficult (Zyzanski, Stanton, Jenkins & Klein, 1981) with arrhythmias, pain, decreased activity, and sleep problems being the most troublesome (Lovvorn, 1982; Nicklin, 1986; Tack & Gilliss, 1990). In a study of functional status recovery after first time CABS (Artinian, Duggan, & Miller, 1993) the oldest group had had longer hospital stays and poorer functional status. An individual’s functional status was operationally defined as their scores on the physical and mental component subscales of the 12-item Medical Outcomes Study Short Form-12 (Ware, Kosinski, & Keller, 1994).

Postoperative Length of Stay and Readmission

Postoperative length of stay including readmission days (PLOS) was an indicator of the older adult’s physical recovery and need for supportive health care resources. CABS is often performed in a regional surgery center specializing in cardiac surgery. Readmission and subsequent care may be to a more local facility. PLOS without readmission was reported as 5-7 days in the U.S. (Artinian, Duggan, & Miller, 1993), 10.4 days for patients aged 65-80 years, and 14.3 days for patients over 80 years (Vaca, Lohmann, & Moskoff, 1994; Peterson, Cowper, Jollis, Bebchuk, DeLong, Muhlbaier & colleagues, 1995). The clinical factors of age, female gender, history of chronic obstructive pulmonary disease, cerebrovascular disease, mitral valve disease, elevated blood urea nitrogen, and preoperative placement of intra-aortic balloon pump significantly predicted increased postoperative lengths of stay (Rosen, Humphries, Muhlbaier, Kiefe, Kresowik & Peterson, 1999). Lengthy hospital stays are costly and not without risk to the patient.
Other Variables Affecting Coping

The literature indicated that demographic variables such as age, minority status, gender, social support, and co-morbidity also influence older adults’ outcomes following CABS. The effects of age have been widely studied. In studies where younger, middle, and older adults were included in the sample, older adults used greater confrontive coping, distancing, and positive reappraisal to cope with stressful situations (Folkman, Lazarus, Pimley & Novachek, 1987). Older CABS patients had more cardiac risk factors, co-morbid conditions, urgent versus elective surgeries (Rose, Gelbfish, Jacobowitz, Kramer, Zisbrod, Acinapura, & colleagues, 1985; Vaca, Lohmann, & Moskoff, 1994; Bridges, Edwards, Peterson, Coombs, & Ferguson, 2003), and longer postoperative lengths of stay (Rose, Gelfish, Jacobowitz, Kramer, Zisbrod, Acinapura et al., 1985; King, Clark, Norsen, & Hicks, 1992; Rosen, Humphries, Muhlbaier, Kiefe, Kresowik, & Peterson, 1999) and more readmission than younger patients (Vaccarino, Lin, Kasl, Mattera, Roumanis, Abramson, & Krumholz, 2003). However, female CABS patients aged 40-55 years showed significantly greater depression than those aged 56-65 or over 66 years (Plach, Napholz, & Kelber, 2003). Age was operationally defined as the individual’s chronological age.

Racial differences in CABS morbidity and mortality have been well demonstrated, with Blacks at a disadvantage both preoperatively and postoperatively (Peterson, Shaw, DeLong, Pryor, Califf & Mark, 1997; Bridges, Edwards, Peterson, and Coombs, 2000; Funk, Ostfeld, Chang and Lee, 2002). Preoperatively, Black patients have more diabetes mellitus, hypertension, pulmonary edema and renal failure but less hyperlipidemia than Whites; postoperatively Blacks have more complications including
stroke, bleeding, renal failure and infection. Paradoxically, in the general population a crossover effect in survival rates has been found at 65 years of age: African-Americans (but not Hispanics) have longer life expectancy than Whites despite clearly documented socio-economic disadvantages for minority older adults (Whitbourne, Jacobo & Munoz-Ruiz, 1996).

Gender differences in coping have been extensively studied with mixed results. Healthy males used greater self-control and less positive reappraisal than females (Folkman, Lazarus, Pimley & Novachek, 1987), and chronically ill males used more action-oriented, problem-focused coping while females used more escape or emotion-focused coping (Viney & Westbrook, 1984). In contrast, middle-aged females with cardiovascular disease used more accepting responsibility, planful problem-solving, and less positive reappraisal than males (Badger, 1992). Female CABS patients had poorer physical and mental functional status preoperatively than men and these differences persisted in the postoperative recovery phase (King, Porter and Rowe, 1994; Artinian, Duggan, and Hillebrand, 1995; King, 2000; Phillips-Bute, Mathew, Blumenthal, Welsh-Bohmer, White, Mark, and colleagues, 2003) although they had equivalent preoperative left ventricular ejection fraction, number of arteries bypassed, time on cardiopulmonary bypass (Artinian, Duggan, & Hillebrand, 1995; Vaccarino, Lin, Kasl, Mattera, Roumanis, Abramson, et al., 2003) and postoperative lengths of stay (King, 2000). Females reported significantly more depression (Artinian, Duggan, & Hillebrand, 1995; Keresztes, Merritt, Holm, Penckofer, & Patel, 2003; Vaccarino, Lin, Kasl, Mattera, Roumanis, Abramson, & colleague, 2003), more cognitive difficulties, greater anxiety, and lower quality of life
than males postoperatively (Keresztes, Merritt, Holm, Penckofer, & Patel, 2003; Phillips-Bute, Mathew, Blumenthal, Welsh-Bohmer, White, Mark, and colleagues, 2003).

Social support, “the comfort, assistance, and/or information one receives through formal or informal contacts with individuals or groups” (Wallston, Alagna, Devillis & Devillis, 1983, p. 369) associated with decreased preoperative anxiety, more rapid postoperative recovery (Mahler & Kulik, 1990), less severe cardiac symptoms (Siegrist, Dittman, Rittner & Weber, 1982), better psychological adjustment (Ben-Sira & Eliezer, 1990), and less depression (Waltz, Bandura, Pfaff & Schott, 1988). In contrast social isolation was related to increased anxiety (Koivula, Paunonen-Ilmonen, Tarkka, Tarkka & Laippala, 2002), hostility (Brummett, Barefoot, Siegler, Clapp-Channing, Lytle, Bosworth, and colleagues, 2001), readmission (Berkman & Syme, 1979), recurrent myocardial infarction, and mortality (Ruberman, Weinblatt, Goldberg & Chaudhary, 1984; Case, Moss, Case, McDermott, & Eberly, 1992).

Co-morbidity is the coexistence of noncardiac illness in any of the following categories: cancer, pulmonary disease, diabetes, renal disease, gastrointestinal disease, arthritis, or acquired immune deficiency syndrome (Charlson, Pompei, Ales & MacKenzie, 1987). Older adults had more co-morbid conditions (Rose et al., 1985). Co-morbidity was predictive of mortality (Charlson, Pompei, Ales, & MacKenzie, 1987).

Summary

Research was needed to help nurses intervene appropriately to support coping and enhance outcomes after coronary artery bypass surgery. Nurses provide preoperative information but do not routinely assess the patient’s preference for information.
Outcomes are better when information is tailored to the patient’s preference. Older adults have poorer outcomes after coronary artery bypass surgery, and it was not clear whether current nursing interventions contributed to these poorer outcomes. Literature on preference for information, perceived control, coping, depression, functional status, postoperative length of stay informed the design of a theoretical model to guide the study. Certain demographic characteristics were also examined because the literature indicated they might possibly be important as well.

Research Questions

The research questions guiding this study were:

1. How much of the variability in outcomes is explained by variability in preference for information, perceived control, and coping after accounting for variability from demographic variables in older adults having first-time coronary artery bypass surgery?

2. How is preference for information related to coping in older adults having first-time coronary artery bypass surgery?

3. How is perceived control related to coping in older adults having first-time coronary artery bypass surgery?

Method

Design

A descriptive prospective one group pretest-posttest design (Campbell & Stanley, 1963) was selected to answer the research questions.
Analysis

Canonical correlation analysis was selected to answer the first research question. Pearson product-moment correlation was used to answer the second and third research questions. A brief discussion of canonical correlation is presented to explain this procedure and to explain the data results included in this section.

