Complex factors that influence patient and partner and dyad outcome 4 months after coronary artery bypass grafting surgery

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This thesis is presented for the degree of Doctor of Philosophy

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September 2008

DECLARATION

I hereby declare the work in this thesis to be my own, except where otherwise stated.

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DEDICATION

To my husband Norman and my son Jamie and daughter Kirsty

ACKNOWLEDGEMENTS

I would like to especially thank my two supervisors, Professor K Niven and Professor D Peck for their expertise and support in guiding me through to the completion of my thesis

A special thanks goes to my husband for his unending patience, continued help and encouragement throughout my years of part-time study.

I would also like to thank the following individuals for their support during my studies -

Mr T Starrs, Head of Department and Dr K Stoddart, Head of Education for assistance and encouragement throughout, and to all my work colleagues and friends in the Department of Nursing and Midwifery for their words of encouragement and support.

Kate Howie, Department of Computing Science and Mathematics, University of Stirling

Professor J McMurray, Department of Medicine and Therapeutics, University of Glasgow and Western Infirmary Glasgow for support and Mr G Berg and the other Cardiac Surgeons at the Western Infirmary Glasgow for access to their patients.

The nursing and clerical staff of Level 4 Out-Patient Clinic and Level 9 Cardio-Thoracic Unit, Western Infirmary Glasgow and Margaret Kinnaird and Ann Ross.

A special thank you goes to the patients and their partners and family who very kindly agreed to take part in the study, and to the friends and family of work colleagues who helped with pre-piloting of the questionnaires.

Definitions

Angiogram	A procedure in which a fine catheter is inserted via a blood vessel to inject X-ray opaque dye into the coronary arteries to obtain an image of the anatomy of the coronary arteries
BHF	British Heart Foundation
CABG	Coronary artery bypass graft or coronary revascularisation is an operation to bypass section or sections of coronary arteries and improve blood supply to the heart
CHD	Coronary heart disease occurs when the walls of the coronary arteries become narrowed by a gradual build-up of atheroma
CAD	Coronary artery disease, disease of the coronary arteries
CVD	Cardiovascular disease, commonly known as CVD, includes coronary heart disease (about 50%), stroke (25%), and all other diseases of the circulatory system
Co-morbidity	A state where an individual has two or more diseases
Dyspnoea	Laboured or difficult breathing, otherwise known as breathlessness
Hypertension	High blood pressure, systolic blood pressure >140mmHg, diastolic blood pressure > 90mmHg
Incidence	A measure of morbidity based on the number of new episodes of an illness in a population over an estimated period
MI	Death of heart muscle (myocardium) which follows sudden reduction in or cessation of the flow of blood down the coronary arteries
Morbidity	A state of being diseased
Mortality	The incidence of death in a population in a given period
Prevalence	A measure of morbidity based on current sickness in the population at a particular time
Primary prevention	The prevention of the development of a condition e.g. CHD, by avoidance of factors known to contribute to its development
PTCA	Percutaneous Transluminal Coronary Angioplasty, otherwise known as PCI, Percutaneous Coronary Intervention (normally includes coronary angioplasty and stenting)
Secondary prevention	In CHD, interventions such as lifestyle changes or drugs aimed at slowing or reversing the progression of the disease
Stable angina	Term used for angina, which is relatively predictable and the intensity and frequency of which remains similar over long periods

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ABSTRACT

Background: Coronary heart disease (CHD) remains a major cause of death and ill-health in Scotland. Coronary artery bypass grafting (CABG) aims to relieve CHD symptoms, improve quality of life and increase life expectancy in high-risk groups. Partners may positively or negatively influence patient outcome, and they too may be adversely affected by the experience of CABG. Health care is currently organised around the patient. The partner's is seen as merely assisting patient recovery. Their health and well-being is neglected despite them being at an increased risk of CHD. Research has been limited in the partner variables that have been examined. Their health needs and concerns and the influence of the patient on partner outcome have seldom been examined and the effects of CABG on the dyad. The dyad has not previously been examined as an outcome variable of interest.

Aim: To explore the complex factors that influence patient and partner and dyad outcome 4 months after CABG surgery.

Design and methods: A multifactorial exploratory, prospective study was carried out. A consecutive sample of 80 patient-partner/family pairs were recruited and data were collected on a number of physical and psychosocial variables 2-3 months prior to elective CABG and 4 months after surgery. The outcome measures were perceived health status, quality of life and CHD risk factors.

Findings: The patients' CHD risk factors and physical and mental health (SF-12) improved significantly from pre- to post-operatively, but there was no corresponding improvement in the partners. Most patients were free from angina following CABG. Though the partners' quality of life improved it remained sub-optimum post-operatively. The patients' self efficacy beliefs and partners' efficacy judgements about the patient's cardiac capabilities improved significantly at 4 months; treatment beliefs were unchanged. The patients' perceived social support improved post-operatively, but not the partners. Patients' and partners' total number of important need met increased significantly post-operatively, and the number of important needs unmet decreased.

There were significant differences between the patient and partner groups over the two time periods (pre- and post-operatively) for CHD risk factors, physical health (SF-12), self-efficacy for maintaining function, affectionate support, positive social interaction and important needs met and unmet. Overall, the recovery patterns indicated a move towards concordance.

The patients' poorer pre-operative physical and mental health (SF-12) significantly predicted their poorer post-operative physical health, and lower pre-operative importance need met predicted poorer mental health. Greater pre-operative CHD risk factors and being female predicted higher post-operative risk factors. Partners' poorer pre-operative physical and mental health (SF-12) significantly predicted their poorer post-operative physical and mental health; low pre-operative affectionate support predicted poorer physical and social health (QL-SP); and a greater number of pre-operative CHD risk factors predicted higher post-operative risk factors. The patients' pre-operative beliefs about CABG – mortality risk reduction predicted the partners' poorer post-operative physical health (SF-12) and emotional health (QL-SP); and patients' poorer pre-operative mental health (SF-12) and greater physical limitation (SAQ) predicted the partners' poorer physical and social health (QL-SP). Only the partners' poorer pre-operative physical health predicted patients' poorer post-operative physical health (SF-12).

This unidirectional relationship in which the patients’ pre-operative factors predominantly influenced partner outcome(s) was also evident when the physical and mental health and CHD risk factors of the dyad (outcomes) were examined.

Results highlight the potential that pre-operative rehabilitation and use of interventions, which target the dyad have for the primary and secondary prevention of CHD. Nurses are heavily involved in the pre-operative preparation for CABG and in the post-operative care of patients and could contribute further to improving the outcomes of surgery for patients and partners.

CHAPTER 1

OVERVIEW OF THE THESIS

This section briefly outlines the overall organisation of the thesis and the rationale for selection of this area of study. The research reported in this thesis aims to examine the complex factors that influence patient and partner and dyad outcome 4 months after coronary artery bypass grafting (CABG) surgery. This area of research was selected because much of my clinical experience involved the care of patients with coronary heart disease (CHD), including those having cardio-thoracic surgery. In contrast, my academic career involved the study of public health at Masters level. I was therefore interested in designing a study to explore the outcomes of CABG surgery, which would be informed by a public health perspective to CHD prevention and care.

My clinical base has been in the West of Scotland. Historically, Scotland has been one of the CHD capitals of the world. Scottish CHD mortality age-sex standardised rates are still amongst the highest in Western Europe, although considerably lower than in some former Soviet Republic States (ISD 2006). Nonetheless, there has been a major shift towards improved survival from CHD brought about by changes in treatment. CABG surgery has played a considerable role in this change as one of the primary treatment options for CHD. In Scotland alone between 1997 and March 2003, 16,520 CABG were performed (Pell and Slack 2004). Whilst the trend in performing CABG had risen steadily over the last decade, CABG rates has now levelled off, as patients who would have been previously treated with surgery as the method of choice are being offered other types of treatment, such as percutaneous coronary intervention (PCI). Consequently, CABG surgery today is performed on patients who may have already had PCI or is reserved for the more seriously ill patient who has a large number of risk factors. These cases are therefore more complicated. In order to maintain the revascularisation benefits of CABG surgery in such patients, CHD risk factors must be modified and adherence to risk factor reduction maintained in the long-term. This need for risk factor modification is reflected in the design of the study.

The role of nursing with respect to the care of the CABG patient has historically focussed on acute care. Currently, the role has broadened to include pre-operative assessment and preparation for surgery and post-operative rehabilitation. However, much of this activity has been physically orientated and is directed toward the patient. Although the patient and their family would normally attend a pre-admission clinic, and secondary prevention programmes or ‘shared care’ approaches exist these are largely designed with the patient in mind. An awareness of the potential influence of the partner or the close family on post-operative outcomes could influence pre- and post-operative nursing interventions for CABG patients. This thesis was designed to explore the potential influence of the partner on CABG patient outcomes, necessitating a broad bio-psychosocial approach to the exploration of the variables involved. In line with a public health approach to the prevention of CHD, this study offered the opportunity to explore the impact that having a partner undergoing CABG surgery might have on the partner. In the future I would argue for a broader remit for nurses informed by a wider bio-psychosocial perspective that considers the patient and their partner; and that utilises the opportunity to reduce the risk of CHD in the partners of CABG patients as well as focusing on maintaining the benefits of treatment for the patient. This remit needs to be underpinned by a substantive evidence base. The research reported in this thesis aims to contribute to that evidence base by focusing on a range of outcomes pertaining to CABG patients and their partners.

In Chapter 2 the literature on CHD incidence, disease progression and treatment is reviewed, the problem with adherence to CHD risk factor modification is established and importance of secondary prevention is highlighted. Many large-scale studies have shown that patients’ pre-operative physical health and disease-severity influence the outcome of CABG surgery. There is a need to establish whether the psychosocial factors associated with quality of life and CHD risk factors are influential in improving outcome. The impact of some major psychosocial factors on the outcome of CABG surgery has been studied to some extent, whereas other important variables have been unexplored. These factors are complex and are likely to moderate one another, so consideration of their effects on outcomes need to be considered using appropriate analytical approaches.

Chapter 3 reviews the literature on the partners of patients with CHD; exploring the potential influence that partner-related variables have on CABG patient outcome; and the psychosocial factors influencing the partners' health and well-being after CABG. The literature pertaining to the partners' risk of developing CHD and concordance in health and risk factors in couples is also examined. Partner support has been shown to be an important factor in determining patient outcome following CABG. However, relatively few studies have examined the needs of the CABG partners pre- and post-operatively, or the influence of lack of social support on partner or dyad outcome following surgery. It is therefore proposed that the consideration of factors related to quality of life and risk factor reduction should be extended to the patient's partner, since they may influence post-operative outcomes in patients including the maintenance of treatment-benefit, and the primary prevention of CHD in the partner. The benefit of looking at the patient-partner pair as a single unit or dyad is debated and it is concluded that this approach should be incorporated into the study proposed.

The design of the study is considered in Chapter 4. Five research questions were identified. Post-operative outcome variables were considered in relation to pre-operative data and differences between the patients and partners for CHD risk factors, perceived health status, self-efficacy, treatment beliefs, perceived social support and self-perceived need were explored. Some similarities and difference between the patient-partner pairs were examined and as were potentially modifiable predictors of patient and partner and dyad outcome. A number of well-established measures were utilised for data collection, enabling comparisons with existing published findings. When such measures were not available, measures that had been used with similar patient groups were selected. Identical or equivalent measures were used to gather data on patients and their partners whenever possible to aid comparability. In addition to analyses related to the patient and their partner, the dyad was used as a unit of analyses. The sample size of 80 which is relatively large compared to previous studies of CABG patient-partner pairs, but not as large as most studies of CABG patients, was set to allow sufficient power given that summary scores were mostly used in the analyses.

Chapter 5, 6 and 7 present the results related to the overarching research questions; namely, what changes are there in the patients and partners from pre- to 4 months post-operatively for CHD risk factors, perceived health status, quality of life, perceived symptom severity (patients only), self-efficacy, treatment beliefs, perceived social support and self-perceived need; what differences exist between the patients and partners pre- and post-operatively for CHD risk factors, perceived health status, self-efficacy, treatment beliefs, perceived social support and self-perceived need; what patient and partner pre-operative factors (physical and psychosocial) significantly predict their own and each others outcome(s) 4 months after CABG surgery; are there significant pre-operative similarities and differences between the dyads that influence patient or partner outcome(s) 4 months after CABG surgery; what patient and partner pre-operative factors significantly predict the post-operative health of the dyad i.e. perceived physical and mental health and the CHD risk factor profile of the dyad ? Chapter 8 provides the main discussion for the thesis and builds on the summary discussions presented at the end of each chapter. The discussion draws on the findings from the research to make recommendations for CHD nursing practice and to suggest directions for future research.

CHAPTER 2

PATIENT LITERATURE

CHAPTER 2

PATIENT LITERATURE

2.1 TRENDS IN CHD MORTALITY AND MORBIDITY

2.1.1 *Introduction*

This chapter of the thesis will focus on the literature pertaining to the patient with CHD, especially in relation to CABG surgery. It will explore the physical and psychosocial factors that may influence the outcome of CABG surgery. To review studies of CABG patients, studies appearing in MEDLINE, PsycLIT, Embase, Cinahl, and PsycLIT data bases were initially accessed between 1989 and 1999, and reviewed regarding objectives, methodological issues, results and clinical relevance. The literature review was then ongoing from 1999 until 2008 (as part-time PhD). Both electronic and manual searches were conducted, using the key words ‘patients’, ‘coronary heart disease’, ‘CABG’, ‘cardiac surgery’. These words were coupled with ‘CHD risk factors’, ‘treatment’, ‘emotional health’, ‘quality of life’, ‘perceived health status’, ’treatment beliefs’, ‘recovery’ and ‘rehabilitation’’ in extensive searches of the literature undertaken to review the factors that could influence patient outcome following CABG surgery. Meta-analysis, systematic reviews, randomised controlled trials were reviewed with respect to the aforementioned areas. The literature revealed some intervention studies intended to enhance the patients’ psychosocial recovery following surgery.

This chapter will proceed by examining the trends in CHD mortality and morbidity, the manifestations of CHD, the aims of surgical revascularisation, secondary prevention, and a range of psychosocial factors that may influence quality of life outcomes and CHD risk factor reduction after CABG, including the patient’s’ pre-operative physical health, perceived symptom severity, perceptions of treatment benefits and risks, self-efficacy, perceived social support and self-perceived need. It will draw on different theoretical concepts to show that for treatment to be maximally effective a wider biopsychosocial perspective must be considered. It places an emphasis on understanding the outcomes that CABG patients' experience by analysing the factors associated with, or that predict the outcome of surgery.

2.1.2 *CHD mortality and morbidity*

CHD remains a major cause of premature death in Scotland, the UK and elsewhere in the developed world (Scottish Executive 2001a). Since the 1970s the number of CHD deaths have been falling in the UK; for adults under 65 years they have fallen by over 40% in the last 10 years (British Heart Foundation, BHF 2006). CHD caused 10776 deaths in Scotland in 2004, one in five deaths in men and one in six deaths in women (BHF 2006). Despite this decline in the incidence and mortality of CHD, the rates of deaths in Scotland remain among the highest in the world and the one of the highest in Western Europe (SEHD 2001, PHIS 2003). Figure 2.1 presents the UK trends in age specific CHD deaths rates for men and women from 1968 – 2004 (BHF 2006). Although CHD mortality has fallen, the prevalence of the disease continues to increase because of ageing populations and the improving prognosis of coronary patients due to more effective treatment (Capewell et al 2005, Unal et al 2005). Life expectancy at birth in Scotland has increased since 1993 –2005 from 71.9 to 74.2 years for males and from 77.5 to 79.2 years for females (Registrar Generals Office for Scotland 2007). Population projection figures show that over the next 10 years the number of people in Scotland aged 65^+ is set to increase by over 46,000 and those aged 75^+ expected to increase by over 32,000 (SEHD 2001). This increase in life expectancy is significant because age is the most important risk factor for CHD. Modern treatments have been estimated as having accounted for as much as 40% of the decline in CHD mortality in Scotland between 1975 and 1994, with 40 - 50% of the reduction being attributable to lifestyle changes (SEHD 2001, Capewell et al 2005). Thus, more people are currently iving with rather than dying from CHD.

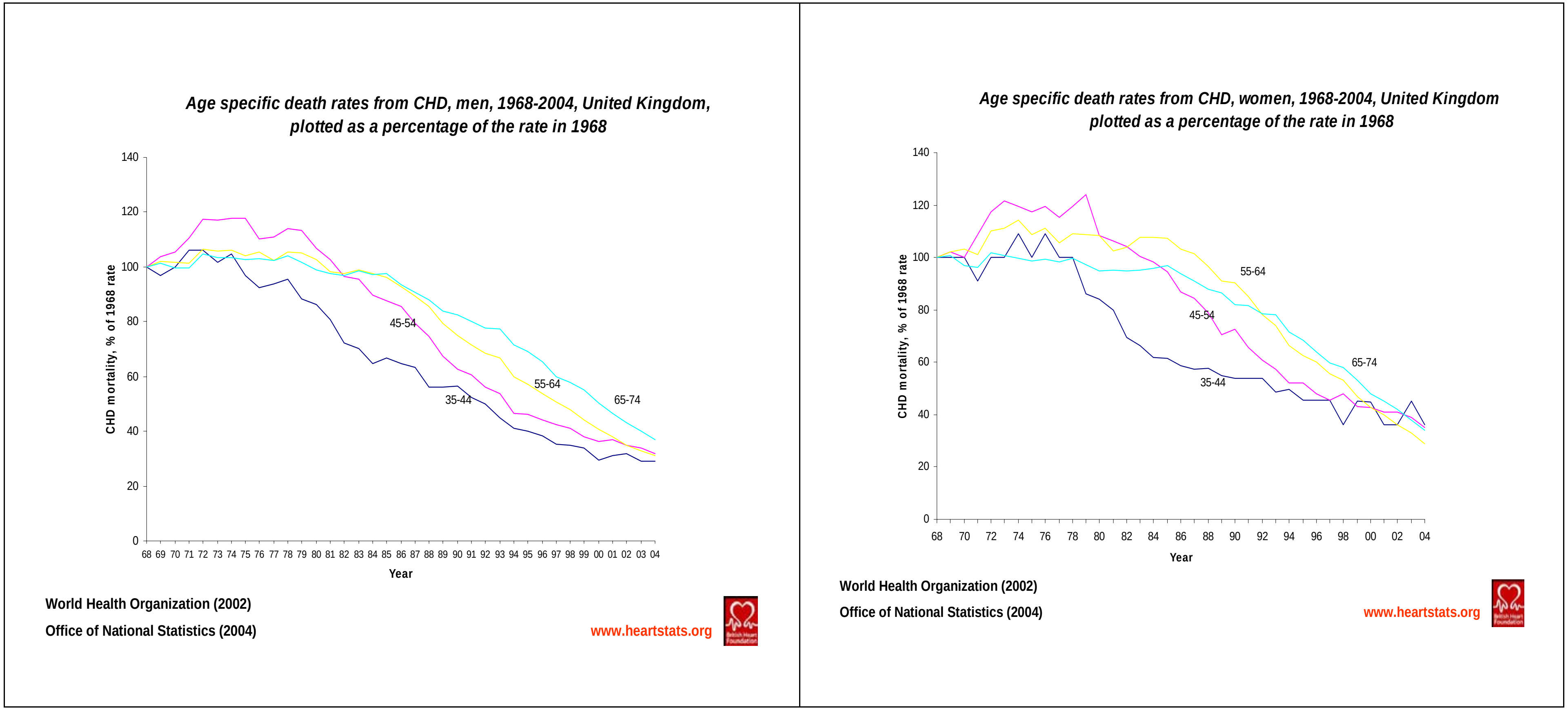

Figure 2.1 Age specific deaths from CHD in men and women1968-2004

In the UK, the incidence of myocardial infarction in men aged 30 – 69 years is about 600 per 100,000 of the population and about 200 per 100,000 for women (BHF 2006). There were 52,000 new cases of angina in men and about 43,000 in women in 2005 (BHF 2006). In Scotland alone, the number of patients treated in hospital for angina rose from 6989 to 14,6595 between 1990 and 1999 (SEHD 2001). Prevalence figures suggest that overall about 4% of men and 2% of women in the UK have had a myocardial infarction (BHF 2006). Figures from the 2003 Health Survey for Scotland (SEHD 2003) suggest a prevalence of angina or myocardial infarction in 8.2% of men and 6.5% of women. It has been estimated that in a one year period about 1% of the population will present with symptoms of angina to their general practitioner (McCormick et al 1995). Within one year of initial consultation one in 10 patients will have a non-fatal myocardial infarction or die from coronary-related causes (Ghandi et al 1995). Coronary heart disease morbidity is increasing and in the older age groups it has risen by over one-third in the past 10 years (BHF 2006). With increasing morbidity from angina and from complications of myocardial infarction more patients may experience long-term disability and ill-health. Patients often need to make adjustments to their everyday lives to cope with symptomatic disease; CHD interferes with the performance of daily activities and diminishes quality of life. It contributes a heavy financial, emotional and physical burden of individuals, families and society.

2.1.3 *Manifestations of CHD and the aims of treatment*

Treatments for CHD need to be looked at within the trajectory of disease. This indicates, from a clinical perspective, the direction that the disease is likely to take. Angina is a common manifestation of atherosclerotic disease of the coronary arteries. Most patients with early coronary artery disease (CAD) will experience classical stable angina that is predictable in onset and relieved by rest. Other patients may be asymptomatic, or have atypical symptoms of CAD (Hatchett and Thompson 2002). As the disease progresses, patients may experience unstable symptoms that indicate acute coronary syndrome (unstable angina or acute myocardial infarction). Acute coronary syndrome is associated with an increased risk of myocardial infarction or death (Jowett and Thompson 1996). The mainstay of treatment for early coronary artery disease is lifestyle changes and the use of pharmacological treatments such as beta-blockers, nitrates, ACE inhibitors and statins (McMurray and Rankin 1994). Treatment aims to control symptoms and reduce the likelihood of a cardiac event. Patients with more advanced CAD otherwise unsuitable for percutaneous coronary intervention (PCI) may be offered CABG surgery, such as those with significant left main stem disease or triple vessel disease. Such patients usually have persistent symptoms despite optimal medical therapy (Wood et al 1998, SIGN 2007).

2.1.4 *The benefits of CABG surgery*

Several large prospective randomised controlled trials have identified the benefits of CABG surgery as relief of angina, improvement in quality of life, and increase in life expectancy in high-risk patients (The Randomised Intervention Treatment of Angina (RITA) Trial Participants, Pocock et al 1993, 1995, The Coronary Angioplasty vs Bypass Revascularisation Investigation (CABRI) Trial Participants 1995, Wahrborg et al 1999, and The Bypass Angioplasty Revascularisation Investigation (BARI) Investigators 1996, Jacobs et al 1998). Three of these studies have emphasised the benefits of surgical revascularisation (CABG or percutaneous transluminal coronary angioplasty - PTCA) in terms of improved quality of life. For example, three-year follow-up in the RITA trial (Pocock et al 1996) identified marked improvement in quality of life in patients having CABG and PTCA, as measured by the Nottingham Health Profile (NHP). The CABRI Trial Participants (1995) assessed quality of life at baseline and 1 year after CABG and PTCA using the NHP, showing significant improvement after surgery in both groups. The BARI trial (Jacobs et al 1998) assessed functional status using the Duke Activity Status Index and emotional health using the RAND Mental Health Inventory as indicators of quality of life in a randomised study comparing PTCA and CABG patients. Results indicated a significant improvement in functional status among patients in both groups in the follow-up period. The aforementioned studies all provide strong evidence that quality of life is an important outcome of surgery, although not necessarily that it is only achieved with CABG.

2.1.5 *CHD risk factor modification and problems with adherence*

However, CABG surgery is palliative and not curative. Angina returns again in about a fifth of patients, often acutely as an unstable coronary event about 7 years after surgery. One-third of patients will experience recurrent stable angina after 10 years. Generally, as grafts fail and angina returns life's quality deteriorates (Caine et al 1999). About 4 – 7% of patients will require a second CABG operation in the first 10 years and most of these will be young patients (Jowett and Thompson 1996). CABG surgery therefore needs to be viewed as part of the trajectory of treatments in the management and prevention of CHD (Engblom et al 1997, Simchen et al 2001, Pasquali et al 2003, Ferguson 2004). Crucially, it is necessary to maintain CHD risk factor modification following CABG to realise the full benefits of surgery (Engblom et al 1997, Allen 1999, Aldana et al 2003, SIGN 2007, Yates et al 2007). Risk factor management aims to reduce the progression of CHD in both native and grafted coronary arteries (Cameron 1995, Campeau 2000). Elevated blood cholesterol, diabetes mellitus and elevated triglycerides after CABG are key factors contributing to graft failure (Barnason et al 2003). Other factors such as cigarette smoking and hypertension are associated with progression of the disease in both grafted and native coronary vessels (Campeau et al 1984).

Several studies have shown that patients often make some, albeit often incomplete, CHD risk factor modification before and after CABG surgery. For example, McKibbin (1994) found one of 3 major reversible risk factors (smoking, cholesterol and high blood pressure) were present in 83% of patients, two major risk factors in 27% of patients and three risk factors in 2.4% of patients having CABG. Allen (1999) reported that 1 year after surgery, 58% of patients remained obese and 54% were still hypertensive, and 92% of women had abnormal lipids. Hartwell and Henry (2003) found patients' mean intake of total fat, saturated fat and dietary cholesterol increased significantly 1 year after CABG by 21%, 36% and 51%, respectively. Similarly, King et al (2000) found that 12 months after CABG most women (71.2%) had returned to their 'normal activities'. Only about a half (57.5%) reported exercising more than before surgery, although 71.2% were following a better diet. Only 25.5% of the women attended a formal cardiac rehabilitation programme after CABG. The women who expressed concerns about their diet at 6 months reported eating a better diet at 12 months than they did before surgery. This indicated that when the women expressed a concern, they were more likely to address it by behaviour change that could reduce their future cardiac risk.

Most studies highlighted that whilst CABG surgery seems to act as a motivator for behavioural change such motivation was short-lived in patients (Coronary Artery Surgery Study (CASS) 1983, Allen and Blumenthal 1995, Allen 1999) with motivation decreasing over time (Salmon 2001), especially on completion of a cardiac rehabilitation programme (Moore et al 1998, Willich et al 2001). In order to maintain the revascularisation benefits of CABG surgery CHD risk factors must be reduced.

2.1.6 Secondary prevention of coronary heart disease

Various international studies and European and national guidelines emphasise the importance of long term surveillance and risk factor management in the secondary prevention of CHD, especially after CABG surgery (Bowker et al 1996, Wood et al 1998, SIGN 2000, De Backer et al 2003, Bradshaw et al 2004, SIGN 2007, SIGN 2007a). For instance, the presence and number of CHD risk factors is significantly associated with surgical mortality and morbidity following CABG. Large epidemiological studies have established that multiple risk factors rather than a single risk factor significantly increases the risk of CHD (Tunstall-Pedoe et al 1999). Risk factors interact synergistically to increase the risk of a coronary event such as myocardial infarction or death (Yusuf et al 1998, Yusuf et al 2004). Uncorrected risk factors after CABG surgery increase the risk of death, disability and ill-health as well as reducing the lifespan of the newly grafted coronary arteries. For instance, the Coronary Artery Surgery Study (CASS) ten-year survival rates of patients having CABG was 84% in those who stopped smoking and 68% in those who continued to smoke (Cavender et al 1992). Moreover, chronic smokers are more likely to develop angina and are more often unable to return to work and usually have more hospital admissions (Jowett and Thompson 1996). When the health behaviours associated with CHD risk factors are modified through smoking cessation, lipid management, physical activity, weight management and blood pressure control, CAD can regress and progression can be delayed (Smith et al 1995, Wood et al 1998, SIGN 2000). However, problems arise because the integration of secondary prevention into clinical practice is still sub-optimal (The EUROASPIRE 1 Study Group 1997, The EUROASPIRE 11 Study Group 2001) and cardiac rehabilitation, which includes exercise training, education and counselling regarding risk factor reduction and lifestyle changes is still haphazard in many parts of the world (Jennings et al 2008 on behalf of the EUROASPIRE 111 Study Group).

For example, The EUROASPIRE 1 (The EUROASPIRE Study Group 1997) and the EUROASPIRE 11 (The EUROASPIRE Study Group 2001) studies found an improvement in drug-treatment for CHD, but adverse lifestyle trends among European patients with CHD. The prevalence of obesity (BMI > 30 kg/m2) increased substantially from 25.3% to 32.8% from the EUROASPIRE 1 to EUROASPIRE 11 study, and the prevalence of smoking remained largely unchanged (19.4 vs 20.8%). Further, the EUROASPIRE 111 survey of 8966 patients with myocardial infarction, ischaemia, CABG and PTCA across 22 countries (including the UK), found the prevalence of smoking was 17.2% overall and 38% in those under 50 years.; 51.9% of patients smoking in the month prior to their cardiac event were still smoking at interview (medium 1.24 years later) (Jennings et al 2008 on behalf of the EUROASPIRE 111 Study Group). These studies highlighted the importance of increasing access to multidisciplinary programmes of secondary prevention as part of the solution for CHD risk factor reduction for all coronary patients, including those having CABG surgery.

