DIFFERENCES IN UNCERTAINTY AND QUALITY OF LIFE BETWEEN PRIMARY AND REOPERATION CORONARY ARTERY BYPASS PATIENTS

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Abstract

The purposes of this study were to explore the relationships between uncertainty and quality of life indicators in patients recovering from coronary artery bypass graft (CABG) surgery and to investigate the differences in uncertainty and quality of life indicators between primary CABG patients and reoperation patients. The indicators of quality of life selected for this study were the patient's perception of health status and life satisfaction.

A convenience sample of 41 primary CABG patients and 11 reoperation patients who were five to ten months postoperative completed the Mishel Uncertainty in Illness Scale (Community Version) (MUISCV), the General Health Rating Index (GHRI), the Cantril Self-Anchororing Scale, and a patient information sheet.

Uncertainty, past life satisfaction, and present life satisfaction did not significantly differ between the primary and reoperation patients. Both groups of patients perceived moderately low uncertainty, and were moderately satisfied with their present lives. Trends in the ratings of past, present, and future life satisfaction suggested that CABG surgery was associated with an improvement in life satisfaction and optimism for the future in both primary CABG patients and reoperation patients. Reoperation patients' perceptions of health status and projections of future life satisfaction were significantly less favorable
than those of the primary CABG patients suggesting that the quality of life following CABG surgery is lower for the reoperation patients. Uncertainty was significantly negatively associated with perceptions of health status, present life satisfaction, and future life satisfaction. This finding suggests that higher uncertainty is associated with a lower quality of life in CABG patients who are five to ten months postoperative.

The findings were discussed in relation to theoretical expectations, other research studies, and the methodological problems inherent in the study. Implications of the findings for nursing practice were suggested. Recommendations for future research were made.
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CHAPTER ONE

Introduction

Background to the Problem

In 1982, cardiovascular disease caused one out of every four deaths in Canada, and over 250,000 patients were admitted to hospital for treatment of cardiovascular disease (Statistics Canada, 1988). While the death rates and disability associated with cardiovascular disease are alarming, morbidity and mortality statistics for patients with cardiovascular disease have been significantly and favorably altered over the past decade by pharmacological and technological advances (Wenger, 1984a). One technological advance is coronary artery bypass graft (CABG) surgery. During 1984 to 1985, 8,307 CABG procedures were performed in Canada (Statistics Canada, personal communication, June 22, 1988). Unfortunately, a number of patients who have had their first CABG surgery must undergo reoperation due to the manifestations of progressive disease or failure of grafts to remain patent. It is estimated that approximately four percent of patients who survive following their first CABG surgery require reoperation (Dr. J. Knight, personal communication, July 5, 1988).

Coronary artery bypass surgery is viewed as a stressful experience for the patient seeking treatment for cardiovascular disease. The emotional impact that CABG surgery has on the patient is not surprising for "as the heart has long been recognized as an organ vital to life...a
high degree of apprehension is aroused when its function is threatened" (Glaser, Harrison & Lynn, 1964, p.377). In addition to the threat to life itself, there may be other factors germane to the experience of CABG surgery which might help to explain the emotional impact of this type of surgery and which may influence the patient's recovery following CABG surgery. One such factor is uncertainty.

Uncertainty has been identified as having a central role in physical illness and treatment and it is considered to be a key antecedent of psychological stress (Cohen & Lazarus, 1979; Jessop & Stein, 1985; Lazarus & Folkman, 1984; Mishel, 1981a; Monat, Averill & Lazarus, 1972). Uncertainty has been found to be related to lower optimism and more adjustment problems in patients diagnosed with cancer (Mishel, Hostetter, King, & Graham, 1984). In myocardial infarction patients, uncertainty has been found to be inversely related to perceived recovery (Painter, 1981), and positively related to emotional distress (Christman et. al, 1988).

In a recent study by Dubyts (1988), uncertainty emerged as a central theme in the experiential accounts of patients waiting for CABG surgery and uncertainty was noted to be a major factor contributing to the feelings of vulnerability and the reactions of anger, frustration, fear, and anxiety. Patients expressed uncertainty about what would be experienced during the event of having the surgery. In addition, patients were uncertain about the short and long
term outcomes of the surgery.

Little is known about the degree of uncertainty experienced by patients who are recovering from CABG surgery. Uncertainty may arise when it is unclear which course the underlying disease will follow, or what the long term prognosis is. It is not known how the experience of CABG reoperation influences uncertainty. Reoperation patients may have less uncertainty about aspects of the immediate postoperative recovery period since they have experienced this period before. However, reoperation patients may experience greater uncertainty about the effectiveness of the CABG surgery and their long term prognosis.

Traditionally, the success of CABG surgery has been measured by morbidity and mortality statistics (Levine and Croog, 1984). However, these statistics are insensitive indicators of the overall effectiveness of CABG surgery as they fail to reflect the influence that this surgery has on the social and psychological aspects of a patient's life and ignore the patients' perceptions of the impact of CABG surgery on their personal well-being and life-style (Wenger, 1984a). Therefore, researchers are increasingly turning to the concept of quality of life to broaden the evaluation of the effectiveness of CABG surgery.

Quality of life denotes "...a wide range of capabilities, limitations, and perceptions that may affect a patient's performance or function in a variety of social
roles and considers the level of personal satisfaction that results from that performance or function" (Wenger, 1984a, p.3). Two variables that have been identified as essential components in the measurement and analysis of quality of life are life satisfaction and the patient's perception of health status (Patrick & Elinson, 1984; Wenger, 1984b).

According to Lazarus and Folkman (1984), life satisfaction and perceptions of health status are affected by the ways people evaluate and cope with the stressors of physical illness. Uncertainty, by influencing the appraisal of the situation and the coping strategies utilized, may affect the life satisfaction and perceptions of health status of patients recovering from CABG surgery. Only one study has been found which addressed the potential influence of uncertainty on the quality of life of CABG patients. That study, by Penckofer and Holm (1984), indicated that patients who were recovering from CABG surgery attributed their dissatisfaction with their lives prior to surgery to a "fear of the unknown" and uncertainty about the future.

Statement of the Problem

Little is known about the degree of uncertainty experienced by patients recovering from CABG surgery. Furthermore, no studies have been found which address the uncertainty experienced by patients who are recovering from CABG reoperation. While there are studies documented which measure the life satisfaction and perceptions of health status of primary CABG patients, reoperation patients have
been systematically excluded from these studies. Uncertainty may influence quality of life, specifically, life satisfaction and perceptions of health status. There is a paucity of research which has examined the relationship between uncertainty and quality of life measures in patients recovering from CABG surgery.

**Purpose of the Study**

The purpose of this study was two-fold. The first purpose of the study was to investigate the relationship between uncertainty and quality of life indicators in patients recovering from CABG surgery. The second purpose was to investigate the differences in uncertainty and quality of life indicators between primary CABG patients and reoperation patients.

**Theoretical Framework**

Lazarus and Folkman's (1984) theory of stress, cognitive appraisal, and coping provided the theoretical framework for this study. According to this theory, cognitive processes intervene between an encounter with an event and the emotional, physiological, and behavioral reactions to that event. It is through the process of cognitive appraisal that the person evaluates the significance of what is happening in the environment in terms of its effect on his or her well-being. Based on this cognitive appraisal, a dynamic coping process is utilized which is continuously mediated by cognitive reappraisals. The prime importance of cognitive appraisal and coping
processes is that they affect adaptational outcomes (see figure 1).

**Cognitive Appraisal**

There are two components to cognitive appraisal: primary appraisal and secondary appraisal. Primary appraisal is an evaluation of what is at stake in the encounter; that is, whether the encounter is irrelevant, benign-positive or stressful. Stressful appraisals result when harm/loss, threat or challenge is perceived. Secondary appraisal becomes salient when the encounter has been appraised as a threat or challenge. In secondary appraisal, the person takes into account the coping options that are available, the likelihood that a given coping option will accomplish what it is supposed to, and the probability that one can apply a particular set of strategies effectively.

Person factors, specifically beliefs and commitments, interact with situation factors to influence cognitive appraisal. In many situations, the information necessary for cognitive appraisal is insufficient or unclear and a state of uncertainty is experienced. Uncertainty may lead to the appraisal of the situation as threatening due to the person's inability to formulate a clear conception of what exactly is in store. Conversely, uncertainty may reduce threat by allowing alternative, perhaps reassuring, interpretations of the meaning of the situation. Based upon the appraisal of uncertainty, coping strategies are implemented by the individual.
Figure 1. Theoretical framework for uncertainty and quality of life.

Coping

Coping is defined as "...constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (Lazarus & Folkman, 1984, p. 142). Coping depends on available coping resources and the constraints that inhibit their use. When uncertainty has been appraised as a threat, coping strategies to reduce uncertainty are implemented. However, in situations which generate uncertainty, the focus for actions is unclear and therefore, the selection of coping processes is limited. This may interfere with the effective management of the threat generated by the uncertainty itself. When uncertainty is appraised as an opportunity to reduce threat, coping strategies to maintain uncertainty are utilized.

Adaptational Outcomes

The prime importance of cognitive appraisal and coping processes is that they affect adaptational outcomes. Three basic kinds of outcomes are functioning in work and social living, morale or life satisfaction, and somatic health. Social functioning refers to the manner in which the individual fulfills various social roles and includes satisfaction with interpersonal relationships. Morale, or life satisfaction, refers to how people feel about themselves and their conditions of life. Somatic health refers to physical and mental well-being.
Reappraisal

Coping is a dynamic, changing process. Any shift in the person-environment relationship will lead to a reappraisal of what is happening, the significance of the event for the person's well-being, and what can be done to manage the situation. Choices among coping alternatives are made and the coping strategies utilized affect adaptational outcomes. Reappraisal is an ongoing process, becoming the basis for further coping.

Summary

According to Lazarus and Folkman's (1984) theory, when a situation or event lacks sufficient information, uncertainty is generated. Uncertainty may be appraised as a threat or as an opportunity to reduce threat. The appraisal of uncertainty affects the coping strategies used which, in turn, influence adaptational outcomes such as quality of life. This study explored the relationship between perceived uncertainty and the adaptational outcomes of life satisfaction and perception of health status in patients recovering from CABG surgery. In addition, the differences in uncertainty, life satisfaction, and perceptions of health status between primary CABG patients and reoperation patients were explored.

Research Questions

The present study was designed to answer the following research questions:

1. What is the difference in uncertainty between
primary CABG patients and reoperation patients?

2. What is the difference in past life satisfaction between primary CABG patients and reoperation patients?

3. What is the difference in present life satisfaction between primary CABG patients and reoperation patients?

4. What is the difference in future life satisfaction between primary CABG patients and reoperation patients?

5. What is the difference in perception of health status between primary CABG patients and reoperation patients?

6. What is the relationship between uncertainty and present life satisfaction in CABG patients?

7. What is the relationship between uncertainty and future life satisfaction in CABG patients?

8. What is the relationship between uncertainty and perception of health status in CABG patients?

**Significance of the Study to Nursing**

Nursing research has not addressed the extent of uncertainty experienced by patients who are recovering from CABG surgery. Knowledge of the degree of uncertainty is crucial to understanding patients' responses to CABG surgery, and to identifying nursing interventions that alter uncertainty.

Quality of life is a salient issue in the health care
field. This is particularly true in the area of CABG surgery. Findings generated from an exploration of quality of life indices, specifically, life satisfaction and perception of health status, will be useful in understanding patients' quality of life following CABG surgery, and will provide information that can be utilized by health care workers in designing rehabilitative and supportive programs for patients who are recovering from CABG surgery. Furthermore, gaining knowledge of the factors which influence the quality of life of patients recovering from CABG surgery will assist health care workers in their attempts to improve patients' quality of life. One factor which has the potential to influence patients' quality of life following CABG surgery is uncertainty.

Finally, reoperation patients have been systematically excluded from study, and therefore, it is not known whether this group of patients have supportive and rehabilitative needs that are different from those of primary CABG patients. The comparison of primary CABG patients and reoperation patients in terms of uncertainty, life satisfaction, and perception of health will provide baseline information which will be useful in determining whether these two groups of patients have specific needs, and in designing approaches which are directed toward meeting the specific needs of each group.

Definition of Terms

Coronary artery bypass graft (CABG) surgery is a procedure
that consists of suturing a segment of the saphenous vein to a small opening made in the aorta at one end and to a coronary artery at the other end. This vein graft bypasses an obstructed portion of a diseased artery and permits blood to pass from the aorta to the myocardium (Meltzer, Pinneo, & Kitchell, 1983).

**Primary coronary artery bypass graft (CABG) patients** are patients who have undergone one CABG surgical procedure. **Reoperation patients** are patients who have undergone their second CABG surgical procedure. **Uncertainty** is a perceptual state that occurs in a situation where the person is unable to assign definite values to objects and events and/or is unable to accurately predict outcomes (McIntosh, 1974). In this study, uncertainty was measured by the Mishel Uncertainty in Illness Scale (Community Version) (MUISCV).

**Quality of life** is a concept which denotes "...a wide range of capabilities, limitations, and perceptions that may affect a patient's performance or function in a variety of social roles and considers the level of personal satisfaction that results from that performance or function" (Wenger, 1984a. p.3). In this study, quality of life was measured by the variables of life satisfaction and perception of health status. **Life satisfaction** is the perceived discrepancy between an individual's aspirations in life and the individual's achievements in life (Campbell, Converse, & Rodgers, 1976).
Past life satisfaction is the patient's perceived life satisfaction two years ago.

Present life satisfaction is the patient's perceived life satisfaction currently.

Future life satisfaction is the patient's perceived life satisfaction two years hence.

In this study, past, present, and future life satisfaction were measured using the Cantril Self-Anchororing Scale (Cantril, 1965).

Perception of health status is the individual's subjective evaluation of his or her general state of well-being. In this study, perception of health status was measured using the General Health Rating Index (Davies & Ware, 1981).

