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Changes in Health-Related Quality of Life Following  
Coronary Artery Bypass Surgery in Patients 65 Years of  
Age and Older as Perceived by Patients and Proxies.

by

Stacey A. Page

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES  
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE  
DEGREE OF MASTER OF SCIENCE.

DEPARTMENT OF EDUCATIONAL PSYCHOLOGY

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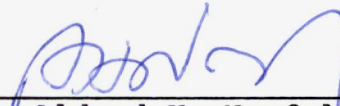
The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "Changes in Health-Related Quality of Life Following Coronary Artery Bypass Surgery in Patients 65 Years of Age and Older as Perceived by Patients and Proxies" submitted by Stacey A. Page in partial fulfilment of the requirements for the degree of Master of Science.



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### **Abstract**

A sample of 18 patients 65 years of age and older was studied prior to and six months after coronary artery bypass surgery (CABS) in order to examine changes in health-related quality of life (HQOL). HQOL was studied primarily through measures of physical, social and psychological functioning as perceived by both patients and proxies. The instruments used included the Sickness Impact Profile (SIP), the Quality of Well-Being Scale (QWB) and the Psychological Well-Being Schedule (PGWB). Significant improvements were noted within each of the dimensions of physical, social and psychological functioning ( $p \leq 0.05$ ). Proxies' reports provided good indications of patient functioning for these dimensions with significant differences found only for certain pre-operative measures ( $p \leq 0.05$ ). Proxies tended to over-rate patient's functioning as assessed by the SIP. Where discrepancies were observed with the PGWB, agreement was higher for more overt dimensions and lower for more covert dimensions.

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### **Dedication**

To my parents, whose love, encouragement and financial support have made my education possible.

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## CHAPTER 1

### INTRODUCTION

The major clinical manifestations of ischemic heart disease (IHD) are angina, bioelectrical abnormalities, ventricular dysfunction and sudden death (Irwin, 1985). Generally, each of these manifestations is attributable to the reduction in capacity of the coronary artery blood supply to meet the myocardial oxygen demand due to occlusion of the coronary arteries by atherosclerotic plaques. Symptoms of IHD may include anginal pain of varying intensity, frequency and duration in the chest, shoulders, arms, wrists, hands, jaw, midscapular area and upper abdominal areas. Shortness of breath (dyspnea) may also be present (Blessey, 1985). Through these symptoms, IHD can impact a number of life domains including functional status, affective state, social relations and participation in recreation/leisure activities to the detriment of the individual's quality of life (Penkofer & Holm, 1984; Flynn & Frantz, 1987).

Medical interventions for the treatment of IHD vary with the manifestations and severity of the disease and with knowledge of the influence of treatment on the course of the disease. The least invasive therapies may include various pharmacological agents (e.g. beta-blockers, calcium channel blockers, long-acting nitrates) with progressively more invasive and costly procedures including percutaneous

transluminal angioplasty, coronary artery bypass surgery (CABS) and even cardiac transplantation (Connor & Bristow, 1985).

During recent years, numerous studies have indicated a progressively increasing number of elderly patients undergoing CABS (Anderson & Pulcins, 1991; Johnston Spyt, Reece, Hillis & Dunn, 1989; Loop et al. 1988). Various researchers have questioned the justification of such resource-intensive procedures in the older age groups (Morgan, Gray, Clague & Gibson, 1989; Mott, 1990). It has been suggested that the trade-off between the immediate risk of death from surgery and the possibility of longterm benefits in quantity or quality of life for CABS patients may be sensitive to age (Anderson & Lomas, 1988). Recent studies have generally noted increased hospital mortality and morbidity in this patient group (Gersh et al. 1985; Horneffer et al. 1987; Loop et al. 1988; Mullany et al. 1990). Anderson and Pulcins (1991) have intimated that elderly patients, who are at greater risk for death and disability from surgery and who may have fewer quality-adjusted life years to gain than younger patients may not be the best target group for this procedure. Other investigators have found no difference in mortality rates across groups (Carey, Cukingnan & Singer, 1992). It has been suggested that despite higher peri-operative mortality rates, CABS confers significant benefits to the elderly

patient (Mullany et al. 1990). Moreover, it has been suggested that these higher rates may be attributed to the presence of co-existing diseases in the elderly and to non-cardiac organ failure (Mullany, et al. 1990; Rose et al. 1985).

Indeed, providing health care for seriously ill elderly individuals presents numerous challenges to the health care professional. As noted by Foreman and Kleinpell (1990), acceptable outcomes are more difficult to achieve in elderly patients as they typically experience diminished physiologic reserve and a multiplicity of chronic health problems. The perception that the elderly consume more than their fair share of health care resources serves to further complicate matters. Najman and Levine (1981) have stated that "most health care must be evaluated in terms of the impact that therapy has on the quality of life" (p. 107). They go on to say that in the current economic crunch, the limited dollars that can be expended for health care research should be used to support those interventions that result in the greatest improvement in quality of life.

In light of such considerations, various researchers have operationalized the construct of "health-related quality of life" in an attempt to evaluate the impact of health status and treatment outcomes on a person's quality of life (Kaplan, 1985; Padilla, 1992). Health-related quality of life (HQOL) has been conceptualized as distinct

from quality of life as it incorporates only those factors that are a part of one's health. Health, as defined by the World Health Organization (WHO) is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (Mapper & Zembatu, 1986, p.240). Correspondingly, HQOL should be viewed as a multidimensional construct. Investigators have conceptualized HQOL as being a means of appraising the impact of disease and disability upon daily functioning (Kaplan, 1985; Romney, Jenkins & Bynner, 1992). Patrick and Deyo (1989) defined HQOL as a broad term covering five categories including: duration of life, impairments, functional states, perceptions and social opportunities. They specified that these concepts are health-related to the extent that they are influenced by disease, injury, treatment or policy. Jenkins, Jono, Stanton and Stroup-Benham (1990) conceptualized HQOL as the maximization of health in the areas of physical, mental and social well-being. Kaplan (1988) used the term to refer to the impact of health conditions on function. Grant (cited in Padilla 1992) felt that HQOL applied to the level of well-being and satisfaction associated with an individual's life and how this is affected by disease, accidents and treatments. Similarly, Schron and Schumaker (1992) define HQOL as a multidimensional concept referring to a person's total well-being including his or her psychological, social or physical

health status. Thus, while there are a broad range of HQOL definitions, there is a substantial degree of similarity among them.

While it has been assumed that the patient should be the primary source of information regarding his HQOL, alternative or complementary sources of such information have been used (Bassett, Magaziner & Hebel, 1990). Such sources are commonly referred to as "proxies" and are typically close relatives, spouses or friends although formal health care providers have also been employed. Proxies may be consulted when the patient is too ill or otherwise unavailable to provide the information for himself. The ability of proxies to assess patient HQOL is important when the proxy is the patient's primary informal caregiver so that the patient's needs may be adequately addressed. It is important therefore to examine the comparability of patient and proxy ratings of patient's HQOL however, relatively little attention has been given to the issue in the literature.

As far as cardiovascular surgery is concerned, published research referring directly to health-related quality of life is primarily a product of the 1980's. Very few studies have given consideration to HQOL outcomes in the elderly CABS patient.

In order to address this area, an exploratory pilot study assessing HQOL outcomes was undertaken in a sample of

10 CABS patients 75 years of age and older by the author. A number of HQOL parameters were assessed using Cantril's Self-Anchoring Scale and an index of change scale developed for the purpose of the study. Each instrument was administered to the patient and a proxy, the latter defined as a close family member or friend, in the subjects' homes by the researcher. Patients were a minimum of six months post-operative at the time of assessment. Both instruments revealed measurable improvements across several HQOL parameters. Specifically, improvements were observed in overall life satisfaction, health perception and achievement of expectations for recovery as measured by Cantril's scale. The index of change scale revealed improvements in various dimensions including functional status, affective state, social relations, health experience and recreation/leisure activities. The presence of other health concerns was noted to adversely impact HQOL for a number of patients. Proxy ratings were found to provide reasonable indications of patient HQOL for a number of items.

Given these findings, it was decided to undertake a subsequent prospective exploratory investigation. The primary objective of this study was to examine changes in elderly patients health-related quality of life following coronary artery bypass surgery. A secondary objective of the study was to assess how comparably proxy respondents are able to evaluate patient HQOL. For the purpose of the

study, health-related quality of life was defined as a multidimensional concept referring to the effect of illness and consequent therapy upon the patient's physical, social and psychological functioning.



## CHAPTER TWO

### LITERATURE REVIEW

This section will first review studies that have examined various outcomes parameters for diverse CABS populations. Studies that have investigated patient and proxy response agreement for health status and health-related quality of life dimensions will then be reviewed.

#### Health-Related Quality of Life and Coronary Artery Bypass Surgery.

The understanding of HQOL outcomes for CABS patients is particularly important as the principal indication for surgery is that it ameliorates the symptoms of IHD and increases survival more than do other medical interventions.

Although there is a degree of variation in the definition of HQOL across studies, when considering the impact of CABS, the majority of conceptualizations of the construct seem to be grouped into three broad categories: physical, social and psychological.

#### I). Physical.

The first category includes observations of general health status including symptoms of the disease per se (i.e. IHD), those induced by treatment or concurrent illnesses, or those reduced or abolished by the intervention. Researchers interested in the physical outcomes of cardiovascular trials

have examined various indicators including prolongation of life, symptomatic relief and improved functional status.

In this category, perfect health is often the implicit standard for many of the health indicators used to assess QOL. For such indicators, it is assumed that the closer the patient is to perfect health, the higher the quality of life.

**i). Morbidity and Mortality.** Numerous investigators have examined the hospital mortality rates among CABS patients and have found a general trend of increased hospital mortality with increasing patient age (Rose et al. 1985). Hospital mortality rates have ranged from 2.0% to 10.7% in patients over 65 years of age (Loop et al. 1988; Mullany et al. 1990). Similarly, increased hospital morbidity (i.e., postoperative complications and slower recovery) has been observed (Horneffer et al. 1987; Rich, Keller, Schechtman Marshall & Kouchoukos, 1988; Rose et al. 1985). This has been attributed to the increased incidence of multiple chronic medical conditions and to the extensiveness of coronary disease in the elderly (Horneffer et al. 1987; Mullany et al. 1990; Rose et al. 1985).

**ii). Longevity.** Prolongation of lifespan after CABS has been examined in several studies. Investigators for the European Cooperative Study (1982), who conducted a

randomized prospective trial of bypass versus medical therapy, demonstrated a significant improvement in 5-year survival for the total CAB population. Analysis by subgroups revealed that surgery conferred the greatest benefit to those patients at high risk (i.e. more advanced coronary artery disease evidenced by left main disease and three vessel disease). For lower-risk, less ill patients, the investigators concluded surgery was unlikely to improve 5-year survival. A subsequent study looked at 12 year follow-up survival in the same group (Varnauskas et al. 1988). During the next seven years, the percentage of patients who survived decreased more quickly in the surgically treated group than in the medically treated group. However, surgical treatment was still advantageous, especially in those patients who were older or who were at higher risk.

Findings from the Veterans Administration Cooperative Study (1984), another randomized trial, indicated that at five to seven years, a survival benefit with surgery was conferred to subgroups of patients at higher risk. This observed benefit diminished gradually when follow-up was extended to 11 years. In contrast, for patients at lower risk (e.g. without left main coronary artery disease) surgery did not significantly improve overall survival.

Results of the Coronary Artery Surgery Study (CASS, 1983b) indicated that for patients who were asymptomatic

after infarction or who had chronic stable angina of class II or less, elective CABS when compared with conventional medical therapy offered no significant advantage in terms of prolonging life as evidenced by five year cumulative survival rates (95 vs.92%). Surgery did however offer advantages in terms of improved QOL as judged by relief of symptoms, fewer activity limitations, improved functional capacity and less requirement for drug therapy. A distinct advantage was observed in surgical patients with three vessel disease and low ejection fractions at five years (90 vs. 80%). This difference persisted and reached statistical significance with the seven year cumulative survival at 88% in the surgical group and 65% in the medically managed group (CASS 1983a). CASS investigators (Gersh et al. 1985) also compared the results of CABS with those of medical therapy alone in 1491 nonrandomized patients 65 years of age or older. A significant difference was observed in the six year cumulative survival between the high risk surgical group (79%) and the medical group (64%). Moreover, at five years, chest pain was absent in 62% of the surgical group compared to 29% of the medical group. It was demonstrated that surgical treatment in the relatively low-risk group of patients did not result in longer survival than medical therapy alone.