Nurses' contribution to patient education in CHD risk factor management was explored in a study by Scholte op Reimer et al (2002), from the perspectives of patients having CABG, PTCA or those admitted for myocardial infarction or ischaemia. Results indicated that although some information was provided on stopping smoking, weight loss, high blood pressure, high cholesterol and a sedentary lifestyle more information was needed, and the perceived contribution of nurses was small relative to doctors and other health care professionals. Many patients did not remember ever having received information about risk factor management**.** Previous studies of secondary prevention in general practice (Campbell et al 1998, Kahan and Wandell 2001), whilst recognising the significant contribution of nurses, have also identified sub-optimum risk factor modification. While a number of secondary prevention programmes have reported some successful outcomes at 1 year, 4 and 5 years (Cupples and McKnight 1994, Campbell et al 1998, Cupples and McKnight 1999, Murchie et al 2003) others such as the Southampton heart integrated care project (SHIP) have reported disappointing results (Jolly et al 1999). A recent systematic review of randomised trials of secondary prevention in primary care concluded that while drug prescribing and medical treatment had improved, changing patients' behaviour and lifestyle remained a considerable challenge (McAlister et al 2001). This may be to due with the individuals' beliefs about their illness (Leventhal et al 1984, Pertrie and Weinman 1996, Wiles 1998, Cooper et al 1999) or treatment, including the benefits of preventive activity (Kee et al 1997).

2.1.7 Summary

Although some important progress has been made in reducing CHD mortality in Scotland and elsewhere, the goal of improving cardiovascular health and health-related quality of life through the prevention, detection and treatment of risk factors remains a considerable challenge. The aims of CABG surgery are relief of CHD symptoms, improvement in quality of life, and increase life expectancy in high-risk groups. Although some large prospective randomised trials have examined the benefits of CABG in terms of improvement in quality of life (Pocock et al 1995, The CABRI Trial 1995, Jacobs et al 1998) the primary outcomes identified have been mainly biomedical factors such as death, myocardial infarction, subsequent revascularisation (CABG or PTCA), or repeat hospitalisations (Bertrand and McFadden 1999). A greater emphasis is required on CHD morbidity and quality of life outcomes following CABG because surgery is palliative and not curative. Examination of quality of life in CABG will form much of the focus of this thesis as will the factors that contribute to poor quality of life outcomes after surgery. The impact of CHD and the outcomes of treatment can be measured in different ways, such as the prevalence and incidence of CHD, disability-adjusted life years (DALYs) and years of healthy life lost (BHF 2006). This thesis will focus on healthy life expectancy, defined as the number of years that people can expect to live in good health (ISD 2006). In order to maintain the revascularisation benefits of CABG surgery, CHD risk factors must be reduced and adherence maintained long-term. This can best be achieved through well organised multi-disciplinary programmes of secondary prevention and cardiac rehabilitation (SEHD 2001). The problem of non-adherence with lifestyle and medical treatment warrants further investigation (Bradshaw et al 2004) along with the patients' beliefs about treatment and perceptions of changes in their physical, psychological and social health as a result of CABG (Duits et al 1997). Moreover, the relationship between CHD risk factor modification and quality of life enhancement is under-researched (Fox et al 2004), especially in CABG patients.

2.2 QUALITY OF LIFE AS A FACTOR IN CABG PATIENTS

2.2.1 *Introduction*

The section of the thesis will provide an overview of the literature on the factors that influence quality of life outcomes in CABG patients. Several factors may influence quality of life in patients having CABG surgery. The main factors identified in large randomised controlled trials are pre-operative quality of life or perceived physical health status (Pocock et al 1995, Pocock et al 1996, Wahrborg et al 1999, the BARI Investigators 1996, Jacobs et al 1998), severity of angina (Canadian Cardiovascular Society, CCS) classification of angina (Pocock et al 1995, Pocock et al 1996, Wahrborg et al 1999), and employment status (Pocock et al 1995, Pocock et al 1996). Therefore, all studies of patients having CABG surgery need to include these variables, and so they will not be discussed any further. The evidence from non-randomised studies suggest socio-demographic factors such as age (Mittermain and Muller 2002, Jarvinen et al 2003, Goyal et al 2005), gender (Herlitz et al 1999, Sjoland et al 1999, Baldassarre et al 2002, Kerestes et al 2003), social deprivation (Lindsay et al 2000, Taylor et al 2003) and educational level (Lukkarinen 1998) may influence quality of life outcome in CABG. Further, the patients' clinical characteristics or symptoms such as breathlessness or dyspnoea class (NYHA) (Hertilz et al 1999, LeGrande et al 2006, Engblom et al 1997, Rumsfeld et al 2004), perceived symptom severity (Lindsay et al 2000, LeGrande et al 2006) and current use of medications, especially anti-anginal drugs (Lukkarinen 1998) are all indicators of disease severity and thus may be factors in quality of life in CABG. Consideration should therefore be given to the inclusion of these factors in cardiac research.

2.2.2 *Factors influencing quality of life outcomes in CABG*

The patient's past medical history, for example, myocardial infarction, heart failure, the number of diseased coronary vessels, degree of stenosis, left ventricular ejection fraction may contribute to operative risk and poorer outcomes (mortality and morbidity) following CABG surgery (Yusuf et al 2004). Similarly, CHD risk factors such as high blood cholesterol, hypertension, smoking, physical inactivity (Sjoland et al 1997, Jacobs et al 1998, Lindsay et al 2000, Barnason et al 2000), diabetes mellitus (Herlitz et al 1999) and co-morbidity (Jacobs et al 1998, Skaggs et al 1999) may contribute to poorer outcomes. Further, the risk of complications after CABG may be increased by a combination of these factors. For instance, Taylor et al (2003) in a retrospective analysis of prospective data on 3578 patients found that higher deprivation scores were associated with younger age, greater body mass index, diabetes mellitus, smoking at time of surgery and higher EuroSCOREs. Social deprivation was an independent predictor of complications following CABG surgery, such as myocardial infarction, stroke and death.

Depression is a widely reported consequence of CABG (Artinian and Hillebrand 1995, LeGrande et al 2006) independent of disease severity (Connerney et al 2001) and it may be a predictor for CAD (Rugulies 2002). Depression impacts significantly on CHD patients’ psychosocial recovery (Con et al 1999, Lopez et al 2007) and wound healing (Doering et al 2005). Pre-operative depression is a significant factor in both physical and psychological recovery (Perski et al 1998, Borowicz et al 2000). For example, a prospective study of 176 patients found that those who were emotionally distressed before surgery showed less improvement in symptoms, functional status and experienced lower quality of life than did non-depressed patients at 1 year follow-up (Perski et al 1998). Preoperative_depression has been shown to predict high readmission rates following CABG (Levine et al 1996, Burg et al 2003). Readmissions have adverse effects for patients in terms of quality of life and well-being (Oxlad et al 2006) as well as economic costs for the health care system (Scheier et al 1999). It is therefore important to identify depression in CABG patients, which may be both a predictor and an outcome of CABG. Other measures have been used as indicators of the patients' mental health, such as perceived health status. This thesis is concerned with measuring the patient's mental health as an integral part of the assessment of perceived health status before and after CABG surgery.

Other psychosocial factors may influence quality of life outcomes in CABG, such as perceived control (Moser and Dracup 1995), illness perceptions (Wiles 1998, Cooper et al 1999), treatment beliefs (Kee et al 1997, Hirani and Newman 2005), cardiac self-efficacy (Gortner and Jenkins 1990, Gillis et al 1993, Carroll 1995, Jenkins and Gortner 1998, Barnason et al 2003), perceived social support (Kulik and Mahler 1993, Kirkevold et al 1996, Shen et al 2004, Barry et al 2006), and self-perceived need (Moser et al 1993, Kattainen et al 2004). Therefore several physical and psychosocial factors may influence quality of life outcome in CABG patients. This thesis will examine pre-operative quality of life, perceived symptom severity, treatment beliefs, cardiac self-efficacy, perceived social support and self-perceived need. Other psychosocial factors such as depression and anxiety and illness perceptions will only be discussed if they relate in some way to the outcome variables of interest i.e. perceived health status, quality of life and modifiable CHD risk factors after CABG. These factors will now be discussed in turn supported by appropriate literature and a rationale provided for their inclusion in the study.

2.2.3 *Pre-operative health as a factor in quality of life after CABG*

It is important to look at pre-operative health as a factor in determining quality of life outcomes in CABG. Pre-operative quality of life can have a bearing on quality of life following CABG surgery (Yusef et al 2004). Quality of life may be defined as the individual's subjective assessment of their health and how their daily life is affected by their illness. Historically, the outcomes of treatment were considered more in terms of mortality rates, based largely on a biomedical or pathophysiological understanding of the consequences of disease (Duits et al 1997). Recent emphasis has been towards holistic assessment of changes in the patient’s state of health as a result of treatment, and how treatment can affect their lives (Duits et al 1997, Hofer et al 2004). Perceived or subjective assessment of quality of life is important in determining CHD related morbidity because the individual’s perception of their quality of life may bear no resemblance to the more objective assessment of health and quality of life as determined by medical means (Jenkins et al 1990). The major factors considered in quality of life assessment are functional capacity, including physical, intellectual, social and emotional functioning; perceptions such as the level of well-being and satisfaction with life and the effects of the symptoms of disease (Blumenthal and Mark 1994). Physical, emotional and social health and functioning are especially important in patients undergoing CABG surgery (Lee 2008).

Several studies of quality of life outcomes in CABG have been examined. These studies examined changes in perceived health status or quality of life in patients before and after CABG and the factors that correlate with or predict quality of life outcome following surgery (Table 2.1). The extent to which the different studies reviewed focused on physical and mental health and social functioning depended largely on the overall aim of the study and the quality of life instruments used and whether the authors considered additional quality of life related variables. The Short-Form 36 Health Survey (SF-36) (Ware et al 1998) and the Nottingham Health Profile (McEwen et al 1993) have been used most frequently in studies of CABG patients. The sample sizes of the studies examined have been quite varied, which limit the conclusions that can be drawn. There have been different periods of follow-up, which can make the comparison of results difficult.

Table 2.1 Studies of patient quality of life in CABG and citations

Reference	Subjects	Design	Variables	Date collection and follow-up	Summary of findings
Rumsfeld et al 1999	2480 CABG US patients Mean age 63 years	Veterans Affairs prospective cohort design	Short-Form-36 SF-36. All-cause mortality within 180 days after surgery. Clinical risk factors	Preoperative and 6 months post-operative	Pre-operative physical health significant risk factor for 6 month mortality. Mental health not associated with 6 month mortality.
Rumsfeld et al 2004	1973 CABG US patients 99% males Mean age 63 years	Veterans Affairs prospective cohort design	Short-Form-36 SF-36	Preoperative and 6 months post-operative	Physical condition significant predictor of post-op physical health Psychiatric disease, COPD, smoking age, NHYA significant predictors of MCS.
LeGrande et al 2006	182 CABG patients in Australia. Mean age 65 years, 80% males	Prospective design	Short-Form-36 SF 36, Mood, Everyday Functioning Symptoms, Complications	1 month before surgery, 2 and 6 months after surgery	Two groups improvers/ non-improvers-physical and mental health. Higher NHYA predicted PCS non-improvers POMS manual occ. predicted poor MCS
Elliott et al 2006	101 CABG patients in Australia, mean age 60 years,	Prospective, repeated-measures observational	Short-Form 36 SF-36, 15D quality of life	Before surgery, at hospital discharge and 6 months later	Deterioration at hospital discharge than pre-op. Improvements in physical health at 6

	76% males	study			months, but not mental health, social function.
Kiezrak et al 2002	81 CABG US patients Mean age 62 years 67 men and 18 women	Prospective design	Short-Form 36 SF-36, socio-demographics	1 year before surgery and 1 year post-operatively	Before CABG all sub-domains of SF-36 low, except mental health. At 1 year 6 of 8 sub-domains improved except general health and role-emotional.
Lindsay et al 2000	183 CABG patients in Scotland. Mean age 58.2 years. 79% males	Prospective, observational design	Short-Form 36 SF-36, symptom severity (VAS). Social networks	Pre-operatively in OP Dept and 16.4 months post- CABG surgery	8 sub-domains SF-36 improved post-op. Patients with lower SF-36 scores pre-op less likely to improve post-operatively
Sjoland et al 1997	2121 CABG patients in Sweden. 83% males, half over 65 years	Prospective design	Quality of life-physical activity Nottingham Health Profile, Well-being index	Pre-operative, 3 months and 2 years post-operatively	Quality of life improved 3 months after CABG, and slight improvement 2 years post-operatively
Barnason et al 2000	39 male and 12 female US CABG patients Mean age 66 years	Prospective repeated measures design	Short-Form 36 SF-36, modified 7-day activity tool.	Pre-operative 3, 6 and 12 months after CABG surgery	7 of 8 sub-domains for SF-36 lowerafter CABG than at 3, 6, 12 months Significant improvement over time. Moderately active lifestyle achieved
Caine et al 1999	100 UK CABG patients, aged	Prospective design	Nottingham Health Profile. Socio-	1 year and 5 years post	Lower NHP scores at 1 year indicating

	under 60 years of age. All males		demographics. Symptoms	surgery	better health. At 5 5 years 40% patients had chest pain. Absence of dyspnoea predicted outcomes.
Herlitz et al 1999	1431 CABG patients in Sweden. Mean age 62.6 years. 81% males	Prospective design	Nottingham Health Profile, Well-being Index, NHYA Physical activity	Before and 5 years post CABG	Female sex, diabetes, COPD predicted poor quality of life. Poor pre-operative QoL strong predictor for impaired
Lee 2008	128 Australian CABG patients 109 males. Mean age 61.1 years	Prospective design	Short-Form 36 SF-36, symptoms of angina and breathlessness CCS, NYHA	Pre-operatively and at 5 years follow-up	Most patients were from angina and breathlessness at 5 years. HRQoL generally good.
Tolmie et al 2006	62 CABG patients in Scotland. Mean age 63.8 years, 84% males	Qualitative design	Patients' perspectives effects of CABG on health and well-being	7 years follow-up	Improved health and well-being over time. Recovery/rehabilitation described as complex. Short-long-term effects QoL 5years postCABG
Goyal et al 2005	100 elderly cardiac surgery patients in Australia. Aged 82.4 years, 100 patients >73 years	Prospective comparative design	Functional status, quality of life. Mood Symptoms	6 – 60 months follow-up	Improvement in outcomes and quality of life. All patients were free from angina
MacDonald	100 CABG/valve	Prospective	Short-Form 36	3 months and	Improvement in 5 out

et al 1998	elderly patients in Canada, 75yrs plus, 66% males	cohort design	SF-36, CCS Seattle Angina Questionnaire.	1 year post-CABG	8 sub-domains SF-36, all domains of Seattle Angina Questionnaire.
Baldassarre et al 2002	34 CABG female patients 61 years plus from Canada	Longitudinal observational design	Short-Form 36 SF-36, The Feeling Thermometer	3 months post CABG	HRQL improved. Age was a predictor with older women having physical (PCS) and mental health (MCS).
Jarvinen et al 2003	508 CABG elderly patients 64 – 75 years 378 males from Finland	Prospective design	Short-Form 36 SF-36. NYHA Performance status.	Before and 12 months after CABG	No complications 86% patients. Improvement in 8 domains of SF-36 and NHYA. Older patients got less benefit from CABG.
Kierestes et al 2003	40 matched pairs CABG men and women, aged 62.7and 63.8 years from US	Prospective design	Quality of life social support mood, symptoms overall health specific activity	Before, 1 and 3 months after CABG surgery	Women had less favourable outcome after CABG, compared to men, especially physical outcomes.
Sjoland et al 1993	2121 CABG men and women aged 62.5 years. 401 (19%) female from Sweden	Prospective design	Nottingham Health Profile Psychological well-being index Physical activity.	Before, 3 months, 1 and 2 years after surgery	Quality of life improved after CABG for both men and women. NHP significantly greater in women.
Sahin et al 1999	90 CABG men and women aged 56 years and over from	Prospective design	SF-36 Health Survey, severity of illness, perceived	24 hours before CABG and 2 weeks to 4 months post-operatively	Patients had poorer health status in all 8 sub-domains of SF-36 prior to CABG.

	Turkey		usefulness CABG		Improvement in all sub-domains post-op.
Deaton et al 1998	100 CABG male and female patients mean age 66-80 years$^+$	Prospective design	Health Status Questionnaire 12, demographics, co-morbidities, length of hospital stay	Baseline and 3 months after discharge	Poorer pre-operative health status trend in patients readmitted following CABG. Longer post-op length of stay associated with higher readmission
Pasquali et al 2003	862 CABG o PCI men and women aged 67-77 yrs from US	Prospective design	SF-36 Health Survey, attendance at cardiac rehab., demographics, risk factors and co-morbidities	1 month before CABG or PCI and 6 months post-operatively	Cardiac rehab after CABG or PCI is associated with improvement physical health/functioning and secondary prevention
Engblom et al 1997	228 CABG patients in Finland. Mean age 54 years 88% males	Randomised control trial of cardiac rehabilitation	Nottingham Health Profile Depression Symptoms, NYHA, exercise, medications	5 year follow-up	Intervention group reported less restriction in physical mobility 5 years after CABG. Improved perceptions of health/life situation
Simchen et al 2001	124 CABG patients and 248 controls, 65% males, in Israli	Exploratory design	Short-Form 36 SF-36, specific quality of life Return to work. Satisfaction with medical services Participation in CR	1 year after CABG surgery	Cardiac rehabilitation patients had higher SF-36 scores for general health, physical and social functioning. More return to work. Higher satisfaction.

Jette and Downing 1996	789 patients post MI or CABG from US	Cross-sectional study	Short-Form 36 Health Survey, psychological profile, CHD risk factors, co-morbidity	Baseline – on entry to cardiac rehabilitation	In patients in cardiac rehab psychological distress is related to poor health in both physical/psychological dimension

NYHA, New York Heart Association; PCS, physical component score; MCS, mental component score; POMS, profile of mood states; NHP Nottingham Health Profile; SF-36, Short-Form 36 Health Survey; COPD, chronic obstructive pulmonary disease; HRQol, health-related quality of life; QoL, quality of life; PCI, percutaneous coronary intervention;

2.2.4 Perceived health status and quality of life after CABG patients

As previously indicated large randomised controlled trials (Pocock et al 1995, The CABRI Trial 1995, Jacobs et al 1998) provide strong evidence that pre-operative physical health is a major factor in quality of life outcomes following CABG surgery. However, mental health and social functioning do not really feature in these studies. We need to know about these factors as part of the patient's holistic assessment of before and after CABG surgery. Thus, non-experimental studies of quality of life in CABG were examined (Table 2.1). The findings from these studies are largely consistent with those found in large randomised trials showing that pre-operative quality of life (physical health) is significantly associated with quality of life following CABG. For instance, Rumsfeld et al (2004) assessed perceived health status before and 6 months after CABG in 1973 patients enrolled in the Veterans Affairs prospective cohort study. Results indicated that after adjustment for baseline quality of life, the significant predictors of poorer post-operative physical health were patients' poorer pre-operative physical health (history of neurologic disease, peripheral vascular disease, chronic obstructive pulmonary disease); risk factors such as hypertension, current smoking and serum cholesterol, left ventricular ejection fraction; and respiratory status (forced expiratory volume). These factors explained almost 20% of the variance in the physical component score (PCS) of the SF-36 at 6 months. The significant predictors of poorer post-operative mental health were pre-existing psychiatric disease, chronic pulmonary disease, current smoking, age and the New York Heart Association (NYHA) functional class, accounting for almost 24% of the variance in the mental component score (MCS) at 6 months. Older age was associated with better post-operative mental health. This study confirmed that most patients reported improved perceived health status after CABG through reduced symptoms, improved functioning and increased participation in activities.

Similarly, LeGrande et al (2006) and Elliott et al (2006) found improvement in perceived physical health in patients 6 months post-CABG. The rate of improvement in mental health and social functioning was slower compared to physical health. For the PCS, lower baseline scores were associated with poorer NYHA functional class, peripheral vascular disease, higher profile of mood state (POMS) tension-anxiety, depression-dejection, fatigue-inertia. For the MCS, lower baseline scores were associated with previous cardiac surgery, higher POMS tension-anxiety, depression-dejection, anger-hostility, fatigue-inertia. Notably, greater improvement in mental health over time was associated with having a partner. For physical health (PCS), the most significant predictor of non-improvers was lower scores on POMS vigor-activity and higher NYHA dyspnoea class. For mental health (MCS), the most significant predictors of non-improvers were higher scores on POMS depress-dejection and manual occupation. This was not a surprise finding for symptoms of depression are often associated with poorer quality of life outcomes after CABG, with as many as half of all the patients waiting for surgery having depression (Cheok et al 2003). Pre-operative anxiety and depression are known predictors of such symptoms after surgery (Suar et al 2001, Rugulies 2002). For instance, a prospective repeated-measures study (Elliott et al 2006) recruited patients before and after cardiac surgery (CABG, valve replacement and combination surgery). Results indicated that mental health was lower 6 months post-CABG despite improvement physical functioning, role functioning, bodily pain, general health, social functioning and role functioning.

A study by Lindsay et al (2000) identified significant improvements in patients' post-operative physical role limitation, physical function and general health as measured by the SF 36 before and 16.4 months after CABG surgery. Patients with poorer pre-operative perceived health status (SF 36) scores to CABG were less likely to experience improvement in health following surgery. Specifically, lower post-operative scores were associated with the presence of diabetes mellitus, cigarette smoking, younger age, higher socio-economic deprivation and higher pre-operative alcohol intake. Pre-operative bodily pain, general health, mental health and energy contributed significantly to quality of life after CABG. Other studies have measured long-term outcomes in CABG patients, using the NHP. For example, Sjoland et al (1997) studied prospectively the quality of life of patients before CABG and 2 years after surgery using the Physical Activity Score, the Nottingham Health Profile (NHP) and the Psychological General Well-being Index. Results showed that scores on all measures improved significantly at 3 months and 2 years compared to before CABG surgery. Most improvement in quality of life was seen at 3 months with further slight improvement at 2 years. Major improvements were noted for physical capacity, pain and mental health.

All the aforementioned studies highlight the interrelationships between physical and mental health in patients having CABG (Elliott et al 2006, Lindsay et al 2000) and the association between perceived mental health (MCS) and POMS (LeGrande et al 2006). Consistent with the findings from Sjoland et al (1997), the longer-term studies by Caine et al (1999) and Herlitz et al (1999) found poor pre-operative quality of life was a strong independent predictor for impairment in quality of life 5 years after CABG (Table 1.1). At 5 years, there was slight improvement in the NHP dimensions of pain, sleep, social isolation and emotional reactions; but deterioration in physical mobility and energy scores (Caine et al 1999). More chest pain was present in 40% of patients at 5 years, compared with 19% at 1 year. Breathlessness was a problem for 60% of patients at 5 years, compared to 19% of patients 1 year after CABG. The absence of dyspnoea before surgery was a significant predictor of better outcomes at 1 and 5 years after CABG (Caine et al 1999). Herlitz et al (1999) identified significant improvements in physical activity, chest pain and dyspnoea, regardless of age. Three factors independently predicted inferior quality of life post CABG: female sex, diabetes mellitus and severe chronic obstructive pulmonary disease.

Studies of quality of life in elderly patients, 75 years and older have shown the beneficial effects of CABG (Macdonald et al 1998). Similarly, Jarvinen et al (2003) found significant improvement in elderly patients in all 8 domains of the SF-36 and improvement functional capacity 1 year after CABG though there were less steep improvements in physical and mental health for the eldest subgroup of patients. Overall, research has been consistent in identifying that younger patients tend to report lower mental health (Goyal et al 2005), whilst older patients report lower physical health (Rumsfeld et al 2004). There have been more mixed findings for quality of life and gender (Sjoland et al 1999, Vaccarino and Koch 2003). Women tend to be more symptomatic before surgery than men and they have poorer quality of life afterwards (Sjoland et al 1999, Vaccarino and Koch 2003).

2.2.5 *Perceived symptom severity and quality of life in CABG patients*

General health status and symptomatic outcome following CABG was explored in an observational study (Lindsay et al 2000) that showed in patients with residual symptoms of angina and breathlessness, the severity of symptoms was significantly reduced post-surgery. Patients with low scores for perceived physical health pre-operatively were less likely to be relieved of symptoms. Age and lower pre-operative scores for bodily pain (SF 36) predicted the recurrence of angina. Post-operative breathlessness was associated with diabetes mellitus and lower scores for mental health (SF 36). This study was significant because self-assessment of health is important as tolerance of symptoms may vary even among patients with similar functional status (Sullivan et al 1996). Physiological symptoms may be shaped by patients' perceptions and psychological symptoms as well as the degree of myocardial ischaemia. For instance, Bengtson et al (1996) found that 88% of patients reported chest pain that limited daily activities to a greater or lesser extent in the wait for coronary angiography, PTCA and CABG. Psychological problems such as anxiety and depression were strongly associated with the severity of pain, sleep disturbance, dyspnoea and other psychosomatic symptoms. These results are consistent with the findings of Sullivan et al (1996) who identified that disease severity and functional status are the result of a complex combination of biomedical and psychosocial factors. Assessment of symptoms, as experienced by the patient with CHD may usefully augment assessment of perceived health status and quality of life in patients having CABG surgery.

2.2.6 *Summary*

Various studies of quality of life outcomes in CABG have been examined (Table 2.1). Different measures have been used and there have been different periods of follow-up showing the beneficial effects of CABG on health outcomes. The studies examined suggest that pre-operative physical health is a major factor influencing quality of life following CABG (Rumsfeld et al 2004, Elliott et al 2006, LeGrande et al 2006,). Not all patients experience improvement in perceived health status and quality of life after CABG (Elliott et al 2006, Lindsay et al 2000). The individual's characteristics such as age, gender, co-morbidity may contribute to poorer post-operative physical health (Sjoland et al 1999, Jarvinen et al 2003, Vaccarino et al 2003). Younger patients tend to report poorer perceived mental health and older patients poorer physical health and functioning. There have been less consistent research findings with respect to gender, although studies that have controlled for age and other relevant variables have reported lower quality of life in females having CABG (LeGrande et al 2006). Although measurement of the patient's quality of life is not routinely carried out in clinical practice, an awareness of the factors likely to affect life's quality in CABG patients can help the nurses involved in pre-operative preparation and post-operative care to identify those most at risk and to introduce interventions as appropriate.

2.3 TREATMENT BELIEFS AS A FACTOR IN THE OUTCOME OF CABG

2.3.1 *Introduction*

Patients' beliefs about treatment may be an important factor influencing the impact of a treatment and its outcome (Hirani and Newman 2005). What patients believe about treatment may influence their behaviour, including adherence to lifestyle and medical treatment (Horne et al 1999, Hirani et al 2004). Research has shown that patient preferences for treatment and perceptions of risk are associated with perceived health status (Kennelly and Bowling 2001, Lambert et al 2004). Whilst researchers have investigated patients' expectations of the benefits of CABG and quality of life (King et al 1992, Gortner et al 1994, Whittle et al 2007) few studies have examined the patients' views about the benefits and risks of surgery (Kee et al 1997, Hirani et al 2004). No studies were found that examined the predictive value of treatment beliefs i.e. perceptions of the benefits and risks of treatment as a factor in quality of life outcomes in CABG patients.

2.3.2 *Treatment beliefs and adherence to treatment regimens*

Horne et al (1999) found that patients' beliefs about medication were significantly related to their adherence to their medication regimens. In another study Horne and Weinman (1999), in examining medication beliefs in patients with four chronic conditions (asthma, renal, cardiac and oncology) found 89% of participants believed their prescribed medication was necessary for maintaining health. However, over a third had concerns about their medications based on their beliefs about dependency or the long-term side-effects of medication. The patients' beliefs about medicines were significantly associated with reported adherence i.e. higher necessity scores correlated with higher reported adherence and higher concerns correlated with lower reported adherence. Medication beliefs were stronger predictors of reported adherence than were clinical and socio-demographic factors. Hirani and Newman (2005) help extend our understanding of patients' beliefs about their treatment in conceptualising treatment representations as: concerns, i.e., emotional impact and anxiety patients have about undergoing a treatment; necessity, i.e., beliefs about the necessity of the treatment for maintaining health now and in the future; treatment value, i.e., beliefs about the benefits of treatment in controlling progression of the disease; decision satisfaction, i.e., evaluation of the decision making process for choosing the treatment; and beliefs about cure, i.e., whether the treatment resolves the illness and returns the patient to a normal life. Though useful, this conceptual framework does not take into account patients' perceptions of the risk of treatment to any great extent.