Assumptions

For the purposes of this study, the following assumptions were made:

1. Perceptions of health status and life satisfaction are valid indicators of quality of life.

2. Uncertainty is experienced by patients recovering from CABG surgery.

3. Subjects will respond honestly to the scales used in the study.

Limitations

This study has the following limitations:

1. A convenience sample was used, and therefore, the sample may not be representative of the population of primary CABG patients or reoperation patients.
2. Due to time and resource constraints, a small sample size was used which decreases the generalizability of the study findings.

**Overview of the Thesis Content**

This thesis is comprised of five chapters. In Chapter One, the background to the problem, theoretical framework, purpose, and research questions were presented. In Chapter Two, a review of selected literature is presented under two headings: appraisal of uncertainty, and adaptational outcomes. Chapter Three addresses the research methodology including a description of the research design, sampling procedure, data collection instruments, data collection procedure, ethical considerations, and statistical procedures used in data analysis. In Chapter Four, the description of the sample, findings, and discussion of the results are presented. The summary, conclusions, implications for nursing practice, and recommendations for future research are presented in Chapter Five.
CHAPTER TWO

Review of Selected Literature

Introduction

The purpose of this chapter is to review selected literature under two headings which have evolved from the theoretical framework: appraisal of uncertainty, and adaptational outcomes. Under the heading of adaptational outcomes, quality of life in general, and the specific adaptational outcomes of life satisfaction and perception of health status, will be addressed.

Appraisal of Uncertainty

The review of the literature on uncertainty will be approached by presenting references which highlight the degree and nature of uncertainty experienced by patients, followed by literature which addresses the relationship between uncertainty and adaptational outcomes. There is a dearth of literature that is specific to uncertainty in CABG patients and therefore, literature which focuses on uncertainty in other groups of cardiovascular patients will be emphasized.

Uncertainty is a cognitive state created when an event or situation cannot be adequately structured or categorized because sufficient cues are lacking (Budner, 1962). According to Mishel (1984), uncertainty is generated by events which are characterized as vague, ambiguous, unpredictable, inconsistent or lacking information. In these situations where sufficient cues are lacking, a
cognitive structure is not formed, and the individual's ability to adequately appraise a situation and choose appropriate actions is limited (Mishel, 1984).

Uncertainty has been widely noted in cases of physical illness and disability (Lazarus & Folkman, 1984; Mishel, 1984; Mishel, 1988; Monat, Averill, & Lazarus, 1972; Moos & Tsu, 1977). Mishel (1988) notes that the events surrounding illness rarely meet the criteria necessary for formation of a cognitive structure. Symptoms are generally novel and ambiguous. In addition, patients receive incomplete information from health care professionals about their condition or receive information that they cannot understand. Furthermore, in the health care environment, patients encounter many unfamiliar situations. Finally, patients are often unclear about what they should and should not do, and the lack of objective markers of progress impedes patients' ability to clearly gauge their recovery status.

Wright (1960) suggested that the uncertainty associated with some illnesses leads to the following:

[the person's] inability to structure his situation in a stable way because at any moment events could shift dangerously beyond his control....Whenever a situation occurs in which the consequences of behaviour are seemingly unpredictable or uncontrollable, and in which benefits and harms occur in an apparently inconsistent, fortuitous, or arbitrary manner, insecurity of the deepest sort may be expected. (p.101).

Certain forms of illness or disease, such as those that are serious, life threatening, and imperfectly controlled, are
replete with uncertainty (Comaroff & Macquire, 1981). One disease which reflects these characteristics is cardiovascular disease.

Mishel (1983) found that cardiovascular patients perceive uncertainty in the form of ambiguity about the severity of their illness. This uncertainty relates to the life-threatening nature of the illness and fears of invalidism, continuing damage to the heart, and death. Cardiovascular patients were also found to perceive uncertainty about the effectiveness of the treatment due to the inability to clearly relate the treatment to specific outcomes.

In a study by Dubyts (1988), uncertainty emerged as a pervasive theme in the experiential accounts of patients who were waiting for CABG surgery. Perceived uncertainty appeared to be related to the patients' loss of trust in their own bodies. Patients experienced uncertainty about the course of the illness and the possibility of an illness-related complication including death. Patients were uncertain about the actual experience of the surgery and hospitalization, and the short- and long-term outcomes of the surgery. Finally, there was uncertainty about whether one would survive the waiting period without having a myocardial infarction or dying.

Dubyts' (1988) study highlights the salience of uncertainty in patients waiting for CABG surgery. It seems reasonable to assume that the uncertainty experienced by
patients awaiting CABG surgery does not dissipate following surgery.

Mishel (1981b) hypothesized that the degree and nature of uncertainty experienced by cardiac surgery patients changes over time as patients move through a continuum of events associated with the experience of cardiac surgery. The primary uncertainties of the preoperative stage are the unpredictable outcome of surgery and the possibility of death. The complex treatment and environment of the critical care unit are the sources of uncertainty in the postoperative period. Feelings of insecurity and uncertainty from the loss of monitoring equipment and less attentive medical and nursing care dominate the intermediate postoperative period. The vagueness about what one should and should not do, and the unpredictability of the return of symptoms generate uncertainty in the post-discharge period. Mishel tested this hypothesis by exploring the change in uncertainty in a group of open heart surgery patients as they progressed through the preoperative, immediate postoperative, intermediate postoperative, and discharge stages. Uncertainty scores did not change significantly through the four time periods. Mishel concluded that denial of threatening events may explain why cardiac surgery patients failed to show the expected pattern of uncertainty.

Uncertainty has the potential to influence adaptational outcomes (Lazarus & Folkman, 1984; Mishel, 1988). A review of the literature by Mishel (1988) found
that a number of studies using diverse samples have addressed the influence of uncertainty on adaptational outcomes operationalized as stress, psychosocial adjustment, recovery, and health.

Support exists for the relationship between uncertainty and poor psychosocial adjustment in women diagnosed with gynecological cancer (Mishel et al., 1984). Uncertainty has been found to be a strong predictor of stress in hospitalized medical patients (Mishel, 1984). In college students, uncertainty about control over aversive events was found to have a significant negative effect on health (Suls & Mullen, 1981).

In the area of cardiovascular disease, studies by Painter (1981) and Christman and colleagues (1988) have addressed the influence of uncertainty on the adaptational outcomes of patients who have had a myocardial infarction. The impetus behind these investigations was to gain an understanding of the factors which might help to explain why many myocardial infarction patients have psychosocial adjustment problems or fail to recover fully despite objective improvements in their physical condition.

Painter (1981) examined the relationship between perceived uncertainty, judgement of recovery, and self-initiated activity in a group of myocardial infarction patients. A significant inverse relationship between perceived uncertainty and perceived recovery was found. The hypothesized negative relationship between uncertainty and
the resumption of daily activities was not supported. Painter suggested that with uncertainty, the appraisal process is hindered, and therefore, the perception of recovery status may not be accurate.

In the study by Christman and colleagues (1988), the influence of uncertainty and the use of coping methods on emotional distress and recovery following myocardial infarction were explored. The relationships among the variables were assessed at three time periods: within 72 hours of hospital discharge; the first week following discharge; and, the fourth week following discharge. At all three time periods, uncertainty and emotional distress were positively and significantly related. One week after discharge uncertainty was significantly inversely related to physical activity (a measure of recovery) ($r = -0.38, p = 0.05$), however, this relationship was not significant at four weeks.

Only one study has been found which examined the potential influence of uncertainty on adaptational outcomes of CABG patients. In that study by Penckofer and Holm (1984), patients recovering from CABG surgery attributed their dissatisfaction with their lives prior to surgery to a "fear of the unknown" and uncertainty about the future but reported relief of uncertainty and a concomitant increase in life satisfaction following CABG surgery.

Summary

The review of the literature points to the
pervasiveness of uncertainty in cases of physical illness and disability. As a life-threatening, imperfectly controlled, and unpredictable disease, cardiovascular disease is replete with uncertainty. Cardiovascular patients have been found to experience uncertainty about the severity of their illness and uncertainty about the effectiveness of their treatment. Uncertainty has been found to pervade the accounts of cardiovascular patients who are waiting for CABG surgery. It has been hypothesized that the nature and extent of uncertainty changes as cardiac surgery patients progress through the stages of the surgical experience, however, in the open heart surgery patients studied, this hypothesis was not supported. Uncertainty has been found to have a negative influence on adaptational outcomes operationalized as psychosocial adjustment, stress, recovery, and health. In CABG patients, poorer life satisfaction prior to surgery has been attributed to uncertainty about the future.

Adaptational Outcomes

The adaptational outcomes addressed in this study were life satisfaction and the perceptions of health status of patients recovering from their first or second CABG surgery. These adaptational outcomes are specific indicators of a broader adaptational outcome, namely, quality of life. Selected literature pertinent to the quality of life of patients recovering from CABG surgery will be reviewed first. This will be followed by a review of selected
literature on life satisfaction and perceptions of health status.

**Quality of Life**

Quality of life has become an important concern in health care and social policy. However, the issue of quality of life is complicated by the problems encountered in defining and measuring it (Ferrans & Powers, 1985). These difficulties are related to the broad character of quality of life considerations. According to McCullough (1984), there are several different life tasks, and many different ways to derive satisfaction from various life tasks.

Traditionally, studies which investigated quality of life following CABG surgery focused on postoperative work status as the basic indicator of improved quality of life (Barnes, Ray, Oberman, & Kouchoukos, 1977; Zyzanski, Rouse, Stanton, & Jenkins, 1982). However, as indicated by LaMendola and Pellegrini (1979), many of the studies which have used work as an indicator of quality of life have failed to show an increase in employment following CABG surgery. Furthermore, despite unemployment, patients in these studies have reported satisfaction with the results of CABG surgery and felt physically improved (LaMendola & Pellegrini, 1979). According to Oberman and colleagues (1982), several characteristics appear to be important determinants of return to work following CABG surgery. These include preoperative work status, non-work income,
occupation, relief of symptoms, age, perception of health, and education.

Recognizing the inadequacy of employment as the single indicator of quality of life following CABG surgery, researchers moved to consider a broad range of psychological and social outcomes as indicators of quality of life. The results of these studies have been contradictory. Gundle and colleagues (1980) found that, despite good physiological outcomes following CABG surgery, a high proportion of patients were psychologically and socially disabled with significant unemployment and sexual dysfunction, constricted social lives, low self-esteem, and depression. In contrast to these findings, other investigations of the psychological and social outcomes following CABG surgery have shown favorable results (Jenkins, Stanton, Savageau, Denlinger, & Klein, 1983; Kornfeld, Heller, Frank, Wilson, & Malm, 1982). For example, Kornfeld and colleagues (1982) found that, in addition to significant physiological improvement, CABG patients showed significant improvements in general pleasure, less anxiety and depression, and subjective improvements in job and family roles.

Current research on the quality of life of patients recovering from CABG surgery has continued to focus on a wide range of patient outcomes which reflects the lack of consensus on which variables to include in the measurement of quality of life. Several authors have attempted to delineate the essential components that should be included

Another issue in the measurement of quality of life is whether to use objective or subjective measures of its dimensions (Cohen, 1982; Ferrans & Powers, 1985). Campbell (1976) has argued that subjective indicators assess the experience of life directly, whereas objective indicators merely measure things that influence that experience. The importance of patients' perceptions in the measurement and analysis of quality of life has been noted by many other authors (Levine & Croog, 1984; McCullough, 1984; Wenger, 1984b).

Life Satisfaction

Despite the disagreement over which indicators to include as standards for quality of life, there is a growing consensus that life satisfaction is the one dimension that seems to be the most important indicator of quality of life (Ferrans & Powers, 1985; Horley, 1984). Laborde and Powers (1980) have called life satisfaction the barometer of quality of life.
In measurements of overall quality of life, the concept of satisfaction has been used interchangeably with happiness (Campbell, 1976; Campbell, Converse, & Rodgers, 1976). However, Campbell and colleagues (1976) have argued that while happiness and satisfaction have something in common, they are conceptually different with satisfaction implying a judgmental or cognitive experience, and happiness suggesting an experience of feeling or affect.

Lazarus and Folkman (1984) note that life satisfaction is conceptually linked to affect or emotion; however, a time dimension distinguishes the two. Lazarus and Folkman state that it is crucial to distinguish between the emotions that a person experiences in a stressful encounter and life satisfaction over the long term. Affect or emotion in a specific encounter is likely to be very much in the foreground and to shift as the encounter unfolds. In contrast, life satisfaction over the long term is likely to be more of a background affective state that is relatively enduring. Lazarus and Folkman state that the key questions concern how appraisal and coping processes affect life satisfaction over the long run.

The approach to the study of life satisfaction has varied among investigators. Some investigators have assessed general or overall life satisfaction (Cantrill, 1965). Others have emphasized satisfaction in a variety of specific domains of life (e.g., health, family life, job) and have examined the relationship between the specific
measures of satisfaction and the contribution that each makes to an overall measure of life satisfaction (Campbell et al., 1976). Noting that the issue of individual differences in the importance of specific domains of life has been neglected, other investigators have addressed life satisfaction by relating satisfaction with specific domains of life and the unique importance of each domain to the individual (Ferrans & Powers, 1985).

Two studies have been found that are specific to the life satisfaction of patients recovering from CABG surgery. In a study by Penckofer and Holm (1984), two groups of CABG patients were compared in terms of past, present, and future life satisfaction. Patients' satisfaction with the specific domains of family, social, occupational, and sexual life were also explored. Seventeen patients were three to five months postoperative and 17 patients were six to eight months postoperative. These two time periods were selected to determine whether length of time since surgery would have an influence on quality of life. Patients three to five months postoperative perceived their future life satisfaction to be significantly higher than their past life satisfaction. Patients six to eight months postoperative perceived both their present and future life satisfaction as significantly better than their past. The authors stated that the difference between the groups in the assessment of present life satisfaction may be related to the effects of time on the recovery process, with patients in the early
months of recovery affected by limitations imposed by residual incisional pain. Both groups reported a significant increase in family, sexual, and social life satisfaction postoperatively. There were no significant differences between the groups on these measures.