Carey, Cukingnan and Singer (1992) looked at the effect of increasing age on survival, risk of reoperation and QOL.

They found the probability of survival at 5, 10 and 15 years to be significantly greater in patients less than 60 years old than in those more than 60 years of age. This discrepancy diminished considerably in patients with an ejection fraction greater than or equal to 0.40 at 12 years. The actuarial risk of reoperation (calculated as the difference between the probability of survival and the probability of survival without reoperation at 5, 10 and 15 year intervals) progressively increased in younger patients but not in patients 60 years of age and older. Quality of life was assessed by means of a health status index. Improved QOL with increasing age was observed, with older persons achieving a greater number of quality adjusted life years after surgery.

In their investigation of CABS in the elderly, Loop et al. (1988) found that for patients 65 years of age and older, successful CABS provided longevity exceeding that of the United States population matched for age and gender. Specifically, for patients 65-74 years of age, five year survival was increased while for patients 75 years of age and older, eight year survival was increased. Consistent with these findings, Mullany et al. (1990) observed increased survival rates in CABS patients 80 years of age and older when compared to a population matched for age and sex. Horneffer et al. (1987) noted the benefits of CABS in terms of late survival were at least as great in a group of

patients 70 years of age and above as compared to two younger groups. Four and five year actuarial survival rates were as good as those expected in the general population matched for age, sex and race.

Thus, when comparing medical to surgical outcomes in terms of longevity, it would appear that surgery offers a clear advantage for five year survival in patients at higher risk. For longer follow-up periods, the surgical advantage tends to decrease, however benefits persist for higher risk patients. Surgical treatment in relatively low-risk populations does not seem to result in longer survival than medical therapy alone. Among patients of advanced age, there seems to be an increased incidence of hospital mortality. However, successful CABS confers benefit to this group in terms of increased longevity and this effect is most notable among patients with advanced coronary disease (Carey et al. 1992; Gersh et al. 1985; Loop et al. 1985).

**iii). Angina and Dyspnea.** Significant, disabling chest pain or angina is the most common indication for CABS. Results of numerous studies and randomized trials of medical versus surgical treatment have indicated that in patients with angina, surgery results in greater relief of symptoms and decreased short-term need for anti-anginal medication (Flynn & Frantz, 1987).

In an early appraisal of CABS on QOL (3-8 mos. post-op), Penkofer and Holm (1984) found angina to be significantly improved for all patients. No consistent pattern was observed among those few patients who did report angina post-operatively. In contrast, Kornfeld, Heller, Frank, Wilson and Malm (1982) reported that postoperative angina correlated with the persistence of Type A behaviour traits. The authors stated that it was unclear as to whether this association reflected a relationship between the behaviour pattern and coronary heart disease or the extra demands placed on the myocardium by the behaviour itself. Further, Kornfeld et al. (1982) reported chest pain to be dramatically reduced in their patient population three and a half years after CABS. Chest pain was rated as extreme by 4%, moderate by 16% and minimal by 28%; 53% of the patients were pain-free. Jenkins, Stanton, Savageau, Delinger and Klein (1983) also examined the experience of angina early in the post-operative period (i.e. 6 mos.). Sixty-nine to 85% of persons who had angina before surgery reported it to be completely relieved at six months while 10-19% experienced no post-operative improvement or worsening of symptoms. Among those asymptomatic prior to surgery, 5-13% reported the occurrence of angina post-surgically. Johnston et al. (1989) reported in their sample of patients over 65, angina was abolished or improved in 93% and 64% required no antianginal medication at follow-up

(mean = 19.8 mos. post-op.). Five-year follow-up of patients 65 years of age and above from the CASS registry showed 62% of the surgical patients were free from pain at this time compared to only 29% of the medically treated patients (Gersh et al. 1985). Mullany et al. (1990) reported that relief from angina was excellent in their group of elderly patients (n = 159, age 80+) with 79% angina-free at follow-up. The mean follow-up period in this study was reported to be 29 months with the longest period being 141 months. Consistent with these findings are those of Morgan, et al. (1989) who reported 88% of their 217 patients over 65 were free of angina without medical therapy at follow-up (mean = 93 weeks).

Zyzanski, Stanton, Jenkins and Klein (1981) indicated the proportion of people experiencing severe and recurring symptoms at the time of postoperative assessment (mean = 3 1/2yrs post-op) was "gratifyingly low" at 4.2%. They also noted that a higher percentage of women than men reported severe recurring chest pain or dyspnea and were confined to bed twice as frequently as men. Unfortunately, it appears that with increasing passage of time post-operatively, angina tends to recur in a greater number of patients. According to data derived by Campeau et al. (1979) angina returns after CABS in approximately five percent of patients per year. Rogers et al. (1990) reported that by 10 years, 53% of surgical patients experienced some degree of



symptomatic chest pain. This has been attributed to the progression of IHD in the patients' ungrafted vessels and to progressive graft narrowing and occlusion.

Measures of dyspnea have also been used as symptomatic physical indicators of HQOL outcomes in CABS. Jenkins et al. (1983) indicated dyspnea before surgery in at least 60% of patients. Of these, 54% were completely relieved at six months and 22% reported some improvement. No improvement was found in 18% and nine percent reported a greater problem after surgery. Caine, Harrison & Sharples (1991) reported that in their sample of 100 patient younger than 60 years, 90% experienced angina and 62% experienced breathlessness prior to surgery. At three months following surgery the proportion with pain fell to 21% and to 19% at one year; those experiencing breathlessness fell to 30% at three months and was 33% at one year. Further, in patients experiencing symptoms, the level of exertion at which these symptoms were evident was different prior to and following surgery with fewer patients experiencing symptoms at rest and more patients experiencing them upon strenuous exertion. Others have reported reduction in the experience of dyspnea postsurgically (Mayou & Bryant, 1987; Zyzanski et al. 1981).

**iv). Exercise Tolerance and Activity Limitations.** A number of studies have considered physical outcomes in terms of exercise tolerance and activity limitations. Results of

studies have shown a 20 to 50% increase in maximal exercise tolerance after CABS (CASS, 1983). Fewer activity limitations were reported by patients post-operatively. Findings from the CASS trial demonstrated surgical patients to be considerably less restricted than those medically treated. Stanton, Jenkins, Savageau and Thurer (1984) found marked improvements in usual daily activities six months post surgically which were associated with a number of factors including less exertional angina, reduced fatigue, greater vigour, less trouble sleeping, higher sense of well-being and lower depression. When responding to a direct question concerning the maximum physical energy expended each day, the data indicated highly significant changes, from high and low to intermediate levels postoperatively. Level of activity was strongly related to gender with men being significantly more active. Jenkins et al. (1983) reported significant increases in level of physical activity post-operatively accompanied by a reduction in the number of days people were unable to carry out their usual activities or were forced to spend the day in bed because of their heart condition. Ninety-five percent of the patients interviewed in the study by LaMendola and Pellegrini (1979) perceived themselves as having no physical limits post-operatively.

## II). Social.

The social dimension of HQOL outcomes in CABS addresses relationships with others and role function - particularly the ability to carry out one's responsibilities in and out of the home. Within this dimension, employment, recreational and social activities, and family and marital relationships have been considered.

i). **Employment.** One of the earliest evaluations of quality of life following CABS used employment status as the primary indicator of the construct. In this study Barnes, Ray, Oberman and Kouchoukos (1977) analyzed change in work status as a result of operation in terms of job status and hours worked before and after surgery in 350 patients (mean age = 50). Overall, the findings indicated that there was no improvement in either index. Similarly, Gundle, Reeves, Tate, Raft & McLaurin (1980) reported that despite good physiologic outcome, their sample of 30 patients examined one to two years following surgery exhibited "considerable psychosocial morbidity." This was evidenced according to the authors by poor adaptation to life, work status and sexual functioning. Of the 23 patients employed pre-operatively, five were employed at the time of follow-up. Although not reporting 'psychosocial morbidity' most surveys have reported a reduced number of people working following CABS (e.g. Bass, 1984; CASS, 1983; Jenkins et al. 1983;

Kornfeld et al. 1982; LaMendola & Pellegrini, 1979; O'Connor, 1983).

One of the variables examined in an attempt to predict which patients will return to work after CABS has been age. Indeed, increasing age has been consistently associated with decreased resumption of employment (Bass, 1984; Zyzanski et al. 1981). Findings have generally indicated that patients younger than 55 years are more likely to return to work than those older than 55 years (Bass, 1984; Gutmann, Knapp, Pollock, Schmidt, Simon & Walcott, 1982). For patients near retirement age, the ability to work may not be of particular importance and these individuals may be more concerned with their leisure and social life. Moreover as North (1988) pointed out, it is important to distinguish between those people who were gainfully employed before surgery who elected to retire from those who were forced to retire after surgery. Other factors related to return to work reviewed by Allen (1990) have included pre-operative work status, financial status, job characteristics, education, sex, attitudes of family members, lack of confidence, fear of symptom exacerbation and physician advice.

Additional social roles that have been addressed involve responsibilities of home care and performing tasks such as shopping, maintenance and errands. Jenkins et al. (1983) reported that over half of their sample indicated no change from before surgery in their involvement in these

activities. The remainder tended to increase their amount of home care but were equally divided with regard to increases and decreases in tasks outside the home. Mayou and Bryant (1987) also noted improvements in certain aspects of home care post-surgically (i.e. repairs, decorating, gardening). A prospective study by Langeluddecke, Fulcher, Baird, Hughes and Tennant (1989) found high levels of impairment on the domestic functioning subscale of the Psychological Adjustment to Illness Scale (PAIS) with over half the sample ( $n = 89$ , mean age = 56) having reported cardiac illness reduced their ability to perform domestic/home maintenance duties pre-operatively. Twelve months after surgery, 71% felt that domestic functioning was significantly improved, 25% reported no change and only 4% reported deterioration.

**ii). Social and Recreational Activities.**

Investigations of recreational and social outcomes following CABS have yielded inconsistent findings.

Gundle et al. (1980) interviewed 30 patients before and one to two years after surgery. As previously mentioned, despite good physiologic outcomes, these authors reported the majority of their sample to be psychosocially maladjusted at follow-up demonstrated by constricted social life, low self-esteem and lack of pleasure from close relationships. Poor postoperative adaptation was associated

with a pre-operative duration of symptoms (i.e. angina) of eight months or more. The authors suggested that the prolonged experience of symptoms produced a damaged self-concept that was reinforced by the experience of surgery. In a study of psychosocial outcome following CABS (n = 36; age range 34 - 65 yrs), Bass (1984) found deterioration in social adjustment to be accompanied by high levels of psychiatric morbidity. Duration of angina pre-operatively was found to have no bearing on psychiatric outcomes. It should be noted that seven of the 36 patients were identified as "psychiatric cases" pre-operatively. Interestingly, there was a strong correlation between age and both psychiatric morbidity and social maladjustment with the personality dimension of neuroticism and with a history of psychiatric disorder. Zyzanski et al. (1981) reported no effect of age at the time of surgery on behavioral outcomes, however they did find consistent decreases in psychosocial functioning among those patients experiencing postoperative heart-related hospitalization, other major (non-cardiac) health problems, continuing and intense chest pain and illness-related bed rest. Similarly, Stanton et al. (1984) found attendance at social activities to be significantly correlated with both amount of physical disability and level of usual daily activity.