2.3.3 *Patients' preferences for treatment and perceptions of risk*

This thesis is concerned with the CABG patients' perceptions of treatment benefits and risks and preferences for treatment, including preventive activities. Investigators have explored CHD patients' preferences for treatment (Mahler and Kulik 1991, Kennelly and Bowling 2001, Lambert et al 2004) and the relation between treatment preferences and perceived health status (Kennelly and Bowling 2001, Lambert et al 2004) and in the context of joint decision making (Kelly-Powell 1997, Pierce and Hicks 2001, Whittle et al 2007). The consensus is that patients should be more actively involved in decisions about their own treatment. This is reflected in various policy documents such as the NHS Plan (Department of Health 2000); The Expert Patient CMO statement (Department of Health 2001); NHS Improvement Plan (Department of Health 2004); Self-Care – A Real Choice (Department of Health 2005); Delivering for Health (Scottish Executive 2005); Delivering Care, Enabling Health (Scottish Executive 2006) and Better Health, Better Care (Scottish Executive 2007). The involvement of patients in clinical decision making has been shown to have a number of benefits, such as improvement in quality of care (Thomson et al 2001), increased cost-effectiveness (Doyal 2002), increased adherence to eventual treatment choices, increased satisfaction and appropriateness of interventions (Pell et al 2001). An important first step in achieving these benefits is gaining a clearer understanding of patients' preferences for treatment and their perceptions of treatment benefits and risks.

According to Horne (1999), perceptions of treatment (negative or positive views) are likely to inform treatment preferences and even pathways of care. For instance, a focus group study by Kennelly and Bowling (2001) of older patients' treatment preferences found that if offered a choice, patients would prefer to take medications at least initially, as they would rather not undergo cardiac surgery. The factors influencing their treatment choices were perceived health status, expected treatment outcomes, families' feelings, age and the previous number of operations. The patients expressed the fear that medication was not a cure and that the benefits of surgery would not last forever. Most patients found it difficult to discuss the percentage risk attached to surgery, instead they preferred to think of treatment as improving their quality of life. In this study patients' preferences for treatment and perceptions of risk were based on their beliefs about treatment and other factors such as their state of health and family views.

A noteworthy study by Sherbourne et al (1997) examined patients' preferences for treatment and perceived health status in a large quasi-experimental study of 16,689 men and women recruited from 46 primary care clinics in the US. The SF 12 Health Survey (Ware et al 1996) was used to assess patient perceived health status and standard gamble and time trade-off utility methods used to identify their preferences for treatment with respect to their current state of health. Results indicated that physical health contributed substantially to treatment preferences (accounting for 35 - 55% of the variance), mental health accounted for 29 - 42% of variance, whereas social health accounted for 16 - 23%. Interestingly, the patients' preferences for treatment were related to their mental and social health almost as much as physical health. No studies were found that examined the association between patients' treatment preferences and their perceived health status in CABG.

2.3.4 *Expectations of the benefits of CABG and quality of life*

Lindsay et al (2000) examined CABG patients' perceptions of their health and expectations of the benefit of CABG. This study found that patients viewed the benefits of surgery in terms of 'removal of a death sentence' and 'freedom of choice'. The factors relating to health status prior to CABG were perceived 'dependency' on others and medication, and feelings of 'impending doom'. Expectations of the benefits from CABG included independence, extended life expectancy and improved quality of life. Results further indicated that patients had unrealistic expectations about the benefits of CABG, especially in relation to increased life expectancy. Many of the patients were willing to have CABG without having a clear understanding of how their health might benefit. This study build on the work of Gortner et al (1985), Gortner et al (1989), King et al (1992) and Gortner et al (1994) by providing information on patients' perceptions of health and expectations of the benefit of CABG. The studies by Gortner et al (1989, 1985, 1994) found that patients' viewed the benefits of CABG as improvement in quality of life, reduction of cardiac pain and reduction in the risk of myocardial infarction or death. Gortner et al (1994) in examining older CABG patients (mean 75.8 years, SD 4.6) expected and realised benefits of surgery at baseline and 6 months found that prolongation of life, improvement in quality of life, resumption of former activities, ability to travel and participation in recreational activities were expected benefits. The unexpected occurrence of continued symptoms had a negative effect on the patients' perceptions of quality of life. Asymptomatic patients before CABG were less likely to report the expected benefits of CABG had been realised.

King et al (1992) examined patients' perceptions of the outcomes of CABG and quality of life 12 months after surgery. The patients were asked whether having surgery was ‘worth it’ and to elaborate on why or why not. The participants who reported the CABG was worth it (n = 126) had significant decreases in angina. There were differences in quality of life scores depending on the reasons given for why the surgery was worth it. Those who believed that improved physical functioning had made surgery worth it had more positive scores for life satisfaction and more positive mood than those who only believed that surgery was worth it because it had saved them from death (n = 62). Patients who were unsure whether surgery was worth it (n = 15) thought there was little change in their health status after surgery. Those who did not believe the surgery had been worth it (n = 70) reported their physical condition was worse than before surgery. Relief of angina as part of health status is therefore an important outcome for patients following CABG (King et al 1992). Patients who perceived improved physical health and functioning with treatment reported better quality of life. These aforementioned studies highlight the importance of patients’ expectations about the benefits of CABG and the relation between treatment expectations and outcome. However, these studies, as others, focused primarily on patients’ expectations of the benefits of treatment without considering the risks involved, or how patients might weigh up the benefits and risks of treatment.

2.3.5 *Patients’ perceptions of treatment benefits and risks*

A study by Kee et al (1997) examined perceptions of treatment benefits and risks in patients having PTCA and found that despite the majority of participants (76%) having discussed the risks of the procedure with the consultant, 63% had not fully understood the information given to them about the risks of treatment. Seventy per cent of patients felt that they had contributed negligibly or not at all to the decision-making process. Most patients (77%) anticipated improvement in quality of life after PTCA and 88% thought their mortality risk would be substantially or greatly reduced. Patients anticipated an increased life expectancy of 10 years (median) from PTCA, which was significantly more than their estimates for a diet to reduce cholesterol, stopping smoking and taking more exercise. They viewed having PTCA as being more effective than risk factor modification in the control of their heart disease. These findings are consistent with those found in a previous study undertaken by the researcher and colleagues (Thomson et al 2004 unpublished), in which patients' expectations of CABG were far in excess of the survival gains obtained in randomised controlled trials (mean 8.8 months in high risk patients) (Yusuf et al 2004). Patients advised to have CABG estimated a mean gain of 11.8 (SD 3.9) years from surgery and those advised PTCA 10.5 years (SD 5.3) years. Patients consistently downplayed the risks associated with CABG and PTCA.

2.3.6 *Summary*

An increased understanding of CABG patients' treatment beliefs is an important first step in designing interventions to help support patients in their decisions about their treatment and care and adjustment to CHD as a chronic health problem. Patients may hold beliefs about their treatment that are quite distinct from their beliefs about illness. Both illness perceptions and treatment beliefs may be salient influences on individuals' health behaviours and emotions (Hirani and Newman 2005). The sense that a person makes of their illness influences the way they cope, which is explained within the Self-Regulatory Model (Leventhal et al 1984) as identity, timeline, causality, consequences and cure/control. Several studies of illness beliefs and myocardial infarction or CABG have been published (Petrie et al 1996, Petrie and Weinman 1996, Cooper et al 1999, Hirani et al 2006) but only one study was found that showed association between Illness perceptions and quality of life (Steed et al 1999). The illness perceptions approach tends to focus more on emotion focused coping than quality of life outcomes (Horne and Weinman 2002). Relatively few studies have assessed perceptions of treatment benefits and risks and quality of life in cardiac patients (Kee et al 1997). Nurses should be aware that patients might hold certain beliefs about their treatment that are different from their beliefs about illness. There may be differences between health care professionals’ views about treatment and patients’ beliefs. Such discrepancies may contribute to poor adherence to lifestyle advice and medical treatment. More research is needed to increase understanding of the patients’ perceptions of treatment benefits and risks and how these factors might influence the outcome from CABG surgery.

2.4 SELF-EFFICACY AS A FACTOR IN QUALITY OF LIFE IN CABG PATIENTS

2.4.1 Introduction

Self-efficacy is an important factor influencing quality of life in CABG patients (Gillis et al 1993, Sullivan et al 1998, Barnason et al 2003, Moore et al 2007). Self-efficacy as a concept is derived from Bandura’s social cognitive theory of behaviour. It is defined as an individual’s confidence in his or her ability to perform a given task; and it is the product of both efficacy expectations, i.e., an individual’s perception of his or her ability to achieve a specific level of performance, and outcome expectations, i.e., an individual’s evaluation of the probable consequences of a specific behaviour (Bandura 1977, Bandura 1986). According to self-efficacy theory, patients who are confident in their abilities are more likely to attempt difficult tasks, put in greater effort to master the task and persist in attempts, despite possible difficulties and obstacles (Bandura 1986). Generalised self-efficacy refers to whether the individual is a particularly confident type of person or not (Schwarzer and Renner 2000). Self-efficacy expectations, i.e., an individual’s degree of confidence he or she has to achieve a specific level of performance has been shown to be the stronger predictor of outcome in research related to self-efficacy (Schwarzer and Fuchs 1995, Moore et al 2007).

2.4.2 Self-efficacy as a factor in the outcomes of CABG

Several studies of self-efficacy were reviewed pertaining to CHD, especially CABG patients (Table 2.2). There is a vast research on self-efficacy so the studies presented were selected because they showed the associations between self-efficacy expectations and recovery behaviours in patients following a cardiac event, or they focused on self-efficacy and quality of life or were interventions studies of particular relevance to clinical practice. The majority of studies were conducted in the US.

Longitudinal studies provide evidence that patient self-efficacy generally increases during recovery following cardiac surgery (Jenkins and Gortner 1998, Perkins and Jenkins 1998) and in cardiac rehabilitation (King et al 2001, Gardner et al 2003). For example, Jenkins and Gortner (1998) in a prospective study of 199 CABG and valve patients found that self-efficacy for walking and other activities increased up to 12 months post-operatively. Further, Carroll (1995), in a prospective repeated measures study of 133 elderly CABG patients aged 65 – 87years, found that self-care expectations mediated recovery behaviours at 6 and 12 weeks after surgery. Consistent with Carroll (1995) other investigators have shown self-efficacy to be significant a predictor recovery in studies of cardiac patients (Bastone and Kerns 1995, Jenkins and Gortner 1998, Mahler and Kulik 1998).

Different investigators have measured self-efficacy expectations in relation to different activities such as health maintenance and role resumption (Jenkins and Gortner 1998, Perkins and Jenkins 1998, King et al 2001), symptom control and risk factor management (Gillis et al 1993, Sullivan et al 1998, Barnason et al 2003, Moore et al 2007). For example, Sullivan et al (1998) explored self-efficacy for controlling symptoms (SE-CS) and self-efficacy for maintaining function (SE-MF). Physical functioning was assessed by asking patients about difficulty with activities of daily living using items derived from the SF-36 and role dysfunction in social and family/home domains using the Sheehan Disability Scales. Results indicated that SE-MF was significantly associated with baseline and 6 month physical functioning. Patients with greater self-efficacy reported better physical functioning. This study highlighted the role of self-efficacy in influencing social health and functioning and not just physical health.

CABG patients were not recruited as such, but some of the participants in this study having cardiac catheterisation later went on to have surgery. A particular strength of the study was that it showed the relationship between self-efficacy expectations and physical and role function. Therefore, from the studies reviewed in Table 2.2 it was evident that the cardiac patient's self-efficacy has been examined in relation to different aspects of recovery and self-management, including their lifestyle adjustment following CABG surgery. It is however, difficult to compare the study findings given the different self-efficacy measures used and different time to follow-up.

2.4.3 *Self-efficacy interventions to improve the outcome of CABG*

Changes in self-efficacy have been evaluated in randomised and non-randomised trials. For example, Gilliss et al (1993) compared usual care with supplementary hospital education and weekly telephone follow-up to boast the patient's self efficacy beliefs. Quality of life was assessed by a single item rated on a scale of 0 to 10. Mood was assessed by the Profile of Mood States (McNair et al 1971) and self-efficacy expectations measured by the Jenkins Self-Efficacy Scales and Activities Checklist (Jenkins et al 1985) recorded at baseline, 4, 12, and 24 weeks after discharge. The intervention significantly increased patient self-efficacy for walking, but it had no effect on perceived quality of life. Baseline quality of life and NHYA class predicted quality of life at 24 weeks. Similarly, Barnason et al (2003) in a pilot study used the SF-36 to assess functional status of CABG patients with heart failure: physical functioning, role limitation due to physical problems, social functioning, bodily pain, mental health, role limitations due to emotional problems, vitality, general health perceptions. Self-efficacy/// was measured using a 15-item Likert scale for aspects related to recovery and lifestyle adjustment after CABG, i.e., physical functioning, psychosocial functioning, CAD risk factor modification and self-care management. The intervention consisted of a telehealth device (Health Buddy), which was successful in improving self-efficacy. There were significant correlations between the self-efficacy scores and

Table 2.2 Studies of patient cardiac self-efficacy and citations

Reference	Subjects	Design	Variables	Date collection and follow-up	Summary of findings
Carroll 1995	133 US elderly CABG patients 101 males and 32 females mean age 65 – 87 years	Prospective repeated measures design	Exercise self- -care agency, SE expectations /performance for walking, climbing stairs, roles etc	At discharge, 6 and 12 weeks later	Self-care expectations mediated self-care agency and self-care recovery behaviours at different times in recovery trajectory
Jenkins and Gortner 1998	199 US CABG, valve patients. 76% males, mean age 75.8 75.8 years	Prospective cohort design	Self-efficacy for walking Functional class Quality of life	At 1 month, 2, 3, 6 and 12 months post-op	SE increased over time Correlations for SE expectations and activity. Evidence for predictive value of SE.
Perkins and Jenkins 1998	90 US PTCA patients 79% men mean age 61 years	Prospective design	Self-efficacy for walking, diet, maintaining health, role, work. Mood	Before hospital discharge and 72 hours after PTCA	Higher self-efficacy associated with better behaviour performance lower mood disturbances.
King et al 2001	304 Canadian patients attending cardiac rehab post myocardial infarction or CABG	Prospective design	Self-efficacy expectations, behaviour performance, Social support	2 weeks, 6 months post-discharge	Higher self-efficacy in those attending CR. Self-efficacy improved over time, particularly in women.

Moore et al 2007	61 Australian male patients with angina, 68 PTCA/CABG patients. Mean age 60.2 years	Cross-sectional design	Generalised self-efficacy, locus of control, health status, risk factors, CAD understanding, impact on health	Treated for CHD in previous 3 years	Knowledge of risk factors mediated SE. SE and locus of control predicted self-rated health.
Sullivan et al 1998	198 US cardiac catheterisation patients, 164 male/83 females Aged 45-80 yrs	Prospective cohort design	Self-efficacy maintain function, control symptoms Anxiety, depression Physical/role function	Baseline and at 6 months	SE to maintain function /to control symptoms helps predict physical function and role function
Bastone and Kerns 1995	42 US male and 6 female CABG patients. Mean age 61.8 years	Correlation design	Self-efficacy for controlling pain medication use, sleep, coughing, walking, stairs Social support	Day before CABG	Self-efficacy form rest, tolerance of pain predicted post-op pain, sleep medication use. Significant others important in recovery.
Gardner et al 2003	114 US female, 358 male patients attending CR post MI, PTCA Mean age 59 yrs	Before and after cardiac rehabilitation	Self-efficacy for ambulation, muscular and caloric expenditure Quality of life	Baseline and 12 weeks post CR	Overall self-efficacy ambulatory and muscular self-efficacy significantly improved.
Woodgate et al 2005	64 Canadian patients 92% male, attending cardiac rehab post MI. Mean age 65 years	Prospective observational design	Exercise self-efficacy, attendance at cardiac rehab. Exercise intensity (Borg)	4 weeks prior to and 4 weeks Following assessment	Scheduling/walking self-efficacy predicted attendance at cardiac rehabilitation. Task SE better predictor of exercise intensity.

Lau-Walker 2004	248 UK patients, 195 males and 53 females post MI or angina. Aged 62.2 years	Cross-sectional design	Illness perceptions Generalised self-efficacy, cardiac diet/exercise self-efficacy. Outcome expectations.	8 months	Associations between illness perceptions/SE Perceived consequence linked to lower SE Longer timeline associated with > SE.
Carlson et al 2001	80 US male and female patients post PTCA, MI or CAB. Mean age 59 years	Randomised controlled trial of CR or modified programme	Exercise adherence exercise SE, outcome expectancy, social support, peer support	Baseline and 3 and 6 months	Higher exercise self efficacy with modified programme. Social support not a predictor of exercise adherence.
Berkhuysen et al 1999	114 patients attending CR with angina or post MI, PTCA or CABG from Netherlands	Randomised controlled trial of high versus low exercise intensity	Self efficacy maintain function, control symptoms Over-protective behaviour (spouse)	Before surgery, end of 6 week cardiac rehab	Low-frequency exercise programme enhanced SE -control symptoms. Over-protectiveness predicted poorer SE.
Barnason et al 2002	35 US ischaemic heart failure/ CABG patients 24 males, 11 females. Aged 65 years or older	Pilot study randomised controlled trial of home communication (HCI) intervention	Self-efficacy for recovery behaviours CHD risk factor modification, self-care and perceived health	Baseline 6 weeks and 3 months	Higher self-efficacy, functioning with HCI. Significant correlations between SE and risk factor modification/ physical functioning.
Ewart et al 1983	40 US male patients post MI, mean age 52 years	Randomised controlled trial-treadmill testing and counselling	SE and treadmill performance. Depression, Anxiety, marital adjustment	3 weeks post MI (approx)	Increased SE added effect of counselling. SE predicted home activity more than treadmill performance.

Oldridge et el 1990	51 US patients 76% males, 23% females, post MI, or CABG Aged 59-65 yrs	Randomised controlled trial ward program vs exercise program	Self-efficacy for routine physical activities, A/Ls, concentration	Baseline- at hospital discharge 7 days later	Significant improvement in physical activity, A/Ls by day 28 in randomised patients
Gortner and Jenkins 1990	149 US cardiac surgery (CABG valve) patients 124 males, 31 females and family Aged 30-75 yrs	Randomised controlled trial of in-patient education, telephone monitoring	Self-efficacy for walking, lifting, climbing, general activities; self-reported activity. NYHA, mood.	Baseline 12 week and 24 weeks after surgery	Self-efficacy increased for all activities. SE at 8 wks predicted activity at 12 and 24 weeks. Significant effect of intervention.
Gilliss et al 1993	156 US cardiac patients (CABG and valves), 81% males, Aged 25 - 75 years	Randomised controlled trial of psycho-educational interventions, telephoning	Self-efficacy for walking, lifting, climbing stairs, working, general activities. Quality of life. Mood.	From discharge to 8th week post discharge	Intervention helped promote self-efficacy expectations for walking/behaviour performance activities e.g. lifting after surgery
Mahler and Kulik 1998	268 US CABG male/female patients, mean age 63.2 years	Randomised controlled trial of pre-operative information	Self-efficacy for general activities Anxiety	Baseline, 4 and 8 weeks post-operatively	Self-efficacy significant predictor of recovery. Significant effect of the intervention in the experimental group.
Mahler et al 1999	216 US CABG male/female patients, mean age 61.38 years	Randomised controlled trial of 2 videotapes on diet, exercise compliance	Self-efficacy eating, exercise, habits, compliance anxiety, physical status	Baseline, at 1 months, 3 months post discharge	Higher self-efficacy for adherence to diet at discharge, 1 month. Less fat intake/more exercise at 1, 3 months post-intervention

Parent and Fortin 2000	56 Canadian male CABG patients, mean age 56.5 years	Randomised controlled trial support visits from volunteer former patients	Self-efficacy for self-reported activity Anxiety	24 hours before CABG, 5th post -op day and 4 weeks post-op	Higher self-efficacy at 5 days and 4 weeks. Lower anxiety in the experimental group/ higher SE and activity.
Carroll and Rankin 2006	Older US patients post MI. 71 women, 39 men unpartnered aged > 65 years	Randomised controlled trial of 3 group interventions	Self-efficacy for recovery behaviour Activity status Perceived health	Baseline- on hospitalisation 3 and 6 weeks, 3, 6 and 12 months	No difference between 3 groups for SE intervention 12 weeks. All groups showed increased SE for recovery behaviours and performance.

SE, self-efficacy; CABG, coronary artery bypass grafting; PTCA, percutaneous transluminal coronary angioplasty; MI, myocardial infarction; A/Ls, activities of living; NYHA, New York Heart Association Classification all SF-36 sub-domains at 6 weeks after CABG, except for mental health. There were significantly higher self-efficacy adjusted mean scores for the intervention group, compared to controls.

Intervention studies designed to enhance patient self-efficacy have to a greater or lesser extent considered different sources of self-efficacy such as performance mastery, vicarious experience, verbal persuasion and physiological states (Bandura 1986). The interventions designed to improve performance mastery are generally the most effective way of building patient self-efficacy. Nonetheless, nurses can develop strategies specific to the other sources of efficacy expectations, such as telephone coaching, modelling and persuasion (Gortner and Jenkins 1990) or by use of lay volunteers to help increase patient self-efficacy through one-to-one support (Carroll and Rankin 2006, Parent and Fortin 2000).

2.4.4 *Summary*

The majority of studies reviewed show self-efficacy expectations to be an important factor in recovery following CABG or myocardial infarction (Carroll 1995, Jenkins and Gortner 1998, Perkins and Jenkins 1998). These findings are consistent with Bandura's theory in suggesting that self-ratings of efficacy are associated with short- and long-term success in initiating and maintaining health-related behaviours (Bandura 1986, Bandura 1997). Self-efficacy expectations mediate recovery behaviours such as walking, general activities, roles and relationships in CABG patients (Carroll 1995, Bastone and Kerns 1995, Jenkins and Gortner 1998, Mahler and Kulik 1998). Higher levels of self-efficacy are more evident in the recovery period following CABG in men, compared to women. The predictive value of self-efficacy has been shown to be independent of physical status suggesting that patients with similar levels of physical impairment can achieve different functional outcomes depending on their self-efficacy beliefs (Allen et al 1990, Sullivan et al 1998). Moreover, self-efficacy may have a role in influencing social health (Sullivan et al 1998). However, the inter-relationships between self-efficacy and recovery behaviours and assessment of quality of life in CABG have been less well studied in research. Nurses are in a pivotal role to positively influence the patient's self-efficacy expectations in their everyday practice, helping them make the necessary adjustments following CABG surgery.

2.5 SOCIAL SUPPORT AS A FACTOR IN QUALITY OF LIFE IN CABG

2.5.1 *Introduction*

Social support has been identified as having an important role in cardiac patient recovery (King et al 1993, Kulik and Mahler 1993, Yates 1995, Kirkevold et al 1996, Shen et al 2004, Barry et al 2006). Moreover, researchers have found that CHD patients who live alone or lack a source of emotional support are at higher risk of recurrent cardiac events and mortality than those with adequate social support (Berkman and Syme 1979, Williams et al 1992, Woloshin et al 1997). The perceived availability of social support is important, as is the nature and quality of the support provided. Perceived social support is based on the individual's evaluation of the content and quality of key interpersonal relationships (Sarason et al 1990). The perception, availability, and activation of social support during a major life event such as CABG surgery may act to 'buffer the adverse effects of stress'. However, there is a more negative side to social relationships that may be detrimental to patient recovery. Several studies were reviewed with respect to the provision of social support in cardiac patients (Table 2.3). These studies were selected on the basis of adequacy of sample size, length of time to follow-up and whether they showed social support as a covariate or predictor of quality of life or physical or psychosocial recovery following CABG or myocardial infarction. Different cardiac patient populations were selected for there are more studies of social support in myocardial infarction. Relatively few qualitative studies of social support found. The quantitative studies examined were mostly prospective, longitudinal designs, conducted in the US or Sweden. Relatively few studies examined the relationship between perceived social support and quality of life in CABG. Instead, decreased length of hospital stay, cardiac symptoms and increased ambulation have been examined with respect to physical recovery, and anxiety and

Table 2.3 Studies of patient perceived social support and citations

Reference	Subjects	Design	Variables	Date collection and follow-up	Summary of main findings
Wang et al 2005	292 Swedish female patients post myocardial infarction or angina	Follow-up study	Emotional support social integration, intrapersonal social relations	3-6 months after hospitalisation, 3 years later	Greater progression of CHD in women who lack emotional support, social and personal relations.
Bosworth et al 2000	4278 US Cardiac catheterisation 63 % male and 37% females,	Descriptive survey	Appraisal support, tangible support, belonging, self esteem. Quality of life/severity CAD	At cardiac catheterisation	Lack of social support associated with lower quality of life. Social support interacted across QoL domains
Lindsay et al 2001	214 Scottish CABG patients 170 males 44 females	Observational longitudinal survey	Health status Social network Severity of symptoms	4 weeks before CABG, 16.4 months after surgery	Patients' perception of level of pre-op social support indicator of post-op health status.
Barry et al 2006	1072 US CABG patients 73% males 27% females	Prospective cohort study	Emotional and informational support. Health status	Before hospital discharge and 6 months later	Frequent instrumental support predicted positive changes in mental health, but not physical functioning**.**
Hamalainen et al 2000	147 Finnish, MI, 150 CABG patients	Longitudinal survey	Social network formal/ informal sources of support Functional activity	Baseline, 3 months, 1 year post cardiac event	Support factors limit recovery. Predictors were previous physical /psychological state.

King et al 1999	141 US CABG patients	Prospective study (secondary analyses)	Social comparisons comparisons Mood state Functional status Temporal comparisons	Before, 1 months and 12 months after surgery	Social comparisons not related to emotional and functional status. Temporal comparisons related to better mood and functional status
Schroder et al 1998	193 German male and 55 female cardiac surgery patients	Longitudinal design	Instrumental, emotional and info support, activity, coping Mood, generalised self-efficacy	Before surgery, 1 week after surgery	Personal/social resources predicted recovery. Coping mediated pre-surgery resources/post surgical adjustment
Shen et al 2004	US Cardiac rehabilitation patients. 138 men and 4 women	Prospective correlational design	Social support, Physical function, Coping, hostility Optimism, Depression	Baseline, 6 weeks	Social support predicted better physical function after treatment. Direct and indirect influence.
Fiscella and Campbell 1999	875 US patients non-cardiac from family practices 63% females mean age 48.8 yrs	Descriptive survey	Perceived family criticism, Hostility, depression demographics, Health behaviours Short-Form SF36	Baseline	Family criticism linked with poorer physical health, negative affect, higher fat intake, lack of exercise, smoking. Related to depression and hostility.
Lewis and Rook 1999	242 residents non-cardiac from US 57% males aged 45-54 years	Descriptive survey	Social control by social network, health behaviour change, psychological distress	Baseline	Social control predicted less health-damaging behaviours and more health-enhancing behaviours but also more distress.

Wieslander et al 2005	240 Swedish female patients post myocardial infarction	Longitudinal comparative design support	Social support, network. Professional	1 year and 4 years post MI	Women who participated in CRP more dependent on professional support in first year, others dependent 4 years.
Fraser-Smith et al 2000	887 Canadian patients post myocardial infarction	Longitudinal survey	Perceived social support. Depression Survival	7 days post MI, and at 1 year	Social support buffers effects of depression. High support predicts improvement in depression. Social support not directly related to survival.
Kristofferzon et al 2005	Swedish patients post myocardial infarction. 74 females and 97 males	Longitudinal comparative design	Social support, coping, quality, of life, health status	1, 4 and 12 months post-MI.	Low emotional support in 20-28% of women and 32-34% of men. Low instrumental support in 17-28% women/ 27-30% men. No change over time
Riegal 1995	US patients post myocardial infarction. 32 males and 32 females	Longitudinal survey	Social support, self-esteem, Mood, health perceptions, dependency, neuroticism	1 and 4 months post discharge	Women wanted more support at 1 month, reported receiving, giving more support than men at 1 and 4 months.
Welin et al 2000	Swedish patients post-myocardial infarction. 230 males, 45 females	Prospective study	Social relationships social activities, Depression, anger Type A behaviour,	3-6 days post MI, 1 and 3 months. 10 years	Lack of social support, depression associated with increased coronary mortality, and

			Locus of control	follow-up	all cause mortality.
Berkman et al 1992	US elderly patients post MI. 100 males, 94 females	Prospective community-based cohort study	Social network /sources (tangible and emotional support). Physical function, depression.	Baseline and 6 months, 1 year	Lack of emotional support associated with 6-month mortality
Fleury et al 1993	24 US patients in cardiac rehabilitation. 17 males and 7 females.	Naturalistic design	Social networks, types of support for motivating behaviour change	10 weeks into cardiac rehab programme	Two sub-categories of social networks- enabling and limiting motivation for behaviour change
Boutin-Foster 2005	63 US patients with CHD 60% men	Qualitative research, phenomenologic approach	Lifestyle changes, instrumental support from social network	Interviews within 1 week of hospital admission to telemetry unit	Social network helps promote risk factor reduction, helps improve CHD outcomes
Woloshin et al 1997	820 patients post-myocardial Infarction	Longitudinal design	Tangible/emotional support, needs met. Physical/mental Health, CCS, Angina	Baseline and 1 year later	Death associated with perceived needs. Decline in physical function related to less tangible support, predicted death/poor function at 1-year
Ford et al 2000	19618 subjects 18 years and over in US NHANES 111	Cross-sectional study	Socio-demographics health behaviours social and individual relationships	Preceding 12 months	Social relationships had beneficial effect on health behaviour change.

depression, resumption of usual roles and responsibilities and better social reintegration.