The second study which has investigated life satisfaction in CABG patients was conducted with subjects who were much earlier in their recovery process than the subjects in Penckofer and Holm's (1984) study. Flynn and Frantz (1987) studied subjects six to ten weeks after their first CABG surgery in terms of past, present, and future life satisfaction. The relationship between domain importance and domain satisfaction was examined. The relationships between life satisfaction and social support, achievement of expectations for recovery, and demographic characteristics were also examined. Subjects rated their past life satisfaction slightly higher than their present life satisfaction and the authors concluded that this could be attributed to the fact that subjects were in their early recovery period. Perceived future life satisfaction was higher than past life satisfaction, however, the significance of the difference was not reported. The comparison of rankings between importance and satisfaction for eight domains revealed that family relationships ranked highest in importance followed by relief of symptoms and increased physical activity with subjects most satisfied with relief of symptoms, family relationships, and social
participation. Multiple regression revealed that mood, material wealth and relief of symptoms were the strongest predictors of life satisfaction. Life satisfaction was significantly higher for patients who had social support than for patients who did not have this support. A significant positive correlation was found between achievement of expectations for recovery and present life satisfaction ($r = 0.40, p = .05$). Life satisfaction was not significantly related to any of the demographic characteristics.

**Perception of Health Status**

Patients' perceptions of health status have frequently been ignored or perceived of as convenient but questionable substitutes for objective health status measures or indicators of quality of life (Mossey & Shapiro, 1982). However, in studies that have included objective health status measures, the patient's perception of health status has emerged as the strongest predictor of life satisfaction (Palmore & Luikart, 1972), recovery outcomes (Garrity, 1973a, 1973b), and mortality (Mossey & Shapiro, 1982). It is not surprising then that several authors have identified the patient's perception of health status as an essential dimension to include in quality of life measurements (Erikson, 1984; Patrick & Elinson, 1984; Wenger, 1984b).

Palmore and Luikart (1972) studied the relative influence of self-rated health, physician evaluation of performance status, activity, and a number of
sociopsychological and socioeconomic variables on life satisfaction in persons aged 45 to 65 years. Self-rated health was found to be the strongest variable related to life satisfaction ($r = 0.43$, $p = .05$) and accounted for more than two-thirds of the explained variance in life satisfaction.

Two studies by Garrity (1973a, 1973b) have highlighted the central role of patients' perceptions of health status in the rehabilitation outcomes of patients six months post-myocardial infarction. In one study, Garrity (1973a) explored several variables proposed as predictive of the morale or happiness of myocardial infarction patients. The perception of one's health as "good" was found to be strongly related to morale ($r = 0.62$, $p = .01$). After controlling the effects of all other variables using multiple regression analysis, only health perception remained significantly related to morale ($F = 11.88$, $p = .001$).

In a subsequent study of myocardial infarction patients, Garrity (1973b) analyzed a number of medical, demographic, and sociopsychological variables for the purpose of determining the strongest correlates of vocational rehabilitation. Perceived health status was the only variable which correlated significantly with return to work ($r = 0.59$, $p = .01$).

The patient's perception of health status has been shown to be a strong predictor of mortality, independently
of objective health status measures (Mossey & Shapiro, 1982). Mossey and Shapiro (1982), studied the relationship between self-rated health and mortality in a group of persons 65 years of age and older. Analysis of the data, controlling for objective health status, age, sex, life satisfaction, and income, revealed that the risk of mortality was significantly greater for persons who rated their health as "poor" than for persons who rated their health as "excellent". The increased risk of death associated with poor self-rated health was greater than that associated with poor objective health status, poor life satisfaction, low income, and being male.

Little is know about the ways by which people form perceptions of their health status and why, in fact, these perceptions have a strong predictive value in terms of life satisfaction, recovery outcomes, and mortality. In the study by Palmore and Luikart (1972) addressed earlier, variables that might explain or be related to self-rated health were explored. A strong and predominant association of the physician's rating of performance status with self-rated health was found ($r = 0.43, p = .05$). Furthermore, the performance status rating accounted for over 80 percent of the explained variance in self-rated health suggesting that the major explanation of how respondents perceived their health was their objective health status as measured by the physician. Similarly, in the study by Mossey and Shapiro (1982), self-rated health was substantially related
to objective health status ($r = .34, p = .001$) with 33 percent of the sample in that study having identical self-rated health and objective health status ratings.

In an attempt to determine the factors which influence the patient's perception of health status, Brown and Rawlinson (1975) explored the relative influence of a number of selected physical, social, and personality variables on the tendency of open heart surgery patients to retain or relinquish the sick role postoperatively. Retaining or relinquishing the sick role was conceptualized as an indicator of the extent to which the individual viewed himself as sick or well. Multiple regression analysis showed only five variables related to the sick role measure. The five variables were preoperative tendency to reject the sick role, duration of illness prior to surgery, sex, age, and depression. Overall, patients rated "myself since surgery" more favorably than "myself before surgery" suggesting that patients experienced a subjective sense of improvement. Furthermore, there was a general tendency both to reject the sick role before surgery and to relinquish the sick role after surgery. Brown and Rawlinson indicated that an unexpected finding was that while patients believed they were not as well as "people in general" preoperatively, they believed that they were better before surgery than "most sick people" suggesting that they were minimizing the seriousness of their illness.

Research into the health perceptions of patients
following CABG surgery has been limited. In the study by Flynn and Frantz (1987) discussed earlier, the past, present, and future perceptions of health status of CABG patients who were six to ten weeks postoperative were explored. Objective health status indicators were also assessed and included rehospitalization, angina, shortness of breath, complications, chronic illness, and exercise tolerance. Patients rated their present state of health slightly higher than their past health and expected an even greater improvement in their future state of health. There was a significant difference in health perceptions between patients experiencing angina or shortness of breath and patients who did not have these symptoms. However, Flynn and Frantz noted that there was an overall discrepancy between subjective reports of improvement and objective health indicators and suggested that this discrepancy may be attributed to a "halo" effect from having survived surgery, coupled with a sense of perceived cure.

Interesting findings were obtained in a study by Charles and colleagues (1982) in which patients with coronary artery disease were randomly assigned to receive medical or surgical (CABG surgery) therapy. No significant differences in demographic and clinical characteristics were found between the groups. At the time of randomization and one year follow-up, patients were asked to respond to selected questions regarding perceived health status and use of medical services. At the time of randomization, the
surgical group had the highest percentage of individuals who reported themselves in excellent or good health and the lowest percentage who stated that they usually or often worry about their health. By these indexes of self-perceived health status, the surgical group perceived themselves to be in better health than the medical group. However, based on bed disability days (considered to be an objective health status measure) and medical care utilization, the medical group was in the best health and the surgical group was in the worst health. These patterns were maintained at one year follow-up. Charles and colleagues stated that because the direction of the indexes was not uniform, further follow-up was required before definitive conclusions could be drawn.

Summary

A broad range of indicators have been used to assess the quality of life of patients recovering from CABG surgery. Contradictory findings have been obtained in studies that have assessed patients along psychological and social dimensions. Two methodological issues arise in quality of life studies. First, there is a lack of consensus regarding which of many variables are essential to the analysis of quality of life. Secondly, there is disagreement among investigators about whether to include objective or subjective indicators of quality of life.

Life satisfaction has been identified as the most important indicator of quality of life. Research suggests
that patients recovering from CABG surgery are optimistic about their future as indicated by their projected future life satisfaction. The present life satisfaction of patients recovering from CABG surgery appears to be influenced by the length of time since surgery.

The patient's perception of health status has also been identified as an important component of quality of life assessments. The patient's perception of health has been found to be a strong predictor of life satisfaction, recovery, and mortality. There have been few attempts to examine the perceptions of health status of patients who are recovering from CABG surgery. In one study, CABG patients who were six to ten weeks postoperative were found to have favorable perceptions of their future health, but perceived their present health status to be only slightly better than their past health. Researchers have found that a strong predictor of the patient's perception of health status is the patient's objective health status as rated by the physician. However, studies of the perceptions of health status of CABG patients have revealed a discrepancy between the patients' perceptions of their health and objective health status measures.

Summary of the Literature Review

The review of the literature reveals a number of areas requiring further research. Uncertainty has been found to be a central theme in the accounts of patients waiting for CABG surgery. However, little is known about the degree of
uncertainty experienced by patients recovering from CABG surgery. Findings from an exploration of the uncertainty experienced by a related group of patients, namely, open heart surgery patients, failed to support the hypothesis that uncertainty would change over time as patients progressed from the preoperative period to the discharge period. Further investigation of the degree of uncertainty experienced by patients recovering from CABG surgery is needed.

Support exists for the relationship between uncertainty and adaptational outcomes operationalized as psychosocial adjustment, stress, recovery, and health. The influence of uncertainty on the adaptational outcomes of patients recovering from CABG surgery has not been systematically addressed. Only one study was found that pointed to the potential influence of uncertainty on the life satisfaction of CABG patients.

The adaptational outcomes of particular interest in CABG patients are those tied to the concept of quality of life. Two important indicators of quality of life, specifically, life satisfaction and perceptions of health status, have not been widely studied. Findings relevant to the life satisfaction of patients recovering from CABG surgery have been generated by two studies which have limited comparability, as patients in those studies were at different stages in their recovery periods. In one of the two investigations found that examined the perceptions of
health status, patients were only six to ten weeks postoperative and patients' perceptions of health status may have been adversely influenced by residual discomfort from the surgery itself. Therefore, further investigation of the life satisfaction and perceptions of health status of patients recovering from CABG surgery is needed to substantiate earlier findings.

Studies which have addressed the uncertainty, life satisfaction and perceptions of health status of CABG patients have focused on primary CABG patients. Reoperation patients have been systematically excluded from these studies. Therefore, it is not known how the experience of reoperation influences uncertainty or how reoperation patients perceive their quality of life.

This present study then, was designed to address a number of gaps identified in the literature by exploring the following: the relationships between uncertainty and the quality of life indicators of life satisfaction and perceptions of health status in patients recovering from CABG surgery; and, the differences in uncertainty, life satisfaction and perceptions of health status between primary CABG patients and reoperation patients.
CHAPTER THREE

Methodology

Introduction

This chapter describes the research design, sampling procedure, data collection instruments, data collection procedure, ethical considerations, and the statistical procedures used in data analysis.

Research Design

A descriptive comparative and correlational design was utilized in this study. The correlational component allowed the researcher to describe functional relationships among variables (Polit & Hungler, 1983). The comparative design allowed the researcher to examine and describe differences in variables between two groups that occur naturally (Burns & Grove, 1987).

Sampling Procedure

Originally, a convenience sample of 20 primary CABG patients and 20 reoperation patients was to be selected for this study. All subjects were to be visited by the researcher for the purpose of administering a questionnaire, and, for commuting purposes, all subjects had to live in the Lower Mainland of British Columbia. After data collection was initiated, the researcher learned that there were only two suitable reoperation patients who lived in the Lower Mainland of British Columbia. Therefore, to access a greater number of reoperation patients, it became necessary to mail the questionnaire to all suitable reoperation
patients who lived anywhere in the province of British Columbia. To have comparable data, the questionnaire was also mailed to a number of primary CABG patients. The researcher continued to visit a group of primary CABG patients for the purpose of administering the questionnaire.

Subjects selected for inclusion in the study met the following criteria:

1. The subjects had undergone their first or second CABG surgery.
2. The subjects were five to ten months postoperative.
3. The subjects had no other major illnesses.
4. The subjects were 35 to 75 years of age.
5. The subjects were able to read, write, and speak English.
6. The subjects lived in the province of British Columbia.

The criterion of no other major illnesses was established for the purpose of limiting the impact of other illnesses on the quality of life indices and uncertainty measurements. The criterion of five to ten months was established so that all subjects were at relatively similar stages in the recovery process.

Twenty-two primary CABG patients who lived in the Lower Mainland of British Columbia were contacted. Only two patients refused to participate in the study. The questionnaire was mailed to 18 reoperation patients. Twelve reoperation patients (67%) returned the questionnaire. Of
the twelve questionnaires returned, one questionnaire documented that the patient had cancer and this respondent was deleted from the study. Of the six reoperation patients who did not respond, one had died, and five failed to respond for unknown reasons. The questionnaire was mailed to 47 primary CABG patients. Thirty-three primary CABG patients (70%) returned the questionnaire. Of the 33 questionnaires returned, two were approximately two-thirds incomplete, four documented that the patients had multiple illnesses, and six of the questionnaires indicated that the respondents were greater than ten months postoperative. Of the 14 primary CABG patients who did not respond, one telephoned the researcher to state that he had recently had major surgery, two patients had died, and 11 failed to respond for unknown reasons.

The final sample obtained consisted of the following: 20 primary CABG patients who were visited by the researcher for the purpose of administering the questionnaire, 21 primary CABG patients who were mailed the questionnaire, and 11 reoperation patients who were mailed the questionnaire. The primary CABG patients who were visited by the researcher were compared with the mailed primary CABG patients to determine the feasibility of pooling the subjects into one group of primary CABG patients. The results of the pooling analysis will be presented with the characteristics of the sample in Chapter Four.
Data Collection Instruments

Four data collection instruments were utilized in this study. The Mishel Uncertainty in Illness Scale (Community Version (MUISCV) (Mishel, 1984) was used to measure perceived uncertainty. The General Health Rating Index (GHRI) component (Davies & Ware, 1981) of the Health Perceptions Questionnaire (Ware & Karmos, 1976) was utilized to measure perceptions of health status. The Cantril Self-Anchoring Scale (Cantril, 1965) was employed to measure past, present, and future life satisfaction. Finally, the Patient Information Sheet was used to collect demographic, surgical, and health data.