Contrasting with these studies are the results of Jenkins et al. (1983) who reported considerable increases in

self-initiated social activities and an increase in the number of organizational memberships six months after surgery. Both Flynn and Frantz (1987) and Penkofer and Holm (1984) found that patients experienced a greater level of satisfaction with social participation and social life postoperatively. Mayou and Bryant (1987) also demonstrated a general increase in activity and social areas following operation.

Findings have been just as varied with recreation and leisure activities. CASS investigators (1983a) found CABS had no effect on recreational activities. O'Connor (1983) observed 30 men (mean age = 56 yrs.) three months postoperatively and reported results indicating patients did not experience any significant improvement in physical leisure functioning as assessed by patient reports of both performance and perceived capacity. Further analysis revealed that energy expenditure on postoperative leisure functioning was related to fear of injury. In the same study, the Recreation and Pastimes subscale of the Sickness Impact Profile indicated significant improvement in functioning, likely reflecting the different nature of constructs being examined. Within their sample of 340 patients (age range 32-69 years), Stanton et al. (1984) reported that the number of hobbies and activities regularly performed did not change following surgery for 22% of patients, 43% were involved in fewer hobbies and 35% took on

more. Flynn and Frantz (1987) found subjects to be least satisfied with their outcome with respect to leisure pursuits following CABS.

Caine et al. (1991) noted positive changes in their sample of patients (n = 100, age < 60 yrs) one year after surgery with the proportion of patients engaging in normal levels of recreational activities rising from five to 82%. Mayou and Bryant (1987) found the majority of their patients experienced improved activity and greater satisfaction with leisure pursuits in the year following surgery. Twelve months after surgery, two-thirds of the patients in the study by Langeluddecke et al. (1989) (n = 89) reported increased involvement in leisure activities compared with pre-operative levels, however close to one-quarter reported residual impairment due to their heart disease. A recent retrospective investigation by Bunzel and Eckersberger (1989) looked specifically at leisure time activities one year after open heart surgery (n = 48 bypass, n = 46 valve). Overall, 90% of patients reported their physical status to be improved and 67% reported their emotional status to be improved. Differences were found in the nature of leisure pursuits engaged in post-surgically, however these changes were not in the expected direction. Participation in active pursuits was found to have decreased while participation in more passive activities increased. It was suggested that the anxieties and limitations acquired during the illness



were not easily overcome and that patients may perceive themselves to be handicapped through the experience of a "repaired defect."

**iii). Family and Marital Relationships.** Findings concerning family and marital relationships generally point to a change for the better following surgery. Penkofer and Holm (1984) reported their patients (n=34, age range 38-62) indicated a significant increase in family life satisfaction after surgery with patients becoming more actively involved in family concerns and household activities. Similarly, 12 months after surgery, Langeluddecke et al. (1989) noted 67% (n = 41) of patients described greater involvement in family activities while only five per cent described a significant decline compared with pre-operative levels. Further, 84% (n = 51) reported significant improvement in marital relationships whereas only one per cent reported deterioration. The majority of patients in the study by Mayou and Bryant (1987) reporting changes in family relations described increased intimacy with their wives, increased closeness to their children and decreased irritability with the family. Postoperatively, patients in the investigation by Folks, Blake, Fleece, Sokol and Freeman (1986) reported significant strengthening of relationships within their nuclear family and in their social activities. Jenkins et al. (1983) found that for 50% of their patients

(n = 318, <70yrs), the experience of surgery had affected their families by bringing them closer together whereas only three percent felt it had pulled them apart. Some of these patients did however feel their families had become somewhat more overprotective following surgery. Kornfeld et al. (1982) and Flynn and Frantz (1987) also noted improved family satisfaction in their samples postoperatively.

Associations between health and supportive social relationships have been reported (Dimond, 1979). Several researchers have noted that marital status may act as a moderator variable with respect to HQOL outcomes following CABS, with married patients reporting better functional outcomes (Guadagnoli, Ayanian & Cleary, 1992; LaMendola & Pellegrini, 1982;). Moreover, LaMendola and Pellegrini (1982) found that positive affiliative experiences were related to lower levels of perceived physical limits by patients postoperatively.

Certain investigators have indicated the outcome for sexual functioning to be relatively unchanged after surgery with respect to frequency and satisfaction (Bass, 1984; Gundle et al. 1980; Jenkins et al. 1983; Mayou and Bryant, 1987). Bass (1984) has suggested that the operation neither has an adverse effect on sexual function nor results in the amelioration of already established sexual problems. Others have noted changes. Kornfeld et al. (1982) reported significantly decreased sexual activity nine months

postoperatively for their patients whereas Folks, Blake, Fleece, Sokol and Freeman (1986) reported increased frequency of sexual encounters and decreased sexual dysfunction for their patients.

Focusing on satisfaction versus frequency of activity, Penkofer and Holm (1984) indicated significant increases in sexual satisfaction after surgery. Flynn and Frantz (1987) reported their patients to be least satisfied with outcomes in sexual activity at six to ten weeks post-surgically compared to several other domains (e.g. family, symptom relief, physical activity, leisure, friends and wealth) however, they also rated this domain as one of the least important to them. Stanton et al. (1981) examined correlates of sexual outcome. For those patients reporting increased satisfaction with their sex life (21%), the most commonly cited reason was increased energy level followed by decreased pain, decreased worry, increased desire, increased desire on the part of spouse and decreased fear on part of spouse. Decreased sexual satisfaction among patients (24%) was found to be correlated with increased fatigue and greater trouble sleeping for the patient and increased family worries concerning the patient's postoperative health. Fifty-five per cent of patients reported no change in sex life satisfaction from the pre-operative period.

In examining global social outcome, Mayou & Bryant (1987) aggregated the measures of improvement or

deterioration in work, leisure, family and sex life. Sixty per cent of their sample were found to have an excellent or good outcome and 40% had a disappointing or bad outcome.

For the whole sample, global social outcome was not significantly related to any measure of cardiac symptoms, physical outcome of surgery or physical impairment.

However, it was related to mental state (PSE and Lorr McNair self-report on depression, anxiety and fatigue). Further, outcome in each particular aspect of social function was most closely associated with premorbid level of functioning in that area. Similar observations were made by O'Connor (1983) who noted that postoperative psychosocial functioning was better when patients had better pre-operative psychosocial functioning.

### III). Psychological.

Psychological well-being as an outcome indicator of HQOL includes both affective and cognitive responses. The affective reaction to the disease and the intervention includes both positive and negative emotions while the cognitive component incorporates a subjective value judgement concerning the outcome. Additionally, certain cognitive faculties such as memory, concentration and reasoning have been considered.

**i). Affective.** Researchers have looked at a number of affective states in CABS patients. Jenkins et al. (1983) examined a number of psychological states and found decreases in anxiety, depression and fatigue postoperatively. Moreover, a general well-being measure showed a clear gain between the two examinations. These patients also showed an important reduction in sleep problems after surgery. The greatest improvement was demonstrated by less frequently waking up feeling tired and worn out with improvements also occurring regarding ease in falling asleep and in staying asleep. Magni et al. (1987) also noted significant reductions in sleep disturbances one year after surgery. According to a questionnaire administered three and a half years postoperatively, the majority of the patients in the study by Kornfeld et al. (1982) indicated that overall pleasure in life had improved, overall nervousness was reduced and mood was improved. Patients in O'Connor's (1983) study reported improved emotional experiences. Zyzanski et al. (1981) revealed an interaction effect between sex and emotional outcome with female bypass patients more likely to report they felt emotionally worse at the time of assessment versus one year prior to surgery than did male patients. While Folks, Blake, Fleece, Sokol and Freeman (1986) observed no significant changes in measures of psychologic distress, they did find increasing age to be associated with less

distress after six months. They hypothesized that younger patients may have had higher expectations for recovery and when these expectations were not realized they resulted in more distress. Carey et al. (1992) also suggested that older patients may have lower expectations and therefore experience greater satisfaction with surgical outcomes than younger patients.

Mayou and Bryant (1987) examined mental state pre and postoperatively using the Present State Examination (PSE), however did not find any significant changes. The Lorr McNair sub-scales of tension, anxiety and vigour did show significant improvement but there was no change in depressed mood. Moreover, there was a small increase in the number of patients who were classified by the PSE as psychiatric 'cases' (anxiety and depression) at follow-up. Bass (1984) also examined mental state using the Clinical Interview Schedule (CIS) and found significant improvement in mean scores after surgery. Pre-operatively, Langeluddecke et al. (1989) reported slightly elevated depression scores for their sample overall with 36% having scores within the clinical range (Centre for Epidemiological Studies Depression Scale). On average, depression was significantly reduced in the sample at 12 months however 22% still had scores in the clinical range. Thirty per cent of the sample had high pre-operative state anxiety levels (Spielberger State Anxiety Inventory). This proportion fell to 18% by 12

months postoperatively. The PAIS psychological distress subscale indicated patients to be moderately impaired pre-operatively: this was significantly improved by 12 months.

In a study of psychological adjustment to CABS, Ramshaw and Stanley (1984) hypothesized that outcome could be predicted from pre-operative personality and coping style variables. This hypothesis was confirmed when the authors found that the ability to cope with stressful events in the past discriminated between positive and negative changes post-surgically as did Eysenck's Neuroticism Scale. Patients with less positive outcomes tended to have coped poorly in the past with stressful events and had higher neuroticism scores. Outcome measures that were found to differ significantly between the two groups included medication, overall physical condition, memory, level of activity, mood/temperament and overall change. There was no difference in relief of angina between the groups with both being significantly improved. Magni et al. (1987) also looked at the connection between pre-operative psychological variables and outcomes one year after heart surgery (n = 55 valve, n = 44 bypass). While mean scores for psychological distress and quality of life improved, 25% of patients manifested poor psychological adjustment at follow-up. This 25% included seven to eight per cent whose pre-operative scores had not been indicative of distress and 17-18% who had already shown significant distress in some specific

psychological areas before surgery. Poor psychological outcomes were best predicted by high scores on the general hypochondriasis and irritability subscales of the Illness Behaviour Questionnaire. Poor psychological adjustment was characterized by high anxiety, high depression and high global scores on the Symptom Distress Checklist and by ischemic (e.g. bypass) rather than valvular heart disease. The authors hypothesized that while the patients realized they were "less ill" (as demonstrated by the IBQ disease conviction score) their self-concept was damaged and thus their emotional response did not undergo much change. It was suggested that modification of these reactions may require specifically directed interventions during rehabilitation.

**ii). Satisfaction.** Measures of psychological symptoms may fail to do justice to the very positive views former patients hold regarding the benefits of surgery. Studies that have asked patients for their view have found that most are pleased by their outcomes. For example, when asked by Horneffer et al. (1987) if they would have heart surgery again based on their present knowledge, 92% of patients 70 years of age and older agreed they would as did 89% of patients 55-69 years of age and 90% of patients under 55. Similarly, 71% of patients gave an unqualified 'yes' to the same question posed by Jenkins et al. (1983), whereas only



8% gave a negative answer. Patients own health perception improved significantly in O'Connor's study (1983).

Curiously, this was found to be related to the number of bypass grafts and to the family's fear of patient injury. Patients tended to have better perceptions of their own health when they had received more grafts and when they did not report family's fear of injury as a barrier to rehabilitation. In the study by Mayou and Bryant (1987), 70% of the patients declared themselves to be very pleased with overall outcome. The majority of patients (81%) in the sample of Mullany et al. (1990) felt they improved with surgery, 3% felt no change and 13% thought they had worsened. Kornfeld et al. (1982) reported that after three and a half years, most patients were pleased they had undergone the operation; 60% were extremely pleased and only four percent were displeased. Further, 77% of these patients indicated that overall pleasure in life had improved. Findings by Penkofer and Holm (1984) support the foregoing results with patients reporting higher levels of life satisfaction three to five months postoperatively. These patients anticipated their rating of life satisfaction to increase in the future reflecting that at the time of questioning, they were still within the early stages of recovery. Two thirds of the subjects ( $n = 79$ ) in the study by Mayou and Bryant (1987) were "very pleased" with their progress at three months, but there was some dissatisfaction

with level of physical activity (25%), work (22%) and sexual relations (21%).