Canonical correlation was used to examine the relationships between linear combinations of the independent, dependent, and demographic variable sets in three separate analyses comparing two sets at a time (Hair, Anderson, Tatham & Black, 1998). The independent variable (IV) set included preference for information, perceived control, and coping. The dependent (DV) set of outcome variables included postoperative length of stay, change in depression, change in physical functional status, and change in mental functional status. The demographic (Demographics) set of variables included age, gender, race, left ventricular ejection fraction, number of bypasses, number of co-morbid conditions, and social support.

Canonical correlation was prefaced by an examination of the range, mean, standard deviation, and product-moment relationships between the variables in each set. While lack of correlation is a desirable characteristic in each individual set of variables, pre-existing correlation between the two sets strengthens the analysis. Redundancy analysis indicates the proportion of variance explained in the set by a linear combination (canonical variate) of its own variables and also by a linear combination (canonical variate) of the opposite set’s variables. The redundancy figure of interest in answering the first research question was the proportion of variance in the dependent variable set explained by the independent (opposite) variate.
The two canonical variates are correlated to determine a canonical correlation coefficient. The first canonical correlation coefficient represents the greatest possible relationship between the two variates. This coefficient squared represents the greatest variance shared or explained by the linear combinations of the two sets. The canonical coefficients whose squares exceed 0.10 (explain at least 10% of the shared variance) are interpreted for meaning and tested for statistical significance using Wilk’s lambda. The canonical variates may be clinically significant whether or not the canonical correlations are statistically significant.

**Sample**

**Sample Size**

A sample size of 64 participants was determined by power analysis to detect a medium effect size (0.15) at a desired power of 0.80 and a two-tailed 0.05 level of significance. The sample size was calculated on the basis of the planned canonical correlations in multiple analyses of variance analysis (Cohen, 1988; Ryan-Wenger and Mentro, unpublished manuscript, 2004). The power analysis for each canonical correlation was conducted according to the formula \( N = \left\lceil (1/s) \times (v_{\text{Iterated}} + u/2 - 1) \right\rceil + \left\lceil (k_Y + k_X + 3)/2 \right\rceil + \max [k_C \text{ or } (k_A + k_G)] \) (Cohen, 1988) where \( k_Y \) represents the number of dependent variables in that individual computation, \( k_X \) represents the number of independent variables, \( u \) is the product of \( k_X \) and \( k_Y \), and \( s \) is a tabled value (Table 10.2.1, Cohen, 1988) based on \( k_X \) and \( k_Y \). Effect size \( f^2 \) was estimated to be at a medium level 0.15 (Cohen, 1988, p. 413) from previous research on preference for information. Studies of preference for information using the Miller Behavioral Style Scale found moderate
differences in anxiety measures between those with a high and those with low preference for information.

The first canonical correlation (CC1) determined the proportion of variance explained in a linear combination of the ten independent variables (one preference for information score, one perceived control score, and eight coping subscale scores) by variance in a linear combination of the seven continuous demographic variables (age, gender, race, left ventricular ejection fraction, number of bypasses, social support, and co-morbidity). A sample size of 61 subjects was needed to detect an effect size of 0.15 at a power of 0.80 for this first correlation. The second canonical correlation (CC2) determined the proportion of variance explained in a linear combination of the four dependent variables (change in depression, change in physical functional status, change in mental functional status, and postoperative length of stay including readmission) by a linear combination of the seven demographic variables. A sample size of 54 was calculated to meet these conditions. The third canonical correlation (CC3) determined the proportion of variance explained in a linear combination of the four dependent outcome variables by the linear combination of the ten independent variables. A sample size of 64 individuals was calculated to meet these conditions. An assumption of Cohen’s (1988) formulae and tables is the use of random sampling techniques. In this study convenience sampling was used to recruit subjects. An additional 6 participants were included to allow for possible 10% attrition of subjects. A sample size of 70 subjects was feasible and well supported by the accessible population.

*Inclusion Criteria*
Inclusion criteria for participant selection were: age 65 and over, able to speak and read English, scheduled for non-emergent first-time CABS, and residing in the community preoperatively including independent living in a retirement community. “Non-emergent” was defined as physical and emotional stability as defined by the staff nurse for inpatient participants and usually greater than one day between the date of the surgeon’s advice to have CABS and the surgery itself, to allow for preoperative data collection. Females (28%) and minorities (5%) were purposefully sampled to reflect the population of patients who undergo CABS (Rose et al., 1985; Bridges, Edwards, Peterson, and Coombs, 2000). To control for possible variation due to surgical technique, one group of five cardiac surgeons was selected. These five surgeons perform CABS at three mid-Western medical centers. The surgeons reported using similar preoperative preparation routines with respect to providing information, similar surgical techniques, and similar postoperative care.

**Instruments**

*Krantz Health Opinion Survey (KHOS)*

The 16-item Krantz Health Opinion Survey (KHOS; Krantz, Baum & Wideman, 1980) measured preference for information. The KHOS contains two subscales: preference for information (KHOS-I; 7 items) and preference for behavioral involvement (KHOS-B; 9 items). Participants responded to each item by selecting between 1 (“strongly disagree”) to 7 (“strongly agree”). KHOS-I scores could range from 7–49; higher scores represented favorable attitudes toward information. The KHOS-I had prior internal consistency reliabilities of 0.74, 0.76, and 0.65 (Krantz, et al., 1980; Garvin and
Kim, 2000; Christensen, Ehlers, Raichle, & Bertolaus, 2000 respectively). In this study, the KHOS-I had an internal consistency reliability of 0.65.

**Control Attitudes Scale (CAS)**

The 4-item Control Attitudes Scale (CAS; Moser & Dracup, 1995) measured patients’ feelings of control or helplessness related to their cardiac disease. Participants responded to each item on a scale of 1 (“not at all”) to 7 (“very much”). Scores could range from 4–28 with higher scores indicating higher perceived control. Internal consistency reliability for the CAS has been reported as 0.89, 0.77, 0.88, and 0.72 (Moser & Dracup, 1995; Moser & Dracup, 2000, respectively). In this study, the CAS had internal consistency reliability of 0.63.

**Ways of Coping Questionnaire (WCQ)**

The 66-item 8-subscale Ways of Coping Questionnaire (WCQ; Folkman & Lazarus, 1988; Edwards & O’Neill, 1998) measured coping. Participants responded to each item on a scale from 0 (“does not apply/not used”) to 3 (“used a great deal”). The eight subscales consisted of Confrontive Coping (6 items; subscale score could range from 0-18), Distancing (6 items; 0-18), Self-Controlling (7 items; 0-21), Seeking Social Support (6 items; 0-18), Accepting Responsibility (4 items; 0-12), Escape-Avoidance (8 items; 0-24), Planful Problem Solving (6 items; 0-18), and Positive Reappraisal (7 items; 0-21). The eight subscales have produced internal consistency reliabilities ranging from 0.21 to 0.76 (Santavirta, Kettunen & Solovieva, 2001). In this study, the eight WCQ subscales’ internal consistency reliabilities were Confrontive Coping, 0.64; Distancing, 0.66; Self-Controlling, 0.61; Seeking Social Support, 0.58; Accepting Responsibility,
0.65; Escape-Avoidance, 0.64; Planful Problem Solving, 0.60; and Positive Reappraisal, 0.69.

Geriatric Depression Scale (GDS)

The 15-item Geriatric Depression Scale (GDS; Sheikh & Yesavage, 1986) measured the number of depressive symptoms preoperatively and six weeks postoperatively. Participants responded “yes” or “no” to each item. Scores could range from 0-15 with higher scores indicating greater depression. The short form was constructed by selecting the 15 items with the highest correlation with depressive symptoms in validation studies of the longer 30-item form (Sheikh & Yesavage, 1986). Validity of the short form was established by its ability to differentiate depressed from non-depressed male and female patients over age 55 (r = .84, p<.001) (Sheikh & Yesavage, 1986). While the GDS has been widely used in older adults, previous internal consistency reliability coefficients have not been reported (e.g., Lelito, et al., 2001; Schreiner et al., 2001; Gooteratne, Weaver, Cater, Pack, Arner, Greenberg, & Pack, 2003; Osborn et al., 2003; Vaccarino, et al, 2003). In this study, preoperatively the GDS had an internal consistency reliability of 0.71. Postoperatively, the GDS had a reliability of 0.74.