Mishel Uncertainty in Illness Scale (Community Version) (MUISCV)

The MUISCV is a Likert-format scale consisting of 28 items relating to the experience of uncertainty during illness. The scale measures perceived uncertainty about symptomatology, diagnosis, treatment, relationships with care-givers, and prognosis (Mishel, 1983). Selected items from the MUISCV are presented in Appendix A.

The MUISCV was developed from the original MUIS (Mishel, 1981b) which was designed for hospitalized individuals. To construct the original MUIS, an exploratory study was conducted in which hospitalized patients were interviewed to identify events perceived as uncertain (Mishel, 1981b). The interviews centered around four illness-related events: symptoms, treatment, technical
environments and unfamiliar routines, and assessment of the future and independence. A list of statements was compiled and subjected to content validation by a group of nurses, doctors, and patients.

Three construct validation studies of the original MUIS were carried out using a total of 259 hospitalized patients (Mishel, 1981a; Mishel, 1981b). The purpose of the first validation study was to test the hypothesis that patients undergoing "rule-out" diagnostic procedures perceive more uncertainty than patients with determined diagnoses. Significant differences in uncertainty were found between the diagnostic "rule-out", medical, and surgical groups. As predicted, the diagnostic "rule-out" group demonstrated the greatest uncertainty. The purpose of the second validation study was to confirm the predicted relationship between perceived uncertainty and the degree of stress experienced in 100 medical patients. Results indicated that a patient's level of perceived uncertainty was strongly related to his/her rating on the Hospital Stress Events Scale. The third validation study provided further evidence of the construct validity of the MUIS by converging the scale with a different method for measuring the same construct, namely, that uncertainty would be related to lack of comprehension. The MUIS and Comprehension Interview were administered to 26 cancer patients and the correlation of uncertainty and comprehension was in the expected direction.

In a later study, Mishel (1983) attempted to develop
uncertainty scales that were specific to the concerns of various patient populations (cardiovascular, gastrointestinal, cancer, lupus, primary treatment, and cardiac catheterization) by carrying out cluster analyses with 268 hospitalized and clinic patients. With the exception of the gastrointestinal population, all populations showed item clusterings interpretable according to the factors of the MUIS. The content of each cluster was found to reflect the concerns of the specific populations.

In the present study, the 28 item MUISCV was used. Items related to hospitalization were eliminated by Mishel for the community version. According to Mishel (personal communication, July 20, 1987), factor analysis of the MUISCV resulted in a one factor solution with an internal consistency reliability alpha of 0.84, but information was not provided on the sample used to obtain the data.

One author has reported using the community version of the MUIS. Hilton (1987) utilized the MUISCV in her doctoral study of the uncertainty experienced by patients with breast cancer. A factor analysis was conducted which resulted in a six factor solution. The scale had an internal consistency reliability alpha of 0.87 and each of the six factors had internal consistencies which ranged from 0.50 to 0.82. The six factors were Lack of Consistency in the Situation, Lack of Clarity in the Situation Regarding the Illness, Not Understanding Explanations, Indefiniteness of the Illness, Indeterminacy of the Treatment Effectiveness, and Not
Knowing About the Situation. Hilton indicated some concern about the content validity of the scale as some subjects had difficulty answering some of the items because of their wording and/or appropriateness.

In this study, the internal consistency reliability alpha of the MUISCV was 0.89.

General Health Rating Index (GHRI)

The General Health Rating Index (GHRI) (Davies & Ware, 1981) is a standardized measure used to survey people's overall perceptions of their general health status. The GHRI evolved from 26 items of the 32-item Health Perceptions Questionnaire (HPQ) (Ware & Karmos, 1976). Twenty-two of the HPQ items are used to compute the GHRI. The total 32-item HPQ and scoring rules for the GHRI are presented in Appendix B and Appendix C respectively.

The 26 HPQ items that were fielded for development of the GHRI measure are complete statements of health that assess the following six dimensions of health perceptions: prior health, current health, health outlook, health-related worry/concern, resistance/susceptibility to illness, and sickness orientation. Davies and Ware (1981) constructed a summary index, the GHRI, that reflects the general health constructs assessed by the six sub-scales of the HPQ and assesses both physical and mental health components of health status.

To construct the GHRI, principal components analysis was used to identify the underlying dimension that accounted for
most of the measured variance shared by the 26 items of the HPQ (Davies & Ware, 1981). The first unrotated component was evaluated for equality of loadings and interpretability in six study sites (n = 3521), and a high degree of correspondence was found. Across sites, the first component explained 30.6 to 38.3 percent of the variance measured by the 26 items. Items that did not correlate at least 0.30 with the first unrotated component in each site were dropped from consideration in the GHRI. Four items were deleted. All but two of the general health perception sub-scales (health-related concern, and sickness orientation) were required to define the general dimension underlying the 26 items. Current health, prior health, health outlook, health-related worry, and resistance to illness had substantial correlations with the principal component and were important to defining its underlying dimension. Perceptions of current health appear to define the core concept.

Content validity for the GHRI is supported in that the index includes a comprehensive sample of general health rating items that represent well those items fielded in published literature (Davies & Ware, 1981). Bivariate validity studies were conducted using 35 variables that fell into six classes: physical health, mental health, social circumstances, patient role propensity, use of health services, and age and life stresses. The GHRI consistently showed substantial relationships where significant
relationships had been hypothesized, with the exception of age. Further bivariate validity studies focused on the meaning of the index scores; specifically, on the relationship of index scores to clinically relevant indicators that defined substantial health impairment. The three indicators were physical functioning, serious chronic illnesses, and emotion functioning. Findings indicated that scores on the GHRI throughout its range reflect differences in physical and emotional functioning.

The GHRI score distribution has been found to be roughly symmetrical in a general population (Ware, 1984). The median stability coefficients for time intervals of one, two, and three years are 0.66, 0.59, and 0.56 respectively. Internal consistency estimates ranged from 0.88 to 0.90 (n = 3521).

In this study, the internal consistency reliability alpha of the GHRI was 0.90.

Cantril Self-Anchoring Scale

The Cantril Self-Anchoring Scale (Cantril, 1965) was devised to measure a general sense of well-being. According to McKeehan, Cowling and Wykle (1986), the scale is one of the few instruments that measures the perceptions of people based on their own worlds of reality (see Appendix D).

The scale is represented as a vertical ladder of ten divisions. According to Kilpatrick and Cantril (1960), each respondent is asked to describe the best and worst possible life which become the top and bottom endpoints of the ladder
respectively. The scale is self-anchoring in the sense that these anchors represent the subject's own perceptions of minimal and maximal life satisfaction. Using these personally defined anchoring points, subjects are asked to indicate the point on the ladder at which they would place themselves currently (present life satisfaction), two years ago (past life satisfaction), and two years hence (future life satisfaction).

In terms of content validity, subjects from a wide variety of populations were interviewed to obtain substantive information given by clients that defined their anchoring points (Cantril, 1965; Kilpatrick & Cantril, 1960). According to Kilpatrick and Cantril (1960), aspirations of people of different backgrounds were differentiated by the scale. No information could be found pertaining to how the Cantril scale relates to other scales which measure life satisfaction, so concurrent validity cannot be substantiated.

According to Cantril (1965), traditional reliability concerns are not applicable to this scale because of the subjectivity of the ratings. However, Kilpatrick and Cantril (1960) stated that the data obtained with the scale "...are psychologically directly comparable; that is, the scale level selected by a person...can be specifically and meaningfully said to be higher, lower, or equal to the scale level of some other individual...because the frames of reference of the replies are in fact psychologically
"similar" (p. 161). Cantril (1965) contended that since the endpoints of the scale are personally defined they remain relatively constant for a given individual over a short period of time, minimizing the error variance.

According to McKeehan, Cowling, and Wykle (1986), a review of the literature outside of nursing reveals that the Cantril Self-Anchoring Scale has been widely used to measure individuals' perceptions, and the predominant variable measured has been life satisfaction. In nursing research, health is the most frequent variable measured using the Cantril Scale. The Cantril Self-Anchoring Scale was used to measure life satisfaction and perception of health status in the study by Flynn and Frantz (1987) noted earlier. The Cantril Self-Anchoring Scale was also used to measure life satisfaction in the study by Penckofer and Holm (1984).

Two modifications were made to the Cantril Self-Anchoring Scale for this study. First, the divisions of the ladder were numbered from one to 10 instead of zero to nine as suggested by Cantril (1965). This modification was made because other researchers who have used the tool have found that a zero point on the scale could be interpreted as being synonymous with death (Laborde & Powers, 1980). The second modification made to the scale was that instructions directed the subjects to think about rather than describe to the researcher the best and worst possible life. This modification was made to maintain a consistent data
collection procedure for mailed and visited subjects.

**Patient Information Sheet**

A patient information sheet was devised by the researcher to elicit demographic, surgical and health information from the subjects (see Appendix E). The data collected through the information sheet were used to establish the suitability of the subjects for participation in the study, and to determine the relative comparability of the groups of subjects under investigation.

**Data Collection Procedure**

Potential participants for this study were obtained through seven local cardiovascular surgeons. Two approaches to data collection were used. One approach was followed to obtain the group of primary CABG patients who were visited by the researcher. The second approach was followed to secure reoperation and primary CABG patients by mail.

To obtain the group of primary CABG patients who were visited by the researcher, the office of each of the seven cardiovascular surgeons contacted suitable potential participants to inquire whether they would consent to their name, address, and telephone number being released to the researcher. If the potential participant agreed to have this information released, the information was given to the researcher and the potential participant was mailed an information letter describing the study and the nature of his/her participation (see Appendix F). The information letter contained the telephone number of the researcher so
that potential participants could contact the researcher if they had any questions or concerns about the study. The information letter also informed the potential participants that the researcher would telephone them in approximately two weeks time to inquire if they were interested in participating in the study. Approximately two weeks after the information letter was mailed, the researcher contacted the potential participants, and, if they indicated a willingness to participate in the study, a time and place were arranged for questionnaire completion. When the participants were visited by the researcher, the consent form was reviewed, and written consent was obtained (see Appendix G). Participants who were interested in obtaining a summary of the study findings could so indicate in the space provided on the consent form. The researcher reviewed the questionnaire and instructions with the participants, and, if there were no questions, the participants were given the questionnaire to complete. The researcher was with the participants throughout the completion of the questionnaire.

A second approach to data collection was used to obtain participants by mail. Stamped coded envelopes were delivered to the cardiovascular surgeons' offices. Each coded envelope contained an information letter (see Appendix H), the questionnaire, a Request for Study Findings form (see Appendix I), and a return stamped envelope with the researcher's address on it. The information letter contained an explanation of the study and the nature of the
respondents' participation, and informed the potential respondents that the envelope was mailed through their cardiovascular surgeon's office so that they would remain anonymous to the researcher. In addition, the information letter contained a statement indicating that return of the questionnaire meant that the respondent had expressed their consent to participate in the study. The information letter also informed that potential respondents that a reminder letter (see Appendix J) would be mailed to all non-respondents in approximately three weeks. The information letter contained the researcher's telephone number and indicated to the potential respondents that they could call the researcher collect should they have any questions or concerns about the study. The names and addresses of potential respondents were affixed to the envelopes by the cardiovascular surgeons' offices and mailed. Three weeks after the questionnaires were mailed, the researcher delivered stamped envelopes containing the reminder letters to the cardiovascular surgeons' offices and informed the offices of the coded envelopes still outstanding. Names and addresses of the non-respondents were affixed to these reminder letters by the offices of the cardiovascular surgeons and mailed.

**Ethical Considerations**

Permission to conduct this study was obtained from the University of British Columbia Behavioral Sciences Screening Committee for Research and Other Studies Involving Human
Subjects. Seven cardiovascular surgeons were telephoned by the researcher to ask for their assistance in securing patients for this study. Each of the cardiovascular surgeons received a copy of the proposal for this study for review. All cardiovascular surgeons gave their approval by signing a consent form (see Appendix K). All of the cardiovascular surgeons received a letter explaining the modifications in the data collection procedure required to obtain an adequate sample size (see Appendix M). Verbal approval of the changes to the data collection procedure was given by each of the cardiovascular surgeons.

All of the potential participants received a written description of the study and the nature of their participation. All prospective participants were informed in writing that they were not obliged to participate in the study and could withdraw or refuse to answer any questions without any effect to their future medical or nursing care. Furthermore, all potential participants were informed in writing that raw data without identifying information would be added to a larger pool of data for a research project at the University of Arizona. The raw data submitted to the University of Arizona will be used by the developer of the MUISCV to establish a normative data base for clinical populations. Only those participants who were visited by the researcher were given a verbal description of the study prior to obtaining informed consent.

The following methods were used to ensure
confidentiality:
1. Names of the participants did not appear on the questionnaires. Each participant was assigned a code number.
2. A list of the participants' names (where known) and code numbers, and the consent forms were kept separate from the data and accessible only to the researcher.
3. Any information that might identify the participants was not used or revealed anywhere.

Data Analysis

Data from the questionnaires were coded, entered into a computer file and analyzed using the Statistical Package for the Social Sciences (SPSS:X) computer program. All key-punching was verified by a colleague of the researcher. Descriptive and nonparametric statistics were utilized to analyze the data. Nonparametric statistics were employed because a convenience sample of a small size was used and therefore, the assumption of normality upon which parametric statistics rests cannot be assured (Burns & Grove, 1987). Nonparametric statistics on the other hand, are distribution-free and are therefore valid when the assumption of normality is not satisfied (Lehmann, 1975).