2.5.2 *Lack of social support as a factor in the outcome of CABG*

Lack of social support is detrimental to health (Williams et al 1992) and is associated with accelerated progression of CHD (Wang et al 2005). Moreover, living alone has been found to be an independent risk factor for a major recurrent cardiac event (Case et al 1992, Woloshin et al 1997). Perceived lack of tangible support significantly predicted death and poor physical function 1 year after myocardial infarction (Woloshin et al 1997). Smith et al (1997) found that low levels of emotional support were significantly associated with poorer functional capacity in patients post-CABG. Further, Lindsay et al (2001) found that patients with low social network scores and low SF-36 scores prior to CABG were less likely to be relieved of symptoms post-operatively. Similarly, Bosworth et al (2001) showed that lack of social support (appraisal support, tangible support, belonging and self-esteem) was significantly associated with lower quality of life scores across all domains of the SF-36, after controlling for disease severity and socio-demographics. Conversely, they found high levels of social support were associated with higher scores for physical role function, social function, mental health and vitality.

2.5.3 *Social support as a factor in quality of life in CABG patients*

High levels of emotional support have been shown to be significantly and independently predictive of better emotional health (lower anxiety, depression), perceived quality of life and compliance with behavioural change in patients 1, 4, and 13 months following CABG surgery (Kulik and Mahler 1993). Results from this study showed that married patients had significantly higher levels of emotional support, compared to unmarried patients. In both married and unmarried patients emotional support decreased over time. Emotional support was defined in this study in accordance with Cobb (1976) and Cohen and McKay (1984) as feelings of being cared for, loved or esteemed. Limitations were social support was explored as a one-dimensional construct and at one time point, in the post-operative period following CABG. A large prospective cohort study by Barry et al (2006) found that frequent instrumental support, but not emotional support predicted positive changes in mental health as measured by the SF-36. High perceived emotional support (provision of caring, showing concern, confiding) and instrumental support (tangible assistance or material goods) were associated with being male and married, but neither was a predictor of 6-month change in physical functioning. The lack of relationship between emotional support and mental health may have been related to the timing of the support, which may change throughout the trajectory of recovery. For instance, King et al (1993) found that after cardiac surgery the pattern of social support decreases from 4 months to 1 year post-operatively. Further, Kirkevold et al (1996) found changes in social support corresponded with changes in quality of life, as measured before and 8 weeks after CABG.

Shen et al (2004) explored depressive symptoms, personality and coping as covariates of social support in predicting quality of life in a cohort of CABG and PTCA patients. After controlling for baseline physical health and dispositional optimism, perceived social support was a significant predictor of physical functioning after CABG or PTCA. Social support was highly correlated with less use of negative coping and lower depression. Social support was shown to contribute to better physical health. Individuals with more social support achieved better physical improvement by reducing negative coping responses and better management of depressive symptoms. The strengths of the study were that it tested the independent and mediating effects of social support and other psychosocial variables. Limitation of the study was that although social support was measured as a multidimensional construct, an average score was computed for the purpose of statistical analyses. This may have obscured the effects of particular types of social support on treatment outcome.

2.5.4 *Sources of social support and supportive interventions*

Social support may be derived from within or outside the family. For middle-aged adults, the spouse is generally found to be the most important source of social support, whereas for the elderly the presence of adult children has the greatest influence on health (Akamatsu et al 1992). Social support received from the spouse or partner has been shown to be particularly important (Kulik and Mahler 1993, Kirkevold et al 1996). Whilst a lack of social support from the spouse may be associated with depressive symptoms in CABG patients too much social support or overprotective behaviour by the spouse, i.e., negative support can be detrimental to patient outcome (Yates 1995). The negative effects of social support and the partner’s lack of social support will be discussed in the partner literature in Chapter 2. Nurses are in a key position to help support patients and their families through information and emotional support (Mullen et al 1992, Kirkevold et al 1996, Artinian 2007) and by identifying those most at risk through lack of social support or depression (Brennan et al 2001, Burg et al 2003).

Social support interventions vary in focus. For example, the recent ENRICHD study (The ENRICHD Investigators 2000) used different strategies to assist with social support, especially through the increased involvement of family, friends and significant others as well as the contribution of nurses and other health care professionals.

2.5.5 *Summary*

There is strong evidence that lack of social support is significantly associated with increased fatal and non-fatal cardiac events (Case et al 1992, Williams et al 1992). However, the relationship between lack of social support and quality of life outcomes in CABG patients has been less well studied. Particular types of social support are important to cardiac patients such as emotional and informational support, which are linked to self-esteem and mastery (Moser 1994). Studies have shown that instrumental support or tangible aid is a significant predictor of perceived mental health in CABG patients, as measured by the SF-36 Health Survey (Barry et al 2006). Further, Kulik and Mahler (1993) identify that higher levels of emotional support are significantly and independently predictive of better (global) quality of life in CABG patients. Higher perceived emotional support and instrumental support were significantly associated with being male and married (Barry et al 2006). Social support is central to perceived control and recovery and readjustment following CABG surgery (King et al 1999).

2.6 SELF-PERCEIVED NEED AS A FACTOR IN QUALITY OF LIFE

2.6.1 *Introduction*

Patient-centred needs assessment or self-perceived need may be an important factor in quality of life outcomes in CABG patients. Few studies were found that examined the associations between pre-operative self-perceived need and quality of life in CABG. Davidson et al (2004) argue in favour of needs assessment as a tool for evaluating perceptions of health status in individuals with advanced heart disease because studies have demonstrated a high proportion of patients have unmet needs for activities of daily living, information sources and comfort. Needs assessment would allow CABG patients to evaluate the care they receive from health services and health care professionals thus allowing perceptions of deficit in need to be identified. Identifying the unique perspective and needs of CABG patients is important to the development of nursing interventions designed to facilitate psychological and social recovery (Moser et al 1993, Kattainen et al 2004). Previous studies of cardiac patients have focused on the associations between health-related quality of life and patient satisfaction (Guldvog 1999), patient expectations and evaluation of care (Staniszewska 1999, Staniszewska and Ahmed 1999) or health needs assessment (Asadi-Lari et al 2003a, Asadit-Lari et al 2003b).

Asadit-Lari et al (2003b) identify that, with the exception of informational needs, the health needs of patients with angina and myocardial infarction are highly correlated with health-related quality of life, as measured by the Seattle Angina Questionnaire and the SF12 Health Survey. Few studies have examined the health needs of patients with respect to quality of life before or after CABG (Kattainen et al 2004). Implicit in the exploration of need is an expectation of the level of care (Davidson et al 2004) and the perceived importance of the need to the individual (Moser et al 1993). Difficulties arise because patient satisfaction, as a construct, is often poorly defined and are therefore difficult to measure (Davidson et al 2004). Patients' expectations may be complicated, varying in a number of ways, from the factors that influence them, their type, whether they are positive or negative, their unpredictability and whether patients attach a value to them (Staniszewska and Ahmed 1999).

2.6.2 *Patients' needs and concerns in the wait for CABG surgery*

Although self-perceived need has rarely been examined in relation to quality of life, investigators have examined the needs and concerns of patients before and after CABG. For example, Fleming et al (2002) in a survey of patients waiting for cardiac surgery found that over half them wanted more education on diet, medication, exercise and surgery. Over 72% of patients wanted more contact from the health care professionals in hospital in the wait for cardiac surgery. Jonsdottir and Baldursdottir (1998) found that patient's health status and symptoms were worse in the wait for surgery, often resulting in depression and negative effects on the spouse and family. Patients wanted more information on financial assistance, sexual life, surgery and rehabilitation, mobilisation and exercise. Jonsdottir and Baldursdottir (1998) concluded that assessment of need from the perspective of the patient is important because perceived lack of information and support may contribute to deterioration in the patients' pre-operative physical and functional status, beyond the effects of their illness.

2.6.3 Patients' needs and concerns following CABG surgery

The post-operative needs and concerns of CABG patients are equally important. For example, Jaarsma et al (1995) explored what information patients needed and the problems experienced in the first 6 months after CABG or myocardial infarction. Results indicated that problems were related to emotional reactions, treatment and convalescence. Patients wanted more information on the adverse effects of treatment, changes in physical condition, CHD risk factors and knowledge of CHD. Further, Goodman (1997), in a qualitative study of patients' perceptions of need in the first six weeks after myocardial infarction or cardiac surgery, found that pain relief and sleep promotion, psychological needs, practical needs and community support were of paramount importance. Specifically, there was a desire for dietary information, general advice about care of wounds and stitches, when to resume driving and information on the possible side effects of drugs, as well as advice on the psychological difficulties that may be encountered in the post-operative period and how to deal with them. Kattainen et al (2004) examined CABG and PTCA patients' expectations of informational support and health-related quality of life longitudinally and the adequacy of information. Results indicated that patients' valued information about recovery and psychosocial functioning more before surgery. After 6 and 12 months psychosocial functioning was their most important concern. Men wanted more information than women about usual activities, post-discharge care, and wound healing before surgery. One year after CABG the men needed more information about sexual activity, compared to women. Therefore, the information needs and priorities of patients may vary before and after CABG surgery and between men and women.

2.6.4 Cardiac rehabilitation

Nurses need to determine what patients need to facilitate physical and psychosocial recovery and readjustment following CABG surgery. Whist cardiac rehabilitation aims to meet the CABG patient's need for education and support this is often limited to the post-operative period. Mooney et al (2007) found that about a quarter of patients waiting for cardiac surgery wanted more contact with the nurse. A quarter of patients found that waiting for cardiac surgery caused uncertainty and distress, and just 12% had or were attending cardiac rehabilitation. Much of the distress experienced by patients in the wait for CABG surgery may be the result of unmet need (Jonsdottir and Baldursdottir 1998, McHugh et al 2001, Fleming et al 2002, Mooney et al 2007) and similarly in the post-operative period, especially with respect to information needs, education on diet, medications and emotional support (Jaarsma et al 1995, Goodman 1997, Kattainen et al 2004). The findings from these studies strengthen the need for a pre-operative programme of cardiac rehabilitation for CABG patients and the need to ensure that the provision of education and support in the pre- and post-operative period is based on assessment of need and interventions tailored to the individual and their personal circumstances.

2.6.5 Summary

No studies were found that examined self-perceived need in CABG patients in both the pre- and post-operative period following surgery, or pre-operative self-perceived need as a factor in quality of life outcomes in CABG patients. Investigators have identified that patients waiting for CABG surgery may have difficulties physically, psychologically and socially. Pre-operatively, CABG patients may lack information and teaching, especially about physical activity and exertion, and how to get as fit as possible for their operation (Fleming et al 2002). Post-operatively, CABG patients may have quite specific physical and psychosocial needs and concerns (Jonsdottir and Baldursdottir 1998). The nature of need as perceived by the patient i.e. felt need may change from before to after CABG surgery and it may differ between men and women. Key priorities are information, education and emotional support. Patient’s perspective of need is important because it may differ from those of the health care professional with respect to what is important and indeed whether needs have been met or unmet (Moser et al

1993). Clearly, more research is needed in this area to help facilitate the recovery trajectory as part of the management of CHD. Finally, the studies reviewed in this section pertain only to the patient. The needs and concerns of partners or close family members of patients having CABG surgery will be discussed in the partner literature in Chapter 3, and in relation to patient and partner or dyad outcome following CABG surgery. The patients and partners may have some similar and yet discrete needs and concerns (Moser et al 1993) that need to be identified to help inform the design of interventions to help promote both their recovery and readjustment following CABG surgery.

2.7 CHD RISK FACTORS AND RISK FACTOR REDUCTION IN CABG

2.7.1 Introduction

The section of the thesis will provide an overview of the literature on the factors that influence CHD risk factor reduction following CABG surgery. Compared to the vast literature on the pre-operative factors that affect quality of life outcomes in CABG patients there is considerably less literature on the factors affecting CHD risk factor reduction (outcome) after surgery. The importance of CHD risk factor management to long-term outcome following CABG has previously been discussed (White and Frasure-Smith 1995, Campeau 2000). The main factors associated with the progression of atherosclerotic CHD in native and grafted coronary arteries are pre-existing or established risk factors (Emond et al 1994 on behalf of CASS Investigators), especially hyperlipidaemia, smoking and hypertension as identified by Campeau et al (1984). Therefore, all studies of risk factor reduction in CABG patients need to examine these factors. Non-experimental studies have shown that demographics such as age, educational level, marital status (Lindsay et al 2001), and indicators of disease severity such as cardiac history, co-morbidity, ejection fraction and the number of grafted vessels and quality of life (The CASS study 1983) many influence CHD risk factor reduction following CABG surgery, as well as obesity and sedentary lifestyle. Therefore, all these factors should be included in cardiac research.

2.7.2 *Motivation for CHD risk factor reduction in CABG*

Motivation for risk factor reduction may be high immediately after CABG surgery (Allen 1999, Barnason et al 2003), but this decreases over time with only about one third of patients continuing adherence to long-term modification after surgery (Roitman et al 1998). For some patients CABG surgery does not serve as a stimulus for lifestyle change and so they either do not change their risk factors or they become worse after CABG (The Coronary Artery Surgery Study (CASS**)** (1983, Allen and Blumenthal 1995). The reasons given for poor adherence to CHD risk factor reduction after CABG may be patient related or programme related (Fleury 1992, Allen 1996), for example, to do with the nature of cardiac rehabilitation (Allen 1999). Psychosocial factors such as anxiety and depression (Duit et al 1997), health beliefs (Fleury 1992, King et al 2006), illness perceptions (Cooper et al 1999, Oxlad and Wade 2006), treatment beliefs (Kee et al 1997, Karner et al 2002), self-efficacy (Allen 1996, Mahler and Kulik 1999), and social support (Kulik and Mahler 1993, Schroder et al 1998) may influence CHD risk factor reduction in CABG. Other factors such as non-attendance at cardiac rehabilitation are influential (Engblom et al 1996, Lindsay et al 2003). Therefore, a wide range of factors may contribute to risk factor reduction in CABG from socio-demographics down to individual psycho-physiological influences and organisational issues. Consideration should therefore be given to the inclusion of some of these areas in research.

This section of the thesis will discuss treatment beliefs, self-efficacy, perceived social support because there is some evidence from the literature that these factors may influence CHD risk factor reduction (outcome) in CABG patients. Other factors such as motivation for lifestyle change (Karner et al 2005, King et al 2006), illness perceptions

(Cooper et al 1999, Petrie and Weinman 1996), anxiety and depression (Duits et al 1997, King et al 2001) though relevant will only be discussed if they relate in some way to the outcome variable of interest. These factors will now be discussed and a rationale provided for their inclusion in the study.

2.8 TREATMENT BELIEFS AND CHD RISK FACTOR REDUCTION

2.8.1 *Introduction*

Patients' beliefs about treatment and adherence to lifestyle changes and medication use may be an important factor in CHD risk factor reduction in CABG patients. Theoretically, beliefs about the necessity of treatment, treatment value and beliefs about cure may influence behaviour change, including adherence to lifestyle and medical treatment (Hirani et al 2004, Horne et al 1999). Research by King et al (2006) identify that some patients view CHD is an 'event' or curable disease, especially through CABG or PCI instead of a chronic, potentially debilitating illness requiring considerable physical and psychosocial readjustment. Despite this finding there is limited evidence of the association between treatment beliefs and lifestyle changes in CHD patients (Kee et al 1997, Karner et al 2002). No studies were found that examined the predictive value of treatment beliefs in determining CHD risk factor reduction following CABG surgery.

2.8.2 *Treatment beliefs and adherence to lifestyle and medical treatment*

Karner et al (2002), in a qualitative study in Sweden, interviewed patients 1 year after a cardiac event (myocardial infarction, CABG or PCI) to examine their beliefs about CHD and its treatment. Results indicated that the patients' level of understanding of the effects and health benefits of treatment were superficial. Although patients made reference to the value of drug treatment and lifestyle changes, many patients found it hard to expand on their answers. There was a superficial understanding about CHD risk factors and misconceptions about the course of events. Some patients considered

CHD to be avoidable by a healthy lifestyle while others referred to such factors as fate and heredity. Very few answers were related to the prognostic value of treatment. There was some, albeit minimum, reference made to the dangers of discontinuing drug treatment for this was thought to run the risk of relapse in the patient's condition. This study was significant for it highlighted that patients' conceptions of treatment may influence their attitudes towards adherence to lifestyle and drug treatment. Further, Kee et al (1997) in Belfast explored patients' views about the benefits and risks (disadvantages) of coronary angioplasty, medication use and lifestyle changes. Results indicated that patients greatly over-estimated the capacity of the procedure to control their disease. For instance, patients anticipated an extra 10 years from coronary angioplasty, which was significantly more than their estimates for stopping smoking, a diet to reduce cholesterol and taking more exercise. Of significance is the finding of Kee et al (1997) that patients who overrate the value of angioplasty to control their disease may be less likely than those with realistic expectations of treatment to adopt a healthier lifestyle.

2.8.3 *Summary*

Patients' beliefs about treatment may influence their treatment preferences, adherence and outcome (Horne et al 1999, Hirani et al 2004). Patients may have a superficial understanding about CHD and the effects of treatment (Karner et al 2002) and unrealistic expectations about the benefits and risks of treatment (Kee et al 1997).

Nurses are in a key position to work with patients to help clarify their beliefs about CHD and treatment, and to further understand the patient's perspective of treatment beliefs as a basis for cardiac education and counselling, especially through brief negotiation and motivational interviewing. A treatment perceptions approach in combination with these techniques may help facilitate adherence to lifestyle and medication use. There is a paucity of research in this area especially in CABG patients and partners.

2.9 SELF-EFFICACY AND CHD RISK FACTOR REDUCTION IN CABG

2.9.1 *Introduction*

Patients' self-efficacy beliefs may be a factor in CHD risk factor reduction following CABG surgery. Studies have identified that self-efficacy contributes to lifestyle changes pertaining to weight control and exercise (Strecher et al 1986). Robertson and Keller (1992) found that patients with higher levels of self-efficacy showed greater participation in a recommended exercise programme. Similarly, Bennett et al (1999) identified that patients with higher self-efficacy reported higher levels of light exercise and lower levels of cigarette smoking and alcohol consumption 3 months following myocardial infarction. However, self-efficacy in CABG patients has been less well studied and focused in terms of CHD risk factor reduction after surgery (Table 1.2). For example, Moore et al (2007) examined self-efficacy and general health or cardiac health relative to the risk factor status in patients having CABG, PTCA or medication. Results indicated that there was a significant improvement in risk factors from treatment (3 years previously) to the current time. Self-rated health was greater among people with fewer current risk factors while a greater change in risk factors was associated with better current health. Participants with higher self-efficacy scores had fewer current risk factors. In this study risk factors were explored as a predictor (independent variable) of health status. Other studies of CABG patients have examined self-efficacy for specific behaviours or one or more activities related to recovery following surgery such as walking and climbing stairs (Jenkins and Gortner 1998, Parent and Fortin 2000) but not specifically related to the patient's risk factor status.

2.9.2 *Self-efficacy intervention in CHD risk factor reduction in CABG*

The intervention studies by Allen (1996), Mahler et al (1999) and Barnason et al (2003) aimed to promote CHD risk factor reduction in CABG patients. For example, Allen (1996) in a randomised control trial of nurse-led intervention to decrease dietary fat intake, stop smoking and increase exercise found that the prevalence of smoking decreased from 24% at baseline to 8% at 1 year in the intervention group and from 19% to 14% in the control group. Both groups reported improvement in exercise at 1 year. The intervention consisted of instructions about CHD risk factors and lifestyle behaviours and a videotape and workbook, which began on the day before hospital discharge and continued over the next 2 weeks. Risk factors were measured at baseline and 1 year after CABG surgery. This study showed that a short, in-hospital session followed by a single home visit and subsequent telephone contacts by the nurse helped enhanced risk factors in women after CABG. Further, Barnason et al (2003) pilot tested a home communication intervention (The Buddy System) that allowed nurses to monitor patient's symptoms and deliver education and information. The patients randomised to the intervention group had significantly higher levels of self-efficacy and better general health, physical and mental health and vitality than the usual care group 3 months following CABG. The patients having the intervention also had significantly higher exercise adherence and stress control 3 months after surgery.

2.9.3 *Summary*

Self-efficacy may contribute to a variety of health behaviours, such as weight control, and exercise (Strecher et al 1986). Adhere to lifestyle change is needed to help ensure the long-term benefits of CABG surgery. Patients with higher levels of self-efficacy report higher levels of health behaviour change and fewer CHD risk factors following CABG surgery (Barnason et al 2003, Moore et al 2007). Limited research has been conducted in this area. Instead, investigators have focused more on self-efficacy for specific behaviours such as exercise, diet, or general activities such as walking and climbing stairs in the immediate recovery period following CABG surgery (Jenkins and Gortner 1998). Randomised controlled trials have found that nurse-led interventions may contribute to risk factor reduction in CABG patients through efforts to increase patient self-efficacy (Allen 1996, Barnason et al 2003). However, more research is needed in this area to show the effects of self-efficacy framed interventions in determining CHD risk factor reduction in CABG patients.

2.10 SOCIAL SUPPORT AS A FACTOR IN CHD RISK FACTOR REDUCTION

2.10.1 *Introduction*

Social support may be a factor in CHD risk factor reduction in CABG patients. No studies were found that specifically examined social support as a factor in CHD risk factor reduction in CABG patients; however, the association between social support and cardiovascular risk has been well established in large studies such as the Multiple Risk Factor Intervention Trial (MRFIT) (O'Reilly and Thomas 1989) and the National Health and Nutritional Examination Survey 111 (NHANES 111) (Ford et al (2000). For instance, the MRFIT trial (O'Reilly and Thomas 1989) examined the role of social networks in maintenance of improved cardiovascular health. Highly significant differences were found between the participants who maintained lifestyle changes and those who did not for the four types of support provided: information/advice, appraisal support, emotional support and availability. Participants with larger social networks had significantly better risk factor reduction after 3 years. In contrast, Wang et al (2005) examined the influence of social support on the progression of coronary artery disease in women and found little difference in lifestyle factors such as smoking, alcohol consumption and body mass index across different levels of social support. Only sedentary lifestyle was significantly related to different levels of social support. Therefore, although social support has been shown to enhance positive health behaviours (Cohen 1988) some inconsistencies exist regarding its influence on lifestyle change in CHD patients.

2.10.2 *Social support as an influence in CHD risk factor reduction*

Qualitative researchers have explored the ways in which social networks contribute to improved outcomes in patients with CHD. For example, Boutin-Foster (2005) identified that patients perceived the network members who helped them to engage in healthy behaviours, alleviate stressful situations and facilitate receiving medical care were most helpful. Fleury (1993) found that social networks, which provided assistance with household chores, facilitated access to rehabilitation programmes and assistance in negotiating the health care system were most helpful. Emotional support, feedback, problem solving and instrumental support were most helpful for patients in dealing with behaviour change. The factors that reduced motivation for behaviour change were value conflict and boundary maintenance. Both of these studies provide important insights into the role of social networks in motivating the patient's behaviour change.

2.10.3 Social support and CHD risk factor changes in CABG patients

Social support has been examined as a moderator of adjustment and compliance to lifestyle change in CABG patients (Kulik and Mahler 1993). In this study 85 patients were follow-up at 1, 4 and 13 months following hospital discharge. Emotional upset, emotional support and marital status were examined as predictors of outcome (quality of life, smoking and ambulation and cardiac status, i.e., angina and physicians visits). The more emotional support the patient received during recovery the less they smoked. Patients who reported more emotional support complied more with behaviour recommendations than did patients who received less support during the 13 month follow-up period. The study was significant because it showed that providing emotional support helps promote smoking cessation, which are especially important following CABG surgery. Limitations of the study were that social support was examined as a one-dimensional construct and the patient's motivation for behaviour change was not examined. Changes in smoking and ambulation may have been mediated by the patient's mood to some extent. Schroder et al (1998) examined the role of social support and personal factors in CABG patients before and 1 week after surgery. Recovery following CABG was predicted by the patient's coping capacity and indirectly by social support and generalised self-efficacy. Seeking social support was identified as an adaptive way of coping. The study was significant in that it examined the mediating effects of social support on patient outcomes (worry, emotional state, mental activity and physical activity levels) following CABG. It did not however assess CHD risk factor status as an outcome variable of interest.

2.10.4 Summary

Social support has been shown to be a significant factor in cardiovascular risk reduction (O'Reilly and Thomas 1989, Ford et al 2000). Qualitative studies of CHD patients show that instrumental support provided by the social network is helpful in facilitating health behaviour change (Fleury 1993, Boutin-Foster 2005). In studies of CABG patients (Kulik and Mahler 1993), more emotional support predicted less smoking and greater ambulation up to 13 months after surgery. More research is needed to examine the influence of different types of social support on CABG patients, especially the mediating effect of social support in CHD risk factor reduction following surgery.

2.11 CONCLUSION

From the literature reviewed it is apparent that CHD remains a leading cause of death in Scotland and elsewhere in the developed world despite decreases in mortality over the last few decades. Although mortality has declined, morbidity has increased as more patients live with the consequences of heart disease. Although commonly understood risk factors such as smoking, sedentary lifestyles, high cholesterol, hypertension and diabetes contribute to the pathogenesis of CHD, psychological and social factors are also important influences in the aetiology and development of the disease. The evidence for this comes from large population based studies of 'healthy individuals' and studies of patients with established CHD. CABG surgery is one of several treatment options in the management of patients with established CHD. There is strong evidence from large prospective randomised controlled trials of the benefits of CABG surgery in terms of relief of symptoms, some evidence of improved quality of life and of increased life expectancy only in high-risk groups. Several studies have highlighted that to maintain the revascularisation benefits of CABG and to prevent the progression of atherosclerotic CHD in native coronary arteries, CHD risk factor reduction must be maintained long-term. Adherence to CHD risk factor modification is a particular problem, with only about one third of patients continuing adherence to CHD risk factor modification after CABG surgery. Therefore, it is important to conduct research into the multiple factors impacting on CHD risk factor reduction in CABG patients.

Quantitative studies have found that quality of life outcomes following CABG surgery may be influenced by socio-demographic factors, pre-operative clinical and medical history and personal and social factors. Although researchers have examined the perceived health status and quality of life of CABG patients more work is necessary that explores the health status of patients and its impact on recovery following CABG surgery. Major psychosocial factors such self-efficacy and social support has also been studied with respect to different health and recovery outcomes in CABG patients. However, self-efficacy has been studied more in the context of specific recovery behaviours such as walking, general activities, but less frequently relating to CHD risk factors and disease management in the wait for and following CABG surgery. Several studies have examined social support in CABG patients, but they have been limited by looking at only one or two types of social support. Emotional and informational support and tangible aid have been well investigated, but affectionate support and positive social interaction are under researched. No studies were found that examined the treatment beliefs of CABG patients or their perceptions of need pre- and post-operatively. Patients' treatment beliefs are important because they may influence their treatment preferences and adherence to treatment recommendations, including lifestyle and medical treatment. Patients' perceptions of need are important in the evaluation of the care they receive from health services and health care professionals.

This allows perceptions of deficit in need to be identified and interventions designed as appropriate to improve patient outcome(s) following CABG surgery. Studies examining the effects of major psychosocial variables on quality of life outcomes in CABG patients have been inconsistent and they often lack statistical power to examine specific effects. Many of the studies have been descriptive in nature, aiming to identify individual salient aspects, but without sufficient theoretical reflection. Therefore, it is important to conduct research into the multiple factors impacting on quality of life following CABG to help improve the outcomes of surgery.

No studies were found that examined the interrelationships between a range of factors (physical and psychosocial) and their influence on quality of life outcomes and CHD risk factor reduction following CABG surgery. Research is necessary that better informs interventions designed to promote patient recovery following CABG surgery, and their readjustment to CHD as a chronic health problem. Consequently, the major research question of this thesis is ‘what factors impact on quality of life and CHD risk factor reduction in patients following CABG surgery’. In order to address this the following research questions seek to examine:

What changes are there in patient perceived health status, quality of life, CHD risk factors, self-efficacy, treatment beliefs, perceived social support and self-perceived need from before - to 4 months after CABG surgery ?

What pre-operative factors (physical and psychosocial) significantly predict patient outcome (perceived physical and mental health and CHD risk factors) 4 months after CABG surgery ?

The partners of CABG patients are an important source of information and support for the patient, especially in their recovery following surgery. However, the partner’s response to, and ability to cope with the recovering patient may be influenced by a number of factors, including their contact with the health care professionals involved in the patient’s preparation for surgery and aftercare and the perceived availability of social support. However, studies tend to focus primarily on the patient often in isolation from their partner. Given the widespread prevalence of CABG, identifying potentially modifiable patient and partner predictors of improved outcomes is important. Improvement in outcome following CABG surgery may be achieved through well-organised multi-disciplinary programmes of secondary prevention and cardiac rehabilitation so the evidence of these has been reviewed.