Medical Outcomes Study Short Form-12 (MOS SF-12)

The Medical Outcomes Study Short Form-12 (MOS SF-12; Ware, Kosinski & Keller, 1996) measured functional status preoperatively and six weeks postoperatively; scores were derived for a physical component subscale and a mental component subscale. The authors estimated MOS SF-12 reliability by correlating scale scores from repeated administrations of the 36-item version, producing test retest reliabilities of 0.89 for the
physical subscale and 0.76 for the mental subscale (Ware, Kosinski & Keller, 1996). In this study, the preoperative physical and mental component subscales had internal consistency reliabilities of 0.64 and 0.63 respectively. Postoperatively, the physical and mental subscales had reliabilities of 0.57 and 0.55 respectively.

Postoperative Length of Stay (PLOS) and Demographics

Postoperative length of stay was counted as the number of whole days from date of surgery to date of initial discharge plus any days of readmission in the 6 weeks following surgery; PLOS could range upwards from zero. Age was tabulated as the individual’s chronological age. Race and gender were coded with indicator variables. Social support was measured by counting the number of people named in response to the question, “Who would you rely on in a time of trouble?”

The Charlson Co-morbidity Scale (Charlson, Pompei, Ales & MacKenzie, 1987) measured participants’ other medical conditions. Each condition was assigned a weight (e.g., diabetes is weighted as “1”, metastatic solid tumor is weighted as “6”). An age-by-co-morbidity interaction was found in prior research thus one weight point was to be added for each decade of age over 40 years (Charlson et al., 1987); however in this study the score before adding age points (pre-age score) was used to reduce self-correlation with age. The patient’s total score was the sum of the weights of all conditions, with higher scores indicating a greater number of co-morbid conditions. In this sample pre-age scores could range upwards from a score of 0 points. In prior research, validity was established through the ability of the scale to accurately predict mortality (Charlson et al., 1987).
Setting

Data were collected from the patients of one group of cardiac surgeons at three Midwestern hospitals. Hospital One was a small specialty hospital performing mostly cardiac surgeries. Of the 69 participants in this study, 60 participants (85.7%) had their coronary artery bypass surgeries at Hospital One. Hospital Two was a medium-sized general hospital performing all types of surgery. Seven participants (10%) had their surgeries at Hospital Two. Hospital Three was a medium-sized general hospital performing all types of surgery. Two participants (2.9%) had their surgeries at Hospital Three. The proportions of participants from each hospital were not large enough for differentiating statistically between hospitals.

Procedure

Appropriate Human Subjects’ approvals were obtained from The Ohio State University and each of the participating hospitals. Health Insurance Portability and Accountability Act (HIPAA) procedures were followed. Participants were recruited from cardiac surgeons’ offices, hospital admissions units, and hospital surgery schedules within the first few days of the surgeon’s advice to have CABS (Table 4.1). Surgeons’ or hospital staff provided information to potential participants and notified the researcher of possible candidates who have agreed to be contacted. Candidates were contacted and recruited by phone if they were at home or in person if they were in the hospital. The initial contact included information about the study, possible benefits and risks, the opportunity to ask questions, and verbal consent.
The preoperative interview was conducted in person at the participant’s home or hospital room. Interviews are excellent tools for obtaining data from older adult patients because they allow the researcher to obtain in-depth data and can be used to collect data from those who cannot write; disadvantages of interviewing older adults include participant fatigue and length of time needed (Burnside, Preski, & Hertz, 1998). During the preoperative interview the study was explained, questions were answered, and written consent was obtained. Participants were given a $10 grocer gift card for each of the two interviews, for a total of $20. Participants were offered the opportunity to receive a summary of the study results and given a copy of their signed consent form. Handwritten Thank You notes were mailed to each participant after each interview. Individual patient data were numerically coded to ensure confidentiality. Individuals who scored highly on depression either preoperatively or postoperatively were called to the attention of the cardiac surgeon for appropriate referral and follow-up. Anecdotal notes were kept on participants’ responses to the procedures and instruments.

Results

Sample

Of the 86 individuals eligible for inclusion and invited to participate into the study, 16 (18.6%) refused participation. Reasons for refusal included feeling too busy (3
persons) or too anxious (1), not liking to answer questions (1), and stressful prior medical experiences (3). In four instances, the patient’s spouse refused to allow participation. Data were collected preoperatively on 70 individuals. Complete pre-operative and post-operative data were collected on 63 individuals.

Seven participants (3 females and 4 males; 1 Black and 6 Whites) withdrew or were withdrawn from the study before postoperative data collection could be completed. Reasons for withdrawal included voluntary cessation of participation (1 person), getting a second opinion and deciding to not have surgery (1), complications such as cerebrovascular accident that resulted in lengthy hospitalization or inability to communicate postoperatively (3), and death after complications (2). T-tests comparing participants retained in the study to those who withdrew indicated that those withdrawn had significantly poorer ejection fraction (35.6% versus 50.7% respectively, p = 0.008), less social support (6.71 vs. 12.37 persons, p < 0.000), more depression (5.0 vs. 2.86, p = 0.028), and poorer physical functional status (27.62 vs. 37.33, p = 0.033). Those withdrawn did not differ from the rest of the sample in any other preoperatively-measured variable, thus their results were grouped with the rest of the sample for discussion of other preoperative variables.

Participants were predominantly White (94.3%) males (65.7%), and they averaged 71.97 (SD 5.71) years of age. The gender target for female participants (28%) was met by the sample (34.3% female) and was sufficient for meaningful analysis. There were 24 females in the preoperative sample and 21 females in the postoperative sample; and 46 males preoperatively and 42 males postoperatively. Racial proportion targets were met (target, 5%; sample 5.7%). There were 4 Blacks preoperatively and 2
postoperatively, making proportion of race in this sample insufficient for separate analysis (Cohen, 1988), thus the descriptive results will be discussed without regard to race. Race was retained as a variable in the canonical correlations.

Preoperatively participants had an average of 4.67 (SD 2.13) other co-morbid conditions and reported having 11.81 (SD 9.22) people they would call on for social support. Surgically, participants had an average of 3.14 (SD 1.18) coronary artery bypasses. One individual had all aspects of the surgical procedure (full preparation, general anesthesia, sternotomy, and recovery) but was found during surgery to not have the potential for successful coronary artery bypass; this participant was retained in the study and a zero was entered for “number of bypasses”. Descriptive statistics reflecting demographics and differences are summarized in Table 4.2.

<table>
<thead>
<tr>
<th>Demographic</th>
<th>N</th>
<th>Range</th>
<th>Mean</th>
<th>SD</th>
</tr>
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<td>Age</td>
<td>70</td>
<td>65-84 years</td>
<td>71.97</td>
<td>5.71</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>70</td>
<td></td>
<td>5.7% **</td>
<td>94.3% **</td>
</tr>
<tr>
<td>White</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td>34.3%</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td>65.7%</td>
<td></td>
</tr>
<tr>
<td>Preop LVEF</td>
<td>70</td>
<td>15-89 %</td>
<td>49.15%</td>
<td>14.74</td>
</tr>
<tr>
<td>Number of bypasses</td>
<td>69</td>
<td>0-5</td>
<td>3.14</td>
<td>1.18</td>
</tr>
<tr>
<td>Co-morbidities</td>
<td>70</td>
<td>1-10 conditions</td>
<td>4.67</td>
<td>2.13</td>
</tr>
<tr>
<td>Social Support</td>
<td>70</td>
<td>1-45 persons</td>
<td>11.81</td>
<td>9.22</td>
</tr>
</tbody>
</table>

*Note.* *p* < .05. **Percent of sample.

Table 4.2: Demographic characteristics of older adults having first-time CABS in three Midwestern hospitals (N = 70).

**Descriptive Results**

Descriptive and frequency analyses were examined for all data to detect and correct for out of range or missing data. Missing data ranged from 1.4% (number of bypasses and social support) to 4.3% (ejection fraction). These were replaced with group
means. Group means are reasonable, conservative estimates when the proportion of missing data does not exceed 5% (Tabachnick & Fidell, 2001). When the situation did not support replacing missing data with a group mean, the sample size was lowered. For example, in determining postoperative length of stay (PLOS), one individual was retained in the database after providing preoperative data even though the participant decided against having the surgical procedure, thus the sample size for PLOS was reported as 69 rather than 70. Possible score ranges for each instrument and descriptive results for the study variables are reported below (Table 4.3).