The two nonparametric statistical tests used in this study were the Mann-Whitney U test and the Spearman's correlation coefficient. The Mann-Whitney U test was utilized to test the difference in selected variables between two groups of patients. The Spearman's rho
correlation coefficient was employed to determine whether a relationship existed between uncertainty and life satisfaction and perceptions of health status.

The level of significance established for this study was 0.05.
CHAPTER FOUR
Presentation and Discussion of Results

Introduction

This chapter is arranged under three headings: characteristics of the sample; findings; and discussion of results.

Characteristics of the Sample

Due to the difficulty encountered in obtaining reoperation patients who lived in the Lower Mainland of British Columbia, a mailing procedure was implemented to secure a greater number of reoperation patients. The mailing procedure was implemented after the researcher had visited 10 of the primary CABG patients. The researcher continued to visit a total of 20 primary CABG patients. To control for method variance, the questionnaires were also mailed to a group of primary CABG patients. Primary CABG patients who were visited by the researcher were compared to the mailed primary CABG patients to determine whether data from the two groups of primary CABG patients could be pooled. Using the Mann-Whitney U test, the two groups of subjects were compared in terms of the following variables: age, number of bypass grafts, number of weeks since surgery, past life satisfaction, present life satisfaction, future life satisfaction, uncertainty, and perceptions of health status. There were no significant differences in the eight variables between the two groups of primary CABG patients at the established significance level of .05. Two of the
variables, past life satisfaction and uncertainty, differed significantly at a .08 and .09 level of probability respectively. The remaining six variables differed significantly between the two groups at values that exceeded p = .30. Since no significant differences were found between the visited primary CABG patients and the mailed primary patients at the established significance level of 0.05, the two groups of patients were pooled to form one group of primary CABG patients.

Therefore, 41 primary CABG patients and 11 reoperation patients constituted the sample for this study. Demographic, surgical, and health characteristics will be presented for the primary CABG patients and the reoperation patients.

Demographic Characteristics of the Sample

Demographic data collected from the patients were age, sex, marital status, employment status, and educational level. The ages of the primary CABG patients ranged from 47 to 72 (M=61.8) years. Reoperation patients' ages ranged from 53 to 72 (M=64.2) years (see Table 1). Of the 41 primary CABG patients, nine were female (22.0%) and 32 were male (78.0%). All of the reoperation patients were male. The marital status of primary CABG patients was as follows: three had never married (7.3%), 34 were married (82.9%), and four were divorced (9.8%). Of the reoperation patients, ten were married (90.9%) and one was widowed. The majority of primary CABG patients (56.1%) and reoperation patients
(72.7%) were retired (see Table II). The majority of primary CABG patients (41.5%) and reoperation patients (45.4%) had attained an educational level of grade 12 to 13 (see Table III).

Table I

**Ages of Primary Coronary Artery Bypass Graft Patients and Reoperation Patients**

<table>
<thead>
<tr>
<th>Age</th>
<th><strong>Primary CABG Patients</strong></th>
<th><strong>Reoperation Patients</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percent</td>
</tr>
<tr>
<td>45-49</td>
<td>5</td>
<td>12.2</td>
</tr>
<tr>
<td>50-54</td>
<td>1</td>
<td>2.4</td>
</tr>
<tr>
<td>55-59</td>
<td>8</td>
<td>19.5</td>
</tr>
<tr>
<td>60-64</td>
<td>10</td>
<td>24.4</td>
</tr>
<tr>
<td>65-69</td>
<td>12</td>
<td>29.3</td>
</tr>
<tr>
<td>70-74</td>
<td>5</td>
<td>12.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>41</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Table II

**Employment Status of Primary Coronary Artery Bypass Graft Patients and Reoperation Patients**

<table>
<thead>
<tr>
<th>Employment Status</th>
<th><strong>Primary CABG Patients</strong></th>
<th><strong>Reoperation Patients</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percent</td>
</tr>
<tr>
<td>Employed</td>
<td>14</td>
<td>34.1</td>
</tr>
<tr>
<td>Unemployed</td>
<td>0</td>
<td>00.0</td>
</tr>
<tr>
<td>Retired</td>
<td>23</td>
<td>56.1</td>
</tr>
<tr>
<td>Disability pension</td>
<td>4</td>
<td>9.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>41</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>
Table III

Educational Level of Primary Coronary Artery Bypass Graft Patients and Reoperation Patients

<table>
<thead>
<tr>
<th>Educational Level</th>
<th>Primary CABG Patients</th>
<th>Reoperation Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percent</td>
</tr>
<tr>
<td>Up to grade 8</td>
<td>3</td>
<td>7.3</td>
</tr>
<tr>
<td>Grade 9-11</td>
<td>14</td>
<td>34.1</td>
</tr>
<tr>
<td>Grade 12-13</td>
<td>17</td>
<td>41.5</td>
</tr>
<tr>
<td>College or university</td>
<td>7</td>
<td>17.1</td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Surgical Characteristics of the Sample

Surgical data collected from the patients were time postoperatively in weeks and number of bypass grafts. Additional data collected from the reoperation patients were time in months between their first and second CABG surgery and the reason for the second surgery. Primary CABG patients were 21 to 39 (M=28.4) weeks postoperative. Reoperation patients were 22 to 38 (M=27.1) weeks postoperative (see Table IV). The number of bypass grafts in the primary CABG patients ranged from one to six (M=3.7). Reoperation patients had two to six (M=3.5) bypass grafts in the recent surgery (see Table V). For the reoperation patients, the number of months between their first and second CABG surgery ranged from 40 to 161 (M=111.2, SD=31.7). Ten of the reoperation patients (90.9%) stated that blockage of the coronary arteries or grafts was the
reason for the second surgery. One of the reoperation patients stated that the reason the second surgery was needed was "because the doctor told me I needed it".

Table IV

<table>
<thead>
<tr>
<th>Weeks Postoperative</th>
<th>Primary CABG Patients</th>
<th>Reoperation Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percent</td>
</tr>
<tr>
<td>20-23</td>
<td>9</td>
<td>22.0</td>
</tr>
<tr>
<td>24-27</td>
<td>11</td>
<td>26.8</td>
</tr>
<tr>
<td>28-31</td>
<td>10</td>
<td>24.4</td>
</tr>
<tr>
<td>32-35</td>
<td>5</td>
<td>12.2</td>
</tr>
<tr>
<td>36-39</td>
<td>6</td>
<td>14.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>41</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Table V

<table>
<thead>
<tr>
<th>Number of Bypass Grafts</th>
<th>Primary CABG Patients</th>
<th>Reoperation Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percent</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>4.9</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>12.2</td>
</tr>
<tr>
<td>3</td>
<td>11</td>
<td>26.8</td>
</tr>
<tr>
<td>4</td>
<td>13</td>
<td>31.7</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>14.6</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>9.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>41</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>
Health Characteristics of the Sample

The health data collected from the patients were the number of heart medications taken, the symptoms experienced since surgery, and non-cardiovascular medical/health problems experienced. The number of heart medications taken by primary CABG patients ranged from zero to six ($M = 2.2$). The majority of primary CABG patients (73.2%) were taking one to three heart medications. The number of heart medications taken by reoperation patients ranged from one to three ($M = 1.8$).

The number of postoperative symptoms reported by primary CABG patients ranged from zero to two ($M = .5$). Similarly, the number of postoperative symptoms reported by the reoperation patients ranged from zero to two ($M = .6$). The majority of primary CABG patients (56.1%) and reoperation patients (54.5%) reported having no postoperative symptoms. The symptoms most frequently reported by the primary CABG patients were shortness of breath (8 patients) and angina (4 patients). Other symptoms reported by three or fewer primary CABG patients were leg pain, fatigue, arrhythmias, and incisional tenderness. The symptoms reported by reoperation patients were angina (3 patients), and shortness of breath (4 patients).

The number of non-cardiovascular medical or health problems reported by the primary CABG patients ranged from zero to two ($M = .4$). The number of non-cardiovascular medical or health problems reported by the reoperation
patients ranged from zero to one ($M = .5$). The majority of primary CABG patients (63.4%) and reoperation patients (54.6%) reported having no other medical or health problems. The health/medical problems most frequently reported by the primary CABG patients were arthritis (4 patients) and insulin-independent diabetes (3 patients). The other medical/health problems reported by one or two of the primary CABG patients included the following: kidney stones, thyroid problems, sternal infection, ulcers, hiatus hernias, tendinitis and prostate problems. The health/medical problem most frequently reported by the reoperation patients was back pain (2 patients). Other medical/health problems reported by the reoperation patients were ulcers, hiatus hernias, and tinnitus.

**Findings**

The findings of the study will be presented in relation to each of the eight research questions. The differences in uncertainty, past life satisfaction, present life satisfaction, future life satisfaction, and perceptions of health status between the primary CABG patients and reoperation patients were examined using the Mann-Whitney $U$ test. Spearman's rank correlation coefficient was used to examine the relationship between uncertainty and present life satisfaction, future life satisfaction, and perceptions of health status. Primary CABG patients and reoperation patients were combined into one group for the correlational analyses.
Research Question 1: Difference in Uncertainty Between Primary CABG Patients and Reoperation Patients

The total score on the uncertainty scale (MUISCV) for the primary CABG patients ranged from 32 to 109 (M = 60.8, SD = 15.4). For the reoperation patients, total uncertainty ranged from 57 to 85 (M = 65.2, SD = 9.7) (see Table VI). There was no significant difference in uncertainty between the primary CABG patients and the reoperation patients (Z = -1.29, p = .20).

Table VI

Uncertainty for Primary Coronary Artery Bypass Graft Patients and Reoperation Patients

<table>
<thead>
<tr>
<th>Total Score on MUISCV</th>
<th>Primary CABG Patients</th>
<th>Reoperation Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percent</td>
</tr>
<tr>
<td>30-39</td>
<td>2</td>
<td>4.9</td>
</tr>
<tr>
<td>40-49</td>
<td>6</td>
<td>14.6</td>
</tr>
<tr>
<td>50-59</td>
<td>13</td>
<td>31.7</td>
</tr>
<tr>
<td>60-69</td>
<td>10</td>
<td>24.4</td>
</tr>
<tr>
<td>70-70</td>
<td>5</td>
<td>12.2</td>
</tr>
<tr>
<td>80-89</td>
<td>3</td>
<td>7.4</td>
</tr>
<tr>
<td>90-99</td>
<td>1</td>
<td>2.4</td>
</tr>
<tr>
<td>100-109</td>
<td>1</td>
<td>2.4</td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Note. Twenty-eight items scored from 1 to 5. Minimum score possible = 28. Maximum score possible = 140.

Research Question 2: Difference in Past Life Satisfaction Between Primary CABG Patients and Reoperation Patients

For primary CABG patients, the ratings of past life satisfaction on the Cantril Self-Anchoring Scale ranged from
The ratings of past life satisfaction of the reoperation patients ranged from 3 to 10 ($M = 5.0$, $SD = 2.4$) (see Table VII). The difference in past life satisfaction between the primary CABG patients and reoperation patients was not statistically significant ($Z = -.95$, $p = .34$).

Table VII

### Past Life Satisfaction for Primary Coronary Artery Bypass Graft Patients and Reoperation Patients

<table>
<thead>
<tr>
<th>Rating</th>
<th>Primary CABG Patients</th>
<th>Reoperation Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percent</td>
</tr>
<tr>
<td>1-2</td>
<td>4</td>
<td>9.8</td>
</tr>
<tr>
<td>3-4</td>
<td>12</td>
<td>29.3</td>
</tr>
<tr>
<td>5-6</td>
<td>11</td>
<td>26.8</td>
</tr>
<tr>
<td>7-8</td>
<td>8</td>
<td>19.5</td>
</tr>
<tr>
<td>9-10</td>
<td>6</td>
<td>14.6</td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Note. Scale ranged from 1 = very worst way of life to 10 = very best way of life.

Research Question 3: Difference in Present Life Satisfaction Between Primary CABG Patients and Reoperation Patients

The ratings of present life satisfaction of the primary CABG patients ranged from 3 to 10 ($M = 7.3$, $SD = 1.8$). Reoperation patients' ratings of present life satisfaction ranged from 2 to 9 ($M = 6.3$, $SD = 2.0$) (see Table VIII). The difference in present life satisfaction between primary CABG patients and reoperation patients was not statistically
significant \( (Z = -1.45, p = .15) \).

Table VIII

Present Life Satisfaction for Primary Coronary Artery Bypass Graft Patients and Reoperation Patients.

<table>
<thead>
<tr>
<th>Rating</th>
<th>Primary CABG Patients</th>
<th>Reoperation Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percent</td>
</tr>
<tr>
<td>1-2</td>
<td>0</td>
<td>00.0</td>
</tr>
<tr>
<td>3-4</td>
<td>3</td>
<td>7.3</td>
</tr>
<tr>
<td>5-6</td>
<td>6</td>
<td>14.7</td>
</tr>
<tr>
<td>7-8</td>
<td>22</td>
<td>53.6</td>
</tr>
<tr>
<td>9-10</td>
<td>10</td>
<td>24.4</td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Note. Scale ranged from 1 = very worst way of life to 10 = very best way of life.

Research Question 4: Difference in Future Life Satisfaction Between Primary CABG Patients and Reoperation Patients

For the primary CABG patients, the ratings of future life satisfaction ranged from 5 to 10 (\( M = 8.5, SD = 1.3 \)). The ratings of future life satisfaction of the reoperation patients ranged from 4 to 10 (\( M = 6.8, SD = 1.9 \)) (see Table IX). Projected future life satisfaction of the primary CABG patients was significantly higher than that of the reoperation patients (\( Z = -2.63, p = .009 \)).

Research Question 5: Difference in Perception of Health Status Between Primary CABG Patients and Reoperation Patients

Perceptions of health status using the GHRI ranged from 48 to 103 (\( M = 76.5, SD = 15.2 \)) for the primary CABG patients. The reoperation patients' perceptions of health
status ranged from 42 to 91 (M = 64.7, SD = 15.5) (see Table X). Primary CABG patients' perceptions of health were significantly more favorable than the reoperation patients' perceptions of health status (Z = -2.11, p = .04).