CHAPTER 3

PARTNER AND DYAD LITERATURE

CHAPTER 3

PARTNER AND DYAD LITERATURE

3.1 PREVENTION OF CORONARY HEART DISEASE (CHD)

3.1.1 Introduction

This chapter of the thesis will focus on the literature pertaining to the cardiac partner and to the dyad, especially in relation to CABG surgery. The term dyad refers to the patient-partner pair and their relationship (Gonzalez and Griffin 1999). It was clear from the patient literature that quality of life and CHD risk factor reduction in CABG patients may be influenced by a number of complex factors. These factors included the influence of the partner and their characteristics, including their self-efficacy beliefs (Schroder et al 1998) and the nature of the support provided (Rankin and Monahan 1991, Rantenen et al 2004). The dyad is important because the experience of CABG surgery is a disruptive and stressful life event requiring the psychosocial adjustment of both the patient and their partner. Each member of the dyad may influence his or her own outcome(s) with little influence from the other partner, or couples may influence each other's outcomes (Lewis et al 2006). It is important therefore to look at the partner for their own health sake and that of the recovering cardiac patient.

To review the cardiac partner and dyad literature studies appearing in MEDLINE, PsycLIT, Embase, Cinahl, and PsycLIT data bases were initially accessed between 1989 and 1999, and reviewed regarding objectives, methodological issues, results and clinical relevance. The literature review was ongoing thereafter from until 2008 (part-time PhD). Both electronic and manual searches were conducted, using the key words 'partners', 'spouses', 'dyads', 'couples', 'family'. These words were coupled with 'CHD', 'prevention', 'public health;, 'CABG', 'cardiac surgery', 'patient', and 'caregiving' in extensive searches of the literature undertaken to review the factors that influence partner or dyad outcomes following CABG surgery. Meta-analysis, systematic reviews, randomised controlled trials were reviewed with respect to the aforementioned areas. The literature revealed some couples' intervention studies intended to enhance the outcome of surgery. Compared to the vast patient literature on CABG patients there was a dearth of information, especially in the UK relating to the health needs and concerns of the partners of patients having CABG surgery.

This chapter will proceed by examining literature on the primary prevention of CHD, CHD in families and risk assessment in cardiovascular disease. It will look at the involvement of the partner and their role in supporting the patient having CABG surgery, followed by examination of the factors that may influence quality of life outcomes and CHD risk reduction in cardiac partners and/or dyads. It will draw on some different theoretical concepts than those previously examined in the patient literature, such as family systems theory, concordance in couples and interdependence theory to show that for treatment to be maximally effective the health needs and concerns of the CABG partner and dyad must be considered. Briefly, the family systems approach recognises that a change in one family member causes others in the family to adjust in some way (Coyne and Fiske 1992). It recognises the family as the primary source of many health beliefs and behaviours (Akamatsu et al 1992). Concordance in couples may be defined as similarity in certain factors, usually between the husband and wife (Brenn 1997). Discordance on the other hand refers to one partner having, for example, CHD risk factors and the other partner not having risk factors. Interdependence theory is a dyad-level social psychological theory used to explain interdependence between couples, which places emphasis on understanding the outcomes that partners experience by analysing how they interact (Lewis et al 2006). The various studies examined of CABG patients and partners have used different terms such as 'spouses', 'partners' or 'families'. When referring to the studies examined, the terms ‘spouse’ or ‘partner’ as reported in these studies are used. Otherwise, the more inclusive term ‘partner’ is used throughout the study to describe the characteristics of the sample.

3.1.2 *Primary prevention of CHD*

The primary prevention of CHD is a moot point by the time patients are admitted to hospital for treatment for CHD (Edwardson 1999). However, secondary prevention strategies are most appropriate for patients following CABG surgery to help avoid complications and the reoccurrence of problems related to the build up of atherosclerotic plagues in the native and grafted coronary arteries (Wood 2000**)**. Significant opportunities exist for primary prevention of CHD in partners or close family members of patients having CABG surgery, in addition to the normal population strategies for disease prevention. Both primary and secondary prevention strategies are necessary to help improve population health and to reduce CHD morbidity and mortality (Rose 1992). Actions for CHD prevention includes three components; a population strategy, a high risk strategy and secondary prevention (Wood 2000). Population approaches i.e. CHD risk factor reduction in apparently healthy people takes place on an opportunistic basis usually in primary care (Unal et al 2005), with priority being given to individuals at higher risk, such as those who smoke, have hypertension or close relatives with CHD (SEHD 2001). The aim of primary prevention is to reduce the risk of the onset of ill health through health education and to raise awareness of the benefits of a healthy lifestyle, and to encourage activities to reduce risk factors for CHD (Donaldon and Donaldson 1993, Naidoo and Wills 2001). The aim is to prevent the first heart attack or to delay the appearance of other symptoms related to myocardial infarction such as angina (Jowett and Thompson 1996, Wood 2000). Previous surveys of asymptomatic populations have established a firm relationship between risk factors and the development of the clinical manifestations of CHD. Characteristics such as age, gender, cigarette smoking, serum cholesterol, hypertension and diabetes mellitus have identified groups at higher risk for later occurrence of angina, myocardial infarction and cardiac death (Kannel et al 1976, Vliestra et al 1980 on behalf of CASS investigators, Wannamethee et al 1998, Stampler et al 2000).

Population based studies such as the US Nurses' Health Study (Stampler et al 2000) with 14 years follow-up found that addressing three combinations of modifiable lifestyle behaviours (diet, smoking, exercise, body mass index) reduces the risk of major coronary artery disease events and stroke. This study identified that if all women did not smoke, were physically active and normal weight then 82% of the coronary events might have been prevented (Stampler et al 2000). In Scotland, the MIDSPAN epidemiological studies have provided valuable information about heart disease in the Renfrew area over a 30 year period (Watt et al 1995, Hart et al 2005), particularly in relation to socially deprived groups and married couples. It showed, for example, in the Renfrew/Paisley area that a higher proportion of men had high blood pressure, were smokers, had more angina and generally had a poor health experience compared to other parts of the country. The 'Have a Heart Paisley' demonstration project was developed in 1999 in response to the findings from the MIDSPAN studies. There are a number of key objectives, including strategies to help people make healthier choices in relation to eating, tobacco and physical activity and to make these more acceptable and easier to make. Strengths of the 'Have a Heart Paisley' project was that it cut across traditional boundaries between secondary and primary care, community groups and local authority areas to provide better access and support for patients to help reduce and prevent heart disease and tackle inequalities related to heart disease.

3.1.3 *CHD in families and the CABG partners' risk of CHD*

Current British and European guidelines (DeBacker et al (2003) on behalf of Third Joint Task Force of European and other Societies on Cardiovascular Disease Prevention in

Clinical Practice) and the Joint British Societies Guidelines (2006) on Prevention of Cardiovascular Disease in Clinical Practice (JSB2) recommend that high risk groups should be targeted for prevention. They suggest that equal weight should also be given to other factors such as familial dyslipidaemia and a family history of premature cardiovascular disease (CVD) because these can put the individual at increased risk of disease, regardless of other risk factors. There is however a difference between a family history of premature CVD as defined in clinical guidelines and what constitutes high-risk families. Higgins (2001) identify the onset of CHD can occur with increased frequency in families of affected individuals whether disease is due to genetic or environmental factors, or the interaction of the two. The family is defined in this instance as being ‘two or more people united by blood, marital or adoptive ties, who may or may not live in the same household’ (Higgins 2001 p1684). Therefore, included in this definition may be the partners of CABG patients who may be considered as ‘low risk’ individuals for CVD at one level, but by virtue of the evidence of concordance in risk factors in couples (Bookwala and Schuiz 1996) may be at increased risk of the disease (concordance will be discussed later in the chapter). Indeed, the Family Heart Study Group (Pankow et al 1997) identified that behavioural risk factors such as smoking, excessive alcohol intake, lack of exercise and high dietary fat intake may be higher between spouses than among first-degree blood relatives. Therefore, whilst family members of patients with premature CHD may be targeted for risk assessment (De Sutter et al 2003 on behalf of the EUROASPIRE 11 family survey), the partners of CABG patients are not. Moreover, the targeting of family members for risk assessment is still sub-optimum. For example, the recent EUROASPIRE survey found that European physicians rarely screen family members of patients with premature CHD for cardiac risk factors (De Sutter et al 2003). It appears that much more needs to be done to prevent CHD in families with a premature history of CHD and those such as CABG partners who may be at an increased risk of CHD due to environmental factors. Therefore, CHD risk factor modification approaches that encourage healthy lifestyles may be appropriate for both CABG patients and their partners who may be at greater risk of CVD than was previously appreciated (Macken et al 2000). Nurses play a key role in CVD prevention, for example, through screening, health promotion, patient education and counselling (Scholte op Reimer et al 2006). However, such activities are mostly geared towards the patient. The level of involvement and the 'active participation' of cardiac partners vary considerably throughout the country, especially in the lead up to and recovery period following CABG surgery (SEHD 2001**)**. Contemporary health services still focus primarily on the needs of the patient with minimum assessment and input directed at the partner (Rankin 1992, Ivarsson et al 2004).

3.1.4 *The partners' own health and health promotion needs*

Currently, pre-operative preparation for CABG surgery involves the patient and partner or close family members attending a pre-admission session with information being provided on topics such as anatomy and physiology, procedural information about the operation and post-operative course, sensory information, post-operative issues and lifestyle changes (Margerson and Riley 2003). Some centres offer a 'once off' visit and others a pre-operative programme of support (Bengston et al 1996, Shuldham 1999). After the patient has had their CABG surgery the partner may be invited to attend a cardiac rehabilitation programme with them (Macken et al 2000), which is important since they are usually the key source of support for the patient (King and Koop 1999). However, current activities are designed primarily with the patient in mind and how the partner might best support the patient in their recovery following a cardiac event, including CABG surgery. The partners' own health and health promotion needs are not formally assessed and documented. The partner's personal health behaviours and their motivation for lifestyle change may be influenced by a range of factors, including the availability and design of health care services, their perceptions of CHD and treatment (Kee et al 1997) and contextual factors such as their relationship with the patient and health care professionals (Murray et al 2000, Astin et al 2008). They may experience emotional distress as a result of the cardiac event that may impact significantly on their health and daily functioning (Moore 1994, Davies 2000) with consequences in terms of dyadic adjustment (Coyne and Smith 1991, Moser and Dracup 2004, Joekes et al 2007, Ruiz et al 2006, Mohrer-Imhof et al 2007).

3.1.5 Summary

It is crucial that nurses and other health care professionals identify and address the needs and concerns of CABG patients and their partners to help improve quality of life outcomes and CHD risk factors after CABG surgery. It may be considered unrealistic my some, from a service perspective, given the current health care climate to advocate targeting the CABG partner more formally for risk assessment and prevention. However, if we are serious about reducing CHD mortality and morbidity in Scotland this course of action is necessary. We need to know about these aspects from research, in particular, the factors that may influence patient and partner and dyad outcome following CABG surgery.

3.2 QUALITY OF LIFE

3.2.1 *Introduction*

The section of the partner literature provides information on the factors that influence quality of life outcomes and the psychosocial recovery of CABG partners or dyads. The same strategy as before (in the patient literature) was used to select the key concepts to be examined i.e. first any randomised controlled trials and then non-intervention studies of the factors influencing the outcome of CABG surgery were examined. In effect there were no randomised controlled trials of the factors influencing the partners' or dyad quality of life outcomes following CABG surgery. Researchers have focused more on the partners' emotional or psychosocial recovery following surgery than on their perceived health status. Non-randomised studies have recruited couples following

CABG or myocardial infarction (Nieboer et al 1998, Moser and Dracup 2004, Halm and Bakas 2007). The key variables examined in the partner or dyad literature have been marital quality (Coyne and Fiske 1992, Brecht et al 1994, Elizur and Hirsh 1999, Kulik and Mahler 2006), relationship satisfaction (Schroder et al 1997), coping styles (Coyne and Smith 1991, Coyne and Smith 1994, Joekes et al 2007), perceived control (Moser and Dracup 1995, Moser and Dracup 2004), emotional distress (Moser and Dracup 2004), Ruiz et al 2007) caregiving burden (Nieboer et al 1998, Halm et al 2007, Halm and Bakas 2007), socio-demographics (Kulik and Mahler 2006), self-efficacy (Coyne and Smith 1994), social support (King et al 1993) and self-perceived need (Moser et al 1993). Consideration should be given to the inclusion of some of these factors in research. This study will examine the literature on perceived health status, quality of life and CHD risk factors both in CABG partners and dyads. Other factors such as perceptions of CHD and treatment, self-efficacy, social support and self-perceived need will be examined. Additional factors such as health concordance (Knuimann et al 1996), the shared environment (Macken et al 2000), anxiety and depression and psychosocial interventions (Knuimann et al 1996, Bookwala and Schulz 1996, Hunt et al 2000, Franks et al 2002, Artinian 1992, Bengtson et al 1996, Moser and Dracup 2004, Ruiz et al 2006) will be discussed if they relate in some way to the outcome of CABG. These factors will be discussed in turn supported by the available literature and a rationale provided for their selection.

3.2.2 Quality of life assessment of CABG partners and family health

Introduction

The partners' pre-existing health and quality of life may be important factors in their quality of life outcomes and psychosocial recovery following CABG surgery. No studies were found that specifically measured the quality of life of CABG partners, having considered their physical, emotional or social dimensions. Studies of quality of life in partners of myocardial infarction or heart failure patients (Ebbesen et al 1990, Svedlund and Axelsson 2000, Luttik et al 2004) were examined to explore the potential impact of these conditions on the partners' quality of life and studies of the emotional health of CABG partners.

A study by Svedlund and Axelsson (2000) explored the lived experience of female patients and their partners in the rehabilitation phase after myocardial infarction. This study found a relationship between the patients' and partners' emotional reactions, and their total well-being was negatively affected. The partner's role was one of trying to adapt to the experiences associated with the illness, however this was difficult for the patients often withheld their feelings from their spouses and communication was poor between the couples. In a study of hospitalised heart failure patients Luttik et al (2004) found that partners of patients often had lower quality of life scores than the patients themselves, especially just prior to hospital admission. The quality of life of the patients' and partners' differed significantly independent of age and gender. However, very limited information was provided about the partners and the factors that may affect their quality of life. A noteworthy study by Ebbesen et al (1990) measured the quality of life of partners' of patients 1 - 2 weeks after myocardial infarction and 8 weeks later, using a quality of life questionnaire developed for the study. The Quality of Life of Spouse questionnaire (QL-SP) was developed from a list of 70-items of potential concern and worry to the spouses. Results from this study showed that the spouses' physical, emotional and social health were adversely affected by the myocardial infarction. Specific areas of emotional dysfunction and concern were nutritional habits, worry, exercise, tension and communication with the patient. Limitations of the study were the small sample size and the low number of the male partners and therefore the conclusions that can be drawn about their quality of life. Only the partners' and not the patients' quality of life was assessed. Other investigators have examined the experience of illness and its impact on the perceived health of families and family relationships. For example, Astedt-Kurki et al (2004) used a Family Functioning, Health and Social Support (FAFHES) questionnaire in a study of 167 family members (77% partners, 21% children and 2% others) and found that they rated total family health as fairly good. This was despite 83% of the patients having had CHD for more than 1 year. Two variables predicted family health i.e. structural factors within the family and family relationships. This study found that the effects of the illness and the patients' symptoms impacted significantly on the daily experiences and activities within the family. The greater the effects of the illness on the patients' daily lives, the worse the family health.

3.2.3 *Concordance in physical and mental health in couples*

Apart from the effects of CHD on the health of the partners or family members of those with the disease, the literature suggests that there is health concordance in couples. The patient and their intimate partner may have similar physical and mental health (Bookwala and Schulz 1996, Knuimann et al 1996), which may have significant implications for the patients and their partners, especially if the couple's health declines together. Concordance studies aim to distinguish assortative mating such as that which occurs between partners for height and education from similarities that result from community life (Dufouill and Alperovitch 2000). A significant systematic review of 103 health concordance research papers found evidence for concordance in physical health, mental health and health behaviours in couples (Mayler et al 2007). Specifically, Bookwala and Schulz (1996) in a large sample (n = 1040) of older married couples drawn from the Cardiovascular Health Study found that perceived health, depressive symptoms (CES-D), feelings about life and satisfaction with the meaning and purpose of life of one's partner significantly predicted similar characteristics in the other partner. These findings lend support to the theoretical proposition of 'affective contagion', which suggests that the mood or emotions of one individual is spread to those closest to them. In terms of CABG patients and their partners this may have significant implications for their ability to cope with and recover following surgery.

3.2.4 *Patients' and partners; similarities in perceptions of health and illness*

Researchers have examined the effects of shared appraisal of the patient's state of health and its influence on patient outcome following a cardiac event. For example, Franks et al (2002) found in a sample of 61 patients having cardiac catheterisation that the partners' and patients' ratings of the patient's global health were moderately correlated. Absolute agreement between the ratings was detected in 50% of couples. The patients with a spouse with similar scores for global health reported more positive affect, compared to the couples with more divergent ratings for global health. This study showed the well-being advantage of shared appraisal of the patient's state of health. In a similar study Hunt et al (2000) found 12 months after surgery that the partners or next of kin of CABG patients had similar ratings for patient quality of life. Further, Figueiras and Weinman (2003) explored similarities in perceptions of myocardial infarction (MI) in a sample of 70 patients and their spouses. They found that most couples had similar positive perceptions for identify, timeline and consequences, but similar negative and conflicting perceptions for control and cure. The results from this study suggest that couples may share similar optimistic or pessimistic beliefs about illness, whilst others can have different perceptions. Couples with similar negative perceptions of myocardial infarction were linked to poorer patient recovery following myocardial infarction. This study was significant in that it showed that couples' similarities and differences in perceptions of myocardial infarction might influence the outcome of a cardiac event. This study was limited in that it only examined patient outcome, but not partner outcome following MI.

3.2.5 Partners' emotional health and patient-partner outcomes in CABG

Several studies have identified that cardiac partners may experience emotional distress as a result of the patient's CABG and that this may impact significantly on their health and daily functioning (Moore 1994, Davies 2000), with significant consequences for dyadic adjustment (Coyne and Smith 1991, Moser and Dracup 2004, Joekes et al

2007, Ruiz et al 2006, Mahrer-Imhof and Hoffman 2007). Emotional distress may be defined as stress that is emotionally or psychologically uncomfortable or unpleasant (Lidell 2002). Emotional distress in CABG partners may give rise to feelings of anxiety, depression, sleeping difficulties, fatigue and inability to concentrate (Lenz and Perkins 2000, Moser and Dracup 2004). Further, anxiety and depression in CABG partners can affect their ability to provide care and assistance to the patient (Monahan et al 1996, Nieboer et al 1998, Davis 2000, Moser and Dracup 2004, Halm et al 2007), or affect ability to look after their own health (Fleury and Moore 1999) and attend to their health promotion needs (Sisk 2000). Cardiac studies have shown that partners may have higher levels of anxiety and depression than the patients themselves. For example, Moser and Dracup (2004) examined anxiety and depression in 417 patients and partners following CABG surgery or myocardial infarction and found their scores for anxiety, depression and perceived control were significantly correlated. Notably, the patients' psychosocial adjustment to illness was significantly worse when their partners were more anxious or depressed. This study highlighted the importance of assessing psychological distress of cardiac partners as a means of improving patient outcome following a cardiac event. It was significant in that it looked at three groups of patients and their partners; i.e. the patients with greater levels of anxiety and depression than the partner; those with similar emotion levels, and partners with greater anxiety and depression than the patients in examination of the dyad.

3.2.6 *Caregiving burden as a factor in quality of life in CABG partners*

Other researchers have examined the emotional health and well-being of the partner in the context of caregiving burden or discharge planning in studies of CABG patients. Helm et al (2007) explains that although care giving can be a potentially meaningful experience for the partner it may have a negative effect on their quality of life. Solaria et al (2000) identified that the burden of care giving in CABG is associated with the partner's monitoring of the patient's clinical progress, managing behaviour, providing emotional support and assuming household tasks. In the 6 weeks after CABG surgery, Artisnian (1992) found that caregivers were most concerned about their husband's self-care activities, uncertainty, physical and mental symptoms and that these worries and concerns were sustained in the medium and long-term. One year after CABG surgery, the caregivers still had physical and mental symptoms of stress and significant role strain. Thirty-three per cent of the partners had made several changes to their personal roles in adapting to the patient's illness and 33% had given up social or recreational activities (Artinan 1992). Together role strain, marital quality and financial concerns added to the physical and psychological stress of the partners (Benson-Stanley and Frantz 1988, Artinan 1992,) who often experienced personal loss of lifestyle and there may be conflict in their relationship with the patient (Liddell 2002) and tension between employment and care giving (Monahan et al 1996). Specifically, the partners of CABG patients may experience fear, anxiety and depression (Rankin and Monahan 1991, Gillis and Balsa 1992, Knoll and Johnson 2000, Clark 2002,), sleep deprivation, chronic fatigue, weight changes, hypertension and health deterioration (Rankin and Monahan 1991, Clark 2002, Helm et al 2006) linked to their care giving role.

Whilst there have been several studies of care giving burden in CABG, relatively few studies have used standard measures to assess the health status of partners or carers. An interesting study by Helm and Bakes (2007) measured caregivers' perceived physical health using the SF-12 Health Survey and found that the younger age of the partners and worse patient proxy health ratings were associated with the caregivers' worse physical health. Moreover, being a female caregiver, worse proxy ratings of the patient's health, lower mutuality scores and more caregiver depressive symptoms were associated with negative caregiver outcomes. Helping caregivers master their role, improve their relationship with the patient and avoid or reduce depression may help improve the quality of life of partners (Helm et al 2007, Helm and Bakes 2007). In contrast King and Kop (1999) asked the CABG patients themselves about the health status of their expected caregivers. Results from this study showed that 46 (38%) primary caregivers had health problems of their own; the most common problems being musculoskeletal (37%) and cardiovascular (35%). Other problems included chronic illnesses such as stroke, multiple sclerosis, diabetes, current and former cancers and mental health problems. This study was significant in that it identified that the caregivers of CABG patients may have significant health problems that need to be taken into account in clinical practice. The caregivers' own health problems may affect their ability to provide care for the recovering patient, if they themselves are in need of care. Therefore, the perceived health status and co-morbidity of partners of CABG patients may need to be more formally assessed in the delivery of health services. In UK society, the expectation still is that partners or close family will be the main caregiver for the patient on their discharge from hospital (Davies 2000).

3.2.7 *Summary*

A limited number of studies have formally measured the physical, psychological and social quality of life dimensions of cardiac partners, or perceptions of health in families of CHD patients. Only one study was found of quality of life assessment of partners and this was following myocardial infarction (Ebbesen et al 1990). Results from this study showed that the experience of myocardial infarction negatively affected the quality of life of partners. Other investigators have found a significant relationship between patients' and partners' emotional health and total well-being in myocardial infarction (Svedlund and Axelsson 2000) or health concordance in couples (Bookwala and Schulz 1996, Knuimann et al 1996, Mayler et al 2007). These studies highlight that the health experience of one partner may have an effect on the other. Results from these studies show the importance of assessing the health of the partner or close family members. Studies have shown the benefits of shared appraisal of the patient's state of health and the benefits of similar scores between the patients and partners for global health ratings (Hunt et al 2000, Franks et al 2002). Similarities in negative perceptions of illness in couples may influence patient recovery following myocardial infarction (Figueiras and Weinman 2003). These aforementioned studies all investigated health-related aspects in the partners of CHD patients or couples. More research is needed that examines the quality of life dimensions of cardiac partners, especially in CABG and the factors associated with or that predict partner or dyads outcomes following surgery. This is important both for the partners' own health as well as the recovering cardiac patient. No studies were found that assessed the perceived health status of CABG partners before surgery. Several studies have examined caregiving burden, concluding that it contributes to the partners' poorer psychosocial adjustment up to 1 year after CABG (Artinan 1992), and their poorer physical health status after surgery (Halm and Bakas 2007). Relatively few studies have used standard measures to assess the perceived health status of CABG partners. Studies have reported caregiving as having a negative effect on the partners of CABG patients (Stolarik et al 2000, Halm et al 2007) with changes noted in their roles, marital quality and former lifestyle (Benson-Stanley and Frantz 1988, Artinian 1992, Monahan et al 1996) and subsequent health problems such as anxiety and depression (Gillis and Belsa 1992, Knoll and Johnson 2000, Rankin and Monahan 1991, Clark 2002). Anxiety and depression may influence the spouse's ability to provide care and assistance to the patient (Moser and Dracup 2004, Ruiz et al 2006). Having strategies in place to support the partner in their caregiving role and relationship with the patient may help improve the quality of life of the patient.

3.3 PARTNERS' SELF-EFFICACY AND JUDGEMENTS ABOUT PATIENTS' CARDIAC CAPABILITIES AND THE OUTCOME OF CABG

3.3.1 *Introduction*

Self-efficacy was discussed previously in the patient literature in Chapter 2 with a particular emphasis on self-efficacy expectations i.e. the individual's beliefs about their ability or perceived competence to perform a particular action or behaviour to attain a desired outcome (Bandura 1977). Studies have shown that recovery after CABG surgery is not altogether determined by the patient's physical condition or treatment, the personal attributes of patients and their partners may be influential (Schroder et al 1997). It is widely considered that self-efficacy plays an important role in patient recovery (Allen et al 1990, Bastone and Kerns 1995, Carroll 1995, Jenkins and Gortner 1998, Mahler and Kulik 1998) and in cardiac rehabilitation (Berkhuysen et al 1999). However, these studies have primarily examined patient outcomes and neglected to examine partner outcomes. Several studies of self-efficacy in couples have examined this with respect to the patient having experienced a myocardial infarction and whether the partners' response assists or hinders the recovery process (Taylor et al 1985, Coyne and Smith 1994), but to a much lesser extent in CABG.

3.3.2 ***The partners' self-efficacy for certain tasks and activities***

Specifically, Coyne and Smith (1994) examined perceived self-efficacy in men recovering from myocardial infarction and showed that greater self efficacy was related to their wives being more efficacious and less overprotective. The wives were asked to rate their self-efficacy for certain tasks and activities such as confidence in influencing the patient, getting support from relatives and friends, working with the patient etc. The patients were asked to rate their confidence in dealing with such factors as lifestyle change, being physically active and handling emotional stress. As a couple they asked to what extent did the husband's physical disability keep him from working, doing things around the house, engaging in strenuous activity, being involved socially and about the adequacy of information that was given to them. Results confirmed an independent adverse association between the wives' reports of being overprotective and the patients' sense of self-efficacy. The wives' behavioural responses were associated with their own psychological distress and with the efficacy of the patient in managing their recovery.

3.3.3 *Influence of partners' self-efficacy on patients' cardiac capabilities*

The strong association between the wife's and patient's self-efficacy suggests that they exerted an influence on patient self-efficacy during recovery. The classic study by Taylor et al (1985) investigated the wives' involvement in their husbands' performance of exercise treadmill testing as a way of reassuring them about the patients' capacity for physical activities following myocardial infarction. Ten wives who did not observe the test, 10 wives who observed the test and 10 wives who observed and participated in the test were compared. Results indicated that the patients' and their wives' perceptions of the patient's capabilities were completely divergent prior to testing. Treadmill testing significantly increased the patient's self-efficacy. Only the wives who participated in the treadmill testing rather than those who observed the test or did not observe the test showed a significant increase in perceptions of their husbands' cardiac and physical self-efficacy. The study was significant in showing that combining both the patient's and their wife's perceptions of the patient's capabilities proved to be the best predictor of treadmill performance 11 and 26 weeks post-treadmill testing. Limitations of the study were the small sample size and the sample of male only patients, which limit the generalisability of findings.

Further, Rohrbaugh et al (2004) explored self-efficacy and adaptation in 191 patients and their spouses related to survival in chronic heart failure. The patients' self-efficacy and their spouse's confidence for weight monitoring, taking medications, exercise, salt intake, managing emotions and seeking medical assistance were assessed. The patients' self-efficacy and the spouses' confidence in the patient's ability to manage his or her own health were moderately correlated. Significant associations were found for survival and patient self-efficacy and spouse confidence. Patients' self-efficacy predicted their survival when considered alone, but only the spouses' confidence remained significant when both of the partners' efficacy ratings were tested. Therefore, the spouses' confidence dominated patient self-efficacy in predicting survival. There was also a significant main effect for the couples' confidence, indicating that combined patient and partner confidence was better for patient survival.

3.3.4 *Partner self-efficacy as a factor in patient or partner recovery in CABG*

Surprisingly few studies have examined self-efficacy in CABG patients and their partners. Ewart (1995) showed the beneficial effects of spouses taking part in rehabilitation after CABG surgery. The spouses were able to obtain new information during rehabilitation and they changed their behaviour and support accordingly. Schroder et al (1997) studied 302 male and 79 female patients and their partners (18 men and 96 women) before and twice after cardiac surgery to determine whether personal factors such as self-efficacy influenced recovery. This study demonstrated the patients' pre-operative self-efficacy and social support predicted their recovery and readjustment post-operatively. Moreover, the spouses' own social support and self-efficacy predicted patient outcome variables. The spouses' characteristics were better predictors of patients' readjustment than were the characteristics of the patients themselves. Patient self-efficacy was significantly related to 7 out of the 10 quality of life indicators assessed; the strongest being satisfaction with self-esteem, mental condition and family life. This study was significant for it focused on the dyad as a unit of analysis. It highlighted that social interactions among couples need to be assessed, as well as assessment of their resources. It showed that the strength and well-being of the spouse might transfer through social interaction to the patient. It examined social support as a resource rather than simply a coping mechanism. Limitation of the study was that it examined generalised self-efficacy rather than self-efficacy for specific activities or behaviours in the recovery period after CABG. Only the patients' quality of life was assessed and not the partners and no standard measure of quality of life was used.