Preference for information, perceived control, and coping were measured preoperatively. Participants indicated a moderate preference for information (mean 25.3, SD 7.5). Participants indicated perceiving moderate levels of control (mean 17.8, SD 5.5) in this situation. They indicated using these coping strategies, in descending order: positive reappraisal (mean score 6.20, SD 0.59), seeking social support (mean 1.78, SD0.60), self-controlling (mean 1.24, SD 0.58), planful problem-solving (mean 1.22, SD 0.63), distancing (mean 1.20, SD 0.63), escape-avoidance (mean 0.93, SD 0.56), accepting responsibility (mean 0.74, 0.72), and confrontive coping (mean 0.61, SD 0.61).
<table>
<thead>
<tr>
<th>Measure</th>
<th>N</th>
<th>Possible Range</th>
<th>Range</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preference for Information</td>
<td>70</td>
<td>7-49</td>
<td>7-48</td>
<td>25.3 (7.5)</td>
</tr>
<tr>
<td>Perceived Control</td>
<td>70</td>
<td>7-28</td>
<td>7-28</td>
<td>17.8 (5.5)</td>
</tr>
<tr>
<td>Coping Subscale Averages</td>
<td>70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confrontive Coping</td>
<td></td>
<td>0 – 18</td>
<td>0.00-2.50</td>
<td>0.61 (0.61)</td>
</tr>
<tr>
<td>Distancing</td>
<td></td>
<td>0 – 18</td>
<td>0.17-3.00</td>
<td>1.20 (0.63)</td>
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<tr>
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<td></td>
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<td>0.14-2.57</td>
<td>1.24 (0.58)</td>
</tr>
<tr>
<td>Seeking Social Support</td>
<td></td>
<td>0 – 18</td>
<td>0.67-3.00</td>
<td>1.78 (0.60)</td>
</tr>
<tr>
<td>Accepting Responsibility</td>
<td></td>
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<td>0.00-2.75</td>
<td>0.74 (0.72)</td>
</tr>
<tr>
<td>Escape-Avoidance</td>
<td></td>
<td>0 – 24</td>
<td>0.00-2.63</td>
<td>0.93 (0.56)</td>
</tr>
<tr>
<td>Planful Problem Solving</td>
<td></td>
<td>0 – 18</td>
<td>0.00-2.50</td>
<td>1.22 (0.63)</td>
</tr>
<tr>
<td>Positive Reappraisal</td>
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<td>0 – 21</td>
<td>5.14-7.71</td>
<td>6.20 (0.59)</td>
</tr>
<tr>
<td>Depression</td>
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<td>0 – 15</td>
<td>0-12</td>
<td>3.07 (2.46)</td>
</tr>
<tr>
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<td>Preoperatively</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>24</td>
<td></td>
<td></td>
<td>4.08 (2.83)*</td>
</tr>
<tr>
<td>Males</td>
<td>46</td>
<td></td>
<td></td>
<td>2.54 (2.10)*</td>
</tr>
<tr>
<td>Postoperatively</td>
<td>63</td>
<td></td>
<td>0-11</td>
<td>2.35 (2.32)</td>
</tr>
<tr>
<td>Females</td>
<td>21</td>
<td></td>
<td></td>
<td>3.29 (2.61)*</td>
</tr>
<tr>
<td>Males</td>
<td>42</td>
<td></td>
<td></td>
<td>1.88 (2.03)*</td>
</tr>
<tr>
<td>Functional Status</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preoperatively</td>
<td>70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Component</td>
<td></td>
<td>42.34**</td>
<td>14.63-60.69</td>
<td>36.4 (11.5)</td>
</tr>
<tr>
<td>Females</td>
<td>24</td>
<td></td>
<td></td>
<td>32.1 (11.9)*</td>
</tr>
<tr>
<td>Males</td>
<td>46</td>
<td></td>
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<td>38.6 (10.7)*</td>
</tr>
<tr>
<td>Mental Component</td>
<td></td>
<td>51.52**</td>
<td>23.03-69.50</td>
<td>52.5 (11.4)</td>
</tr>
<tr>
<td>Females</td>
<td>24</td>
<td></td>
<td></td>
<td>47.5 (13.4)*</td>
</tr>
<tr>
<td>Males</td>
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<td></td>
<td></td>
<td>55.1 (9.4)*</td>
</tr>
<tr>
<td>Postoperatively</td>
<td>63</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Component</td>
<td></td>
<td>42.34**</td>
<td>23.36-57.58</td>
<td>40.7 (9.0)</td>
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<tr>
<td>Females</td>
<td>21</td>
<td></td>
<td></td>
<td>37.1 (8.4)*</td>
</tr>
<tr>
<td>Males</td>
<td>42</td>
<td></td>
<td></td>
<td>42.6 (8.9)*</td>
</tr>
<tr>
<td>Mental Component</td>
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<td>32.25-66.70</td>
<td>55.8 (9.0)</td>
</tr>
<tr>
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<td>21</td>
<td></td>
<td></td>
<td>50.8 (9.9)*</td>
</tr>
<tr>
<td>Males</td>
<td>42</td>
<td></td>
<td></td>
<td>58.4 (7.4)*</td>
</tr>
<tr>
<td>Postoperative Length of Stay</td>
<td>69</td>
<td>0 – 42</td>
<td>3 – 28</td>
<td>7.63 (4.7)</td>
</tr>
</tbody>
</table>

*Note.* Higher scores indicate higher characteristic. *p < .05 (two-tailed). ** Adjusted norm for individuals with the chronic condition of recent myocardial infarction. From “SF-12: How to Score the SF-12 Physical & Mental Health Summary Scales,” by J.E. Ware, M. Kosinski, & S.D. Keller, 1998.

Table 4.3: Mean scores for preference for information, perceived control, coping, depression, functional status, and postoperative length of stay in older adults having CABS.
Depression and functional status were measured preoperatively and postoperatively. Although depression was very low for the group both preoperatively (mean score 3.07 of a possible 15) and postoperatively (2.34 of a possible 15), there were statistically significant gender differences. Females were significantly more depressed than males both preoperatively (4.08 versus 2.54 respectively, \( p = 0.012 \)) and postoperatively (3.29 versus 1.88 respectively, \( p = 0.022 \)). Functional status was represented in a physical component subscale and a mental component subscale; both showed significant differences related to gender. Females had significantly poorer physical functional status than males both preoperatively (32.1 vs. 38.6, \( p = 0.022 \)) and postoperatively (37.1 vs. 42.6, \( p = 0.021 \)). Females also had poorer mental functional status than males both preoperatively (47.5 vs. 55.1, \( p = 0.018 \)) and postoperatively (50.8 vs. 58.4, \( p = 0.004 \)). The numerical scores can be better understood in relation to the adjusted normal physical component score of 42.34 and mental component score of 51.52 for people with chronic illness who have recently experienced a myocardial infarction in the United States (Ware, Kosinski, & Keller, 1998). Postoperatively, the group needed from 3-28 days of hospital stay including readmissions (mean length of stay 7.63 days, SD 4.72 days. Ten individuals needed to be readmitted to the hospital. When readmitted, the additional lengths of stay ranged from 1-9 days (mean readmission stay 4.10 days, SD 2.7 days).

Relationships among Variables

The statistical procedure of canonical correlation analysis is prefaced by an examination of the descriptive results (Table 4.3) and of Pearson product-moment correlations between all continuous study variables. The Pearson correlation coefficients
(Figure 4.2) that were statistically significant also warrant reporting due to the descriptive nature of this study, the general lack of knowledge about the older adult’s experience with open heart surgery, and the possible nursing implications for older adults. The first section will describe relationships between study variables in the theoretical model. The second section will describe relationships between demographic variables and study variables. Double-ended arrows are used to depict relationships between variables measured at the same time point.