Table IX

**Future Life Satisfaction for Primary Coronary Artery Bypass Graft Patients and Reoperation Patients**

<table>
<thead>
<tr>
<th>Rating</th>
<th>Primary CABG Patients</th>
<th>Reoperation Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percent</td>
</tr>
<tr>
<td>1-2</td>
<td>0</td>
<td>00.0</td>
</tr>
<tr>
<td>3-4</td>
<td>0</td>
<td>00.0</td>
</tr>
<tr>
<td>5-6</td>
<td>4</td>
<td>9.8</td>
</tr>
<tr>
<td>7-8</td>
<td>15</td>
<td>36.6</td>
</tr>
<tr>
<td>9-10</td>
<td>22</td>
<td>53.6</td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**Note.** Scale ranged from 1 = very worst way of life to 10 = very best way of life.

**Research Question 6: Relationship Between Uncertainty and Present Life Satisfaction in CABG Patients**

Using the Spearman's rank correlation coefficient, a significant negative relationship was found between uncertainty and present life satisfaction (\( \rho = -.33, p = .009 \)). Higher uncertainty was associated with lower present life satisfaction.

**Research Question 7: Relationship Between Uncertainty and Future Life Satisfaction**

A significant negative relationship was found between uncertainty and future life satisfaction (\( \rho = -.43, \))
p = .001). Higher uncertainty was associated with lower expectations of future life satisfaction.

Table X

Perceptions of Health Status for Primary Coronary Artery Bypass Graft Patients and Reoperation Patients

<table>
<thead>
<tr>
<th>GHRI Score</th>
<th>Primary CABG Patients</th>
<th>Reoperation Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>40-49</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>50-59</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>60-69</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>70-79</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>80-89</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>90-99</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>100-109</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>11</td>
</tr>
</tbody>
</table>

Note. Twenty-two items scored from 1 to 5. Minimum score possible = 22. Maximum score possible = 110.

Research Question 8: Relationship Between Uncertainty and Perception of Health Status

A significant negative relationship was found between uncertainty and perception of health status (\( \rho = -.38, p = .002 \)). Higher uncertainty was associated with perceptions of a poorer health status.

Discussion of the Results

The discussion of the results will take place under five major headings: sample characteristics; uncertainty; life satisfaction; perceptions of health status; and the relationship of uncertainty to adaptational outcomes. The
results of this study will be discussed in relation to theoretical expectations, other research studies, and the methodological problems inherent in the study.

Characteristics of the Sample

The small sample size and the convenience method of sampling may have resulted in a sample that is not representative of the populations of primary CABG patients and reoperation patients who are five to ten months postoperative. The small sample size is particularly acute in the reoperation group. It should be noted that, despite having the assistance of seven cardiovascular surgeons in obtaining subjects for this study, and mailing the questionnaires province-wide, only 18 reoperation patients were found to be potential participants for this study.

Canadian statistics from 1984 to 1985 indicate that the largest percentage of CABG surgical procedures (68%) were performed on patients 55 years of age and older (Statistics Canada, personal communication, June 22, 1988). Of the CABG surgical procedures performed in Canada between 1984 and 1985, 79% of the cases were male (Statistics Canada, personal communication, June 22, 1988). Therefore, with respect to age and sex, the sample of this study appears to reflect the national trends. No statistics could be found with which to determine the representativeness of the sample of this study in terms of other demographic, surgical, or health characteristics. However, considering that the subjects contacted for this study constituted a large
percentage of the seven cardiovascular surgeons' patients that were five to ten months postoperative, it seems that the sample of this study was reasonably representative of the primary CABG patients and reoperation patients who had their surgery performed in Vancouver.

The primary CABG patients and reoperation patients were similar with respect to age, marital status, educational level, number of postoperative weeks, number of bypass grafts, and number of heart medications taken. Although the majority of primary CABG patients and reoperation patients were retired, a greater percentage of the primary CABG patients were actively employed than was the case in the reoperation group. This may reflect the greater number of primary CABG patients who were younger than retirement age. There were no females in the reoperation group; however, this may be due to the extremely small sample size of the reoperation group. The number of postoperative symptoms and non-cardiovascular health problems was similar for both groups. However, the broad nature of the symptoms and health problems reported, and the lack of information obtained regarding the severity of the symptoms and health problems experienced makes it impossible to establish the similarity of the two groups with respect to these two health characteristics.

Uncertainty

Both primary CABG patients and reoperation patients perceived moderately low levels of uncertainty with means
ranging from 60.8 to 65.2. There was a higher degree of variability in the uncertainty perceived by the primary CABG patients than the reoperation patients, with some primary CABG patients having very low uncertainty and others having moderately high uncertainty. It is possible that a wider variance would have been noted in the reoperation group with a larger number of patients.

Only one study was found in the literature that measured uncertainty in a sample that is comparable to the CABG patients studied here. In the study of open heart surgery patients by Mishel (1981b), mean uncertainty scores for patients preoperatively, two days postoperatively, in the observational unit, and two weeks following discharge were 75.8, 72.0, 77.1, and 71.6 respectively. It is not known whether patients in Mishel's study had open heart surgery for coronary insufficiency or structural repair. Mishel utilized a 30-item version of the MUIS in contrast to the 28-item version used in this study which makes the comparison of results difficult. However, the mean uncertainty of patients after discharge in Mishel's study differs from the mean uncertainty of the primary CABG patients and reoperation patients in the present study by six to ten points. It is unlikely that two items would have contributed to the difference between the means of the two studies suggesting that the primary CABG patients and reoperation patients in this study had lower uncertainty than the subjects in Mishel's study. Mishel's subjects were
assessed two weeks following discharge compared to the five to ten month postoperative interval used in this study. Therefore, the lower uncertainty of the patients in this study may be due to the effects of time on uncertainty.

Although the MUISCV scores indicate that the primary CABG patients and reoperation patients experienced moderately low levels of uncertainty five to ten months postoperatively, it is possible that the MUISCV does not represent all of uncertainties experienced by patients recovering from CABG surgery. Further investigation using a qualitative methodology might reveal that uncertainty is more pervasive in CABG patients who are five to ten months postoperative.

According to the theoretical framework used in this study, the appraisal of uncertainty is influenced by situation factors (Lazarus & Folkman, 1984). The situation factor examined in this study was the nature of the surgery, that is, whether patients had undergone their first or second CABG surgery. Postoperatively, reoperation patients, by virtue of their need for reoperation, may perceive greater uncertainty about the effectiveness of the treatment in controlling their symptoms and their long term prognosis. For primary CABG patients, the experience of recovery from CABG surgery is novel and unfamiliar, and they may have greater uncertainty about what they can and cannot do, whether they are progressing as expected, and what the long term outcomes of surgery are.
In this study, the reoperation patients had higher uncertainty than the primary CABG patients, but the difference in the degree of uncertainty between the two groups of patients was not statistically significant. Means for the 28 items of the MUISCV were explored to determine whether any differences existed in the nature of the uncertainty experienced by primary CABG patients and reoperation patients. The item means can be reviewed in Appendix M. There were no significant differences between the two groups of patients on any of the items. Furthermore, there appeared to be a high degree of consistency between the groups in the items scored to reflect higher uncertainty. Hilton's (1987) factor analysis of the MUISCV was referred to in order to determine the dimensions underlying those items scored to reflect higher uncertainty by both groups. The items tapped into the unpredictability and lack of consistency in the situation.

Given the lack of a significant difference in the degree or nature of uncertainty perceived by the primary and reoperation patients, it does not appear that the situation factor of a first or second CABG surgery is one which influences the appraisal of uncertainty in patients who are five to ten months postoperative. Rather, it appears that primary CABG patients and reoperation patients who are five to ten months postoperative have similar appraisals of uncertainty, with uncertainty in both groups being generated by the unpredictability of the underlying illness and the
lack of consistency in the illness course.

The lack of a significant difference in the degree and nature of uncertainty between the primary CABG patients and reoperation patients may have been related to the small sample size, particularly that of the reoperation group. Furthermore, the appraisal of uncertainty may differ between primary CABG patients and reoperation patients during other stages of the CABG surgical experience, particularly preoperatively. Reoperation patients may perceive less uncertainty than primary CABG patients in the preoperative period as the events during that period are familiar to reoperation patients, and it is more likely that they have formulated clearer expectations regarding the actual surgery by virtue of their previous experience with CABG surgery.

Life Satisfaction

The primary CABG patients and the reoperation patients were compared in terms of their ratings of past, present, and future life satisfaction. The mean ratings of past, present, and future life satisfaction showed the same trend in the primary CABG patients and the reoperation patients; that is, past life satisfaction was rated lowest, present life satisfaction was rated higher than past life satisfaction, and future life satisfaction was rated higher than present life satisfaction. This trend suggests that, for primary CABG patients and reoperation patients who are five to ten months postoperative, life satisfaction is improved following surgery and there is optimism about the
The findings of this study can be compared to findings obtained in studies by Penckofer and Holm (1984) and Flynn and Frantz (1987) (see Table XI). In each study, the Cantril Self-Anchorign Scale was used to measure life satisfaction.

Table XI

<table>
<thead>
<tr>
<th></th>
<th>Present Life Satisfaction</th>
<th>Penckofer and Holm</th>
<th>Flynn and Frantz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study</td>
<td>Primary Reoperation 3-5 mos.</td>
<td>6-8 mos.</td>
<td>6-10 wks.</td>
</tr>
<tr>
<td>Past</td>
<td>5.6</td>
<td>5.0</td>
<td>3.6</td>
</tr>
<tr>
<td>Present</td>
<td>7.3</td>
<td>6.3</td>
<td>5.4</td>
</tr>
<tr>
<td>Future</td>
<td>8.5</td>
<td>6.8</td>
<td>7.9</td>
</tr>
</tbody>
</table>

The trend in life satisfaction found in the present study was also found in the study by Penckofer and Holm (1984) however, in the study by Flynn and Frantz (1987), present life satisfaction was very similar to past life satisfaction. One possible explanation for the different findings of Flynn and Frantz is that patients in that study were only six to ten weeks postoperative and ratings of present life satisfaction may have been adversely influenced by residual discomfort from the CABG surgery itself.

The postoperative recovery time of the primary CABG patients and reoperation patients in this study was similar to the six to eight month postoperative primary CABG group
in the study by Penckofer and Holm (1984). With the exception of past life satisfaction, the mean ratings of life satisfaction are similar for the primary CABG patients in the present study and the group of six to eight month postoperative patients in Penckofer and Holm's study. With the exception of past life satisfaction, the reoperation patients in the present study rated their life satisfaction substantially lower than the six to eight month postoperative patients in study by Penckofer and Holm. This researcher is unable to explain why the mean ratings of past life satisfaction for the patients in the present study were substantially higher than that of the patients in Penckofer and Holm's study.

In this study, there were no significant differences in the past and present life satisfaction between the primary CABG patients and reoperation patients. The lack of a significant difference in the past life satisfaction between the primary CABG patients and reoperation patients is not a noteworthy finding in itself. However, as implied earlier, the findings related to past life satisfaction are important in that they reveal that CABG surgery was associated with an improvement in the life satisfaction of both primary and reoperation patients. Both primary CABG and reoperation patients were moderately satisfied with their present lives.

The projected future life satisfaction of the reoperation patients was significantly lower than the projected future life satisfaction of the primary CABG
patients. As can be seen in Table XIV, the mean rating of future life satisfaction of the reoperation patients was also lower than the mean rating of future life satisfaction of the primary CABG patients in the studies by Penckofer and Holm (1984) and Flynn and Frantz (1987).

The significantly lower projected future life satisfaction of the reoperation patients is not a surprising result. Reoperation patients have experienced the return or progression of symptoms following their first CABG surgery and are therefore more likely to feel a guarded optimism about their future. Primary CABG patients on the other hand, may believe that CABG surgery promises well-being, leading them to have optimistic responses to the appraisal of future life satisfaction.

A second factor which might explain the significant difference in future life satisfaction between the primary CABG patients and reoperation patients is their perception of health status. The literature indicates that life satisfaction is strongly influenced by the patient's perception of health status, with perception of health status significantly positively related to life satisfaction (Flynn & Frantz, 1987; Garrity, 1973a; Palmore & Luikart, 1972). In this study, there was a significant difference in perception of health status between primary CABG patients and reoperation patients with the reoperation patients perceiving their health to be significantly less favorable than the primary CABG patients' perception of health. The
reoperation patients' appraisal of a poorer health status may lead them to perceive that their future is in jeopardy resulting in less favorable appraisals of their future life satisfaction.

Cantril (1965) suggested that when ratings of life satisfaction are obtained using the Cantril Self-Anchoring Scale, participants should be asked to describe to the researcher those elements that anchor the scale in terms of the best way of life and worst way of life so that the means by which an individual evaluates his past, present, and future life satisfaction become known. In the present study, patients were asked to think about rather than describe to the researcher what they felt to be the best and worst way of life. The rationale for this modification was methodological in nature. Since the questionnaires were mailed to some of the participants it would not have been possible to have the participants describe the anchoring points to the researcher, or the manner by which they rated their life satisfaction. Although it would have been possible to follow the approach suggested by Cantril with the group of primary CABG patients who were visited by the researcher, this would have resulted in two different approaches to data collection which might have affected the results obtained. Unfortunately, this prevented the researcher from obtaining some additional data with which to explain the differences and similarities in life satisfaction between the primary CABG patients and the
reoperation patients.

Perception of Health Status

The perceptions of health status of the primary CABG patients were found to be significantly more favorable than the reoperation patients' perception of health status. While the primary CABG patients perceived their health to be moderately good, the reoperation patients perceived their health to be below average.