3.3.5 *Summary*

Self-efficacy in cardiac partners has been shown to significantly correlate with patient self-efficacy in studies of myocardial infarction patients (Coyne and Smith 1994, Taylor et al 1985), indicating that they may play a significant role in patient recovery. The wives responses to the patient's cardiac event are particularly important because they may exert a positive or a negative influence on their self-efficacy during recovery (Coyne and Smith 1994), and in self-management of their condition (Rohrbaugh et al 2004). The partners' good intentions can have a negative effect when the patient starts to feel helpless and ineffective. Conversely, the involvement of the partner in the care and treatment of the patient may help reassure them about the patient's cardiac capabilities (Taylor et al 1985). The patients' and partners' combined confidence is better for patient recovery and survival (Taylor et al 1985, Rohrbaugh et al 2004). Surprisingly few studies have examined the CABG patients and their partners' self-efficacy (Ewart 1995, Schroder et al 1997), or the pre-operative characteristics of CABG patients and partners as factors affecting the outcome of surgery. Research is needed to identify if increasing self-efficacy in couples helps improve the recovery outcomes and psychosocial adjustment of both patients and their partners following CABG surgery.

3.4 PERCEIVED SOCIAL SUPPORT AS A FACTOR IN QUALITY OF LIFE IN PARTNERS

3.4.1 *Introduction*

During patient recovery from CABG surgery the partner has been identified as a key source of support (King et al 1993). However, they have their own need for support. Relatively few studies have examined the effects of social support on the outcomes of patients and their partners following CABG surgery (Rankin and Monahan 1991, King et al 1993, Schmitz et al 1998). The results from these studies suggest the importance of the spouse in providing social support to the patient.

3.4.2 *Patients and partners perceived social support and relation to outcomes*

A longitudinal study by King et al (1993) examined the effects of social support in 155 patients and 103 of their spouses before and 1 year after CABG surgery. It was hypothesised that higher levels of perceived social support i.e. appraisal support, tangible support, esteem support and emotional closeness would be related to more positive emotional and functional outcomes in patients recovering from CABG and in their spouses. Also, that there would be a relationship between the support provided to the spouse and patient outcomes. Results indicated that there was a significant decrease in scores for emotional closeness between the patients and partners from 4 months to 1 year, but on average the levels of social support were reasonably high. Of the different types of social support measured only esteem support was significantly and consistently related to outcomes. Of significance here was the finding that the spouses' perceptions of support were significantly related to patient outcomes, after controlling for the patients' own perceptions of support. This study demonstrated that esteem support may be most important type of support, and that it was related to the patients' and spouses' mental health before and after CABG surgery. Similarly, Rankin and Monahan (1991) found that in a sample of 94 male and 23 female cardiac surgery patients and their spouses, assessed 1 and 3 months after cardiac surgery, that there were significant differences in the levels of perceived social support. Social support was shown to buffer the impact of caregiving burden on mood disturbance in spouses, but it did not significantly influence the physical or mental health of patients.

Perceived social support was a key variable in a longitudinal study by Schmitz et al (1998) in which data were collected from CABG patients and their spouses pre-operatively, 4 days post-op and 6 months later. The mean differences between the groups i.e. high and low support patient and partner groups were explored using ANOVA. Results indicated that when the patients felt well-supported they showed other favourable characteristics such as being less depressed, more energetic, more confident, feeling more in control and giving up less easily, and similarly the spouses. From the different variables examined, loneliness showed the strongest effect and then self-efficacy, optimism, sadness, and fatigue. The spouses that belonged to the high support group suffered less fatigue. Therefore, the patients and spouses that felt well supported were better adjusted and experienced better health and well-being. This study was significant in showing the impact of the spouses' adjustment on the patients' perception of support. Findings highlight the importance of providing social support to spouses since it is linked to quicker recovery and better adjustment in patients.

3.4.3 Lack of social support in partners of CABG patients

A qualitative study by Lukkarinen and Kyngas (2003) of spouses of patients having CABG, PTCA or medication found that they felt alone in the situation of providing support to the patient, they did not receive enough support themselves from health care providers or their family and their lives were limited by the patients' needs. The CABG partners especially described problems relating to family atmosphere, which was attributed to the patients trying to hide their symptoms from their partners, while the partners tried to find out about them contributing to an atmosphere of anxiety and threat. The results from this study indicated the patients and partners did not function particularly well together and that they had not really adjusted to the situation regarding CABG, and they were not supportive of each other. Studies have found that the support needs of CABG partners are not particularly well met, either from their social network or from health care professionals. For example, Tarkka et al (2003) found in a study of in-hospital support for families of patients having CABG, PTCA and medication that they were dissatisfied with the level of support provided; 40% were dissatisfied with the aid and affirmation support (reinforcement, feedback) they received and 30% were dissatisfied with the emotional support received. The most important predictors of support were family structure, the age of patient, gender of the family member and whether the patient had been hospitalised for cardiac symptoms. Perceived lack of social support in CABG partners is a concern. Several studies have highlighted this issue in relation to discharge planning (Artinian 1993, Leske and Pelczynski 1999, Theobald and McMurray 2004), with as few as one in five partners feeling adequately prepared for discharge (Leske and Pelczynski 1999).

3.4.4 *Intervention studies*

Relatives few studies have evaluated the provision of partner support in the waiting period for cardiac surgery, compared to programmes for patients (Arthur et al 2000, McHugh et al 2001, Goodman et al 2003, Mooney et al 2007). A noteworthy randomised trial of couples support (Hartford et al 2002) in the early period after discharge after elective CABG surgery demonstrated the beneficial effect of an information and telephone intervention to reduce anxiety in a sample of 131 patients and their partners during a 7 week period. Further, Micik and Borbasi (2002) introduced a support programme for the partners of CABG patients and found that it reduced stress in partners when the patient had a more complicated recovery following surgery. Several studies have tested interventions such as educational sessions (Gilliss et al 1990, Lenz and Perkins 2000, Mahler et al 2002), counselling or psychosocial interventions (Johnston et al 1999, ENRICHD investigators 2000, Daugherty et al 2002, Froelicher et al 2003), self-help support groups (Hindingh et al 1995), home visits/ telephone follow-ups (Hartford et al 2002, Hartford 2005) in the post-operative period following cardiac surgery all with mixed results. For example, Gilliss et al (1990) in a randomised controlled trial of in-hospital and post discharge support to help improve patient recovery and family functioning after cardiac surgery failed to show a significant effect. In a similar study by the same investigators (Gillis et al 1993), patients that received dyadic education and support showed improvement in self-efficacy and quality of life, with more improvement noted in the patient group at most time points. Mahler and Kulik (2002) found significant effects for a videotape intervention on spouse's optimism, but not their level of emotional distress.

3.4.5 *Summary*

Studies have shown the beneficial effects of spousal support on patient outcome following CABG surgery. In particular, research has shown the positive effects of social support on both the CABG patients' and partners' mood. These studies highlight the importance of adopting a dyadic perspective in evaluating the outcomes of surgery. CABG not only changes the patients' emotional or behavioural response, but that of the partner and close family members in what Schmitz et al (1998) describe as a transactional relationship. Belonging to a high support couple is associated with the better short- and long-term adjustment of patients, as well as their spouses. It is crucial that support is in place for both the CABG patient and their spouses before and after surgery to help aid recovery and readjustment. Interventions need to adopt a dyadic perspective to help improve the health and functioning of the dyad.

3.5 SELF-PERCEIVED NEED AS A FACTOR IN QUALITY OF LIFE IN CABG PARTNERS OR DYADS

3.5.1 *Introduction*

The partners' or dyads' perspective of need and whether their needs are met are likely to be an important factor in their satisfaction with health care, and in the outcome of treatment. Researchers have looked at the education and support needs of patients and their families in the wait for surgery (Raleigh et al 1990) and in relation to discharge planning (Theobald and McMurray 2004). However, only a limited number of studies have examined the self-perceived needs of both CABG patients and their partners (Moser et al 1993, Carroll and Mahoney 2007, Davies 2000). No studies were found that looked at self-perceived need as a predictor of perceived health status in CABG partners or dyads. Researchers have explored what information out of that commonly provided to patients and their partners after CABG or myocardial infarction is rated as being the most and least important (Moser et al 1993, Turton 1998, Carroll and Mahoney 2007).

3.5.2 Self-perceived n*eeds of CABG patients and their partners*

The needs of 59 carers or partners of cardiac surgery patients were examined in the context of cardiac rehabilitation (Davies 2000). Data were collected by postal questionnaire one week and six weeks after cardiac surgery, including CABG patients. Results indicated the partners received little structured advice or information from the hospital staff. They appreciated the telephone contact and reassurance offered by staff but felt that more support was needed. Consistent with the results of other studies, Davies (2000) found that cardiac partners did not feel adequately prepared for the responsibility of providing physical and emotional support to the patient on discharge from hospital. It was concluded that the provision of support to partners was necessary to help ensure optimal patient rehabilitation. The inclusion of partners and close family members in the rehabilitation process can influence patient outcomes (NHS CRD 1998).

The self-perceived needs of patients and their spouses were examined by Moser et al (1993) in a study of 49 couples 5 months after a cardiac event (myocardial infarction, PTCA or CABG) using a 28-item needs assessment scale developed for the study. Participants were asked to rate a series of the needs statements on a 4 –point Likert scale, ranging from 0 = not important to 3 = very important and to indicate whether their needs were met or unmet. Results from this study indicated the patients' and their spouses' expressed similar needs for information and emotional support. Specifically the patients identified the need for information as being most important, compared with all other types of needs. Many of the patients ranked several of their needs most highly (means greater than 2.5) such as the need to have information related to their condition, lifestyle changes, feeling and emotions, but less intermediate needs (means 2.0 – 2.5) such as to receive information about return to sexual activity; to have my partner assist me in making lifestyle changes; to have help with financial concerns etc. Some needs were ranked as having low importance (mean < 1.5) by the patients. The spouses ranked several of their needs most highly (means greater than 2.5) and less of their needs as intermediate, compared to the patients. Much of the information that the patients and spouses had ranked as being important or very important were unmet in 40 – 70% of cases, with spouses reporting a higher incidence of unmet emotional needs.

More recently, Carroll and Mahoney (2007) used the Moser Needs Assessment scale in an exploratory study of older patients and their spouses (aged 65 years or older) following myocardial infarction or cardiac surgery. This study found 6 weeks after discharge that both the patients and their spouses had a wide variety of needs, some similar and some divergent. They had similar needs for honest explanations and information about CHD and the patients wanted more time alone for themselves. Similar to the findings of Moser et al (1993) there were significant differences between the patients and spouses in the number of important needs met and unmet. Both these studies highlight the importance of assessing the needs of patients and spouses as individuals, and as a dyad.

3.5.3 Summary

The results from the studies by Moser et al (1993) and Carroll and Mahoney (2007) indicated that CABG patients and their partners might have some similar but yet discrete information and emotional needs. These needs pertain to CHD and treatment and likely course, different care aspects, lifestyle changes, feelings and emotions, and about others that can help. Assessment of the patients' and partners' perceptions of need is important for they can assist nurses and other health care professionals to identify any deficits in need and to plan interventions accordingly. Further research is needed to examine the pre-operative needs of CABG patients and their partners and how these might change post-operatively, and to explore self-perceived need as a predictor of perceived health status and quality of life after surgery.

3.6 CHD RISK FACTOR REDUCTION

3.6.1 *Introduction*

The importance of CHD risk factor modification in CABG patients and partners was discussed at the start of this chapter with respect to the primary and secondary prevention of CHD. Studies showing the factors associated with the partner's risk of developing CHD or the CHD risk factor status of CABG partners or dyads will now be discussed. As before, the strategy adopted has been to identify from randomised controlled trials the factors that may influence CHD risk factor reduction in CABG patients and partners and to include these variables in the study. Next, the factors shown in non-randomised controlled trials to influence CHD risk factor reduction are identified. Some of these factors are taken forward for discussion and a rationale provided for their choice. In effect, no randomised controlled trials were found of the factors affecting partner or dyad CHD risk factor reduction in CABG. Few studies have measured both the patients' and partners' CHD risk factors (Macken et al 2000) or the partners' risk of developing CHD (Wood et al 1997, Chow et al 2007) or the predictors of health promotion in individuals prior to the development CHD (Thanavaro et al 2006). Researchers have focused on the partner's perceptions of CHD and its treatment (Karner 2002, Karner et al 2004), concordance in CHD risk factors in couples (Macken et al 2000), spousal support as a factor in lifestyle change**,** and the importance of a couples approach to reducing risk factors**.** The key variables examined in these studies were marriage (Venters et al 1984, Coyne and Fiske 1992, Hippisley-Cox et al 2002, Jurj et al 2006), the partner's relationships and communication styles (Sher and Baucom 2001, Goldsmith et al 2006) and caregiving (Lee et al 2000).

Consideration should therefore be given to some of these variables in research. The factors selected for closer examination in the study are the partner's risk of developing CHD due to concordance in risk factors in couples**,** caregiving as a factor in the partner's risk development of CHD**,** conceptions of CHD and its treatment, partner support and communication styles and interventions to promote CHD risk factor reduction in couples. Other factors such as anxiety and depression and cardiac rehabilitation will be only discussed if they relate in some way to the partner's risk of developing CHD or risk factor reduction in partners or dyads. These factors will now be presented and discussion supported by the literature as available or theoretical propositions, and a rationale provided for their use in the study.

3.6.2 *Concordance in CHD risk factors in couples*

Marital partners may be at increased risk of the same disease (Hippisley-Cox et al 2002, Jurj et al 2006), including CHD due to concordance in risk factors (Macken et al 2000). Several studies have found spouse concordance for smoking (Venters et al 1984, Brenn 1997, Hippisley-Cox et al 2002, Jurj et al 2006) after controlling for other risk factors. For example, Venters et al (1984) found that 74% of 560 married pairs in the Minnesota Heart Survey compared to 64% of matched pairs reported significant concordance of smoking patterns and other lifestyle factors, suggesting that spousal influence during the marriage was responsible for the concordance. Other studies have shown spousal concordance in high blood pressure (Wood et al 1998, Jurj et al 2006), although the evidence for this is less consistent (Knuiman et al 1996, Brenn 1997, Macken et al 2000) except in certain age groups (40 – 52 years). Macken et al (2000) examined concordance of risk factors between 117 men and their spouses two months after the patient's hospitalisation for CABG, PTCA or myocardial infarction. The CHD risk factor profile of both patients and spouses were examined using a Behavioural Risk Factor Surveillance System (BRFSS) tool. Results indicated that there was significant spousal concordance for frequency of exercise, dietary fat and fibre intake, body mass index, history of smoking and current smoking status. There was no significant concordance between the patients and spouses for hypertension, systolic or diastolic blood pressure, high blood cholesterol, current exercise program or salt in the diet. This study was significant for it showed that physiological risk factors such as blood pressure were not significantly related among the marital partners, but behavioural risk factors such as smoking were significantly related. Further evidence of the impact of environmental influences on risk factors comes from a large study of Korean couples (n = 3141) (Kim et al 2006) that examined spousal concordance of metabolic syndrome, defined as a clustering of risk factors such as abdominal obesity, high blood pressure, elevated blood glucose, high triglycerides, low high density lipoprotein cholesterol all of which put the individual at high risk of CHD mortality. Findings from this study indicated that when one spouse tested positive for metabolic syndrome his or her marital partner showed a 30% increased risk of having it. This implies that not only genetic factors but also environmental factors may contribute to the development of metabolic syndrome. In this study both cohabitation effects and assortative mating mediated spousal concordance of the metabolic syndrome.

3.6.3 *Influence of the shared environment on couples CHD risk factors*

Assortative mating can be explained as obese people being more likely to have obese marital partners so they may share an increased risk of disease due to their obesity or factors related to its development such as lack of exercise (Hippisley-Cox et al 2002). Most studies however support the hypothesis that the shared environment contributes to similar lifestyle and morbidity patterns in spouses. Further evidence in support of the shared environment hypothesis comes from the British Family Heart Study (Pyke et al 1997), in which changes in cardiovascular risk factors were examined in married couples following a 1year lifestyle intervention program. The sample consisted of 1477 men, aged 40 to 59 years and their female partners who attended for a family health checkup. After 1 year, 1204 (82%) partner pairs were rescreened. Results indicated that changes in the partner's overall coronary risk score, cigarette smoking, body mass index, systolic blood pressure, cholesterol levels, blood glucose were positively correlated with their baseline values. There was concordance between couples for coronary risk factors and concordance for change in coronary risk factors. The men and women who benefited most from risk factor reductions had partners who also benefited the most. Conversely, men and women who had little or no benefit had partners who had similar small or no benefit from risk factor reduction.

Further, similarity in married patients and their spouses (n = 99) exercise behaviour were explored in a study of cardiac rehabilitation (Hong et al 2005), using an actor-patient interdependence model. This allowed the simultaneous estimate of individual and shared contributions to dyadic outcomes. Results indicated that for couples similar in their reported exercise behaviour, a significant association exists between both partners' independent reports of providing exercise support to and receiving exercise support from one another. For couples that were different in their reported exercise behaviour there was no association between either partner's provision and receipt of support for exercise. The aforementioned studies provide strong evidence that targeting interventions at men and women as couples rather than as individuals is more beneficial in reducing cardiovascular risk factors, possibly through mutual reinforcement of lifestyle changes (Pyke et al 1997).

3.6.4 *Caregiving as a factor in the partner's risk of CHD*

Caregiving is discussed again because studies have linked it to the partners' risk of developing CHD (Lee et al 2000). No studies were found that examined caregiving and CHD risk factor reduction in partners or dyads following CABG surgery. Hypothetically, if the caregiver's roles and responsibilities are linked to the development of CHD then it may follow that caregiving may influence CHD risk factor reduction in CABG. It is important that the partners of CABG patients look after their own health and take a long term view of CHD prevention and management, both for their own health sake and that of the recovering cardiac patient. The Nurses' Health Study with a 4 year follow-up of 54,412 women found that providing care to an ill or disabled spouse increased the risk of hypertension, diabetes mellitus and hyper-cholesterolamia in the other spouse (Lee et al 2000). Spouse caregivers were more likely to be smokers, have a higher body mass index and to consume more saturated fats. Caregiving for more than 9 hours a week increased the risk of CHD almost two-fold and this association stayed constant after controlling for other CHD risk factors. Whilst the partners' caregiving roles and responsibilities may increase after CABG surgery (Rankin and Monahan 1991, Halm et al 2007), the expectation is that there will decrease over time as the patient's condition improves with relief of symptoms and improved functional capacity. Quantitative studies have found that caregivers of CABG patients experience low-to-moderate burden (Rankin and Monahan 1991, Stolarik et al 2000) that may persist up to 12 months after cardiac surgery (Rankin and Monahan 1991). However, in the medium and long-term post CABG, as the grafted coronary arteries start to fail and angina becomes refractory to treatment the requirements for caregiving may increase again. This is assuming an almost linear trajectory of recovery after surgery and the progression of, or reoccurrence of atherosclerotic CHD. In addition, some patients may have incomplete relief of angina following CABG and/or they may experience a degree of chronic heart failure that has implications for caregiving (Dracup et al 2004). Subsequently, the partner may be less able to attend to his or her own health needs and preventive activities.

3.6.5 Summary

Studies of married couples have been useful for they are usually not genetically related, but share the same living environment (Hippisley-Cox et al 2002). Because they are living together marital partners are more likely to adopt one another's behavioural habits i.e. risk factors such as smoking or alcohol intake. Others may adopt a healthier lifestyle related to a healthier diet or regular exercise, which may have a protective effect (Jurj et al 2006). Large epidemiological studies such as the Minnesota Heart Survey (Venters et al 1984) and the Korean Nationwide Survey (Kim et al 2006) and the intervention study by Pyke et al (1997) provide strong evidence that targeting interventions at couples rather than individuals is needed for the more effective reduction of CHD risk factors. There is very limited evidence of spousal concordance in risk factors in CABG patients and partners so more research is needed in this area (Macken et al 2000). Previous studies have been limited by the inclusion of mostly married couples living together to the exclusion of cohabiting or same sex couples (Venters et al 1984, Pyke et al 1997, Jurj et al 2006). No studies were found that focused specifically on the partner's or dyad's perceived health status or quality of life as factors in CHD risk factor reduction following CABG. Instead, caregiving was discussed as contributing to the partner's risk of developing CHD and their ability to look after their own health (Lee et al 2000). Caregivers have been shown to have a higher incidence of behavioural risk factors that predispose them to the risk of developing CHD (Lee et al 2000). The need for caregiving may vary in accordance with the trajectory of recovery following CABG surgery. The requirements for caregiving and possible consequences for the partner need to be considered in the context of CHD prevention and their ability to take care of their own health. This may be especially important because the caregivers of CABG patients may already be at an increased risk of CHD, given the evidence of spousal concordance of risk factors (Macken et al 2000). More research is needed in this area to identify the influence of caregiving on CHD risk factor reduction in CABG partners or dyads.

3.7 PARTNER'S PERCEPTIONS OF CHD AND TREATMENT

3.7.1 Introduction

The CABG partners' perceptions of CHD and its treatment may be a factor in their CHD risk factor reduction in CABG. No studies were found to this effect. However, studies have shown that the close and intimate partner may influence the patient's decision making (Kelly-Powell 1997). Knowing the partners level of understanding and orientation to, and beliefs about CHD and its treatment is therefore of paramount importance.

3.7.2 *Partners' negative views about treatment and influence on outcome*

Karner et al (2004) interviewed 25 spouses (17 women and 8 men) who were living with a patient who experienced a cardiac event (myocardial infarction, PTCA or CABG) in the preceding year. The interviews focused on five domains: physical activity, diet, stress, smoking and drug treatment. Results indicated the spouses had no more than a lay level of understanding about the causes of CHD and its treatment. They were most knowledgeable about how fat intake might influence CHD, but less knowledgeable about how physical inactivity, stress and smoking contributed to the development of CHD. Drug treatment was seen as being beneficial for controlling the disease and preventing relapse but it was also viewed as being disadvantageous because of side effects and the risk of becoming dependent and developing drug resistance. The spouses' negative views about drugs may influence the patient's adherence to treatment (Karner et al 2004), and so potentially the secondary prevention of CHD.

3.7.3 *Summary*

In general terms, the spouse may positively promote CHD prevention through the provision of social support (Wing and Jeffery 1999) and by virtue of their presence in the immediate environment as a role model to whom the patient can relate and who is modeling good health behaviours (Burke and Fair 2003). The findings from Karner et al (2004) of spouses' lack of understanding about lifestyle and drug treatment are consistent with the results of other studies (Steward et al 2000). Very limited research has examined the spouses' conceptions of CHD and its treatment (Karner 2002, Karner et al 2004). The spouses of cardiac patients may only have a lay level of understanding about lifestyle and medical treatment, and their negative views about drugs may influence patient adherence to treatment recommendations. Although Karner et al (2004) recruited the spouses' of patients following myocardial infarction, PTCA or CABG they did not examine their beliefs about the benefits and risks of surgery. Research is needed to examine the partners' beliefs about preventive activities, medication use and CABG and how their views about different treatment may influence CHD risk factor reduction in the dyad following CABG surgery.

3.8 SOCIAL SUPPORT AS A FACTOR IN CHD RISK FACTOR MODIFCATION

3.8.1 *Introduction*

When the patient and partner talk about lifestyle change it can produce some helpful but also some potentially unhelpful consequences. The partners' critical attitude or attempts at emotional support and encouragement for health behaviour change or maintenance may result in undesired control or criticism of the patient (Fiscella and Campbell 1999, Lewis and Rook 1999, Goldsmith et al 2006, Lewis et al (2006), which can lead to tension within the dyad.

3.8.2 Partners' communication styles as negative social support

Goldsmith et al (2006) examined the meaning of 'talk' about adherence to lifestyle change as a process through which partners' influence occurs and the dilemmas that may result from conflicting meaning. Communication within the dyad is important because it may improve the likelihood that the patient adopts a healthier lifestyle (Sher and Baucom 2001, Sher et al 2002). Currently, only about one-third of CHD patients will initiate lifestyle changes and about half who do will discontinue within 1 year (Goldsmith et al 2006). Twenty-five patients were interviewed who had experienced a myocardial infarction and/or CABG and 15 of their partners. A grounded theory approach was used to analyse the data. Findings revealed three categories or dilemmas arising from the multiple meanings couples attribute to talking about lifestyle change: unwanted attempts to control; caring as a double-edged sword; and not wanting to dwell on the illness. The partner's nagging was problematic and involved talking frequently in a way that irritated the patient because it implied control and/or condescension. Talking about lifestyle changes could be interpreted as a desirable expression of relational caring, closeness, and responsibility. However, caring was seen as a 'double-edged' sword for when couples did not discuss lifestyle change, it could be construed as a lack of care. Lastly, the couples talking about lifestyle change was a reminder to them that life had changed. Participants spoke of their desire to see the CHD as 'fixed' by surgical procedure, medication and/or risk factor modification and of their desire to return to normal activities. Thus, adopting a healthy lifestyle was seen as an 'at risk' identity by some that differed from the sick role, or from the 'well' or 'normal' identity. For some patients and partners talking about lifestyle change was a positive step toward recovery, whilst for others it had a negative effect. This study was significant because it showed that couples interacting might be seen as one form of CHD risk factor modification.

3.8.3 *Family criticism and health behaviours*

The association between perceived family criticism and health behaviours was surveyed in a study of 922 patients in family practice (Fiscella and Campbell 1999). It was hypothesised that perceived family criticism was be associated with adverse health behaviour, including smoking, higher dietary fat intake and less exercise, independent of age, sex, race, income, education and physical health status (SF 36), and associations would be mediated by higher levels of negative effect, especially depression and hostility. Results indicated that associations between high levels of perceived criticism and health behaviour were independent of demographics characteristics, physical health, high-fat diet, no regular exercise and current smoking. None of the associations were statistically significant after controlling for depression and hostility. Thus, a high level of perceived family criticism was associated with unhealthy behaviours. This association seems to reflect negative affect. In a non-cardiac study, social control in personal relationships was examined for its impact on health behaviours and psychological distress in a survey of 242 married and unmarried people (Lewis and Rook 1999). Social control was defined as the interactions between social network members that included regulation, influence and constraint. The health behaviours examined were smoking, frequency of alcohol intake, drinking problems, medication misuse, including tranquilizers and seat belt use. Results indicated that 86% of participants reported experiencing social control from social network members; 34% were friends, 53% were family members and 73% were spouses. Most married people experienced social control. Attempts by specific network members revealed that social control predicted less health compromising behaviour but also more distress. Positive social control strategies were significantly related to health behaviour change and to feelings of sadness/guilt. Negative social control was unrelated to behaviour change, but significantly related to feelings of hostility/irritation and sadness/guilt. The amount of variance accounted for in the model was modest, but comparable with that reported in CABG studies of social support and long-term recovery in patients and spouses (King et al 1993).

3.8.4 *Partners' views of their role in supporting the patients' lifestyle change*

Most of the literature reviewed discusses the role of the partner in supporting the patient in CHD risk factor reduction or relational processes within the dyad. A unique study by Karner et al (2004), examined the spouses' views of their role in supporting patients in making lifestyle changes during rehabilitation, using a phenomenological approach. Results indicated that changes in physical activity, diet, stress and smoking were important to both the patients and spouses. Patterns of spouse support were identified with respect to their communication with the patient and their attitudes towards lifestyle changes. Five categories of support were identified; the participative role, regulative role, observational role, incapacitated role and dissociative role. The participative and observational roles were similar in that they were both supportive, but different for the latter represented a more passive role by the spouse. The regulative role was more controlling in that it encouraged the patients to behave in certain ways; this was attributed to the way the spouses were feeling i.e. being stressed or fearful. The spouses who adopted the incapacitated role were positive about change, but pre-occupied by their own health problems. The dissociative role was explained as reluctance by the spouse to become involved in behaviour change with the patient. The spouses who adopted the participative, observational and incapacitated roles listened to the patients more and encouraged them without making any demands; this type of communication has been identified as correlating positively with a sense of mastery, self-esteem and understanding of disease (Ben-Sira and Eliezer 1990).

3.8.5 *Summary*

The study by Lewis and Rook (1999) and the others highlight the health-related significance of close interpersonal relationships. They integrate constructs from dyad-level theories that have been used to help enhance the understanding health behaviour change and the different aspects of couple functioning. For some patients and partners talking about lifestyle change was a positive step towards recovery, whilst for others it had a negative effect (Goldsmith et al 2006). High level of perceived family criticism was associated with unhealthy behaviours (Fiscella and Campbell 1999). Social control by the spouse or network members may predict less health damaging behaviours, but they may also cause more psychological distress (Lewis and Rook 1999). Communication styles are important in seeking to facilitate health behaviour change (Lewis and Rook 1999) and recovery following a cardiac event (Karner et al (2004). Lewis et al (2006) suggest that the couples' interdependence may lead to enhance motivation for them to act together to cope with and adopt health-enhancing behaviour change. This theoretical proposition as depicted by interdependence theory underpins much of the interventions designed to help couples cope. Within this approach the partner is seen as an agent of behavioural change and the patient as existing within an environment that can facilitate or hinder the recovery process (Sher and Baucom 2001).