Preference for Information and Perceived Control

Preference for information was significantly related to one study variable: postoperative physical functional status ($r = 0.34$). Higher preference for information was associated with better physical function postoperatively; lower preference was related to poorer functional status six weeks after surgery. Perceived control was not related to any other variable in this study, thus it is not included.
Three coping strategies were positively associated with preoperative depression: confrontive coping ($r = 0.30$), accepting responsibility ($r = 0.29$), and escape-avoidance ($r = 0.48$). Two coping strategies were inversely associated with preoperative depression: seeking social support ($r = -0.27$), and planful problem-solving ($r = -0.24$). Higher use of confrontive coping, accepting responsibility, and escape-avoidance were associated with greater preoperative depression, and lower use of these coping strategies preoperatively was associated with lower depression. Higher use of the coping strategies seeking social support and planful problem-solving were associated with lower preoperative depression.
Conversely, lower use of seeking social support and planful problem-solving were significantly related to higher preoperative depression.

Although positive reappraisal was most predominantly reported form of coping in this sample, three coping strategies were significantly related to postoperative variables. Two forms of coping, seeking social support and positive reappraisal, were inversely related to postoperative length of stay (r = -0.27 for both). Greater use of these two coping strategies was associated with decreased postoperative length of stay. Lower use of seeking social support and positive reappraisal were associated with increased length of stay. The coping strategy of escape-avoidance was related to postoperative mental functional status (r = -0.29). Greater use of escape-avoidance was associated with poorer postoperative mental functional status and lower use of escape-avoidance as a form of coping was associated with better postoperative mental functional status.

*Depression*

Depression was measured both preoperatively and postoperatively. Preoperative depression was significantly related to several study variables in addition to the coping subscales. Preoperative depression was inversely related to preoperative mental and physical functional status (r = -0.29 and -0.61 respectively). Higher preoperative depression scores were associated with poorer preoperative physical and mental function, and lower preoperative depression was related to higher preoperative functional status. Preoperative depression was positively related to postoperative depression (r = 0.48), meaning that higher preoperative depression was associated with higher postoperative depression while lower preoperative depression was associated with lower postoperative depression. Preoperative depression was also inversely related to postoperative mental
functional status ($r = -0.42$). Higher preoperative depression was associated with poorer mental functional status postoperatively, and lower preoperative depression was associated with better postoperative mental functional status. Postoperative depression was inversely related to postoperative physical and mental functional status ($r = -0.68$ and -0.31 respectively). Higher postoperative depression was associated with poorer mental and physical function postoperatively. Conversely lower postoperative depression was associated with better mental and physical function.

**Physical and Mental Functional Status**

Functional status was associated with several study variables in addition to those discussed above. Preoperative physical functional status was inversely related to postoperative depression ($r = -0.30$). Better preoperative physical functional status was associated with lower postoperative depression, and poorer preoperative physical function was related to higher postoperative depression. Preoperative physical function was positively associated with postoperative physical functional status ($r = 0.35$). Better preoperative physical function was associated with better postoperative physical function. Conversely, poorer physical functional status preoperatively was related to poorer physical functional status postoperatively. Preoperative mental functional status was inversely related to postoperative depression ($r = -0.26$). Better preoperative mental function was associated with less postoperative depression. Poorer preoperative mental function was associated with higher postoperative depression. Preoperative mental functional status was positively associated with postoperative mental function ($r = 0.39$). Better preoperative mental function was associated with better postoperative mental
function, and poorer preoperative mental functional status was associated with poorer postoperative mental functional status.

**Demographic Variables**

The statistically-significant relationships between study variables and demographic variables (Table 4.4) are reported to further describe the results and to precede the canonical correlation analysis.

<table>
<thead>
<tr>
<th>Demographic Variable</th>
<th>Study Variable</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Postoperative Physical Functional Status</td>
<td>-0.26 *</td>
</tr>
<tr>
<td>Left Ventricular Ejection Fraction</td>
<td>Coping: Accepting Responsibility</td>
<td>-0.24 *</td>
</tr>
<tr>
<td></td>
<td>Coping: Positive Reappraisal</td>
<td>-0.26 *</td>
</tr>
<tr>
<td>Number of Bypasses</td>
<td>Postoperative Physical Functional Status</td>
<td>0.27 *</td>
</tr>
<tr>
<td>Co-Morbidity</td>
<td>Postoperative Depression</td>
<td>0.33 **</td>
</tr>
<tr>
<td>Co-Morbidity</td>
<td>Postoperative Mental Functional Status</td>
<td>-0.35 **</td>
</tr>
<tr>
<td>Social Support</td>
<td>Preoperative Depression</td>
<td>-0.24 *</td>
</tr>
</tbody>
</table>

*Note.* *p < .05.*  **p < .01.

Table 4.4: Statistically-significant (p < 0.05) Pearson product-moment correlations among demographic and study variables in older adults having first-time CABS.

Age was an important variable of interest because the theoretical framework for this study was based on research in younger and middle adults and this study extended established theory into an older adult population. Age was significantly correlated with only one other variable: postoperative physical function six weeks (r = -0.26). Increased age was related to poorer physical function postoperatively. In this sample age was not related to any other demographic or study variable: age was not related to gender, ejection fraction, number of bypasses, co-morbidity, social support, preference for information, perceived control, coping, depression, mental functional status, preoperative physical function, or postoperative length of stay. Ejection fraction was inversely related
to the use of two coping strategies: accepting responsibility (r = -0.24) and positive reappraisal (r = -0.26). Those with low ejection fractions reported greater use of these coping strategies; conversely those with higher ejection fractions reported lower use of these strategies. Number of bypasses was related to physical function postoperatively (r = 0.27). As the number of bypasses increased, physical function at the six week point also increased; however as the number of bypasses declined so did postoperative physical function. Co-morbidity was significantly associated with postoperative depression and mental functional status (r = 0.33, r = -0.35 respectively). Those with relatively greater numbers of pre-existing other medical conditions had greater depression and poorer mental functional status postoperatively. Social support was inversely associated with postoperative depression (r = -0.24). As social support increased postoperative depression declined, and as social support decreased postoperative depression increased.

Results for Research Questions

Research Question #1: How much of the variability in outcomes is explained by variability in preference for information, perceived control, and coping after accounting for variability from demographic variables in older adults having first-time coronary artery bypass surgery?

The first research question was designed to examine the amount of residual variance in the set of dependent variables (DV$s$: change in depression, change in physical functional status, change in mental functional status, and postoperative length of stay that was explained by a linear combination of the independent variables (IV$s$): preference for information, perceived control, and coping. Three separate canonical correlation procedures were used to answer the first research question. The first canonical correlation procedure determined the variability in the IV set explained by the linear combination of the demographic variables (Demographics): age, gender, race, left
ventricular ejection fraction, number of bypasses, co-morbidity, and social support. The correlation matrix for the sets of IVs and Demographics is reported in Table 4.5.

<table>
<thead>
<tr>
<th></th>
<th>INF</th>
<th>CAS</th>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
<th>W6</th>
<th>W7</th>
<th>W8</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE</td>
<td>-.13</td>
<td>.19</td>
<td>-.08</td>
<td>-.12</td>
<td>-.17</td>
<td>-.17</td>
<td>-.06</td>
<td>.00</td>
<td>-.17</td>
<td>-.20</td>
</tr>
<tr>
<td>RACE</td>
<td>-.13</td>
<td>.06</td>
<td>.22</td>
<td>.08</td>
<td>.00</td>
<td>-.20</td>
<td>.17</td>
<td>.25</td>
<td>-.17</td>
<td>-.09</td>
</tr>
<tr>
<td>GENDER</td>
<td>-.03</td>
<td>-.05</td>
<td>-.10</td>
<td>-.06</td>
<td>-.06</td>
<td>-.08</td>
<td>-.02</td>
<td>.16</td>
<td>-.07</td>
<td>.05</td>
</tr>
<tr>
<td>LVEF</td>
<td>.09</td>
<td>.08</td>
<td>-.19</td>
<td>-.09</td>
<td>.01</td>
<td>-.05</td>
<td>-.23</td>
<td>-.07</td>
<td>-.08</td>
<td>-.25</td>
</tr>
<tr>
<td>BYPSSES</td>
<td>-.02</td>
<td>-.01</td>
<td>-.16</td>
<td>-.01</td>
<td>-.13</td>
<td>-.17</td>
<td>.06</td>
<td>.01</td>
<td>-.08</td>
<td>.06</td>
</tr>
<tr>
<td>CHARLMA</td>
<td>-.21</td>
<td>-.07</td>
<td>.19</td>
<td>.07</td>
<td>.05</td>
<td>-.14</td>
<td>.06</td>
<td>.07</td>
<td>.14</td>
<td>.11</td>
</tr>
<tr>
<td>SOCSUPP</td>
<td>.11</td>
<td>.17</td>
<td>-.05</td>
<td>.15</td>
<td>-.07</td>
<td>.08</td>
<td>.04</td>
<td>.01</td>
<td>.07</td>
<td>.05</td>
</tr>
</tbody>
</table>

Note. INF = Preference for Information, CAS = Perceived Control, W1-8 = Coping subscales 1-8. AGE = age, RACE = race, GENDER = gender, LVEF = left ventricular ejection fraction, BYPSSES = number of coronary artery bypasses, CHARLMA = number of co-morbid conditions, SOCSUPP = social support.