The finding of perceptions of poorer health in the reoperation patients was not unexpected. The need for reoperation may highlight the seriousness, progressiveness, and incurability of the underlying disease to the reoperation patients leading them to perceive their health as poor despite having an improvement in physiological well-being following CABG surgery. In contrast, primary CABG patients, particularly those that are symptom-free following CABG surgery, may believe that CABG surgery has eradicated their disease, leading them to have more favorable perceptions of their health. Dubyts (1988) found that patients awaiting their first CABG surgery had a tendency to believe that their current illness was a temporary one which would be rectified by surgery.

A second possible explanation for the difference in the perceptions of health status between the primary CABG patients and reoperation patients may be the differences in the postoperative symptoms and non-cardiovascular health problems experienced by the two groups of patients.
However, the broad spectrum of symptoms and health problems reported by each group, and the lack of information obtained regarding the severity of the symptoms and health problems experienced makes it difficult to substantiate this claim.

The underlying construct assessed by the GHRI is current health (Davies & Ware, 1981). Unfortunately, no data were collected on the patients' perceptions of their health status prior to CABG surgery, and therefore it is not possible to determine whether CABG surgery was associated with an improvement in the patients' perceptions of their health.

The Relationship Between Uncertainty and Adaptational Outcomes

In this study, Lazarus and Folkman's (1984) theory of stress, appraisal, and coping was used to understand the relationship between uncertainty and the adaptational outcomes of life satisfaction and perception of health status. According to this theory, uncertainty may be appraised as a threat due to the person's inability to determine what is at stake. Alternatively, uncertainty may be appraised as an opportunity, allowing the individual to formulate favorable interpretations of the meaning of a situation. The appraisal of uncertainty affects the coping strategies utilized which, in turn influence adaptational outcomes. Although the influence of uncertainty on appraisal and coping was not explored in the study, it is possible to use the theoretical framework to explain the
Significant negative relationships were found between uncertainty and present life satisfaction, uncertainty and future life satisfaction, and uncertainty and perception of health status. More specifically, higher uncertainty was associated with poorer present life satisfaction, projections of a poorer future life satisfaction, and perceptions of poorer health status in CABG patients who were five to ten months postoperative. These findings suggest that, for CABG patients who are five to ten months postoperative, higher levels of uncertainty are perceived as threatening or stressful. The stress mediates the association of uncertainty and quality of life. It is also possible that higher levels of uncertainty interfere with the coping processes needed to manage the stress generated by the uncertainty itself, leading the CABG patients to feel less confident, more emotionally overwhelmed, and less capable of drawing on coping resources, which further contributes to a poorer quality of life.

Since the relationship between perceived uncertainty and quality of life in CABG patients has not previously been systematically explored, there is no way of comparing the results of the correlational analyses obtained in this study. While the potential association of uncertainty and life satisfaction was noted in the study by Penckofer and Holm (1984), namely, that CABG patients attributed their
dissatisfaction with their lives prior to surgery to a "fear of the unknown" and uncertainty about the future, that finding was anecdotal in nature.

One study was found in the literature which provides partial support for the negative association between perceived uncertainty and future life satisfaction found in this study. In a study of the uncertainty experienced by women with gynecological cancer, Mishel and colleagues (1984) found that higher levels of uncertainty were associated with more sad feelings about the future, less motivation to try to get what is wanted, and negative expectations concerning the future.

Summary

This chapter began with a description of the rationale and method for the pooling of the visited group of primary CABG patients with the mailed group of primary CABG patients. Demographic, surgical, and health characteristics of the primary CABG patients and reoperation patients were reported.

Overall, the primary CABG patients and reoperation patients perceived moderately low levels of uncertainty. However, there was variability noted in the primary CABG patients' appraisal of uncertainty. The nature of the uncertainty experienced by the primary CABG patients and the reoperation patients was similar and appeared to be related to the unpredictability and lack of consistency in the illness course. The lack of a significant difference in the
degree and nature of uncertainty experienced by the primary CABG patients and reoperation patients suggests that having one's first or second CABG surgery is not a situation factor which influences the appraisal of uncertainty in CABG patients who are five to ten months postoperative.

The trend found in ratings of life satisfaction suggests that CABG surgery is associated with an improvement in life satisfaction and optimism for the future in primary CABG patients and reoperation patients who are five to ten months postoperative. There were no significant differences in past life satisfaction and present life satisfaction between the primary CABG patients and reoperation patients. Reoperation patients had significantly less favorable projections of future life satisfaction than primary CABG patients.

There was a significant difference in perceptions of health status between primary CABG patients and reoperation patients. Reoperation patients were found to have significantly less favorable perceptions of their health status than primary CABG patients.

Significant negative correlations were found between uncertainty and the adaptational outcomes of present life satisfaction, future life satisfaction, and perceptions of health status. The negative associations of uncertainty and the adaptational outcomes suggest that higher levels of uncertainty are appraised as threatening or stressful by CABG patients who are five to ten months postoperative.
The results of this study were in the expected direction. The findings of the study were discussed in relation to the theoretical framework, other research studies found in the literature, and the methodological problems inherent in the study.
CHAPTER 5

Summary, Conclusions, Implications and
Recommendations

Introduction

This study was designed to explore the differences in uncertainty, life satisfaction and perceptions of health status between primary CABG patients and reoperation patients. In addition, the relationships between uncertainty and life satisfaction and perceptions of health status in CABG patients were explored. An overview of the study is presented in this chapter followed by conclusions, implications for nursing practice, and recommendations for future research.

Summary

A review of the literature suggests that uncertainty is a salient feature of the experiential accounts of patients waiting for CABG surgery. No research has been found which has looked at the degree of uncertainty experienced by patients recovering from CABG surgery. Furthermore, is not known how the experience of reoperation influences the appraisal of uncertainty. A number of research studies have found that uncertainty has a negative influence on a wide range of adaptational outcomes. Adaptational outcomes of particular interest in the area of CABG surgery are those that are indicators of quality of life. Two important indicators of quality of life are life satisfaction and the patient's perception of health status.
While there are studies that have looked at the life satisfaction and perceptions of health status of primary CABG patients, no studies have been found which have looked at these variables in reoperation patients. Furthermore, research has not addressed the influence that uncertainty has on the quality of life of patients recovering from CABG surgery. Therefore, this study was designed to address the gaps identified in the literature.

This descriptive comparative and correlational study was conducted in western Canada. Data were collected from a convenience sample of 41 primary CABG patients and 11 reoperation patients who were five to ten months postoperative. The researcher had difficulty obtaining an adequate number of reoperation patients from the immediate area for this study, and therefore, two approaches to data collection were required. All of the reoperation patients received the questionnaire by mail. One group of primary CABG patients were visited by the researcher for the purpose of administering the questionnaire. To control for method variance, a second group of primary CABG patients were mailed the questionnaire. No significant differences were found between the two groups of primary CABG patients on a number of selected variables, and therefore data from the two groups of primary CABG patients were pooled.

All subjects completed the Mishel Uncertainty in Illness Scale (Community Version) (MUISCV), the Health Perceptions Questionnaire (HPQ), the Cantril Self-Anchor ing
Scale, and a patient information sheet. The data were analyzed using descriptive statistics and nonparametric statistical tests.

The mean ages of the primary CABG patients and reoperation patients were 61.8 years and 64.2 years respectively. All of the reoperation patients and the majority of primary CABG patients (78%) were male. The majority of primary CABG patients (82.9%) and reoperation patients (90.2%) were married. The largest percentage of primary CABG patients (41.5%) and reoperation patients (45.4%) had attained an educational level of grade 12 to 13. The largest percentage of the primary CABG patients (56.1%) and reoperation patients (72.7%) were retired.

The mean number of postoperative weeks of the primary CABG patients and reoperation patients were 28.4 and 27.1 respectively. The primary CABG patients had an average of 3.7 bypass grafts while the mean number of bypass grafts performed on the reoperation patients was 3.5. For the reoperation patients, the mean number of months between the first CABG surgery and the second surgery was 111.2. The majority of reoperation patients (81.8%) attributed the need for reoperation to blockage of the coronary arteries or grafts.

The mean number of heart medications taken by the primary CABG patients and reoperation patients were 2.2 and 1.8 respectively. The majority of primary CABG patients (56.1%) and reoperation patients (54.5%) reported having no
postoperative symptoms. The majority of primary CABG patients (63.4%) and reoperation patients (54.6%) reported having no other medical or health problems.

The primary CABG patients and reoperation patients experienced moderately low levels of uncertainty five to ten months postoperatively. There was higher variability in the uncertainty experienced by primary CABG patients than in the uncertainty experienced by reoperation patients. The difference in uncertainty between the primary CABG patients and reoperation patients was not statistically significant. The MUISCV items scored to reflect higher uncertainty were similar in both groups of patients and these items appeared to be related to the unpredictability and lack of consistency in the illness situation.

Trends in the mean ratings of life satisfaction were similar for the primary CABG patients and reoperation patients; that is, present life satisfaction was rated higher than past life satisfaction, and future life satisfaction was rated higher than present life satisfaction. The mean ratings of past life satisfaction of the primary CABG patients and reoperation patients were 5.6 and 5.0 respectively. In terms of present life satisfaction, the primary CABG patients had a mean rating of 7.3 while the mean rating of the reoperation patients was 6.3. indicating that both groups of patients were moderately satisfied with their present lives. The differences in past life satisfaction and present life satisfaction between the
primary CABG patients and reoperation patients were not statistically significant. The mean ratings of future life satisfaction of the primary CABG patients and reoperation patients were 8.5 and 6.8 respectively. The difference in future life satisfaction between primary CABG patients and reoperation patients was found to be statistically significant \( Z = -2.63, p = .009 \).

There was a significant difference in perception of health status between the primary CABG patients and reoperation patients \( Z = -2.11, p = .04 \). While the primary CABG patients rated their health as moderately good, the reoperation patients had significantly less favorable perceptions of their health, rating their health as below average.

A significant negative correlation was found between uncertainty and present life satisfaction \( \rho = -.33, p = .009 \). A significant negative correlation was also found between uncertainty and future life satisfaction \( \rho = -.43, p = .001 \). Finally, uncertainty was found to be significantly negatively correlated with perceptions of health status \( \rho = -.38, p = .002 \).

The results of this study were discussed in relation to the theoretical framework, other research studies, and the methodological problems inherent in the study. The uncertainty experienced by the patients in this study was lower than that found in earlier research which addressed the uncertainty experienced by cardiac surgery patients who
were two weeks post-discharge. This suggests that uncertainty may be influenced by time. The lack of a significant difference in the degree and nature of uncertainty experienced by the primary CABG patients and reoperation patients suggests that having one's first or second CABG surgery is not a situation factor which influences the appraisal of uncertainty in patients who are five to ten months postoperative.

The trend found in the mean ratings of life satisfaction gains support from earlier research. This trend suggests that CABG surgery is associated with an improvement in life satisfaction and optimism for the future in both primary CABG patients and reoperation patients. The reoperation patients' less favorable perceptions of health and future life satisfaction suggest that the quality of life of reoperation patients is poorer than that of primary CABG patients five to ten months postoperatively. The need for reoperation may highlight the seriousness and incurability of the underlying disease to the reoperation patients leading them to perceive their health and future as less favorable.

Lazarus and Folkman's (1984) theory of stress, appraisal, and coping was utilized to explain the significant negative correlations between uncertainty and the quality of life indicators. The findings of the correlational analyses suggest that higher levels of uncertainty are appraised as threatening or stressful by
CABG patients who are five to ten months postoperative and this stress mediates the association of uncertainty and quality of life.

**Conclusions**

Due to the small sample size, particularly the small number of reoperation patients, and the non-random nature of the sampling procedure, the results of this study cannot be generalized. However, the findings of this study suggest some similarities, differences and trends among subjects.

Overall, primary CABG patients and reoperation patients who are five to ten months postoperative experience moderately low levels of uncertainty. However, the appraisal of uncertainty is individualized. The nature of the uncertainty experienced by primary CABG patients and reoperation patients who are five to ten months postoperative is similar and appears to be related to the unpredictability and lack of consistency in the illness situation. Given the similarity in the degree and nature of uncertainty experienced by the primary CABG patients and reoperation patients, it does not appear that the experience of reoperation is a factor which influences the appraisal of uncertainty five to ten months postoperatively.

CABG surgery is associated with an improvement in life satisfaction and optimism for the future in primary CABG patients and reoperation patients who are five to ten months postoperative. However, the significantly lower ratings of future life satisfaction and less favorable appraisals of
health of the reoperation patients suggest that, five to ten months postoperatively, the quality of life of reoperation patients may be lower than that of primary CABG patients.

Finally, the quality of life of CABG patients may be adversely influenced by uncertainty. Higher levels of uncertainty are associated with poorer present life satisfaction, projections of poorer future life satisfaction, and perceptions of a less favorable health status in CABG patients who are five to ten months postoperative.

Implications for Nursing Practice

The findings of this study suggest two major implications for nursing practice. First, nurses are often involved in the implementation of educational, supportive and rehabilitative programs for patients recovering from CABG surgery. Traditionally, the approach to these programs has not involved distinguishing primary CABG patients from reoperation patients. However, the lower optimism and perceptions of poorer health of the reoperation patients suggest that reoperation patients have a lower quality of life than primary CABG patients five to ten months postoperatively and therefore, reoperation patients have educational, supportive and rehabilitative needs which differ from those of the primary CABG patients. Nursing interventions that are directed toward improving reoperation patients' quality of life should focus on assisting patients to adapt to the chronicity of the underlying coronary artery
The reoperation patients can be assisted to focus on the positive aspects of their health. In terms of future life satisfaction, reoperation patients can be assisted with the setting of long-term goals that are both realistic and attainable.