**iii). Cognitive Capacities.** A few studies have reported adverse effects on cognitive functions such as memory, concentration and abstract reasoning in the early weeks following surgery (Shaw et al. 1986). However, controlled studies conducted six to eight months post-surgically have shown these deficits to disappear in the majority of patients. For example, Ellis, Wisniewski, Potts, Calhoun, Loucks and Wells (1980) studied 30 patients and found 75% to have significant clinical impairment in some aspect of cognitive function one week after operation. Seventeen per cent of patients were still impaired after four weeks, but all had returned to normal by the end of six months.

Others have looked prospectively at changes in cognitive function. Jenkins et al. (1983) assessed changes in certain aspects of cognitive function six months after surgery compared to presurgical measures. Significant improvements were found on the Trailmaking Tests A and B, which measure attention and concentration. While visual reproduction scores from the Wechsler Memory Scale were essentially unchanged, the logical memory subtest showed a significant improvement. Thus, these data indicated enhancement in speed and concentration which the authors

suggest may have been associated with lower anxiety and depression and fewer medications at the postoperative examination. Mattlar, Enablom, Vesala, Vanttinen and Knuts (1991) used a comprehensive psychodiagnsotic examination to investigate the impact of CABS on the cognitive functioning of their patient sample (n = 104, ages 40 - 64 years). Exams were conducted pre-operatively and at two and eight months postoperatively. The majority of the sample showed no significant change between pre and postoperative measures. Of the patients demonstrating change, more revealed improvement than impairment. The direction of change however appeared to be strongly influenced by the nature of the tests compared (e.g. robust vs sensitive). The authors noted that patients with improved cognitive function often had shorter surgical times than patients with unchanged or impaired cognitive function. Finally, Newman, Klinger, Venn, Smith, Harrison and Treasure (1989) remarked on the association between subjective perceptions of cognitive performance and mood. Specifically, their study addressed the question of the role mood state may play in the reporting of cognitive deficits. The results indicated little relationship between self-reported changes in cognitive function and assessed cognitive function. The findings on mood state however indicated that depression, and to a lesser extent anxiety, were associated with reports of deterioration in cognitive functions including memory,

attention, concentration and problem-solving abilities.

V). CABS, HQOL and the Elderly: Comparative Studies

Studies that have looked comparatively at HQOL outcomes across age groups are decidedly few. In a recent investigation, Guadagnoli et al.(1992) looked at HQOL outcomes reported by patients under 65 years of age with those reported by patients 65 years of age and older six months after surgery. These outcomes included symptoms, cardiac functional class, instrumental activities of daily living, and emotional and social functioning. The data indicated no difference in the experience of cardiac-related symptoms and resource use (i.e. physician visits and hospitalizations) between age groups post-operatively. Additionally, both the magnitude of post-operative scores for activities of daily living and social functioning and the degree of improvement over pre-admission functioning were equivalent in the younger and older groups. Only mental health scores differed between age groups, an outcome for which older patients reported better functioning than did younger patients. The authors concluded that older patients selected for CABS benefit as much from this procedure as do younger patients. Consistent with these findings, Horneffer et al. (1987) reported that late follow-up failed to demonstrate any significant differences based on age alone in survival or functional status among patients

32-85 years who had undergone CABS.

Folks, Franceschini, Sokol, Freeman and Folks (1986) compared psychiatric morbidity following CABS in patients over 65 years (n = 58) and under 65 years (n = 58) through a retrospective review of patient records. Pre- and postoperative scores on measures of anxiety, depression and cognitive function were analyzed. While no difference was found for anxiety and depression indices, a significant difference was found between the postoperative cognitive performance of the two groups revealing clinically apparent organic brain syndrome in three of the elderly patients and only one of the younger patients. The utility of these findings may be questioned however as the authors stated the changes observed in the older patients were "not clinically important." Moreover, it appears that the postoperative assessments occurred four days after surgery which would seem insufficient time to allow recovery from the trauma of operation.

#### VI). Summary

Health-related quality of life outcomes following CABS have been positive for the most part. Perioperative mortality varied from 0.7% to 7.9% with older patients being at greater risk. In contrast to medical therapy, CABS offered a significant advantage in terms of longevity for patients at high risk. Differences in life expectancy for

less ill patients were not as clear. Symptomatic relief following CABS was good, however there were indications that angina would eventually recur in a number of patients. There was an improved exercise tolerance and decreased activity limitations for most patients. Return to work following CABS was poor, but this was likely due to factors other than actual physical capacity. Participation in social activities and in recreational and leisure pursuits were generally inconsistent with patients manifesting both increased and decreased levels of activity. Family and marital relationships improved for the majority of patients. Sexual functioning outcomes were varied with respect to frequency of activity, although many patients expressed increased satisfaction with this domain postoperatively. Affective state was typically improved however there were a number of patients who continued to exhibit varying degrees of depression and anxiety. These seemed related to pre-operative measures in these domains. Patient reports indicated most were very satisfied with the procedure. There was evidence to suggest patients experience certain cognitive impairments following CABS but these deficits appeared to be transient. Regarding such outcomes, Stanton et al. (1983) pointed out that from a clinical perspective, the recovery process is often viewed as a unitary process. However, through analysis of their study, they have suggested that a number of dimensions are involved and

further, that the people who recover in one functional group are not necessarily the people who recover in another group.

The rapid progress made in the field of heart surgery over the last 30 years, has resulted in a corresponding growth in awareness of numerous HQOL outcomes related to CABS. While older patients represent a growing proportion of people undergoing CABS, most assessments of outcomes have involved patients under 65 years of age. Research that has given consideration to the older age group has primarily explored morbidity and mortality factors. Conclusions about HQOL outcomes in patients over age 65 must therefore be extrapolated from studies performed in younger cohorts. Even then, the findings have been inconsistent at times and are difficult to integrate due to numerous differences in the methods and populations used.

#### **Proxy Respondents.**

Several studies have looked at subject-proxy agreement on items requiring judgements of health and functional status. Briscoe (1984) examined proxy effects in symptom reporting among 50 couples. Subjects were asked to report symptoms recently experienced by their spouses as well as symptoms experienced by themselves. The author reported a high level of agreement between husbands and wives regarding the prevalence and severity of specific symptoms in each individual; however neither concordance rates nor

correlations were provided. Where a discrepancy existed, it was in the direction of the proxy of either sex reporting greater prevalence. These findings were interpreted as indicating that individuals have a slight tendency to under-report their own symptoms, but are more willing to report the illness experience of a spouse.

Magaziner, Simonsick, Kashner & Hebel (1988) evaluated response comparability between 361 elderly hip fracture patients and proxies on items pertaining to the patients pre-injury health and functional status. Interviews took place in the hospital. A proxy was identified by the interviewer for each patient - usually a frequent visitor who the interviewer felt was most knowledgeable about the patient's circumstances. The authors found proxies who reported greatest contact with the patients as responding most comparably to the patients. When there was disagreement however, proxies again tended to overestimate patient disability. Proxy relationship to the patient contributed to response similarity with siblings being most comparable followed by spouses, offspring, non-relatives and other relatives. Poor patient cognitive status and poor affective state both tended to predict lower agreement as did proxy age less than 65.

Rubenstein, Schairer, Weiland and Kane (1984) studied possible biasing effects of different respondents on the functional status scores of 61 hospitalized elderly patients



both to validate the patients' self-reports and to determine the interchangeability of respondent data. The respondent groups included the hospitalized patients, community informants (friends or significant others) and nurses who were familiar with the patients. Analysis of the mean scores showed patient self-ratings of functional capacity to be significantly higher than the community respondents. The discrepancy between these two groups increased when the proxy was a spouse and visited the patient more often in hospital. The nurses rated the patients as somewhat more dysfunctional than the patients rated themselves. In a separate survey of nursing home residents conducted concurrently by the same investigators, the residents' ratings were compared to those made independently by two different nurses (Rubenstein et al. 1984). A similar trend was noted with the residents rating themselves as more functional than either of the nurses. Differences between the residents' and nurses' scores reached statistical significance while differences between the nurses measures were nonsignificant. Of the three respondent types, the authors suggested that the nurses proxies provided the most valid indication of patient functional status because they were probably most similar to the "skilled observers" with whom most functional status measure have been validated. This then implies that patients tend to overrate their functioning. It was suggested that this could be due to

patients attempting to conceal disability so they would not feel themselves to be a burden or in order to be discharged sooner.

An investigation by Rothman, Hendrick, Bulcroft, Hickman and Rubenstein (1991) examined the validity of proxy assessments for patient physical and psychosocial health status using the Sickness Impact Profile (SIP). Patients, primarily men, were interviewed by trained interviewers. Proxy questionnaires were self-administered and this group was mainly women who were the patients' primary informal caregivers. Correlation between the two groups was 0.72 for the physical dimension. Further analysis revealed a significant response bias with proxies rating the patients as more impaired than the patients rated themselves. The correlation for the psychosocial dimension scores was relatively weak at 0.33. The proxy-generated score was found to be heavily influenced by the perceived burden of caregiving and the proxy's own psychological distress.

Epstein, Hall, Tognetti, Son and Conant (1989) compared the responses of 60 elderly patient/proxy pairs on a number of dimensions designed to assess the patients health-related quality of life. As in the study by Rothman et al (1991), these authors found the strongest correlations for the dimensions of overall health status (0.71) and functional status (0.73) followed by social activity (0.64), emotional status (0.62) and satisfaction (0.43). Proxy and patient

mean responses were generally similar for overall health, functional status and social activity. When the proxy lived with the patient, correlations tended to be stronger.

Proxies who spent more time per week helping the patient rated patient functional status and social activity as more impaired than did the subject and this may again relate to the issue of caregiver burden. Patients who had poorer overall health tended to rate their health relatively lower than proxies.

The use of a surrogate SIP score was investigated in a sample of 66 chronically or terminally ill homebound patients and their primary informal caregivers, usually the spouse (McCuster & Stoddard, 1984). Profile analysis suggested no systematic difference between patient and proxy scores, however patients rated themselves significantly more disabled on the Recreation and Pastimes subscale while proxies rated the patients significantly more disabled on the Sleep and Rest subscale. Further test-retest correlations showed that surrogate SIP scores agreed less with patient scores than would scores from retesting the same patient. Agreement between patients and proxies appeared somewhat lower if the patient was terminally ill, had lower educational attainment or if the proxy did not live in the same household as the patient.

The reliability of proxy responses on four mental health indices administered to a sample of elderly women was

explored by Bassett et al. (1990) in 538 respondent-proxy pairs. While the results indicated responses were strongly associated, a comparison of scores showed statistically significant differences on three of the scales. Proxies significantly underrated the respondents affective well-being and overrated both measures of respondent cognitive functioning. Higher correlations for cognitive (0.60-0.78) as opposed to affective measures (0.30-0.53) may reflect greater ease by the proxies in responding to the more concrete, objective items in the cognitive scales compared with the more subjective questions regarding affective functioning. Examination of agreement by proxy characteristics revealed that female proxies, offspring, and cohabitants all positively impacted the degree of agreement between proxies and respondents. For the cognitive measures, a higher association was noted between pairs with greater frequency of contact either through living arrangements or visitation.

#### I). Summary

Empirical evaluation of the agreement between subject and proxy responses is limited. The only finding that seemed to appear with any degree of consistency across the studies described is that proxies tended to over-represent level of impairment relative to the patient's own judgement. Proxy ratings appeared to be more consistent with patient

ratings when they lived in close proximity to the patient, however they could have been biased by the caregiving function of the rater. Generally, on the basis of item content, it appeared the less concrete and more covert the activity, behaviour or quality assessed, the poorer the agreement.

## CHAPTER THREE

### METHOD

#### Purpose.

The primary purpose of the present study was to explore changes in the elderly patient's health-related quality of life following CABS. The secondary objective of the study was to assess the comparability of patient and proxy derived data.