Table 4.5: Correlations among independent and demographic variables in older adults having first-time CABS.

The adjusted canonical correlation coefficient for the relationship between a linear combination of the IVs and a linear combination of Demographics was 0.45 (p = 0.40).

Thus variability in the set of demographic variables did not explain a significant proportion of variance in the set of preference for information, perceived control, and coping in this sample of older adults having first-time CABS.

The second canonical correlation analysis procedure determined the variability in the Dependent Variables set explained by the linear combination of the Demographics.

The correlation matrix for the sets of DVs and Demographics is reported in Table 4.6.
Table 4.6: Correlations among demographic and dependent variables in older adults having first-time CABS.

The adjusted canonical correlation coefficient for the relationship between a linear combination of the Demographics and a linear combination of Dependent Variables was 0.34 (p = 0.65). Thus variability in the set of demographic variables did not explain a significant proportion of variance in the set of postoperative length of stay, change in depression, change in physical functional status, and change in mental functional status in this sample of older adults having first-time CABS.

The third canonical correlation procedure determined the variability in the Dependent Variables set explained by a linear combination of the Independent Variables. The correlation matrix for the sets of IVs and DVs is reported in Table 4.7.

<table>
<thead>
<tr>
<th></th>
<th>PLOS</th>
<th>CHINDEPR</th>
<th>CHINFSP</th>
<th>CHINFSM</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE</td>
<td>.10</td>
<td>.16</td>
<td>-.04</td>
<td>-.06</td>
</tr>
<tr>
<td>RACE</td>
<td>.21</td>
<td>-.35</td>
<td>.10</td>
<td>.04</td>
</tr>
<tr>
<td>GENDER</td>
<td>-.07</td>
<td>-.03</td>
<td>.06</td>
<td>.02</td>
</tr>
<tr>
<td>LVEF</td>
<td>.06</td>
<td>-.25</td>
<td>.08</td>
<td>.01</td>
</tr>
<tr>
<td>BYPSSES</td>
<td>-.11</td>
<td>-.09</td>
<td>.06</td>
<td>-.07</td>
</tr>
<tr>
<td>CHARLMA</td>
<td>.06</td>
<td>.13</td>
<td>.17</td>
<td>-.15</td>
</tr>
<tr>
<td>SOCSUPP</td>
<td>-.20</td>
<td>.12</td>
<td>-.03</td>
<td>-.01</td>
</tr>
</tbody>
</table>

Note. PLOS = Postoperative length of stay. CHINDEPR = Change in depression. CHINFSP = Change in Functional Status Physical subscale. CHINFSM = Change in Functional Status Mental subscale. AGE = age, RACE = race, GENDER = gender, LVEF = left ventricular ejection fraction, BYPSSES = number of coronary artery bypasses, CHARLMA = number of co-morbid conditions, SOCSUPP = social support.
Table 4.7: Correlations among independent and dependent variables in older adults having first-time CABS.

The adjusted canonical correlation coefficient for the relationship between a linear combination of the Independent Variables and a linear combination of the Dependent Variables was 0.33 (p = 0.37). Thus variability in the set of preference for information, perceived control, and coping did not explain a significant proportion of variability in the set of postoperative length of stay, change in depression, change in physical functional status, and change in mental functional status. Canonical correlations between the sets of demographic variables, independent variables, and dependent variables are summarized in Table 4.8.

Table 4.8: Canonical correlation coefficients for the sets of independent, dependent, and demographic variables in older adults having first-time CABS.
Thus, the results of this research study indicate that variability in preference for information, perceived control, and coping did not explain a significant proportion of variance in outcomes for older adults having first-time coronary artery bypass surgery.

**Research Questions #2 and #3:** How is preference for information related to coping in older adults having first-time coronary artery bypass surgery? How is perceived control related to coping in older adults having first-time coronary artery bypass surgery?

In this study of older adults having first time coronary artery bypass surgery, the correlations among preference for information, perceived control, and each of the eight coping subscales were not statistically significant at the 0.05 level (Table 4.9).

<table>
<thead>
<tr>
<th>Coping Subscale</th>
<th>Preference for Information</th>
<th>Perceived Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Confrontive Coping</td>
<td>-0.02</td>
<td>0.09</td>
</tr>
<tr>
<td>2. Distancing</td>
<td>-0.18</td>
<td>0.12</td>
</tr>
<tr>
<td>3. Self-Controlling</td>
<td>0.03</td>
<td>0.08</td>
</tr>
<tr>
<td>4. Seeking Social Support</td>
<td>0.22</td>
<td>0.08</td>
</tr>
<tr>
<td>5. Accepting Responsibility</td>
<td>-0.11</td>
<td>0.02</td>
</tr>
<tr>
<td>6. Escape-Avoidance</td>
<td>-0.08</td>
<td>-0.07</td>
</tr>
<tr>
<td>7. Planful Problem Solving</td>
<td>0.07</td>
<td>0.17</td>
</tr>
<tr>
<td>8. Positive Reappraisal</td>
<td>0.14</td>
<td>-0.04</td>
</tr>
</tbody>
</table>

Table 4.9: Pearson product-moment correlations for preference for information, perceived control, and coping in older adults having first-time CABS at three Midwestern hospitals (n = 70).

This indicates that the concepts represented in these instruments are different from and independent of each other.

**Discussion and Recommendations**

This study was designed to determine how well a theoretical model derived from research in younger and middle adults would describe the experiences of one group of older adults having their first coronary artery bypass surgeries at three Midwestern hospitals. The literature review was used to develop the theoretical model, identify research questions, design the method, and select statistical procedures and instruments.
Literature on older adults indicated that the demographic variables such as age, gender, race, social support, and co-morbidity might also impact coping and outcomes after CABS.

**Canonical Correlations**

In this study, the findings do not support the extant theoretical model of coping drawn from research on younger and middle-aged CABS patients. Possible reasons for this warrant discussion. The first possibility is that the relationships which were reasonably predicted from the literature are simply not present in this sample of older adults experiencing first-time CABS. On the other hand, there are two reasons why the results of this study support that the relationship was present but was not detected. First, the results met some but not all of the assumptions of canonical correlation analysis (Hair, Anderson, Tatham & Black, 1998). Canonical correlation assumes that measurement error is minimal, variance in the variables is not restricted, there are no substantial differences in the shapes of the distributions, and that the variables are linearly related. Canonical correlation is especially sensitive to measurement error. As mentioned earlier instrument reliabilities were low for four of the five instruments, and this may have introduced error. Secondly, in performing canonical correlation the statistics software ignores any cases where full data are not present. Thus the final sample size of 63 individuals may have been just slightly too small in order to reach statistical significance even though the relationships were moderately strong (Table 4.8). This study should be used as pilot study for future research on much larger samples in order to further test this conclusion.
Preference for Information

Prior research indicated that individuals with high preference for information had better outcomes in the long term because they tended to seek information actively (Andrew, 1970), perform self-exams, get preventative health care (Jacob, Penn, Kulik & Speith, 1992; Steptoe & Vogele, 1992), and visit the physician before symptoms grew severe (Miller, Brody & Summerton, 1988). Prior research indicated that preference for information moderated coping (Miller, Combs & Stoddard, 1989), that patients had better outcomes when information was tailored to patients’ preferences (Andrew, 1970; Auerbach, Martelli & Mercuri, 1983; Miller & Mangan, 1983; Phipps & Zinn, 1986), and that older adults had poorer outcomes after CABS (Rose, Gelbfish, Jacobowicz, Kramer, Zisbrod, Acinapura, et al., 1985). Education interventions are the most important nursing interventions to reduce stress and facilitate coping. Currently nurses prepare patients for CABS by giving large amounts of detailed information; often this intense educational process occurs the day before surgery. Nurses might inadvertently contribute to older adults’ poorer outcomes by providing information that did not match older adults’ preferences.