3.9 CONCLUSION

From the literature reviewed it would appear that the partners' of CHD patients might be at an increased risk of developing the disease. The evidence for this comes from population-based studies of 'healthy individuals' and studies of concordance in risk factors in couples. There are significant opportunities for the primary prevention of CHD in partners of CABG patients, in addition to the normal population strategies for disease prevention. Current health policy recommends that family members of patients with premature CHD be targeted for risk assessment but this does not include the cardiac partner. Despite proposals for a more family-orientated approach to CHD prevention, large surveys such as the EUROASPIRE found that family members are rarely screened for cardiac risk factors. Therefore, contemporary health services still focus primarily on the needs of the patient with minimum assessment and input directed at the family, and even less at the partner. A range of factors may influence this, including the capacity of an already over-stretched health care system to accommodate this approach. A range of factors may influence the partner's motivation for lifestyle change, including their perceptions of CHD and its treatment, and contextual factors, such as their relationship with the patient and health care professionals. Few researchers have examined CABG partners' perceptions of CHD and treatment concluding they have no more than a lay understanding about its causes and treatment. Partners' negative views about treatment may influence patient adherence to lifestyle and drug treatment. Partners' motivation for lifestyle change and the level and nature of the support provided to the patient, may influence patient preferences for and adherence to treatment. There is an need to look at the primary prevention of CHD in CABG partners given the particularly high prevalence of CHD in Scotland. The partner's likely increased risk of developing CHD and the potential influence of the partner on the patient. Few studies were found that assessed CHD risk factor status of CABG partners, and none that explored the range of factors that may influence CHD risk factor reduction in partners or dyads following surgery.

No studies were found of quality of life assessment in CABG partners before or after surgery. Studies examining partners' emotional health with respect to psychosocial recovery following myocardial infarction and CABG have concluded that their health and well-being may be negatively affected by the experience. Moreover, studies have shown a significant relationship between the patients' and their partners' emotional health and total well-being; concordance in physical and mental health and health behaviours in couples. Caregiving burden is linked to the partners' poorer physical and mental health and psychosocial adjustment up to 1 year after cardiac surgery. Caregivers of CABG patients may experience loss of their former lifestyle and changes in their roles and responsibilities.

The literature highlights the need to target CABG patients and their partners to improve patient recovery following a cardiac event. Therefore, it is important to conduct research in this area. Studies of psychosocial issues such as self-efficacy have shown that partner self-efficacy correlates with patient self-efficacy and that combining both the patients' and partners' perceptions generate the best predictor of patient recovery. The literature highlights that partner support is an important variable in determining patient outcome following surgery. However, relatively few studies have examined the support needs of the CABG partners, or the influence of a lack of social support on partner or dyad outcome following surgery. Existing literature suggests the support needs of CABG partners are not well met by health care providers or their social networks and that they may feel anxious, isolated and alone in caring for the patient. In addition, CABG partners have been shown to have their own particular needs and concerns, especially in the immediate discharge period. More research is needed to identify the CABG partner’s needs and concerns and whether their support needs are met pre and post-operatively.

The literature has emphasised the importance of focusing on the dyad in addition to looking at individual patients and partners. Researchers have examined the dyad at different levels of analysis, although this could be much clearer in the reporting of research. Researchers have examined differences between dyads, whilst others have examined the similarities and differences between the two members of the dyad. Researchers have focused on the dyad primarily to determine patient outcome following a cardiac event; no studies were found that examined partner or dyad outcome. Many of the studies examined have been small and descriptive in nature, often including different variables in the analysis, which make the comparison of results difficult. Identifying the potentially modifiable predictors of partner or dyad outcome following CABG surgery is important. Studies that aim to change the process of care by considering the needs of couples as well as of individual patients and partners could potentially affect the outcomes of surgery. A quantitative approach is necessary that has the potential to provide rigorous evidence, which could provide implications for care delivery.

There is a pressing need to utilise a wider biopsychosocial perspective in order to highlight the range of physical and psychosocial factors that may influence patient and partner and dyad outcome following CABG surgery. The overall aim of this study is to explore the complex factors that influence patient and partner and dyad outcome after CABG surgery. The following research questions were derived from the partner and dyad literature in this chapter and the patient literature reviewed in Chapter 2. As discussed in Chapter 2, this objective will be explored through the examination of changes in patients’ and partners’ variables from pre- to 4 months post CABG. The data were collected 4 months after CABG because the patients who have had an uncomplicated recovery from surgery will be ready to return to work about this time and they will have been invited onto a structured programme of cardiac rehabilitation.

Research question 1*:* What changes are there in the patients' and partners' variables from pre - to 4 months post-operatively for the:

- Total number of main modifiable CHD risk factors (patients and partners) ?
- Perceived health status and quality of life (patients and partners) and perceived symptom severity (patients only) ?
- Patients' self-efficacy and partners' efficacy judgements about the patient's cardiac capabilities ?
- Perceptions of treatment benefits and risks (patients and partners) ?
- Perceived social support and self-perceived need (patients and partners) ?

Research question 2: What differences exist between the patients' and partners' pre- and post-operatively for CHD risk factors, perceived health status, self-efficacy, treatment beliefs, perceived social support and self-perceived need ?

Research question 3: What patient and partner pre-operative factors (physical and psychosocial) significantly predict patient or partner outcome(s) 4 months after CABG surgery ?

Research question 4: Are there significant similarities and differences between the dyads pre-operatively that influence patient or partner outcome(s) 4 months after CABG surgery?

Research question 5: What patient and partner pre-operative factors significantly predict the post-operative health of the dyad i.e. perceived physical and mental health and the CHD risk factor profile of the dyad ?

CHAPTER 4

METHODS

CHAPTER 4

METHODS

4.1 INTRODUCTION

The aim of the study was to explore the complex factors that influence patient and partner and dyad outcome 4 months after CABG surgery. This patient group was selected because they often have complex needs both before and after surgery. Although most patients will experience significant improvement in their physical health and functioning after CABG (Moore 1994) there may be psychological problems that impede recovery**.** There is often the necessity for lifestyle changes in several areas simultaneously that may enhance the patient's burden, perhaps even more than in other diseases (Westin et al 1997). The partner group was selected because they can have CHD risk factors that go unaddressed in their encounters with health care professionals involved in the patient's preparation for surgery and aftercare. Moreover, the partner's health and well-being may be negatively affected by the experience**,** and by their caregiving roles and responsibilities (King and Koop 1999). The partner may or may not be actively encouraging, or consistent in their efforts to support the patient in lifestyle changes. They may hold beliefs about CHD and its treatment that militate against patient adherence to lifestyle and medical treatment (Karner et al 2002). Therefore, the health and well-being, beliefs and needs of the partner are of paramount importance for their own health sake and that of the recovering patient. There may be patient and partner factors (physical and psychosocial) that influence the outcome of CABG, and similarities and differences between the dyads that affect recovery after surgery and readjustment to CHD as a chronic health problem.

This study will examine patient and partner perceived health status, quality of life, self-efficacy, treatment beliefs, social support and self-perceived need before and 4 months after CABG surgery. No studies were found that have examined these particular combination of variables and associations with patient and partner and dyad outcome 4 months after CABG surgery. Previous studies have been limited in the amount of partner variables that have been investigated. Researchers have primarily looked at the influence of the partner on patient outcome(s). There may therefore be a lack of appreciation of the complexity of the real life situation. This chapter will present the research questions, study design, sample and population and the procedure for data collection. It will discuss the instruments used and it will describe the proposed methods of statistical analyses.

4.1.1 *Research questions*

Five research questions were identified in order to address the overall aim of the study; to explore the complex factors that influence patient and partner and dyad outcome 4 months after CABG surgery. These question**s** were derived from the patient literature reviewed in Chapter 1 and the partner and dyad literature in Chapter 2.

Research question 1: What changes are there in the patient and partner variables from pre- to 4 months post-operatively for: the total number of modifiable CHD risk factors, perceived health status, quality of life, perceived symptom severity (patients only), self-efficacy, treatment beliefs, perceived social support and self-perceived need ?

Research question 2: What are the differences between patients' and partners' pre- and post-operatively CHD risk factors, perceived health status, self-efficacy, treatment beliefs, perceived social support and self-perceived need ?

Research question 3: What patient and partner pre-operative factors (physical and psychosocial) predict patient or partner outcome(s) 4 months after CABG surgery?

Research question 4: Are there significant similarities and differences between the patients and partners pre-operatively that influence patient and partner outcome(s) 4 months after CABG surgery ?

Research question 5: What patient and partner pre-operative factors significantly predict the post-operative health of the dyad ? i.e. perceived physical and mental health and the CHD risk factor profile of the dyad ?

4.1.2 *Design and plan of the study*

The study was designed as a multifactorial, exploratory, prospective study. It takes primarily a quantitative approach although there is the opportunity for participants to comment in response to some of the questions. Data were collected from the patients and partners at two time points; when the patient was first seen by the Cardiac Surgeon in the Out Patients (OP) Clinic and it was confirmed that they would go on waiting list for elective CABG surgery (time point 1), and again at 4 months post-operatively (time point 2). The first time point was selected for it allowed data collection early in the waiting period of CABG (between 2-3 months at the time of the study). The follow-up period was selected because the patient normally attends to see the Cardiac Surgeon 3 months after surgery and providing they have had an uncomplicated recovery, they would start a cardiac rehabilitation programme about that time, and return to work as appropriate about 4 months after surgery. The timetable and plan of the study is presented in Figure 4.1.

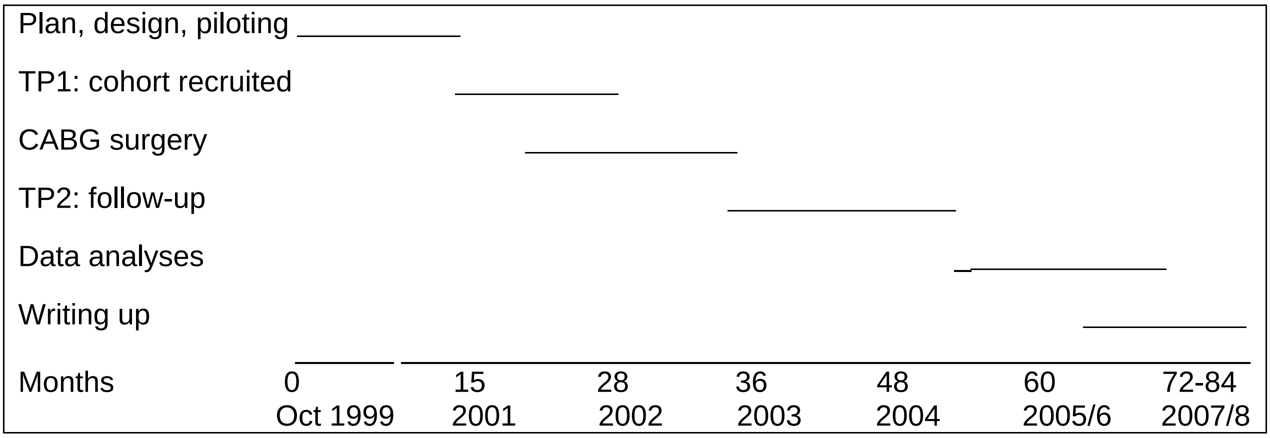

Figure 4.1 Timetable and plan of the study

4.1.3 *Population, sample and selection*

The population consisted of all patients due to have elective CABG surgery at the Western Infirmary, Glasgow (WIG). Approximately 700 patients annually undergo elective CABG at the WIG. The WIG was one of only two regional Cardiac Surgery centres in Glasgow doing open-heart surgery at the time of data collection; the other being the Royal Infirmary in Glasgow. A purposive sample of 84 patient-partner pairs or patient-family pairs were recruited over a 14 month period, according to the following inclusion criteria:

4.1.4 *Inclusion criteria*

- Aged between 40 – 80 years of age
- Stable angina pectoris – Canadian Cardiovascular Score (CCS) ii, iii, or iv) or grade ii-iv or moderate to severe coronary artery disease (confirmed by angiography as greater than 70% stenosis, 50% if left main stem disease).
- First time CABG procedure or CABG plus aortic or mitral valve replacement
- Elective surgery
- The patient was living with a partner (spouse) or close family member

4.1.5 *Exclusion criteria*

- Partners with a personal history of CHD
- Patients and partners with psychological, neurological or communication limitations

The aim of the sampling strategy was to recruit as representative a sample of participants as possible. The age range of the patients was selected because this represented the peak incidence of CHD in individuals and it allowed for more women to be included in the study (BHF 2006). Patients were excluded if they were having emergency surgery because they would likely be sicker (SIGN 2000). Partners were included providing that they lived in the same household as the patient because they would likely to be the main carer, and therefore share the experience with the patient. The aim of the study was to recruit patient and partner pairs, but if the patient did not have a partner and they specifically requested a close family member be involved then they were included. Partners were excluded if they had a personal history of CHD since this might influence their perceptions of CHD and treatment. Both patients and partners were excluded if there were any psychological, neurological or communication limitations likely to affect their ability to consent to participate in the study.

4.2 DATA COLLECTION PROCEDURE

4.2.1 *Introduction*

The patients' and partners' were invited to take part in the study prior to them attending the Cardiac Surgery Out-Patient (OP) Clinic to see the Cardiac Surgeon. An explanation about the study was given to them in advance in an information sheet (Appendix I, II and III) posted out to them with the OP Clinic appointment card. All patients due to see the Cardiac Surgeon between 2003-2004 were asked to consider participation in the study and if agreeable to sign and return the enclosed consent form to the Cardio Thoracic secretaries (Appendix II). The GPs of those who consented were notified by letter (Appendix IV) of patients' willingness to be involved in the study. They were asked to advise the researcher if they had any concerns about this and if so to contact the Cardiac Surgery OP clinic. If there was no contact made by the appointment date then it was taken that they had no objections.

4.2.2 *Ethical approval*

Applications for ethical approval were submitted to the Research and Ethics Committees of the Western Infirmary, Glasgow and the Department of Nursing and Midwifery, University of Stirling and approved (Appendix V and VII). Written permission to contact the patients was received from the Consultant Cardiac Surgeons.

4.2.3 Pre-testing of the questionnaires

Prior to conducting the pilot study there was pre-testing of the questionnaires to be used in the study.

Aim: The aim was to identify any difficult or ambiguous questions, to estimate the questionnaire completion times, and to determine the questionnaires that could be self-completed by the participants or best administered by the researcher.

Subjects and methods: Pre-testing involved the recruitment of 10 patient volunteers with a diagnosis of CHD and their partners. The participants were friends and family of work colleagues in the Department of Nursing and Midwifery, University of Stirling who kindly agreed to complete the questionnaires and to provide feedback.

Measures: The questionnaires included the UK version of the SF-12 Health Survey (Jenkinson and Layte 1997), the UK Seattle Angina Questionnaire (SAQ-UK) (Garratt et al 2001), a Cardiac Self-Efficacy Scale (Sullivan et al 1998), an abbreviated version of the Treatment Beliefs Questionnaire (Kee et al 1997), the Medical Outcomes Study (MOS) Social Support Survey (Sherbourne and Stewart 1991) and a Self-Perceived Needs questionnaire (Moser et al 1993). The same questionnaires were used for both patients and partners with the exception of the SAQ-UK, which was used for the patients and the Quality of Life for Cardiac Spouse (QL-SP) questionnaire (Ebbesen et al 1990) that was used with partners. Only patient perceived symptom severity was assessed. The self-efficacy scale was reworded for the partners so that it reflected their efficacy judgements about the patient's cardiac capabilities. All the other questionnaires were used to collect data about the partners themselves.

Results: Results from the pre-piloting showed that completion of the questionnaires on one occasion would be onerous for the participants. The recommendation was made that these be completed on separate occasions. The treatment beliefs questionnaire seemed more difficult for the participants to complete mainly because the questions were more varied and a bit less straightforward for them to follow.

Conclusion: Pre-testing was extremely useful because it helped identify the questionnaires that could be self-completed by the patients and partners themselves, and those that would be best administered by the researcher.

The questionnaires were divided into 3 separate sections in a patient and partner booklet. The SF-12 Health Survey (SF-12) (Jenkinson and Layte 1997) and the SAQ-UK (Garratt et al 2001) were placed together in Section 1 of the patient booklet (Appendix VIII), and the SF-12 (Jenkinson and Layte 1997) and the QL-SP (Ebbesen et al 1990) in Section 1 of the partner booklet (Appendix IX). The Self-efficacy scale (Sullivan et al 1998) and the modified Treatment Beliefs questionnaires (Kee et al 1997) were placed in Section 2 of the patient and partners booklets. The MOS Social Support Survey (Sherbourne and Stewart 1991) and the Self-Perceived Needs questionnaire (Moser et al 1993) were placed together in Section 3 of the patient and partner booklets. The questionnaires in Sections 1 and 3 were self-completed by the patients and partners, and the Section 2 questionnaires were administered by the researcher. Newell and Burnard (2006) suggest assisted administration deals best with more complicated materials and it helps obtain a higher response rate and completeness of data.

4.2.4 *Pilot study*

Prior to carrying out the main study, a pilot study was carried out in the Cardiac Surgery OP Clinic, WIG.

Aim: The aim was to identify the practicalities involved in interviewing the patients and partners once they had seen Cardiac Surgeon and to ascertain the most reliable method of distributing the questionnaires.

Subjects and methods: Piloting involved the recruitment of 5 patients and their partners who attended for a first time visit to see Cardiac Surgeon in the OP Clinic.

Measures: During the pilot study the researcher administered the Section 2 questionnaires separately to the patients and partners and they were given the Section 1 and 3 questionnaires to take home to complete. They were advised to complete these independently of each other and to return them to the researcher in the stamped addressed envelopes provided.

Results: The pilot study was useful for it revealed there would be insufficient time between the Cardiac Surgeon seeing the patients and the researcher having enough time to conduct the interviews. The consultation with the Cardiac Surgeon lasted 10 – 15 minutes, whilst the interviews with the researcher lasted 45 – 50 minutes. Often the patients and their partners had a long journey to the hospital and a long wait to see the Cardiac Surgeon so they were understandably tired and less inclined to want to be interviewed then.

<u>*Conclusion:*</u> The patients and partners should be seen briefly by the researcher in the Cardiac Surgery OP Clinic and then arrangements made to conduct a home interview with them within 1 week of the OP Clinic appointment. This was more convenient for the patients and partners and it helped improve the quality of information obtained.

4.2.5 *Main study*

Following receipt of ethical approval (Appendix V and Vll) and Hospital Trust Management approval (Appendix Vl) and pre-testing and piloting of the questionnaires, the main study was started. This involved collecting data from both patients and partners before and 4 months after CABG surgery.

The data collection at time-point 1 (pre-operative) involved interviewing the patients and partners briefly for 10 - 15 minutes in the Cardiac Surgery OP Clinic, following their consultation with the Cardiac Surgeon and confirmation that the patient would go on the waiting list for CABG surgery. This initial meeting allowed the researcher to introduce herself to the participants and to answer any queries they still had about the study and to verify their level of understanding. The patients were asked whether they could recall the percentage operative risk that had been conveyed to them by the Cardiac Surgeon. An arrangement was then made to conduct the home interviews with patients and partners. They were given the Section 1 and 3 questionnaires to take home to complete with the instruction given that they do this separately from each other, and on two separate occasions, if possible to help minimise response burden and possible patient fatigue. Since not all of the partners attended the Cardiac Surgery OP clinic appointment with the patient only those that previously consented were contacted by telephone and an interview date arranged. At the home interviews, the researcher administered the Section 2 questionnaires separately to the patients and partners and discussed any missing items from the completed Section 1 and 3 questionnaires. Overall, the interview was structured in format, with the researcher presenting the questions. There was an opportunity for the participants to comments with respect to their ratings made for treatment benefits and risks and to respond to the question about the expected and realised benefits of CABG. Steps were taken throughout the interviews to minimise any interviewer bias, for example, the questions were presented in the same order to help ensure a high reliability of responses (Schumacher and Gortner 1992, Robson 1993). Whilst this type of approach can be restrictive (Meadows 2003) the semi-structured interview would not have allowed the same information to be collected. Whilst qualitative methods may be useful for obtaining the patient's perspective on things they too can be restrictive depending on the level of direction from the researcher (Clark et al 1998).

The time-point 2 data collection (post-operative) involved interviewing the patients and partners at home 4 months after CABG surgery. Approximately 3.5 months after the patient's surgery contact was made again with the participants and arrangements made to conduct the follow-up interviews. The patient and partner Section 1 and 3 questionnaires were posted out to the patients and partners separately, in advance of the interview, when the researcher would collect them. In a similar manner to before the researcher administered Section 2 questionnaires separately to the patients and partners and checked the Section 1 and 3 questionnaires for completeness. The patient and partner questionnaires used at 4 months follow-up were the same as pre-operatively, except patients were asked about the realised benefits of surgery, length of hospital stay, re-admissions.

4.2.6 *Additional ethical considerations*

Ethical considerations relate to the nature and purpose of the study, which was explained to the patients and partners in advance of them attending for the Cardiac Surgery OP Clinic appointment. Therefore, they had the opportunity to discuss their participating in the study with each other in advance. It was made clear at the recruitment stage that in the event of one person wanting to drop out of the study, and in the interests of confidentiality then data collection would continue with the other person unless they requested otherwise. It was re-iterated to the participants that the decision to take part in the study was entirely voluntary and that it would not affect the patient's treatment in any way. The wait for cardiac surgery is a particularly worrying time for patients and their partners and since the researcher was in close contact with the multidisciplinary team, the option was available to refer them, with their consent, back to the Cardiac Surgeon, Rehabilitation Sister or Physiotherapist, as appropriate. Each of the aforementioned health care professionals had indicated their willingness to see the participants again, if this form of support was deemed necessary based on the researcher's judgement of the situation at interview. The participants were asked should any major life events occur during the course of the study that may affect their own or their partner's continued participation in it to notify the researcher. In the event that the patient or partner should die the decision was taken that data collection with the other partner would stop as it was deemed inappropriate to continue unless the other partner indicated otherwise. As a further safeguard against risk and in the event that the patient should die, the Cardiac Rehabilitation Sister and Physiotherapist agreed to notify the researcher about this.

4.3 MEASURES

Data were collected on patients' and partners' socio-demographics, modifiable and non-modifiable CHD risk factors, past medical history and clinical risk factors.

4.3.1 *Background socio-demographics*

Marital status was classified as never married, married/cohabitating, widowed/ divorced/separated to take account of traditional and non-traditional households. Years of education were recorded because this variable has been shown to be important in studies of cardiac patients (Pocock 1997) and their partners (Egeland et al 2002). Employment status was recorded as employed, unemployed or retired. Occupation was classified in accordance with the Registrar General's Classification (OPCS 1980) for it had been most widely used in cardiac research at the start of the study and it has been shown to successfully discriminate between different socio-economic groups (Wannamethee and Shaper 1988). Postcode was recorded using the updated version of the Carstairs index (1991 census data) (Carstairs and Morris 1991). Compared to the original index (1981 census data) this allowed for the collection of information on long-term illnesses. It focused more on co-morbidity and social deprivation of individuals than on populations of areas. Categories range from 1 (most affluent) to 7 (most deprived) (McLoone and Boddy 1994). A limitation of the Register General's occupational classification (OPCS 1980) is that it fails to take into account the unemployment rates in the community (Tunstall-Pedoe et al 1996). Postcode sectors have been criticised because they relate more to geographical area of residence than the characteristics of the individual or their personal circumstances (Humphreys and Carr-Hill 1991). However, they are more accurate than occupational classification when it comes to discriminating between socio-economically deprived groups**.** Since the start of this study, the Scottish Index of Multiple Deprivation (SIMD**)** (Scottish Executive 2006) has been published that is based on 6 domains: current income, employment, housing, health, education, skills and training and geographic access to services and telecommunications. The SIMD appears superior for it allows small pockets of deprivation to be identified based on 31 indicators, calculated at data zone levels from the most deprived to the least deprived areas. Identifying areas of social deprivation is important because it may then be possible to identify the patients at greater risk of poorer outcomes following treatments such as CABG surgery.

4.3.2 *Risk factors for CHD and clinical assessment*

Patients' and partners' main modifiable CHD risk factors were identified by self-report, i.e., current smoking status, level of physical activity, body mass index (BMI)
and blood cholesterol . These 4 factors were selected because they are mostly under the control of the individual. Both the patients' and partners' main modifiable CHD risk factors are reported singularly and then summed to give a total CHD risk factor score, in accordance with the method used by Yusef et al (1994). In addition, other modifiable risk factors are identified such as weekly alcohol intake, premature family history of CHD (patients only), high blood pressure and diabetes mellitus since these factors all contribute to the individuals cardiovascular risk (Wood et al 2005).

Patients and partners were asked about their current and past smoking status, classified as smoker, ex-smoker or never smoked. These categories were selected because they were used in the MONICA Project (Morrison et al 1997), involving a West of Scotland population. Those who had never smoked or who smoked a pipe or cigars were categorised as having 'never smoked', as documented in the British Regional Heart Study (Phillips et al 1996). The number of cigarettes smoked per day and the years smoked were recorded (Teo et al 2006). patients' and partners' current level of physical activity was recorded by self-report and categorised as: 1 = very active (30 minutes of moderate intensity activity 5 or more days/ week); 2 = fairly active (30 minutes of moderate activity 2 - 3 days/week); 3 = not very active – sedentary (less than one session of 30 minutes moderate activity/ week); 4 = not physically active (cardiac reasons) (no moderate active in a week) and 5 = not physically active (non-cardiac reasons). The self-report method of recording physical activity is frequently used in clinical practice since it is practical and low cost (Jolliffe and Taylor 1998). The recommendation is that adults take a minimum of 30 minutes of moderate intensity activity such as brisk walking, cycling or climbing stairs on 5 or more days of the week. In addition the patients and partners were asked whether they had attended a cardiac rehabilitation programme before or after CABG surgery.

The participants were asked about their height and weight, documented as body mass index (BMI). This was calculated as weight in kilograms (kg) divided by height squared in metres (m^2), a BMI < 18.5 being underweight; 18.5 – 24.9 normal weight, 25.0 – 29.9 overweight; 30.0 – 34.9 obese; and > 35.0 very obese (Roche BMI chart 2004). The BMI is frequently documented in clinical practice as a measure of obesity. The BMI correlates with total body fat, which when it exceeds 25 kg/m^2 significantly increases the individual's risk of cardiovascular disease (WHO 1998). Measurement of waist circumference is preferable (Han et al 1995, Kannel et al 2002), but it is less convenient and more intrusive and so it was not used in the study for this reason. Participants were asked if they had elevated blood cholesterol and whether they were taking cholesterol-lowering drugs. They were asked if they had high blood pressure and whether they were taking any medication for this. The patient's blood pressure (systolic and diastolic) was measured in mmHg, using a calibrated sphygmomanometer and stethoscope in accordance with the procedure outlined by the British Hypertension Society (Ramsay et al 1999). The participants were asked if they had diabetes and whether they were taking medication for this. This is relevant for several studies have shown that CABG patients who have diabetes mellitus have poorer outcomes following surgery, compared to non-diabetic patients (Coronary Artery Surgery Study (CASS) 1993).

Alcohol intake per week was documented in accordance with the categories listed in the Integrated Care Pathway (Cardiothoracic Unit, WIG) as none, less than 14, 14 - 21 and over 21 units/week. The quantity and type of alcohol consumed was considered in the estimation of participants' weekly alcohol intake. The recommended 'daily benchmarks' are no more than 3 - 4 units per day for men and 2 - 3 units per day for women. Excessive alcohol intake contributes to increased cardiovascular risk (Wood et al 2005). Finally, the patients were asked if there was a premature family history of CHD, documented as the total number of male relatives who had suffered a heart attack or angina before the age of 55 years, and the number of female relatives before the age of 60 years. Cross-sectional and longitudinal studies have consistently found a familial clustering of CHD, although there are some inconsistencies in reporting of the exact percentage increased risk (Greenlund et al 1997, Higgins 2000, Wada et al 2006, Burke 2003). Married couples often have similar risk factors such as obesity, high blood pressure, cholesterol and blood glucose (Wood et al 1998).

Patients were asked about a personal history of CHD, i.e., whether they had angina, age of onset of angina, history of myocardial infarction (MI), the number of MIs, and about the frequency and severity of breathlessness. The Canadian Cardiovascular Society (CCS) and the New York Heart Association (NYHA) grades; left ventricular ejection fraction, the number of main coronary vessels diseased, degree of stenosis were all recorded as clinical indicators of disease severity. The Canadian Cardiovascular Society (CCS) grading system of angina is an indicator of the patients' functional status (Cox and Naylor 1992). This is usually documented by the Physician in the patient's case notes as a component of clinical assessment. The CCS helps in quantifying the level of exertion that a patient routinely experiences before the onset of angina (Cox and Naylor 1992, Dougherty et al 1998). The validity of the CCS has been shown in large randomised trials (Pocock et al 1997) and other studies of CHD (Hemingway et al 2004), but the reliability of the CCS in clinical practice is still unknown. Main limitation is that it does not take into account the speed at which the patient walks; it only deals with symptoms occurring when the patient climb stairs, when in effect they may have symptoms with other types of activity. The NYHA classification system (NYHA 1973) is similar in concept to the CCS in that it assesses the effects of cardiac disease on a persons' everyday life. The two scales differ in that the NYHA considers other symptoms the patient may have such as dyspnoea, fatigue, palpitation as well as angina. Difficulties arise with the NYHA because a patient may be visibly short of breath at rest, but not complain about breathing difficulties (Jowett and Thompson 1996). Overall, the reliability of the NYHA scale is not strong; the main criticism being that it is too vague. The CCS is better for it identifies activity thresholds for symptoms at levels 2 and 3.