#### Sample.

A small sample of patients who underwent coronary artery bypass surgery during 1992 took part in the study. In addition, a spouse, family member or friend, defined as a "proxy" participated for each patient. In order to be included in the study, patients were required to be English speaking, to be 65 years of age or older, due for coronary artery bypass surgery and available for an interview both prior to and six months following surgery. Proxies were required to be English speaking and available for an interview both prior to and six months following patient surgery. Patients meeting the inclusion criteria were initially invited to participate in the study by the office of the Cardiovascular and Thoracic Surgical Associates. Patients who agreed to participate were subsequently contacted by the researcher. The nature of the study and the role of the patient and the proxy in the study were

explained at this time. An interview was arranged with those subjects who agreed to participate. At the first interview, subjects were asked if they had any questions pertaining to the study. Any questions that arose were answered and written consent (see Appendix A) was obtained from both the patient and the proxy. All subsequent data pertaining to the subjects were coded numerically to ensure anonymity.

#### Procedure.

Interviews were conducted between April 27, 1992 and May 26, 1993. Subjects were seen on two occasions: pre-operatively and approximately six months after surgery. The mean length of time between interviews was 204.9 days (S.D. = 17.3). The six month interval between the pre-operative and postoperative interviews was chosen to ensure patients were past the surgical recovery phase (Schron & Shumaker, 1992). Pre-operatively, interviews took place either in the patients' own homes or in the hospital. Postoperative interviews were all conducted in the patients' homes.

#### Instruments.

i). **General Information Form.** Information regarding demographic characteristics, history of illness, comorbidities, angina, and perception of health was obtained

from patients. Proxies gave information about their demographic characteristics, length of association with the patient and their perception of the patient's health. Both patients and proxies were asked postoperatively what they perceived as the greatest benefit of surgery. They were also asked if the patient would have CABS again based on their present knowledge.

**ii) Psychological Well-Being Schedule (PGWB).** This index was developed for the purpose of assessing intrapersonal affective or emotional states reflecting a sense of subjective well-being or distress (Dupuy, 1984). The PGWB is a 22-item self-report questionnaire. It provides an overall measure of well-being and can also be broken down into six subscales including: Anxiety, Depressed Mood, Vitality, General Health, Self-Control and Well-Being. The response format is graded 0 - 5 with scores ranging from 0 - 110 and higher scores reflecting greater well-being. The schedule has high internal consistency and high test re-test reliability. The validity of the PGWB has been tested against various instruments and conditions with acceptable correlation coefficients resulting (Dupuy, 1984).

**iii). Sickness Impact Profile (SIP).** The SIP is a behaviourally based measure of sickness-related dysfunction. Kaplan (1988) describes it as one of the best-known and most



widely used quality of life measures. It is composed of 136 items that describe changes in behaviour and daily activities due to sickness. It was designed to reflect the subject's perception of performance rather than actual capacity. Statements are aggregated into 12 categories: Sleep and Rest, Eating, Work, Home Management, Recreation and Pastimes, Ambulation, Mobility, Body Care and Movement, Social Interaction, Alertness Behaviour, Emotional Behaviour and Communication. Based on a consensus of health care consumers, each item has an associated weight or scale value that reflects its relative degree of dysfunction. The instrument can be scored at various levels providing individual category scores, two dimension scores (Physical & Psychosocial) and an overall score. The Physical Dimension score contains the Ambulation, Mobility and Body Care and Movement subscales. The Psychosocial Dimension score contains the Social Interaction, Communication, Alertness Behaviour and Emotional Behaviour subscales. Scores at any level are expressed as a percentage. Increasing scores on the SIP reflect increasing levels of dysfunction. The reliability of the SIP has been assessed in terms of internal consistency of response patterns, test-retest score comparability and interrater reliability (Bergner, Bobbitt, Carter & Gilson, 1981; Pollard et al. 1976; Rothman, Hedrick & Inui, 1989). The reliability of individual categories and the instrument as a whole have been demonstrated (Bergner et

al. 1981). Concurrent and construct validity have been supported by correlations with clinical and laboratory findings, patient self-reports and clinician assessments of patient health status (Bergner et al. 1981).

**iv). Quality of Well-Being Scale (QWB).** The QWB uses the standard of perfect health to evaluate quality of life. The concept of a "well year" is employed where one well-year is defined as the equivalent of one year of completely healthy life. Forty-three functional levels have been assigned a value between 1.0 (representing one year of completely healthy life) and 0.0, (representing death). The QWB describes behaviour over a time interval of six days prior to interview. Mobility, physical and social activities and the presence of various symptoms are considered to provide an overall score. Several studies have established the reliability (Anderson, Kaplan, Berry, Bush & Rumbaut, 1989) and validity (Kaplan, Berry & Bush, 1976) of the QWB.

**v). Method of Administration.** The general information form, the SIP and the QWB were interviewer-administered to patients. The PGWB was self-administered. For proxies, the general information form and the QWB were interviewer-administered while both the SIP and the PGWB were self-administered.

The proxy versions of the PGWB and the QWB were identical to the patient versions except for pronoun substitution. The items on the patient and proxy SIP questionnaires were identical, however, proxies were instructed to complete the SIP in an attempt to describe the patient.

#### Statistical Analysis.

Statistical analyses were performed using nonparametric tests as data characteristics precluded the use of analyses which assumed a normal distribution. For comparisons of test scores before and after CABS, Wilcoxon's matched-pairs signed-ranks tests were used. To examine the association between pre- and postoperative levels of functioning, Spearman's rank-correlation coefficient ( $r_s$ ) was used. Patient subgroups were analyzed using the median test (chi-square or Fisher's exact test) to see if certain characteristics had any influence on outcomes.

Patient and proxy data comparability were assessed using Wilcoxon's matched-pair signed-ranks test. As another way of understanding proxy concordance, the correlation between patient and proxy data was examined using Spearman's rank-correlation coefficient.

An alpha criterion of less than or equal to 0.05 was used to indicate statistical significance.

## CHAPTER FOUR

### RESULTS

#### Description of Sample.

Twenty-eight patients were referred to the investigator by the office of the Cardiovascular and Thoracic Surgical Associates. Of these 28 patients, four declined to participate in the study, four lived out of town and were thus ineligible and two cancelled their surgery. The study cohort therefore comprised 18 patients. Eighteen proxies also participated. The patient group consisted of 14 males and four females. Overall the mean age for the sample was 70.8 years (S.D. = 4.5). The mean age for males was 71.1 years (S.D. = 4.2) and the mean age for females was 69.8 (S.D. = 5.9). Fifteen (83%) of the patients were married; three (16.7%) were widowed. The widowed subjects were all female.

Length of patient illness varied among the subjects: this information is presented in Table 1. Regarding surgery, four (22.2%) patients had a double bypass, five (27.8%) had a triple bypass, eight (44.4%) had a quadruple bypass and one patient (5.6%) had a quintuple bypass. Two patients (11.1%) had valve defects repaired during the same surgery. Patients were admitted to hospital a mean of 9.1 days (S.D. = 11.3) pre-operatively. For patients classified as planned or urgent out-of-hospital cases (n = 12), admission to hospital was 2-3 days prior to surgery. For

patients who were more unstable, classified as urgent in-hospital cases ( $n = 6$ ), admission to hospital varied between 9 and 39 days pre-operatively. Mean hospital stay post-surgically was 10.1 days (S.D. = 5.3). Two patients, both male, did not survive the surgical procedure. The majority of patients had health problems in addition to heart disease. Three (16.7%) had one additional health problem, six (33.3%) had two health problems and six (33.3%) had three or more health problems. The most common health problems were arthritis ( $n = 6$ ), diabetes, including borderline ( $n = 4$ ) and eye problems ( $n = 3$ ). Comorbidities were coded according to their severity using an approach similar to that of Guadagnoli et al. (1992). Conditions assessed included arthritis, diabetes and respiratory, gastrointestinal, seizure and visual disorders. The most severe comorbid disease was used to classify each patient. Comorbidity levels were defined as follows: 1- no comorbid condition or physical impairment; 2- mild to moderate comorbid condition or physical impairment, and; 3-severe comorbid condition or physical impairment. Using these criteria, three patients were classified as a "1", 10 patients were classified as a "2" and the remaining five patients were classified as a "3".

The proxy group included two males and 16 females. The average age of proxies was 67.9 years (S.D. = 8.3). For 15 cases, the patient's spouse was the proxy. For the

remaining three cases, proxies included a brother, a daughter and a close friend of the patient. Fifteen of the proxies lived with the patients. Proxies had known the patients an average of 41.4 years (S.D. = 14.8)

#### Completeness of Follow-Up.

Post-operatively, 14 patients and 13 proxies were interviewed; four patients and five proxies were lost to follow-up. As mentioned, two patients did not survive the surgical procedure yielding a mortality rate of 11.1%. A third subject, also male, was diagnosed as having a brain tumour and was undergoing chemotherapy at the time of follow-up. One patient was under the care of a psychiatrist for depression he had been experiencing subsequent to the surgery. He declined participation in the follow-up interview, feeling that it was not in his best interest. The corresponding proxies for these patients did not participate either. The remaining proxy was out of the country at the time of follow-up. One patient-proxy pair was followed up at three months post-operative. The data for this couple were not included in those analyses which considered changes in HQOL, however they were included in those comparing patient data to proxy data. One patient was out of the country at the time of follow-up. The SIP and the PGWB were self-administered by this patient and returned by mail. The proxy was interviewed by the researcher and

the same two questionnaires were completed. The QWB was not completed for either the patient or the proxy due to the difficulty of self-administration and its reliance on a specific time frame.

### Description of Results.

i). **General information.** The length of time patients reported experiencing symptoms of heart disease is given in the following Table (1).

Table 1

Length of Time Patients Reported Having Cardiovascular Illness at the Time of First Interview (n=18)

Length of illness	Frequency	Percent
0 - 6 months	4	22.2%
6 - 12 months	3	16.7%
3 - 5 years	4	22.2%
more than 5 years	7	38.9%

Patient ratings of the severity, frequency and duration of anginal pain pre- and postoperatively are presented in Table 2.

Table 2

Patterns of Anginal Pain Pre- and Postoperatively

Patterns of Pain	Pre-op.	Postop.
Intensity	(n=18)	(n=13)
no pain	2	12
discomfort	2	1
mild pain	3	--
moderate pain	7	--
severe pain	4	--
Frequency		
no pain	2	12
rarely	5	--
several times/mos	2	1
several times/wk	7	--
several times/day	2	--
Duration		
no pain	2	12
rarely >several mins.	10	--
lasts mins. to hours	3	1
present all day	1	--
continuous	2	--

In addition to this reduction in the experience of angina, patients also demonstrated a significantly reduced need for antianginal medications postoperatively ( $p \leq 0.000$ ).

Pre-operatively, the median value of patient's self-rated overall health was seven (range 2-9) on the scale from zero (worst possible) to ten (best possible). Post-operatively, this measure rose to eight (range 5-10;



$p \leq 0.01$ ). The median pre-operative proxy rating was five (range = 2-8) and this rose to eight postoperatively (range 5-9;  $p \leq 0.01$ ).

For patients, the most commonly reported benefits following surgery were better functional capacity and reduction in the symptoms of angina, dyspnea and fatigue. Patients also reported enjoying substantial relief from the anxiety their illness produced. Similar benefits were noted by the proxies. Without exception, all patients indicated, based on their present knowledge, they would again have surgery if faced with the same decision. Eleven proxies felt the patient would again choose to have the surgery, one felt the patient would not and one did not know.

**ii). Differences in pre- and postoperative scores.**

Pre- and postoperative median scores on the SIP, the QWB and the PGWB reported by patients are presented in Table 3, and those reported by proxies are presented in Table 4. Differences between pre- and postoperative measures were assessed using Wilcoxon's matched-pair signed-ranks test.