In this sample of adults aged 65 years and greater, participants’ preferences for information ranged widely. As a group they preferred slightly lower than a median amount of information. Higher preference for information was significantly related to better postoperative physical functional status (but not to the outcomes of postoperative length of stay and mental functional status). In this descriptive study no attempts were made to manipulate the nursing intervention of providing information, however when older adults preferred more information, and nurses provided the current standard of care...
(high amounts of information), then older adults had better outcomes. Conversely, the patient who preferred low amounts of information but received high amounts had poorer outcomes. This finding provides support to prior research which linked high preference for information to better outcomes. These findings must be tempered by the low reliability (Cronbach’s alpha = 0.64) of the Krantz Health Opinion Survey-Information subscale (Krantz, Baum & Wideman, 1980) used to measure preference for information. Further study is needed on the relationship between preference for information and outcomes following CABS in older adults, and on providing high versus low information to older adults awaiting CABS. Nurses must assess patients’ preferences before providing educational interventions, and monitor patients’ reactions to the information for signs of increased stress.

Perceived Control

Prior research indicated that the perceived controllability of a situation mediated coping especially in those individuals with high preference for information. Folkman and Lazarus (1984) found than when a situation was perceived as controllable, problem-focused coping was more likely. Miller, Combs, and Stoddard (1989) found that in situations of low perceived control, individuals with a high preference for information avoided it because in this instance information increased their stress. Moser and Dracup (1995) found that perceived control predicted psychosocial recovery six months after cardiac illness. In this sample of adults aged 65 years and older, participants perceived moderate levels of control. Perceived control was not related to preference for information, coping, or any other variable. Perceived control did not mediate coping and was not associated with psychosocial recovery (depression or functional status) at the six
week time point after CABS. It is possible that the relationship might be more evident at the six month time point. These findings must be tempered by the low reliability (Cronbach’s alpha = 0.63) of the Control Attitudes Scale (Moser & Dracup, 1995) used to measure perceived control. Further study is needed on older adults’ perceived control, coping, and outcomes following CABS.

Coping

Prior research indicated that coping depended on the individuals’ appraisal of the stressful event (Lazarus & Folkman, 1984), and that appraisal depended on their personal interpretations of the “facts”, beliefs and goals (Smith & Lazarus, 2001). The two original forms of coping (problem-focused and emotion-focused; Lazarus & Folkman, 1984) were ineffective in describing individuals’ responses because some forms of coping (e.g., seeking social support, a problem-focused strategy) served both functions. Eight forms of coping (confrontive coping, distancing, self-controlling, seeking social support, accepting responsibility, escape-avoidance, planful problem-solving, and positive reappraisal) were found to be the best fit (Blanchard-Fields & Robinson, 1987; Edwards & O’Neill, 1998; Folkman & Lazarus, 1988). Earlier research in middle-aged CABS patients indicated that information seeking (a problem-focused strategy) was the most frequently-used coping strategy (King, 1985). Older adults used more confrontive coping, distancing, and positive reappraisal than younger adults (Badger, 1992; Folkman, Lazarus, Pimley & Novachek, 1987). Avoidant coping increased with age in a sample of adults aged 60-100 years (Martin, Poon, Clayton, Sil Lee, Fulks & Johnson, 1992).

In this sample of adults aged 65 years and older, positive reappraisal was the most frequently used coping strategy. This finding supports the works of Badger (1992)
and Folkman and colleagues (1987), however in this sample the use of positive reappraisal did not increase with age. Two coping strategies (seeking social support and planful problem-solving) were inversely associated with preoperative depression, while three strategies (confrontive coping, accepting responsibility, and escape-avoidance) were directly related to preoperative depression. Three forms of coping were associated with outcomes after CABS. Higher use of seeking social support and positive reappraisal were associated with shorter postoperative stays, while higher use of escape-avoidance was associated with poorer postoperative physical function. The coping strategy of seeking social support was not significantly related to the demographic variable of actual social support (measured by asking, “Who would you rely on in a time of trouble?”). However, these findings must be tempered by the low reliabilities of the Ways of Coping subscales (Cronbach’s alphas = 0.58 - 0.69) and the subscales’ high correlations with each other (r = 0.26 - 0.67, p < 0.05). The significant correlations among the eight subscales suggests that they are not independent (orthogonal), and suggests that fewer than eight subscales might be produced by factor analysis in this sample. Additional analysis is needed on the Ways of Coping subscale. Further study is needed to test older adults’ appraisals of CABS as a stressful event, measure their coping, and investigate the relationship between coping and outcomes following CABS. Patients’ use of coping strategies may be amenable to nursing intervention. In order to best support older adults’ outcomes after CABS, nurses must recognize the importance of and assist CABS patients’ coping by using positive reappraisal. Nurses must also prioritize providing social support and assisting patients’ social support systems, which may be difficult in the highly technical postoperative intensive care units.
Depression

Prior research indicated that depression occurs in nearly 20% of CABS patients (Artinian et al., 1993; Levine et al., 1996). Depression clearly impedes physical and psychological recovery after CABS (Blumenthal, et al., 2003; Bruce & McNamara, 1992; Frasure-Smith, Lesperance & Talajic, 1995; Levine et al., 1996; Oxman & Hull, 1997; Ruiz, Dibble, Gilliss & Gortner, 1992). Women were consistently more depressed than men (Artinian, Duggan & Hillebrand, 1995; Vaccarino, Lin, Kasl, Mettera, Roumanis, Abramson & Krumholz, 2003). Social support was inversely related to depression (Waltz, Bandura, Pfaff & Schott, 1988). Common cardiac medications are associated with increased depression (Bright & Everitt, 1992; Waal, 1967). However, age was inversely associated with studies of depression containing middle and older CABS patients (Gortner, Gilliss & Shinn, 1988; Plach, Napholz & Kelber, 2003).

Mean depression scores were fairly low in the group overall both preoperatively (mean score for females 4.08; for males 2.54 of a possible 15) and postoperatively (mean score for females 3.29, for males 1.88), and depression did not differ by age. The score of 5 is considered the minimum score for assessing the presence of depression (Sheikh & Yesavage, 1986). Preoperatively 20 of 70 participants (24.3%) of the sample had depression scores of 5 or greater; postoperatively 10 of 63 participants (15.9%) scored 5 or greater. These findings are congruent with the proportions reported by Artinian and colleagues (1992) Levine and colleagues (1996).

Depression had significant relationships with numerous other study variables. Preoperative depression was associated with poor physical \( r = -.29 \) and mental functional status \( r = -.61 \) preoperatively, and with mental functional status \( r = -.42 \)
postoperatively. The coping strategies associated with higher preoperative depression included escape-avoidance \((r = .48)\), confrontation \((r = .30)\), and accepting responsibility \((r = .29)\). Preoperative depression was highly related to postoperative depression \((r = .48)\) and to the outcome of postoperative mental functional status \((r = -.42)\). Two coping strategies (planful problem solving, \(r = -.24\); seeking social support, \(r = -.27\)) and self-reported social support \((r = -.24)\) were associated with lower preoperative depression. Postoperative depression was associated with poorer outcomes of postoperative physical \((r = -.68)\) and mental \((r = -.31)\) functional status. These findings are supportive of prior research (Blumenthal, et al., 2003; Bruce & McNamara, 1992; Frasure-Smith, Lesperance & Talajic, 1995; Levine et al., 1996; Oxman & Hull, 1997; Ruiz, Dibble, Gilliss & Gortner, 1992).