Secondly, poorer quality of life of CABG patients appears to be associated with higher levels of uncertainty. Nurses working with CABG patients must perform individualized assessments of the nature and degree of uncertainty experienced by CABG patients and implement nursing interventions that either reduce the uncertainty experienced by the patient or that assist the patient in managing the affects of uncertainty where it is not reducible. Uncertainty generated by a lack of information, lack of clarity, or misconceptions can be reduced through patient education. On the other hand, uncertainty related to the unpredictability and lack of consistency of the illness situation is a form of uncertainty that the CABG patient may need to endure, however, the impact of that uncertainty on the patient's quality of life may be lessened through helping the patient to develop suitable coping strategies.

Recommendations for Future Research

Given the small sample size and convenience method of sampling, this study should be replicated to substantiate the findings obtained. A prospective time series design would provide a more comprehensive assessment of the affects
of CABG surgery on the quality of life of primary CABG patients and reoperation patients. In addition, a prospective time series design would be useful for exploring changes in the degree and nature of uncertainty experienced by primary CABG patients and reoperation patients over time.

The difference in perceptions of health between primary CABG patients and reoperation patients found in this study may be attributed to differences in the severity of the postoperative symptoms and non-cardiovascular health problems experienced by these two groups of patients. Future investigations should include more comprehensive measures of the objective health status of primary CABG patients and reoperation patients to identify whether objective health status or some other variable is responsible for the difference in perceptions of health status between these two groups of patients.

Investigations of the life satisfaction of primary CABG patients and reoperation patients should follow the procedure described by Cantril. Having patients describe the means by which they rate their life satisfaction would increase knowledge of the factors which contribute to the life satisfaction of primary CABG and reoperation patients.

The moderately low level of uncertainty experienced by the primary CABG patients and reoperation patients may have been related to the instrument used to measure uncertainty. Qualitative investigation of the uncertainty experienced by postoperative primary CABG patients and reoperation patients
would be useful for substantiating the pervasiveness and nature of uncertainty experienced by these two groups of patients and the impact that uncertainty has on their quality of life.

A highly significant negative correlation was found between uncertainty and the quality of life indicators explored in this study. It could only be inferred that higher levels of uncertainty are appraised as threatening or stressful by CABG patients and that higher levels of uncertainty interfere with the coping processes needed to manage the stress generated by the uncertainty itself. Therefore, future investigations should attempt to explore more fully the relationships between uncertainty, appraisal, coping, and quality of life in CABG patients.
References


to disease and treatment outcomes in cardiovascular care. *Quality of Life and Cardiovascular Care, 1*, 45-54.


Appendices
Appendix A: Selected Items from the Mishel Uncertainty in Illness Scale (Community Version) (MUISCV)
Selected Items from the Mishel Uncertainty in Illness Scale (Community Version) (MUISCV)

Instructions: Please read each statement. Take your time and think about what each statement says. Then place an "X" under the column that most closely measures how you are feeling TODAY. If you agree with a statement, then you would mark under either "Strongly Agree" or "Agree". If you disagree with a statement, then mark under either "Strongly Disagree" or "Disagree". If you are undecided about how you feel, then mark under "Undecided" for that statement. Please respond to every statement.

1. I don't know what is wrong with me.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5)</td>
<td>(4)</td>
<td>(3)</td>
<td>(2)</td>
<td>(1)</td>
</tr>
</tbody>
</table>

5. The explanations they give about my condition seem hazy to me.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5)</td>
<td>(4)</td>
<td>(3)</td>
<td>(2)</td>
<td>(1)</td>
</tr>
</tbody>
</table>

7. When I have pain, I know what this means about my condition.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5)</td>
<td>(4)</td>
<td>(3)</td>
<td>(2)</td>
<td>(1)</td>
</tr>
</tbody>
</table>

8. My symptoms continue to change unpredictably.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5)</td>
<td>(4)</td>
<td>(3)</td>
<td>(2)</td>
<td>(1)</td>
</tr>
</tbody>
</table>
9. I understand everything explained to me.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5)</td>
<td>(4)</td>
<td>(3)</td>
<td>(2)</td>
<td>(1)</td>
</tr>
</tbody>
</table>

13. Because of the unpredictability of my illness, I cannot plan for the future.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5)</td>
<td>(4)</td>
<td>(3)</td>
<td>(2)</td>
<td>(1)</td>
</tr>
</tbody>
</table>

14. The course of my illness keeps changing. I have good and bad days.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5)</td>
<td>(4)</td>
<td>(3)</td>
<td>(2)</td>
<td>(1)</td>
</tr>
</tbody>
</table>

15. I have been given many differing opinions about what is wrong with me.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5)</td>
<td>(4)</td>
<td>(3)</td>
<td>(2)</td>
<td>(1)</td>
</tr>
</tbody>
</table>

16. It is not clear what is going to happen to me.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5)</td>
<td>(4)</td>
<td>(3)</td>
<td>(2)</td>
<td>(1)</td>
</tr>
</tbody>
</table>

17. I usually know if I am going to have a good or bad day.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5)</td>
<td>(4)</td>
<td>(3)</td>
<td>(2)</td>
<td>(1)</td>
</tr>
</tbody>
</table>
19. The effectiveness of the treatment is undetermined.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5)</td>
<td>(4)</td>
<td>(3)</td>
<td>(2)</td>
<td>(1)</td>
</tr>
</tbody>
</table>

20. I can generally predict the course of my illness.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5)</td>
<td>(4)</td>
<td>(3)</td>
<td>(2)</td>
<td>(1)</td>
</tr>
</tbody>
</table>

22. I'm certain they will not find anything else wrong with me.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5)</td>
<td>(4)</td>
<td>(3)</td>
<td>(2)</td>
<td>(1)</td>
</tr>
</tbody>
</table>

24. They have not given me a specific diagnosis.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5)</td>
<td>(4)</td>
<td>(3)</td>
<td>(2)</td>
<td>(1)</td>
</tr>
</tbody>
</table>

25. My physical distress is predictable, I know when it is going to get better or worse.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5)</td>
<td>(4)</td>
<td>(3)</td>
<td>(2)</td>
<td>(1)</td>
</tr>
</tbody>
</table>

26. My diagnosis is definite and will not change.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5)</td>
<td>(4)</td>
<td>(3)</td>
<td>(2)</td>
<td>(1)</td>
</tr>
</tbody>
</table>

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27. The seriousness of my illness has been determined.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5)</td>
<td>(4)</td>
<td>(3)</td>
<td>(2)</td>
<td>(1)</td>
</tr>
</tbody>
</table>

28. The doctors and nurses use everyday language so I can understand what they are saying.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5)</td>
<td>(4)</td>
<td>(3)</td>
<td>(2)</td>
<td>(1)</td>
</tr>
</tbody>
</table>

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Appendix B: General Health Perceptions Questionnaire (HPQ)
General Health Perceptions Questionnaire (HPQ)

Instructions: The purpose of the following items is to find out how you feel about your health. THERE ARE NO RIGHT OR WRONG ANSWERS. I just want to know how true each statement is for you. I would like you to tell me whether you think the statements are true or false. I simply want you to tell me what you believe. Circle the number beside each item which best corresponds to how true or false this statement is for you. Circle only one number for each item.

1= Definitely False
2= Mostly False
3= Don't Know
4= Mostly True
5= Definitely True

1. According to the doctors I've seen, my health is now excellent. 1 2 3 4 5
2. I try to avoid letting illness interfere with my life. 1 2 3 4 5
3. I seem to get sick a little easier than other people. 1 2 3 4 5
4. I feel better now than I ever have before. 1 2 3 4 5
5. I will probably be sick a lot in the future. 1 2 3 4 5
6. I never worry about my health. 1 2 3 4 5
7. Most people get sick a little easier than I do. 1 2 3 4 5
8. I don't like to go to the doctor. 1 2 3 4 5
9. I am somewhat ill. 1 2 3 4 5
10. In the future, I expect to have better health than other people I know. 1 2 3 4 5
11. I was so sick once I thought I might die. 1 2 3 4 5
12. I'm not as healthy now as I used to be. 1 2 3 4 5
1 = Definitely False
2 = Mostly False
3 = Don't Know
4 = Mostly True
5 = Definitely True

13. I worry about my health more than other people worry about their health.  1 2 3 4 5
14. When I'm sick, I try to just keep going as usual.  1 2 3 4 5
15. My body seems to resist illness very well.  1 2 3 4 5
16. Getting sick once in a while is a part of my life.  1 2 3 4 5
17. I'm as healthy as anybody I know.  1 2 3 4 5
18. I think my health will be worse in the future than it is now.  1 2 3 4 5
19. I've never had an illness that lasted a long period of time.  1 2 3 4 5
20. Others seem more concerned about their health than I am about mine.  1 2 3 4 5
21. When I'm sick I try to keep it to myself.  1 2 3 4 5
22. My health is excellent.  1 2 3 4 5
23. I expect to have a very healthy life.  1 2 3 4 5
24. My health is a concern in my life.  1 2 3 4 5
25. I accept that sometimes I'm just going to be sick.  1 2 3 4 5
26. I have been feeling bad lately.  1 2 3 4 5
27. It doesn't bother me to go to a doctor.  1 2 3 4 5
28. I have never been seriously ill.  1 2 3 4 5
29. When there is something going around, I usually catch it.  1 2 3 4 5
30. Doctors say that I am now in poor health.  1 2 3 4 5
1=Definitely False  
2=Mostly False  
3=Don't Know  
4=Mostly True  
5=Definitely True

31. When I think I am getting sick, I fight it.  

32. I feel about as good now as I ever have.

Appendix C: Scoring Rules for the General Health Rating Index (GHRI) Component of the Health Perceptions Questionnaire
Scoring Rules for the General Health Rating Index (GHRI)
Component of the Health Perceptions Questionnaire

**Item Scoring**

1 = Definitely true
2 = Mostly true
3 = Don't know
4 = Mostly false
5 = Definitely false

3, 5, 9, 11, 12, 13, 18, 26, 29, 30

1 = Definitely false
2 = Mostly false
3 = Don't know
4 = Mostly true
5 = Definitely true

1, 4, 6, 7, 10, 15, 17, 19, 22, 23, 28, 32

**GHRI Scoring**

(Sum these items after scoring as above)

\[
1 + 3 + 4 + 5 + 6 + 7 + 9 + 10 + 11 + 12 + 13 + 15 + 17 + 18 + 19 + 22 + 23 + 26 + 28 + 29 + 30 + 32
\]

**Note.** Questionnaire responses are printed 1=Definitely False, etc., so only items in first set are recoded to score General Health Rating Index.
Appendix D: Cantril Self-Anchoring Scale
Cantril Self-Anchorong Scale

Instructions: Think about what you feel would be the very best or ideal way of life. Next, think about what you feel is the very worst way of life. Below is a picture of a ladder. The best way of life that you have just thought about is at the top of the ladder (i.e. 10). The worst way of life that you have just thought about is at the bottom of the ladder (i.e. 1).

1. Where on this ladder would you say you are right now?_____

2. Where on this ladder were you two years ago?_____

3. Where on this ladder do you expect to be two years from now?_____

Appendix E: Patient Information Sheet
Patient Information Sheet

Below are a number of questions. Please indicate your answer to each question in the space provided. Some of the questions may not apply to you. If the question does not apply to you, please write "Not Applicable" in the space beside that question.

Are you male or female?_________ What is your age?_____

Did you have your first or second coronary artery bypass surgery?____________________

If you have had your second coronary artery bypass surgery, why was the second surgery needed?____________________

How many coronary arteries were bypassed on this last operation?___________

What was the date of your first coronary artery bypass surgery?___________

What was the date of your second coronary artery bypass surgery?___________

What is your marital status? Never married_____ Married______
Separated______ Divorced______ Widowed______

What level of education do you have? Up to grade 8_______
Grade 9-11_______
Grade 12-13_______
College or university_______

What is your employment status? Presently employed_____
Presently unemployed_____
Retired_____
Disability pension_____

What is your occupation?____________________

What medications are you currently taking? ___________

What symptoms have you been having since your surgery (e.g. angina, shortness of breath)? ________________________

What other medical/health problems do you have? _________

What is the date that you completed this questionnaire? ________________________
Appendix F: Patient Information Letter for Visited Subjects
Appendix G: Consent Form
Appendix H: Patient Information Letter for Mailed Subjects
Appendix I: Request for Study Findings
Request for Study Findings

I am interested in receiving a summary of the study findings so I am including my name and mailing address below.

________________________________________ (name)

________________________________________ (address)

If you have completed this form, please remember to include it with the completed questionnaire in the return stamped envelope.
Appendix J: Reminder Letter
Appendix K: Physician Consent Form
Physician Consent Form

I, ______________, agree to provide Lori Simurda with the names of patients who have had coronary artery bypass surgery within the past six to eight months. This would include both patients who have had their first coronary artery bypass surgery and patients who have had one reoperation. Patients will not have other major medical problems. I understand that Lori Simurda will contact these patients by mail and then telephone them to inquire if they are interested in participating in her study entitled "Differences in Uncertainty and Quality of Life Between Primary and Reoperation Coronary Artery Bypass Patients". I understand that patients will be asked to complete a questionnaire and that Lori Simurda will be with the patients when the questionnaire is administered.

__________________________________________

(signature of physician)

Note. Postoperative interval extended to five to ten months.
Appendix L: Physician Information Letter
Appendix M: MUISCV Item Means for Primary CABG Patients and Reoperation Patients
MUISCV Item Means for Primary CABG Patients and Reoperation Patients

<table>
<thead>
<tr>
<th>MUISCV Item</th>
<th>Primary CABG Patients Item Mean</th>
<th>Reoperation Patients Item Mean</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1.7</td>
</tr>
<tr>
<td>28</td>
<td>1.9</td>
<td>1.7</td>
</tr>
</tbody>
</table>

Note.

* = Items scored to reflect higher uncertainty by primary CABG patients and reoperation patients.