**Table 3**  
**Pre- and Postoperative Median Values for the SIP, the QWB**  
**and the PGWB as Reported by Patients**

<b>Scale</b>	<b>Pre-op.</b>	<b>Postop.</b>	<b>p</b>
<b>SIP(%)</b>	<b>n=18</b>	<b>n=14</b>	
Ambulation (A)	23.7	10.6	0.002*
Mobility (M)	10.6	0.0	0.237
Body Care/Movement(BCM)	4.0	4.2	0.722
Physical Dimension	10.6	3.7	0.009*
Social Interaction (SI)	12.5	3.5	0.051
Communication (C)	0.0	0.0	0.138
Alertness Behaviour(AB)	3.8	9.7	1.000
Emotional Behaviour(EB)	0.0	0.0	0.529
Psychosocial Dimension	9.1	3.6	0.017*
Sleep/ Rest (SR)	19.2	12.2	0.241
Eating (E)	6.1	6.1	0.017*
Work (W)	70.1	70.1	0.317
Home Management (HM)	23.8	6.6	0.004*
Recreation/Pastimes(RP)	17.8	9.2	0.028*
Total SIP Score	13.7	7.1	0.005*
<b>QWB(1.00)</b>	<b>0.579</b>	<b>0.610</b>	<b>0.534</b>
<b>PGWB</b>			
General Health (15)	6.5	10.0	0.002*
Vitality (20)	12.0	14.0	0.023*
Positive Well-Being(20)	12.5	14.0	0.010*
Anxiety (25)	19.0	20.0	0.272
Depression (15)	13.5	13.0	0.933
Self-Control (15)	14.0	13.0	0.610
Total PGWB Score (110)	76.0	83.0	0.004*

\*p≤0.05

**Table 4**  
**Pre- and Postoperative Median Values for the SIP, the QWB**  
**and the PGWB as Reported by Proxies**

<b>Scale</b>	<b>Pre-op.</b>	<b>Postop.</b>	<b>p</b>
<b>SIP(%)</b>	<b>n=18</b>	<b>n=13</b>	
Ambulation (A)	23.0	2.9	0.008*
Mobility (M)	12.6	0.0	0.008*
Body Care/Movement(BCM)	3.7	0.0	0.012*
Physical Dimension	12.6	1.5	0.005*
Social Interaction (SI)	7.0	1.5	0.008*
Communication (C)	0.0	0.0	0.109
Alertness Behaviour(AB)	0.0	0.0	0.080
Emotional Behaviour(EB)	8.8	0.0	0.173
Psychosocial Dimension	7.6	1.8	0.009*
Sleep/ Rest (SR)	12.2	0.0	0.285
Eating (E)	6.1	6.1	0.142
Work (W)	70.1	70.1	0.317
Home Management (HM)	18.6	3.3	0.012*
Recreation/Pastimes(RP)	14.0	3.9	0.050*
Total SIP Score	10.3	5.1	0.005*
<b>QWB(1.00)</b>	<b>0.580</b>	<b>0.640</b>	<b>0.505</b>
<b>PGWB</b>			
General Health (15)	9.0	11.0	0.021*
Vitality (20)	11.0	14.5	0.013*
Positive Well-Being(20)	10.5	12.5	0.068
Anxiety (25)	19.0	20.5	0.013*
Depression (15)	12.0	13.0	0.083
Self-Control (15)	14.0	13.5	0.779
Total PGWB Score (110)	72.5	86.0	0.012*

\*p≤0.05

For patient-reported measures, significant improvements were noted for the SIP subscales of Ambulation, Eating, Home Management, and Recreation and Pastimes ( $p \leq 0.05$ ). The Physical, Psychosocial and total SIP aggregate scores also showed significant improvement ( $p \leq 0.01$ ). With the exception of the subscale of Body Care and Movement, and Alertness Behaviour, all other changes, though statistically nonsignificant, were in the direction of improvement. The QWB score also showed nonsignificant improvement. For the PGWB, statistically significant improvements were noted for the subscales of General Health, Vitality and Positive Well-Being ( $p \leq 0.05$ ) as well as for the total scale score ( $p \leq 0.01$ ). Nonsignificant improvement was observed on the Anxiety subscale while minor deteriorations were seen on the Depression and Self-Control subscales.

Proxies reported improvement over a greater number of SIP subscales than did patients including; Ambulation, Mobility, Body Care and Movement, Social Interaction, Home Management and Recreation and Pastimes ( $p \leq 0.05$ ). Additionally, the Physical and Psychosocial dimension aggregate scores and total SIP score showed significant improvement ( $p \leq 0.01$ ). All other changes, while statistically nonsignificant, were in the direction of less dysfunction. The change in the QWB score was in the direction of improvement, however the difference did not reach statistical significance. Significant improvements on the

General Health, Vitality and Anxiety subscales of the PGWB were demonstrated ( $p \leq 0.05$ ) as was significant improvement on the total score ( $p \leq 0.05$ ). Changes on the Anxiety and Depression subscales were not significant however did tend towards greater well-being. There was a slight nonsignificant decline in the measure of Self-Control.

**iii). Correlations Between Pre- and Postoperative Scores.** Pre- and postoperative correlation coefficients (Spearman  $r_s$ ) for patient reported measures are presented in Table 5.

**Table 5**  
**Correlation Coefficients Between Pre- and Postoperative**  
**Patient Reported Values of the SIP, QWB and PGWB (n=14)**

<b>Scale</b>	<b>r<sub>s</sub></b>	<b>p</b>
<b>SIP</b>		
Ambulation (A)	0.640	0.014*
Mobility (M)	0.194	0.506
Body Care/Movement (BCM)	0.627	0.017*
Physical Dimension	0.594	0.025*
Social Interaction (SI)	0.366	0.198
Communication (C)	0.404	0.151
Alertness Behaviour (AB)	0.489	0.076
Emotional Behaviour (EB)	0.406	0.150
Psychosocial Dimension	0.606	0.022*
Sleep/ Rest (SR)	0.580	0.030*
Eating (E)	0.165	0.573
Work (W)	0.646	0.117
Home Management (HM)	0.845	0.000*
Recreation/Pastimes (RP)	0.294	0.308
Total SIP Score	0.670	0.009*
<b>QWB</b>	0.301	0.277
<b>PGWB</b>		
General Health	0.580	0.030*
Vitality	0.609	0.021*
Positive Well-Being	0.596	0.025*
Anxiety	0.685	0.007*
Depression	0.682	0.007*
Self-Control	0.445	0.111
Total PGWB Score	0.609	0.021*

\*p≤0.05

Three pre-operative patient subscale scores of the SIP showed significant moderate correlations with postoperative measures; Ambulation, Body Care and Movement and Sleep and Rest ( $r_s = 0.58-0.64$ ;  $p \leq 0.05$ ). Pre- and postoperative scores for home management were highly correlated ( $r_s = 0.85$ ;  $p \leq 0.001$ ). Pre- and postoperative aggregate scores (i.e. physical & psychosocial dimensions, total SIP score) were moderately correlated ( $r_s = 0.59-0.67$ ;  $p \leq 0.05$ ). With the exception of Self-Control, all pre- and post-test scores on the PGWB and the total scale score were moderately correlated ( $r_s = 0.58-0.69$ ;  $p \leq 0.05$ ).

**iv). Correlations and Differences Between Patient and Proxy Reported Measures.** Correlations were assessed using Spearman's rank correlation coefficient ( $r_s$ ) and are shown in Tables 6 and 7. Differences were examined using Wilcoxon's matched pair signed ranks test and these results are given in Tables 8 and 9.

**Table 6**  
**Correlation Coefficients Between Patient and Proxy Pre-operative Values for the SIP, QWB and PGWB (n=18)**

<b>Scale</b>	<b><math>r_s</math></b>	<b>p</b>
<b>SIP</b>		
Ambulation (A)	0.552	0.018*
Mobility (M)	0.574	0.013*
Body Care/Movement (BCM)	0.692	0.001*
Physical Dimension	0.555	0.017*
Social Interaction (SI)	0.825	0.000*
Communication (C)	0.610	0.007*
Alertness Behaviour (AB)	0.637	0.004*
Emotional Behaviour (EB)	0.473	0.048*
Psychosocial Dimension	0.767	0.000*
Sleep/ Rest (SR)	0.493	0.038*
Eating (E)	0.271	0.278
Work (W)	1.000	0.000*
Home Management (HM)	0.791	0.000*
Recreation/Pastimes (RP)	0.531	0.023*
Total SIP Score	0.707	0.001*
<b>QWB</b>	0.635	0.006*
<b>PGWB</b>		
General Health	0.455	0.058
Vitality	0.618	0.006*
Positive Well-Being	0.586	0.011*
Anxiety	0.728	0.001*
Depression	0.321	0.194
Self-Control	0.264	0.289
Total PGWB Score	0.747	0.000*

\* $p \leq 0.05$



**Table 7**  
**Correlation Coefficients Between Patient and Proxy Post-operative Values for the SIP, QWB and PGWB (n=13)**

<b>Scale</b>	<b><math>r_s</math></b>	<b>p</b>
<b>SIP</b>		
Ambulation (A)	0.736	0.004*
Mobility (M)	1.000	0.000*
Body Care/Movement (BCM)	0.344	0.250
Physical Dimension	0.679	0.011*
Social Interaction (SI)	0.584	0.036*
Communication (C)	0.736	0.004*
Alertness Behaviour (AB)	0.778	0.002*
Emotional Behaviour (EB)	0.614	0.026*
Psychosocial Dimension	0.643	0.018*
Sleep/ Rest (SR)	0.522	0.067
Eating (E)	0.306	0.309
Work (W)	1.000	0.000*
Home Management (HM)	0.657	0.015*
Recreation/Pastimes (RP)	0.121	0.694
Total SIP Score	0.875	0.000*
<b>QWB</b>	<b>0.865</b>	<b>0.000*</b>
<b>PGWB</b>		
General Health	0.456	0.118
Vitality	0.642	0.018*
Positive Well-Being	0.136	0.657
Anxiety	0.509	0.076
Depression	0.494	0.086
Self-Control	0.312	0.299
Total PGWB Score	0.413	0.160

\*p≤0.05

**Table 8**  
**Differences Between Patient and Proxy Reported Values for**  
**the SIP, QWB and PGWB Pre-operatively (n=18)**

<b>Scale</b>	<b>p</b>
<b>SIP</b>	
Ambulation (A)	0.363
Mobility (M)	1.000
Body Care/Movement (BCM)	0.530
Physical Dimension	0.435
Social Interaction (SI)	0.096
Communication (C)	0.028*
Alertness Behaviour (AB)	0.610
Emotional Behaviour (EB)	0.147
Psychosocial Dimension	0.136
Sleep/ Rest (SR)	0.327
Eating (E)	0.033*
Work (W)	0.313
Home Management (HM)	0.198
Recreation/Pastimes (RP)	0.289
Total SIP Score	0.018*
<b>QWB</b>	<b>0.650</b>
<b>PGWB</b>	
General Health	0.098
Vitality	0.518
Positive Well-Being	0.453
Anxiety	0.026*
Depression	0.050*
Self-Control	0.141
Total PGWB Score	0.084

\*p≤0.05

**Table 9**  
**Differences Between Patient and Proxy Reported Values for**  
**the SIP, QWB and PGWB Postoperatively (n=13)**

<b>Scale</b>	<b>p</b>
<b>SIP</b>	
Ambulation (A)	0.169
Mobility (M)	0.109
Body Care/Movement (BCM)	0.173
Physical Dimension	0.094
Social Interaction (SI)	0.327
Communication (C)	0.180
Alertness Behaviour (AB)	0.144
Emotional Behaviour (EB)	0.753
Psychosocial Dimension	0.108
Sleep/ Rest (SR)	0.155
Eating (E)	0.161
Work (W)	0.317
Home Management (HM)	0.327
Recreation/Pastimes (RP)	0.721
Total SIP Score	0.101
<b>QWB</b>	0.445
<b>PGWB</b>	
General Health	0.965
Vitality	0.093
Positive Well-Being	0.081
Anxiety	0.142
Depression	0.262
Self-Control	0.906
Total PGWB Score	0.182

With the exception of the Eating subscale on the SIP, correlations between pre-operative patient and proxy reported values were moderate to high ( $r_s = 0.47-1.00$ ;  $p \leq 0.05$ ). Pre-operative QWB scores were moderately correlated ( $r_s = 0.64$ ;  $p \leq 0.01$ ) as were the General Health, Vitality, Positive Well-Being, Anxiety and total score on the PGWB ( $r_s = 0.46-0.75$ ;  $p \leq 0.06$ ).