Female gender was significantly associated with depression in this study, with women being more depressed than men both preoperatively and postoperatively. This finding is congruent with prior research (Artinian, Duggan & Hillebrand, 1995; Vaccarino, Lin, Kasl, Mettera, Roumanis, Abramson & Krumholz, 2003), however self-reports of depression may be affected by males’ reluctance to admit depressive feelings. Self-reported social support was inversely to preoperative depression, congruent with the findings of Waltz, Bandura, Pfaff and Schott (1988). In this study, patients who had a greater number of co-existing morbidities also had greater postoperative depression \((r = .33)\).

These findings on depression support numerous prior findings in emphasizing the powerful impact of depression on CABS patients. Nurses do not currently assess for depression or social support in CABS patients but do have access to information on
gender and cardiac medications. The findings suggest a need for depression and social support to be included in routine preoperative assessment of cardiac surgery patients, especially those taking beta-blockers. Nurses must assess for and support those coping strategies which decrease depression, especially in women CABS patients.

Demographic Variables

Prior research suggested that age, race, gender, social support, and co-morbidity impacted coping and outcomes. The relationships of these demographic variables to study variables yielded some expected and unexpected results. Each of these findings will be briefly discussed.

Age

Age was an important variable of interest because the theoretical framework for this study was based on research in younger and middle adults and this study extended established theory into an older adult population. Prior research indicated that increased age was associated with forms of coping (Badger, 1992; Folkman, et al., 1987; Irion & Blanchard-Fields, 1987; Martin, et al., 1992), poorer cardiac function (Vaca, et al., 1994), a greater number of co-morbid conditions (Vaca, et al., 1994), less depression (Gortner, Gilliss & Shinn, 1988; Plach, Napholz & Kelber, 2003), longer postoperative stay after surgery (Bridges, et al., 2003; King, et al., 1992; Rose, et al., 1992; Rosen, et al., 1999), and poorer outcomes after CABS (Bridges, et al., 2003; Vaca, et al., 1994). Greater age was associated with female gender in CABS patients (King, et al., 1994; Phillips-Bute, et al., 2003; Vaca, et al., 1994).

In this sample of adults over age 65 years age was related to only one of the above characteristics: physical functional status six weeks postoperatively. Age was not related
to any other study variable: preference for information, perceived control, coping, depression, mental functional status, preoperative physical function, postoperative length of stay, gender, ejection fraction, number of bypasses, co-morbidity, or social support. These findings are not congruent with prior research findings; however in prior research studies the samples included younger and middle-aged adults. Future studies should repeat the current study procedure with a sample including younger and middle adults to further test these findings.

Race

Although sample target proportions were met for gender (target: 28% females, sample: 34.7% female) and race (target: 5% minority; sample: 5.7% Black), due to withdrawals the final postoperative group contained only 2 Black participants, making proportion of race in this sample insufficient for separate analysis (Cohen, 1988). Thus this study does not meaningfully contribute to knowledge about race and older adult CABS patients. Future studies should increase the proportion of minorities initially recruited to ensure meaningful analysis.

Gender

As mentioned above, female CABS patients had greater depression than males (Artinian, Duggan & Hillebrand, 1995; Vaccarino, Lin, Kasl, Mettera, Roumanis, Abramson & Krumholz, 2003) and greater age than males (King, et al., 1994; Phillips-Bute, et al., 2003; Vaca, et al., 1994; Vaccarino, et al., 2003). Female gender was also associated with forms of coping (Folkman, et al., 1987), less social support (Vaccarino, et al., 2003), greater number of co-morbid conditions (Artinian, et al., 1995; Phillips-Bute, et al., 2003; Vaccarino, et al., 2003), poorer preoperative physical and mental functional

In this study, women were significantly more depressed than men and women had poorer mental and physical functional status than men both preoperatively and postoperatively. These findings support prior research findings of gender differences (Artinian, et al., 1995; King, 2000; Phillips-Bute, et al., 2003; Vaccarino, et al., 2003). In this study women did not differ from men in their age, coping, social support, comorbidity, or postoperative length of stay. Although women had more depression than men, they did not differ from males in social support or coping (two factors which were associated with depression). These findings suggest a need for nurses to be aware of these gender differences in CABS patients and to develop special interventions to support women’s recovery.

**Instruments**

Four of the five instruments used to measure concepts in this study did not meet established thresholds for reliability. The Krantz Health Opinion Survey used to measure preference for information has shown marginal reliabilities in similar nursing research studies (Cronbach’s alphas = .57 - .76; Garvin, et al., 2000; Garvin, et al., 2003). The search for a more effective instrument - or the need to develop one - continues. The 4-item Control Attitudes Scale (Cronbach’s alpha = .63), 66-item Ways of Coping Questionnaire (subscales’ alphas = .58 - .69), and Medical Outcomes Study Short Form-12 (subscales’ alphas = .55 - .64) need further testing in this population. The 15-item Geriatric Depression Scale performed reliably (Cronbach’s alphas = .71 - .74) and remains the most appropriate measure of depression in older adults, although the longer
30-item scale may have better reliability. Lastly, the face-to-face interview format and recording participants’ anecdotal responses to the study process and instruments was an essential element to more fully understanding their experiences. These methods are recommended for future research studies on this population.

**Threats to Validity**

This study used a pre-experimental, descriptive, pretest-posttest one group design (Campbell & Stanley, 1963). The greatest threat to the validity of this design is misplaced precision (Campbell & Stanley, 1963). Only one of the five instruments produced satisfactory reliability above 0.70: the 15-item Geriatric Depression Scale. The others produced reliabilities in the 0.60-0.70 range, which may be acceptable in an exploratory study. Two measures produced unacceptably low reliabilities below 0.60. The study’s results must be tempered by the low reliability of its instruments. In addition to low instrument reliability, threats to the internal validity of design include history, maturity, testing, and regression (Campbell & Stanley, 1963). The history threat increases as the length of time between measures increases. Postoperative measures were taken six weeks after surgery. This time period was selected to represent a return to everyday activities after initial physical healing and to allow comparisons with prior research. External events possibly represented history threats by significantly slowing the rate of participant enrollment and data collection, resulting in doubling the anticipated time needed to collect data. Changes in the study procedure including grant funding to support participant incentives, use of telephone calls for the postoperative interview (versus being present in person), changes in document wording, and the mid-study advent of new
federal regulations (i.e. the Health Insurance Portability and Accountability Act, April 2003) required data collection suspension while Human Subjects approval was obtained. Another threat to internal validity was maturation (Campbell & Stanley, 1963). In the time period between the preoperative and postoperative interviews, the participants may have changed psychologically. Preoperatively, the individuals were anticipating major surgery; postoperatively they might have been feeling relief and a need to create distance from the stressful surgical and hospital experience. Testing represents a threat to internal validity in a pretest-posttest design (Campbell & Stanley, 1963). Repeat administrations of two instruments were performed to assess for pre-existing and postoperative depression and functional status. It is possible that participants experienced reactivity (Campbell & Stanley, 1963) and changed their behaviors or responses based on increased self-awareness after exposure to the study instruments or procedures. In other words, the study instruments themselves may have affected participants’ recovery; for example, a participant may have recognized and used an inner coping resource (e.g., new or pre-existing personal faith) after encountering the WCQ item about finding new faith. Furthermore, the presence of the research nurse and attention given during study procedures may have influenced participants’ responses and outcomes by acting as a source of social support and expert knowledge. In the interest of ethical behavior the study staff (all registered nurses) made no attempts to refrain from responding to participants’ health or surgery questions, or to refrain from representing a nursing body of knowledge. For example, during telephone and face-to-face interviews the study staff might communicate accurate knowledge to correct misinterpretations or to interpret data when asked. When participants were experiencing difficulties that could lead to health
problems the study staff communicated appropriate information to the participant, surgeons, and/or hospital. In one instance during a preoperative telephone call one individual expressed the desire to participate but also mentioned having shortness of breath and chest pain. The researcher sent this individual immediately to the hospital and called both the surgeon’s office and the emergency room with this information. This individual needed emergency surgery and did not get to participate. Participants may also have given responses they considered to be socially acceptable, a form of testing threat (Campbell & Stanley, 1963) common in older adults (Burnside, Preski, & Hertz, 1998) e.g., on measures of depression or functional status if they feared that acknowledging these feelings or abilities might result in loss of independence. More rapid participant enrollment and data collection will reduce the threats of history, but the influence of researcher-as-nurse can best be simply acknowledged and accommodated.
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