Patient and proxy values differed significantly on the SIP measures of Communication, Eating and on the total SIP score ( $p \leq 0.05$ ). In each instance, proxies reported less dysfunction than did patients. For the PGWB, patients and proxies differed on the measures of Anxiety and Depression ( $p \leq 0.05$ ), although for this scale, proxies reported more dysfunction than did patients.

Postoperatively, the majority of patient and proxy SIP scale scores showed impressively high correlations. The two groups were highly correlated on the QWB measure ( $r_s = 0.88$ ;  $p \leq 0.001$ ). The General Health, Vitality, Anxiety and Depression Subscales of the PGWB showed moderate correlations ( $r_s = 0.46-0.64$ ) however, only the Vitality correlation was statistically significant ( $p \leq 0.05$ ).

Without exception, all differences between patient and proxy scores post-operatively were nonsignificant.

**v). Analyses of Subgroups.** The patient group was further analyzed to determine if certain subgroup

characteristics had any influence on outcome. Differences in age (<70 vs. >71), number of vessels bypassed, whether or not the patient also had a valve replacement, presence/severity of comorbidities, location of pre-operative interview (home vs. hospital), duration of symptoms pre-operatively (<1 yr vs >3 yrs), sex of patient and marital status were analyzed using the median test (i.e. chi-square or Fisher's exact test).

Pre-operatively, location of interview significantly affected outcomes on the QWB with patients in hospital more likely to have below median scores ( $p \leq 0.05$ ). Patients with more severe comorbidities were more likely to have below median scores on the PGWB ( $p \leq 0.05$ ) and above median scores on the Psychosocial Dimension of the SIP ( $p \leq 0.01$ ).

Postoperatively, severity of comorbidities significantly affected the Physical Dimension score and the total score on the SIP. Patients with more severe comorbid conditions were more likely to have above median scores on these scales ( $p \leq 0.005$ ).

**vi). Correlations Between Instruments and Overall Health Rating.** The SIP and PGWB total scores, the QWB and the overall health ratings were correlated for the pre-operative and the postoperative measures for both the patient and proxy groups.

Pre-operatively, the majority of measures were significantly correlated with one another ( $r_s=0.64-0.77$ ;  $p\leq 0.01$ ). The QWB showed little correlation with the PGWB or with the patient's own health rating. Similarly, most pre-operative proxy measures were significantly correlated with one another ( $r_s=0.47-0.90$ ;  $p\leq 0.05$ ). Again, the QWB showed little association with the PGWB. The SIP showed a low correlation with the proxy's rating of patient health ( $r_s=0.37$ ).

Postoperatively, all measures achieved statistically significant moderate to high correlations ( $r_s=0.68-0.94$ ;  $p\leq 0.01$ ).

## CHAPTER FIVE

### DISCUSSION

The majority of health-related quality of life dimensions assessed demonstrated measurable improvements for both patient-reported and proxy-reported data in the group of 13 elderly patients studied before and six months after coronary artery bypass surgery. Patient and proxy responses showed good agreement for the majority of these dimensions.

In this section, results of the impact of CABS on HQOL will be discussed in terms of the changes experienced in physical, social and psychological functioning by patients. Agreement between patient and proxy responses will also be discussed. Implications of the findings will be considered, strengths and limitations of the study will be pointed out and directions for future research will be proposed.

#### I). Changes in HQOL Parameters

i). **Physical.** The length of time patients reported experiencing symptoms of heart disease presurgically varied from less than one year to more than five years. Subgroup analysis indicated no difference in either pre- or postoperative outcome indices for those reporting a duration of less than one year to those reporting symptoms persisting in excess of three years. Given the lack of discrepancy between the two groups, the variance in length of time patients experienced symptoms may reflect a hesitancy on the

part of some physicians to refer the elderly patient for CABS as has been demonstrated in the past (Morgan et al. 1989). Referring physicians may be unaware of the effectiveness of CABS in the elderly, or may assume the operative risks are excessively high. Alternatively, this may reflect variance in the speed of disease progression to the point that surgery was indicated.

The majority of patients described experiencing angina with intensity ranging from minor discomfort to severe pain. At follow-up, 92% (n = 12) reported it to be completely alleviated. While the remaining patient experienced angina postoperatively, it was considerably improved (i.e. lessened intensity, frequency and duration). Moreover, patients demonstrated a greatly reduced need for anti-anginal medications at follow-up. Relief from angina has been found consistently across CABS studies (Caine et al. 1991; Flynn & Frantz, 1987; Johnston et al. 1989; Penkofer & Holm, 1984). Patients also related experiencing reduced dyspnea and fatigue, an outcome similarly demonstrated by others (Jenkins et al. 1983; Mayou & Bryant, 1987). Despite these improvements, several patients felt they were still somewhat limited and weren't yet "back to 100%." These feelings likely indicated that patients were still in the process of recovery from surgery.

Eighty-three percent (n = 15) of patients reported a history of one or more chronic illness(es) in addition to



heart disease, a frequency consistent with the age of the sample (Flynn & Frantz, 1987; Foreman & Kleinpell, 1990). Postoperatively, increasing severity of comorbidities was strongly associated with higher dysfunction scores on the overall SIP and on its physical dimension subscale. As there was no association between these variables pre-operatively, it can be hypothesized that patients became more cognizant of other complaints once the symptoms of IHD were abolished or alleviated.

Overall, the magnitude of impairment measured by the SIP was small. This finding was not unexpected as the SIP measures impairment across a broad range of activities ranging from near coma to minor deficits of sleep or eating. The pattern of pre-operative scores was similar to those reported by Tandon, Stander and Schwartz (1989) and by Bergner, Hallstrom, Bergner, Eisenberg and Cobb (1985) who assessed congestive heart failure and cardiac arrest infarction patients respectively.

In the present study, the Physical Dimension of the SIP showed significant overall improvement which was manifested primarily by the Ambulation and Mobility subscales. These subscales contained items pertaining to speed and distance of walking, use of stairs and the ability to move about both in and out of the home. Improvement on the Physical Dimension was consistent with patient reports of better functional capacity and decreased angina and dyspnea

following surgery. Findings of decreased activity limitations and increased exercise tolerance have been widely reported by others (Jenkins et al. 1983; Stanton et al. 1984). The Body Care and Movement subscale did not show any improvement. This scale contains items pertaining to coordination, joint mobility, and continence which would not be expected to change as a function of CABS.

Pre- and postoperative scores were moderately correlated on the total SIP score, the Physical Dimension scale, the Ambulation subscale and the Body Care and Movement subscales of the SIP. These correlations might reflect a difference in either reporting of symptoms and/or symptom experience. Mechanic (1986) offers a dispositional approach towards understanding illness behaviour. This approach assumes that people have a fairly stable orientation to respond to illness in particular ways. While some tend to be stoical in the face of illness, others may be hypochondriacal. Thus, patients who related few symptoms pre-operatively would tend to relate few postoperatively and conversely those patients reporting more symptoms pre-operatively would report more post-operatively. Alternatively, these correlations may reflect the persistence of symptoms and limitations due to illnesses that were unaffected by CABS. As noted by Glower et al. (1992) elderly patients tend to have significant pre-operative disability from noncardiac disease and this might

be expected to impair functional status both before and after CABS.

The mortality rate observed in the present study was 11.1%. This rate is somewhat higher than those observed by others for this age group (Carey et al. 1992; Johnston et al. 1989) and is probably a function of the small sample size.

**ii). Social.** Employment status is one of the earliest and most often cited outcome indices for CABS (Barnes et al. 1977; Gundle et al. 1980; Lamendola & Pellegrini, 1979). Fifteen of the subjects were retired at the time of the initial interview, hence significant changes in employment status were not expected. Of these patients, seven reported their retirement to have been related to their health, thus accounting for the high level of dysfunction observed on the Work subscale of the SIP. One of the patients was employed part-time prior to the surgery and the time of follow-up had resumed this employment. A second patient who had been working pre-operatively did not survive the operation.

Improvements in the Home Management subscale of the SIP were considerable. This finding is important given that most patients were retired and domestic duties were among their major social role responsibilities. Others have reported significant improvements in domestic functioning (Langeluddecke et al. 1989; Mayou & Bryant, 1987). Patients

indicated they were still limited in the performance of heavy duties (e.g. shovelling the sidewalk, vacuuming) but this was on the advice of their physicians for this time in their recovery and did not reflect perceived inability to perform these tasks.

Increased functioning was observed on the Social Interaction subscale of the SIP. Patients had indicated a reduction in the frequency and length of visits with people pre-operatively, however significantly fewer impairments were seen following surgery. This is consistent with the results of Penkofer and Holm (1984) whose patient population indicated that prior to surgery, participation in social activities was limited due to the concern evoked by angina. Jenkins et al. (1980) described the increase in social activities in their patients post-surgically as an accompaniment to increased physical mobility.

Interactions with family members were generally only minimally influenced by the experience of surgery. Such outcomes have been previously noted by Langeluddecke et al. (1989). A slight trend was noted towards married patients having a better outcome on the total SIP score at follow-up which may be demonstrative of the relationship between social supports and health (Dimond, 1979). Sexual functioning remained unchanged for this sample of patients. Bass (1984) reported that bypass surgery neither adversely affected sexual functioning nor resulted in the amelioration

of already established sexual dysfunction. In contrast, others have reported both an increase (Penkofer & Holm, 1984) and a decrease (Kornfeld et al. 1982) in sexual activity following surgery.

Outcomes for leisure functioning have been varied as well with researchers reporting either improvements (Mayou & Bryant, 1987) or no change (Rogers et al. 1990) in this index. Significant improvement was observed for the SIP subscale of Recreation and Pastimes in the present sample. Again, it seems that reduction in the symptoms of IHD is responsible for this increase.

**iii). Psychological.** No significant changes were observed in the SIP subscales of Alertness Behaviour, or Emotional Behaviour.

The Alertness Behaviour dimension of the SIP contains items relating to cognitive processing such as attention, concentration, memory and reasoning. Some researchers have revealed cognitive deterioration in CABS patients early in the recovery period (eg. Shaw et al. 1986) however these capacities have usually returned to pre-operative levels by six to eight months after surgery (Ellis et al. 1980).

The majority of patients didn't report any impairments in Emotional Behaviour either prior to or after surgery as assessed by this subscale of the SIP. This subscale taps constructs similar to those measured by the Anxiety,

Depression and Self-Control subscales of the PGWB. Consistent with the SIP measure, the PGWB subscales reflected little dysfunction pre-operatively nor did they change significantly at follow-up. Pre- and postoperative measures were significantly correlated for both the Psychosocial Dimension of the SIP and for the total PGWB. Some investigators have speculated that psychological functioning after surgery is related to functioning before surgery. O'Connor (1983) found that postoperatively psychosocial functioning and depression were positively associated with pre-operative psychosocial functioning. Similarly, Magni et al. (1987) reported the variable most predictive of high levels of overall psychological distress postoperatively were high scores for psychological distress prior to surgery. It is interesting to note that the patient who was lost to follow-up due to depression scored lowest on the PGWB and was among the most dysfunctional quartile of the sample for the SIP subscales of Alertness and Emotional Behaviour pre-operatively.

Patients cited one of the greatest benefits surgery brought to them was relief from the anxiety that their illness evoked. In light of this, it is surprising that greater improvement on the Anxiety subscale of the PGWB was not observed. It might be that the items comprising this subscale did not adequately measure the construct as it relates to the experience of illness. Specifically,

anxiety, nervousness and tension were considered in general terms and were not directly associated with either the illness or the impending operation.

The PGWB subscales of General Health, Vitality, Positive Well-Being and the total PGWB measure all significantly improved following surgery. Improvements in health and vitality are consistent with the decreased experience of angina, dyspnea and fatigue and with the increase in physical functioning previously discussed. Increases in overall sense of well-being have been reported by others (Jenkins et al. 1983).

Severity of comorbid illnesses significantly affected measures of psychosocial well-being pre-operatively as evidenced by patients with more severe comorbidities demonstrating significantly more impairment on both the PGWB and the Psychosocial dimension of the SIP. It has been proposed that psychological disturbance in chronic illness may be a reaction to having the illness and related complications (Huapaya & Aanth, 1980). A number of mediators are believed to intervene between disease and adjustment, one of which is illness severity. Cassileth et al. (1983) found that severity of disease rather than type of disease was associated with psychological adjustment, with increased severity related to poorer adjustment. Severity of comorbidities did affect PGWB and Psychosocial Dimensions scores at follow-up period, however the

relationship did not attain statistical significance. It may be that in addition to illness severity, the number of illnesses an individual suffers play a mediating role in the relationship between disease and adjustment and thus there is an additive effect at work. Removing one source of distress would then improve adjustment accordingly.

In addition to measures of psychological symptoms, patients views about the surgical experience and their health were assessed. Patient's appraisal of their own health status increased significantly following surgery. Overall satisfaction with the surgical procedure was reflected by all patients indicating that they would again choose to have surgery if faced with the same decision.

**iv). Aggregate Measures.** Outcomes for the HQOL dimensions of physical, social and psychosocial functioning improved significantly following surgery as demonstrated by the aggregate dimension scores of the SIP, and by the total SIP and PGWB scores.

Like the total SIP score, the QWB provided a global measure of HQOL through consideration of mobility, physical and social activities and the presence of various symptoms. Patient disability as measured by the QWB appears to be higher than that assessed by the SIP. Discrepancies have previously been observed between measures of patient well-being when using the SIP versus other measures of patient



well-being. Hornberger, Redelmeier and Petersen (1992) found that well-being was substantially higher as evaluated by the SIP compared to the other measures of well-being, including the Kaplan-Bush Index of Well-being, an early version of the QWB, for a group of dialysis patients.

Despite the fact that significant improvement was not found with the QWB at follow-up, the scale was highly correlated with the total SIP score for all patients pre-operatively and for surviving patients postoperatively.

## II). Comparability of Patient and Proxy Responses.

Concordance between patient and proxy responses for the SIP, the QWB and the PGWB was generally good as assessed by both correlational and difference measures.

**i). Correlations Between Patients and Proxies Responses.** The majority of correlations between patient and proxy data were moderate to high for both pre- and postoperative measures indicating a substantial degree of concordance in the responses of the groups. This suggests that when repeated measures are taken on patients, for example to monitor progress or to assess the effectiveness of interventions, proxy data would provide a reasonable indication of the degree of change.

**ii). Differences Between Patient and Proxy Responses.**

Significant differences were observed between the responses of the two groups only for certain pre-operative measures. For the total SIP scale score, patients reported themselves as experiencing a greater degree of dysfunction than did proxies. This contrasts with previous studies in the literature which have typically demonstrated proxies reporting more dysfunction than patients (Epstein et al. 1989; Magaziner et al. 1988; Rothman et al. 1991).

To account for these differences, a couple of explanations may be offered. Firstly, in a number of studies, the patients have been more severely impaired and the proxies have assumed the role of an informal caregiver (Rothman et al. 1991; Rubenstein et al. 1984). The degree of subjective burden experienced by the caregiver has been found to influence perceptions of patient functional status with more burdened caregivers underestimating patient functional status more (Zarit, Todd & Zarit, 1986). In the present study, patients were able to function independently, thus the experience of caregiver burden would have been negligible.

Secondly, it might be that while patients were independent in self-care, they may have recognized limitations in themselves not readily apparent to a significant other. Patients may not have disclosed the full extent of their symptoms and feelings to their proxies, or

may have downplayed them, as they did not wish to cause worry. In contrast, patients may have been more willing to report disabilities and concerns to the interviewer.

Differences between patient and proxy responses on the PGWB pre-operatively were more consistent with earlier findings. Research has shown that concordance of proxy ratings appears to be dependent upon the dimension of HQOL under consideration. In general, the more concrete and visible and the less subjective the information, the more agreement there is between the ratings (Bassett et al.1990; McCusker & Stoddard, 1984). Correspondingly, in the present study, responses were most similar for the more overt dimensions of General Health, Vitality and Self-Control. In contrast, the more covert dimensions of Anxiety and Depression were significantly different with proxies reporting greater distress than patients. Curiously, the dimension of Positive Well-Being did not differ significantly. Epstein et al. (1989) have suggested that observers tend to give more weight to negative rather than positive information when forming impressions of others and have further postulated that negative emotional expressions are more salient and memorable than positive ones. Thus, even if patients displayed both negative and positive feelings equally, proxies impressions would be more influenced by the negative resulting in their opinions of the subjects condition being biased negatively.

Postoperatively, no significant differences were found between patient and proxy responses. The couples may have been more comfortable discussing the patient's well-being since the threat posed by imminent surgery had been removed. Alternatively, lack of differences may have been due to a practice effect. As the patient-proxy pairs were familiar with the interview process and content, they may have discussed patient functioning prior to the session.

It is important to note that it was agreement of proxy data that was examined in this study, not validity. Whether patients or proxies provided the more valid measures is not known.

### III). Implications of Findings.

i). **HQOL, CABS and the Elderly.** As the proportion of elderly in the population increases, planners are likely to meet an increasing demand for resources in the surgical management of coronary artery disease in this group. In the current climate of health care cutbacks, opinions regarding resource allocation in the elderly range from those who would ration all expensive, procedurally oriented health care, which would exclude people over age 70 or 80 to those who feel that care cannot be limited even if the patient is permanently comatose (cited in Mott, 1990).

Anderson and Lomas (1988) stated the net benefit of CABS over medical therapy involves a trade-off between the

immediate risk of death associated with surgery compared to medical therapy and the longer term benefit of surgery over medical therapy. Given that surgical mortality is higher in the elderly than in the nonelderly and the probability that elderly patients have a shorter life span in which to accrue the longterm benefits of surgery over medical therapy, these authors suggested that the relationship of age to net benefits indicate that the cost-effectiveness of CABS is likely lower in the elderly than the nonelderly.

In contrast, Mullany et al. (1990) acknowledged the benefits of successful operation in elderly CABS patients to include good relief of disabling symptoms and further emphasized additional economic and social benefits in terms of early dismissal from the hospital and fewer subsequent admissions for cardiac-related problems. Similarly, Morgan et al. (1989) suggested that the increasing demand for resources in the elderly CABS patient would be more than offset by lower social costs as patients become more mobile and independent following surgery.

Still other researchers have ignored cost issues altogether and focused primarily upon health-related quality of life outcomes. Many have maintained that for a wide spectrum of activities, older patients do as well, if not better, than younger patients following CABS and have concluded that patients should not be denied CABS on the basis of age alone (Gold et al. 1991; Carey et al. 1992;

Guadagnoli et al. 1992; Horneffer et al. 1987).

While it is beyond the scope of the present investigation to resolve such issues, it is clear that health-related quality of life considerations will lead to important conclusions concerning the interaction of medical and social factors. In turn these conclusions may play a role in the allocation and justification of various medical interventions.

**ii). Patient and Proxy Respondents.** The study of agreement between patient and proxy respondents provided insight into the ability of such significant others to evaluate accurately the impact of heart disease and bypass surgery on the daily functioning of patients. To the extent that health-related quality of life considerations play a role in decisions regarding treatment and patient care, the information derived from such sources may contribute to the understanding of the place of subjective judgement in such decision-making processes.

#### IV). Strengths and Limitations.

This study provided an in-depth, prospective examination of changes in health-related quality of life prior to and following coronary artery bypass surgery as perceived by both patients and proxies. The findings of this study were generally consistent with the results of

others: patients 65 years of age and older experienced improvement in health-related quality of life through improvements in physical, social and psychological functioning following coronary artery bypass surgery. Further, proxy respondents provided responses comparable to the patients themselves in the measurement of this construct. Nonetheless, the data were limited by the small number of subjects and by the fact that all patients were operated on by the same group of surgeons at a single institution.

#### VI). Directions for Future Research.

The central issue with CABS is that there are very few data on the benefits of the procedure in the elderly. While the results of a number of randomized trials (CASS, 1983a; European Coronary Surgery Study Group, 1988; Veterans Administration Cooperative Study Group, 1984) have indicated that CABS results in greater survival and improvement in HQOL parameters compared to medical therapy in certain patient subgroups, no randomized trial to date has included patients who were aged 65 or over. Conclusions about the role of CABS in this group have therefore primarily extrapolated from studies performed on younger cohorts. Clearly, further research needs to be done to examine the role of CABS in the management of the elderly patient particularly with respect to health-related quality of life

outcomes. Conducting a randomized trial in this population would serve to quantify the difference in HQOL benefits reaped by surgically versus medically treated groups.

Information regarding the use of proxy respondents in assessments of patient's health-related quality of life is also limited and further research is required in this area in order to corroborate or refute previous findings.

Increased understanding of the agreement between patient and proxy scores might be achieved if subgroups of patient and proxy characteristics are further explored.

Continued research pertaining to both HQOL outcomes following CABS, and patient/proxy response agreement will serve to benefit future populations of elderly patients.



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**APPENDIX A**

**CONSENT FORM**

I understand that the purpose of the present study in which I have been asked to participate is to investigate the changes in my life as a result of my undergoing coronary artery bypass surgery. I understand that my participation is voluntary and will consist of completing an interview and a set of three questionnaires both prior to my surgery and at a time about six months after my surgery. I understand that my spouse or a close friend or relative will be asked to provide similar information about me independently. I understand that the interview and the questionnaires will be given to me in my own home, or in the hospital by Stacey A. Page, an M.Sc. candidate at the University of Calgary and that the time required to complete these should not exceed two hours for each session. I understand that I am free not to answer specific items or questions and that any data or answers to questions will remain confidential in regard to my identity.

I confirm that the above matters have been fully explained to me, that I have been given an opportunity to ask whatever questions I may have had and that all such questions have been answered to my satisfaction. I understand that I am free to withdraw my consent and terminate my participation at any time and should I withdraw from the study, future treatments or therapies I may require from Calgary District Hospital Group shall not be compromised in any way.

This is to certify that I, \_\_\_\_\_, hereby agree to participate as a volunteer in this study as an authorized part of the research undertakings within the Department of Cardiovascular Surgery at the Holy Cross Hospital, Calgary District Hospital Group.

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Date

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Participant's Signature

Witnessed by:

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Date

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Witness's Signature

**CONSENT FORM**

I understand that the purpose of the present study in which I have been asked to participate is to investigate the changes in my spouse's/relative's/friend's life as a result of his/her undergoing coronary artery bypass surgery. I understand that my participation is voluntary and will consist of completing an interview and a set of three questionnaires both prior to my spouse's/relative's/friend's surgery and at a time about six months after their surgery. I understand that the interview and the questionnaires will be given to me in my own home or at a place of my convenience by Stacey A. Page, a M.Sc. candidate at the University of Calgary and that the time required to complete these should not exceed two hours for each session. I understand that I am free not to answer specific items or questions and that any data or answers to questions will remain confidential in regard to my identity.

I confirm that the above matters have been fully explained to me, that I have been given an opportunity to ask whatever questions I may have had and that all such questions have been answered to my satisfaction. I understand that I am free to withdraw my consent and terminate my participation at any time and should I withdraw from the study, future treatments or therapies I may require from Calgary District Hospital Group shall not be compromised in any way.

This is to certify that I, \_\_\_\_\_, hereby agree to participate as a volunteer in this study as an authorized part of the research undertakings within the Department of Cardiovascular Surgery at the Holy Cross Hospital, Calgary District Hospital Group.

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Date

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Participant's Signature

Witnessed by:

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Date

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Witness's Signature