The number of diseased vessels, degree of stenosis, number of bypassed vessels and left ventricular ejection fraction were all documented since they are significant indicators of severity of disease. The CASS study (1993**),** showed that the number of coronary vessels diseased and the distribution of stenosis affects the patient's prognosis. A significant coronary stenosis is one that occludes 70% or more of the internal diameter of the vessel (50% in the case of the left main stem coronary artery) and poor left ventricular function is one of the major causes of acute breathlessness in cardiac patients (SIGN 1998). An ejection fraction of 30 – 49% indicates moderate impairment of left ventricular function, and 30% or less is indicative of severe impairment. Therefore, the patients with a low ejection fraction stand to gain more absolute benefits from surgery (Smith et al 1991, Yusef et al 2004).

The patients' operative risk was assessed by the Cardiac Surgeon or Registrar, using the EuroSCORE scale (Nashef et al 1999), which has been frequently used in clinical practice. It has been widely validated in Europe (Nashef et al 1999, Bridgewater et al 2003) in large samples of cardiac surgery patients. Compared to its predecessor, the Parsonnet scale, it considers more factors related to the clinical status of the patient (SIGN 2002). The individual's level of operative risk varies with the severity of the condition, mode of treatment and co-morbidity (Beresford et al 2001, SIGN 2002) (see Figure 4.2)

Advanced age	Obesity
Number of vessels affected	Impairment of left ventricular function
Female sex	Renal failure
Severity of angina	Cerebrovascular, peripheral vascular disease
Smoking	Recent MI, or unstable angina
Co-existing valvular disease	Hypertension
Diabetes mellitus	Chronic obstructive airways disease

Figure 4.2 Factors influencing the patient’s operative risk

The patient’s operative risk is usually documented as low risk (EuroSCORE of 1 – 2), medium risk (EuroSCORE of 3 – 5) or high risk (EuroSCORE of 6 plus) by the assessor so these categories were used in the study. The main criticism of the EuroSCORE is that it fails to take account of the psychosocial factors that may influence the outcome of cardiac surgery (Margereson and Riley 2003) or the patient’s understanding of the risks involved and their expectations of treatment.

4.3.3 *Perceived symptom severity and troublesome health problems*

Patient perceived symptom severity was measured pre-operatively using 4 separate numerical rating scales (NRS) (Section 2 questionnaire), and then post-operatively if the patient had residual symptoms of angina. The advantage of the NRS is that it is easy to administer and to score and it can be used with a greater variety of patients (Kremer et al 1981), including the elderly (Jensen and Karoly 1992). Nurses have used the NRS in clinical practice for the assessment of pain (Banks and Mackkrodt 2005), including angina, when it was shown to improve pain management (Meurier et al 1998). The NRS has been used in pain research (Jensen and Karely 1992, Banks and Mackrodt 2005) and it has been shown to positively and significantly correlate with other measures of pain intensity (Downie et al 1978). Patient perceived symptom severity was assessed using NRSs for : 1) severity of angina, 2) limitation of activities to prevent the onset of angina, 3) dependence on medication and 4) severity of breathlessness, where 0 represented no limitation/ dependence and 10 represented extreme limitation/dependence. The number that the patient circled represented his or her score. These symptom severity items have been used before in research (Lindsay et al 2001, Thomson et al 2004, unpublished), but using visual analogue scales (VAS). However, due to some patients having difficulties with concentration and vision when using the VAS previously the decision was taken to use the NRS instead in this study.

The patients and partners were asked to indicate whether they had any troublesome health problems (for the patients this was in addition to CHD). The number reported were summed to give a total score, which provided a crude indicator of co-morbidity. This was a quick and simple method of assessment.

4.3.4 *Perceived health status*

The UK version of the Medical Outcomes Short-Form 12 Health Survey (SF-12) (Jenkinson and Layte 1997) was used to measure the patients' and partners' perceived health status. It was selected because it is a brief measure of physical and mental health and it can be self-completed in about 2 minutes, compared to its counterpart the SF-36 that takes 10 minutes to complete (Ware et al 1998). The SF-12 has been shown to have comparable validity and reliability to the SF-36, which has been used extensively in research in CABG patients (Hunt et al 2000, Rumsfeld et al 2004). Other generic instruments were considered, including the Nottingham Health Profile (NHP) (Hunt et al 1980, McEwen et al 1993) and the Sickness Impact Profile (SIP) (Bergner et al, 1976), but some of these were particularly long. The SF-12 was originally developed in the US as an abbreviated version of the SF-36 (Ware et al 1995).

The SF-36 has been extensively tested and shown to have good content validity and criterion validity (Ware and Sherbourne 1992, Ware et al 1995, Hemingway et al 1997). The authors in developing the SF-12 from the SF-36 reduced its eight sub-scales to 2 summary components i.e. the physical component score (PCS) and the mental component score (MCS) (Ware et al 1998). The US version of the SF-12 has been well validated in surveys involving 1493 to 9000 patients in 9 different countries (Gandek et al 1998, Ware et al 1998) and it has been shown to have comparable validity to the SF-36. The UK SF-12 (Jenkinson and Layte 1997) was validated in a large community sample of 9000 people in the Oxford Healthy Lifestyle Survey. Further testing showed the UK SF-12 (PCS-12 and MCS-12) had similar levels of accuracy to the US SF-12 (Ware et al 1998) and comparable validity to the UK SF-36 with reliabilities of 0.86 for the PCS and 0.77 for the MCS (Jenkinson and Layte 1997, Brown et al 1999). It has been shown to be stable over a 1-year period and it successfully distinguishes between patients with different conditions such as congestive heart failure, sleep apnoea and hernia repair (Jenkinson et al 1997).

Different authors have compared the SF-12 to the SF-36 in cardiac patient populations, including CABG (Dempster and Donnelly 2001, Muller-Nordhorn et al 2004) and found it to be a valid and reliable tool. In addition, the SF-12 has been used in the Scottish Health Survey (SEHD 2003) to assess the health of the general population, having distinguished between groups by age and gender. It therefore appears suitable for use with both the CABG patients and partners. A limitation of the SF-12 is that it contains a number of areas of health within a single item. However, only the two summary components i.e. the PCS and MCS were needed for this study. The procedure for scoring and interpretation of the UK SF-12 followed the methods described in the SF-12 manual (Ware et al 1998). Regression weights and a constant were added to transform the scores so they had a mean of 50 and a standard deviation of 10. All PCS and MCS scores above or below 50 are above or below the population average

(Jenkinson and Layte 1997). Missing data were handled is accordance with the instructions in the SF-12 handbook (Ware et el 1998).

4.3.5 *Quality of life*

The UK version of the Seattle Angina Questionnaire (SAQ-UK) (Garratt et al 2001), a disease-specific measure, was used to assess patients' quality of life. The Quality of Life of Cardiac Spouses questionnaire (QL-SP) (Ebbesen et al 1990) was used to assess partners' quality of life, in addition to the SF-12 Health Survey. Several investigators have highlighted the need to use a generic and disease-specific instrument (Dempster and Donnelly 2000) to help overcome the limitations of a single instrument. The generic measure takes into account the wider effects on health such as co-morbidity and it allows for results to be set in the context of the general population (Moore et al 2005). The disease-specific instrument is more sensitive and responsive to clinical change (Thompson and Roebuck 2001, Thompson and Cheuk-Man Yu 2003). Other disease-specific measures were considered for use in the study, including the Multi-dimensional Index of Life Quality (Avis et al 1996), the Quality of Life after Myocardial Infarction Scale (Hillers et al 1994) and newer measures such as the MacNew Heart Health-Related Quality of Life Scale (Hofer et al 2004), Myocardial Infarction Dimensional Assessment Scale (MIDAS) (Thompson et al 2002) and the Cardiovascular Limitations and Symptoms Profile (CLASP) (Lewin et al 2002), but these related more to patients following acute myocardial infarction.

The SAQ is most suited for assessing angina, whether or not the patient has had a myocardial infarction (Dougherty et al 1998). The original 19-item Seattle Angina Questionnaire (SAQ) (Spertus et al 1994) was developed and validated in the US and has 5 sub-scales : physical limitation, anginal stability, anginal frequency, treatment satisfaction and disease perception. The SAQ has been widely used in research (MAPI Research Institute 1999) and it has been shown to have acceptable validity and reliability (Spertus et al 1995, Dougherty et al 1998, Spertus et al 2000). It has been used with CABG patients and it can be self-completed in only 5 minutes (Spertus et al 1994). The SAQ-UK has been shown to have comparable validity and reliability to the US version of the SAQ) (Garratt et al 2001), and it has been used in patients in the UK with angina pectoris (Dougherty et al 1998). The SAQ-UK was validated in a community sample of 959 patients with stable angina recruited from 12 general practices in the North of England (Garratt et al 2001). It has comparable validity to the US SAQ (Spertus et al 1994). It has been shown to be more responsive to improvements in health than generic instruments such as the EuroQol (Hutchison and Russell 2001). The SAQ-UK has 3 sub-scales; physical limitations, anginal frequency and perception and treatment satisfaction. Apart from the reduction of 19-items to 14 there were minor wording changes made to the SAQ-UK to improve clarity and relevance to the UK population. Internal consistency of the SAQ-UK is good with scores for each of the sub-scales ranging from 0.83 – 0.92. Scoring of the SAQ-UK involves assigning each response an ordinal value beginning with 1 for the lowest level of functioning and 5 for the highest level of functioning and the summing across items within each of the 3 sub-scales. Scale scores range from 0 to 10 that are obtained by subtracting the lowest possible score and dividing by the range of the scale and multiplying by 100. Since each of the SAQ sub-scales assesses a unique dimension of coronary artery disease, no summary score is computed. Missing data in the study were handled in accordance with the instructions provided by Garratt et al (2001).

The Quality of Life of Cardiac Spouses questionnaire (QL-SP) (Ebbesen et al 1990), was used to measure the partners' quality of life pre- and 4 months post-operatively. The QL-SP was originally designed to assess the quality of life of spouses of patients post myocardial infarction. It was selected for use in the study since no other measure was found for this purpose and it assesses emotional, physical and social quality of life dimensions. All the questionnaire items seemed relevant given the literature reviewed in Chapter 3, and the instrument showed good internal consistency when tested. The 25 item QL-SP was developed from a list of 70-items identified as potential areas of concern and worry to cardiac spouses. Participants are asked to rate each item identified as a concern or problem on a 7-point Likert scale from 1 (all of the time) to 7 (none of the time). Strength of the QL-SP is it had been tested for validity and reliability in a number of ways. Content validity was established by asking the health care professionals involved in cardiac rehabilitation to comment on the appropriateness of the questions. Construct validity was established by checking the QL-SP against other indexes such as the Katz Instrumental Activity of Daily Living Index, the Beck Depression Inventory, the State and Trait Anxiety Inventory, marital status, home situation, self-anchoring scale and the RAND Quality of Well-being questionnaire. The dimensions of the QL-SP changed in accordance with all the instruments examined. Testing of the instrument revealed two dimensions: the Emotional Function Dimension (EFD) or affective component; and the Physical and Social Function Dimension (PSFD) or lifestyle pattern component and test-retest correlations (1 - 2 weeks and 8 weeks) were high. The questionnaire items are summed to give a total score for each dimension. The highest possible score for the EFD was 98 (14 questions x 7) and the PSFD was 84 (12 questions x 7). Higher scores represented better physical, emotional or social levels of functioning. Missing data for the QL-SP were handled in accordance with the methods described by Ebbesen et al (1990).

4.3.6 *Treatment beliefs*

The patients' and partners' treatment beliefs, i.e., perceptions of treatment benefits and risks were assessed using an abbreviated version of the Kee et al (1997) questionnaire. Other measures of treatment beliefs were considered, but these either focused on the benefits of treatment but no risks or they were limited in the range of CHD treatments examined (Lindsay et al 2001, Lukkarinen and Kyngas 2003, Karner et al 2004). The Kee Treatment Beliefs questionnaire was selected because it considers the benefits and risks (or disadvantages) of preventive activities (stopping smoking, increasing physical activity, weight loss, a diet to reduce cholesterol), medication use and CABG. Participants are asked about each treatment in terms of benefits to - mortality risk reduction, general health and well-being and gains in life expectancy; and risks (or disadvantages) – to general health and well-being, operative risk and complications of surgery. The question about operative risk was posed at the initial interview in the Cardiac Surgery OP Clinic because patients may have problems with recall of information at a later date (Bereford et al 2001). If the study patients were unable to recall the percentage operative risk given to them by the Cardiac Surgeon, then they were asked to identify it from one of 4 pre-determined categories: 1 in 2; 1 in 50; 1 in 100; 1 in 1000. These had used previously by the researcher in a previous study (Thomson et al 2004, unpublished). In modifying the Kee questionnaire (Kee et al 1997) questions were removed that did not relate to the aim of the study, for example, prioritisation for surgery and this helped reduce the length of the instrument.

The questions about the benefits of treatment with respect to mortality risk reduction asked the participants to respond to statements such as, ‘if you (or someone of your age with CHD that smoked) gave up smoking it would lower your (their) risk of dying and help you (them) live longer – to what degree ?’, measured on a scale of 0 to 5, where 0 = don’t know, 1 = no effect, 2 = little, 3 = moderate, 4 = substantial, and 5 = great. The partners were asked this question with respect to the patient or someone of their age with CHD who smoked. Similar questions were posed about increasing physical activity, weight loss, a diet to reduce cholesterol, medication use and CABG, and also the level of agreement for each of these recorded as 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, and 5 = strongly agree. Numerical rating scales (NRS) were used to assess the participants’ beliefs about treatment benefits and risks to general health and well-being, rated on a scale of 0 – 10 where 0 represented no benefit and 10 great benefit, and similarly 0 represented no risks (or disadvantages) and 10 great risks. They were asked to circle a number on each of the NRS and to comment with respect to their ratings made. This helped provide some information about why the participants rated items the way they did. The questions about anticipated gains in life expectancy asked, for example, ‘how many extra years of life would you guess that you (or someone of your age with CHD that smoked) might gain by giving up the habit ?’ This information was presented as mean gains in life expectancy (years) for each of the preventive activities, medication use and CABG, consistent with the method used by (Kee et al 1997).

The modified version of the Kee Treatment Beliefs questionnaire has been used before by the researcher and colleagues in a study of patients having coronary angiography (Thomson et al 2004 unpublished) when it was shown to have content validity. Both individual and totalled scores are presented for the participants’ for the different treatments. Occasional missing data were replaced with mean substitution scores, but the results were similar with or without these. In addition to using the modified Kee questionnaire, the patients were asked about the expected and realised benefits of CABG. The answers were categorised in accordance with those identified by Gortner et al (1985), Gortner et al (1989), Gortner et al (1994) (Appendix XV)

4.3.7 ***Self-efficacy***

The Sullivan Cardiac Self-Efficacy scale (Sullivan et al 1998) was used to measure patient self-efficacy and partner efficacy judgements about the patient’s cardiac capabilities (reworded to reflect the different relationships). This was the only time in the study that information was collected from the partner about the patient instead of themselves. The Sullivan scale was selected because it can be self-completed in about 2 minutes and it focuses on specific areas, especially important in terms of perceived confidence for lifestyle change and self-management. Other self-efficacy measures were considered having been used with CABG patients but these either assessed generalised self-efficacy or they specifically focused on things such as walking, climbing stairs (Jenkins 1985, 1988, Bastone and Kerns 1995, Gardner et al 2003), or the psychometric properties of the instrument were not sufficiently documented (Barnason et al 2002).

The Sullivan Self-Efficacy scale (Sullivan et al 1998) was preferable. It was developed in the US for use in a large 6-month prospective study of patients having elective coronary angiography. It has been shown to have good discriminant and convergent validity when tested against the Jenkins Self-Efficacy scale, which has been widely used in cardiac research. There are two sub-domains in the questionnaire – self-efficacy for controlling symptoms (SE-CS, 8 items) and self-efficacy for maintaining function (SE-MF, 5 items) Use of the scale involved asking the participants to rate their confidence with knowing or acting on 16 statements related to daily functioning, ranked on a 5-point Likert scale (0 = not at all confident, 1 = somewhat confident, 2 = moderately confident, 3 = very confident, and 4 = completely confident)**.** An item could be rated as not-applicable if it did not apply. It is unknown whether the Sullivan self-efficacy scale has been used in the UK. It has been used by other cardiac researchers (Berkhuysen et al 1999, Salamah et al 2003) and found to be a valid and reliable tool. Strengths of the Sullivan scale are that it has been shown to be stable over a 6 month period (Sullivan et al 1998) and it is a brief, but yet fairly comprehensive measure of self-efficacy. There are 3 behavioural items for lose weight, stop smoking, and change your diet. The minimum score for SE-CS is 0 and the maximum score is 32 (8 questions x 4) and the minimum score for SE-MF is 0 and the maximum score is 20 (5 questions x 4); higher scores indicate greater confidence for controlling symptoms or maintaining function. The scores for SE-CS and SE-MF were calculated by summing the responses to each set of items then dividing by the number of rated items. In keeping with the scoring system used by Sullivan et al (1998), the 3 behavioural items i.e. ‘lose weight’ (if you are over-weight); ‘stop smoking’ (if you smoke); and ‘change your diet’ (if your doctor recommended this) were excluded from the totalled scores.

4.3.8 *Perceived social support*

The Medical Outcome Study (MOS) Social Support questionnaire (Sherbourne and Stewart 1991) was used to measure patients’ and partners’ perceived social support. It was selected because it assesses different types of social support and it includes one structural item. Perceived social support is important because a person’s perceptions of support may not reflect the amount of support that is available or what has been provided (Sarason et al 1990). The MOS survey can be self-administered and only it takes about 5 minutes to complete. Other social support scales were considered (Cohen et al 1985, Henderson et al 1980, Norbeck et al 1981, Brandt and Weinert 1981, Tilden et al 1990, Donald and Ware 1982, the Enhancing Recovery in Coronary Heart Disease (ENRICHED) Inventory Scale (The ENRICHD Investigators 2000). They all have their own particular strengths and weaknesses. Some scales focused more on the social network, whilst others only assessed one or two functional aspects.

The MOS Social Support Survey (Sherbourne and Stewart 1991) was developed on behalf of the Rand Corporation. It was validated in a longitudinal study of 3000 patients with four chronic conditions, including CHD. It has been shown to have good internal consistency with Cronbach alpha’s for each of the sub-scales of 0.91 or greater. It has content validity and construct validity and test re-test reliabilities shown over a 1-year period. The MOS scale consists of 20-items measuring emotional support (the expression of positive affect, empathic understanding and encouragement of feelings); informational support (involving advice, information, guidance or feedback), tangible support (material aid or behavioural assistance), affectionate support (the expression of love and affection) and positive social interaction (the availability of other people to do fun things with). The MOS scale has been validated in studies of cardiac patients with anxiety and depression (Sherbourne et al 1995, Sherbourne and Wells 1997) and studies of cardiac rehabilitation (Shen et al 2004), including CABG patients. A limitation of the scale is that it assesses social support without considering the source i.e. whether from the spouse (partner), family, friends or significant others. The MOS survey asks the individual how often each kind of support was available to them, if they needed it, on a 5-point Likert scale from 1 = none of the time to 5 = all of the time. The minimum score for each sub-scale is 0 and the maximum is 100; higher scores indicate higher levels of social support. An overall social support index can also be calculated. The procedure for scoring and the interpretation of the MOS Social Support Survey followed the methods described by Sherbourne and Stewart (1991), and the few missing data were handled accordingly.

4.3.9 *Self-perceived need*

The Needs Assessment Scale developed by Moser et al (1993) was used to measure the patients' and partners' self-perceived need. This scale was selected because it allowed for assessment of needs met and unmet, and it was relatively straightforward and easy to use. It can be self-administered and it only takes a few minutes to complete. Other needs assessment scales were considered but they varied in the extent to which they were problem orientated or needs based (Jaarsma et al 1995, Kattainen et al 2004). The Needs Assessment scale by Moser et al (1993) was developed following a review of the literature in areas pertaining to the information and emotional needs of cardiac patients and families, patient coping after a cardiac event and the psychological recovery of patients and their spouses. The instrument was piloted on 20 subjects, 10 myocardial infarction patients and spouses and it was shown to have good internal consistency with Cronbach's alphas of 0.86 for spouses and 0.89 for patients. Content validity was established by obtaining feedback from 5 Cardiac Nurse Specialists. The scale consists of 28 needs statements and participants are asked to rate each of these in order of importance on a 4-point scale, ranging from zero (not important) to 3 (very important) and to indicate whether need was met or unmet, on a scale from 0 (completely unmet) to 3 (completely met). The Moser Needs Assessment scale has been used before with CABG patients and their partners (Moser et al 1993) and in a study of older patients having CABG and their spouses (Carroll and Mahoney 2007). However, the scale has only been tested for stability over a 1 week period and it has not been used before in the UK. Scoring for the individual items was carried out in accordance with the procedure outlined by Moser et al (1993). In addition, composite scores were calculated for the participants total number of important needs met and unmet and this allowed for further statistical analyses. Scoring involved taking the average scores for each of the 28 items and multiplying by the number for important needs met or unmet to give the totalled scores. In order to calculate the total score for need unmet this variable was recoded from 0 = unmet need to 2, and then divided by 2. The minimum possible score for the total number of important needs met was 0 and the maximum score was 84 (28 questions x 3), with higher scores indicating a greater total number of important needs met or unmet. The minimum possible score for the total number of important needs unmet was 0 and the maximum score was 28 (28 questions x 2). Occasional missing data were replaced with mean scores but the results were similar with or without substitution of missing data.

4.4 DATA HANDLING AND STATISTICAL ANALYSIS

4.4.1 *Introduction*

On entry to the study the patient and partner data were coded; the code numbers were only known to the researcher, who used the same numbers throughout the research process including the research findings. The raw data were entered into SPSS for Windows version 12.0. All data will be disposed in accordance with law and the requirements of the Data Protection Act. The approach taken was to report on each of the variables using frequency distributions and graphical displays, as appropriate and to report the composition of the sample highlighting characteristics such as age, sex, marital status, clinical variables etc. Summary statistics included measures of central tendency such as means and medians, and measures of variability such as the range, variance and standard deviation and confidence intervals. A variety of statistical tests were used such as the paired-sample *t*-test, repeated measures analysis of variance (ANOVA) with post hoc tests (Brace et al 2000, Dancey and Reidy 2002, Field 2005). This allowed for exploration of differences between the patients and partners for the variables of interest and to test the effect of time (Robson 1993).

4.4.2 *Statistical analyses*

To explore whether socio-demographics, clinical characteristics, quality of life and social and psychological variables were associated with the outcomes a series of correlation matrixes were constructed to test the inter-relationships among variables. The pre-operative (independent) variables that significantly correlated with the outcome variables i.e. perceived health status (physical and mental health), quality of life and the total number of main modifiable CHD risk factors were then tested by multiple linear regression or multiple logistic regression. ANOVA was used to explore the pre-operative differences between the dyads and whether these contributed significantly to patient or partner outcome 4 months after CABG surgery. Paired *t*-tests were used to examine differences between the two member of the dyad and intra-class correlations to explore similarities. Statistical tests therefore included exploration of the differences and similarities between and within the dyads. In order to report the dyad as an outcome variable of interest each of the patient-partner pairs post-operative scores were combined to provide a dyad score for physical health, mental health and the total number of CHD risk factors. To determine whether the participants’ pre-operative factors (socio-demographics, clinical, quality of life, social and psychological) were significantly associated with dyad outcome, correlation matrixes were constructed. The correlated variables (independent) were then tested against each of the dyad outcome(s) (dependent variables), using multiple linear regression. Statistical significance was set at 0.05 and all statements were 2-tailed. Additional information on the methods of statistical analyses are presented at the start of each of the results chapters.

4.4.3 *Sample size requirements*

The power calculation was initially based on the need to identify changes in scores between the pre- and post-operative variables of interest i.e. perceived health status, quality of life, self-efficacy, treatment beliefs, social support and self-perceived need (research question 1). Published data for means in populations with CHD and normal populations were examined to estimate the likely differences between the pre- and post-operative scores. A sample size of 60 gives 80% power of finding significant differences in the key variables, and between the patients and partners at the 5% significance level (research question 2). The sample size for multiple linear regression and logistic regression was based on the standard requirements for these procedures (Tabachnick and Fidell 2001), which requires examination of the ratio of cases to the number of predictor (or independent) variables. Retrospective calculations for the multiple regressions revealed that a sample size of 80 gives 80% power of finding the predictors of outcomes (research questions 3 and 5). Power analyses for the ANOVA were adequate (> 0.80) in all analyses (Research question 4).

In the study, the ‘rule of thumb’ method of $N = 50 + 8m$ (Tabachnick and Fidell 2001) was used to calculate the number of cases needed for multiple linear regression. This assumed a medium-effect size would be detected between the predictors and the dependent variable, alpha = 0.05 and ß = 0.20. When the data were normally distributed (or could be transformed) multiple linear regression was used. Transformations of data were conducted as appropriate for skewed data, in accordance with that outlined in Tabachnick and Fidell (2001). When data were bimodal in distribution multiple logistic regression was used. The sample size requirement for the multiple logistic regression was a minimum of 10 observations per parameter in the model (http:www2.chass.ncsu.edu/garson/pa765/logistic.htm, Peduzzi et al 1996, Field 2005). The X^2 goodness-of-fit test was used to compare observed with expected frequencies in cells formed by the combination of discrete variables (Polit 1996, Tabachnick and Fidell 2001).

Possible attrition rates were considered in calculation of the sample size requirements for the study. The following factors were taken into account i.e. the number of patients and partners who may not wish to participate in the study, those who might not meet the inclusion criteria and those who may be lost to follow-up. From the patients attending the Cardiac Surgery OP Clinic each week it was estimated that at least 1 patient-partner pair would be recruited per clinic; 5 patients and partners per week. This estimate took into account the fact that 40 - 50% of patients would be seen in outlying clinics, instead of the WIG and another 10% would have emergency CABG surgery. There is the enhanced risk of death (around 1.8%) after patients go on the waiting list for CABG and after receiving an admission date for surgery (SEHD 2001), so this was also taken into account in calculating the sample size. In the study by Moser et al (1993) 6 subjects were lost at initial recruitment. Taking all these factors into account an estimated attrition rate of 10% was calculated for the study.

CHAPTER 5

RESULTS

CHANGES IN THE PATIENTS' AND PARTNERS' VARIABLES FROM PRE- TO 4 MONTHS POST-CABG, DIFFERENCES BETWEEN THE PATIENTS/ PARTNERS

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CHAPTER 5

RESULTS

CHANGES IN THE PATIENTS' AND PARTNERS' VARIABLES FROM PRE- TO 4 MONTHS POST-CABG, DIFFERENCES BETWEEN THE PATIENTS/ PARTNERS

5.1 INTRODUCTION

This chapter presents information on the changes in the patients' and partners' scores from pre- to 4 months post-operatively for the following variables:

- Modifiable CHD risk factors (patient and partner)
- Perceived health status (patient and partner)
- Quality of life (patient and partner)
- Perceived symptom severity (patient only)
- Patients' self-efficacy and partners' efficacy judgements about the patient's cardiac capabilities
- Treatment beliefs (patient and partner)
- Perceived social support (patient and partner)
- Self-perceived need (patient and partner)

5.1.1 *Hypothesis*

It was hypothesised that patients and partners would show an improvement in perceived physical and mental health, quality of life and a reduction in modifiable CHD risk factors from pre- to 4 months post-operatively. Patients would show increased cardiac self-efficacy and partners' greater confidence in the patient's cardiac capabilities post-operatively. The patients' and partners' treatment beliefs, perceived social support and self-perceived need would change from pre- to 4 months post-operatively (Research question 1). A second hypothesis was that there would be differences between the patients and partners pre- and post-operatively and a significant effect of time (interaction) for perceived health status, total number of modifiable CHD risk factors, cardiac self-efficacy, treatment beliefs, perceived social support and self-perceived need (research question 2). The overall aim of the study was to explore the complex factors that influence patient and partner and dyad outcome 4 months after CABG surgery.

5.2 SOCIO-DEMOGRAPHICS, RISK FACTORS, CLINICAL INFORMATION

Pre-operatively the sample consisted of 79 patient-partner pairs (married/cohabitating) and 5 patient-family members (daughters, sister, son, brother). There were 71 male and 13 female patients, and 73 female and 11 male partners or family members. At 4 months follow-up there were 80 patients (67 males and 13 females) and 80 partners (69 females and 11 males) remaining. Two male patients died whilst on the waiting list for CABG surgery. One patient died within 24 hours of surgery due to complications and 1 patient had his surgery postponed until he had lost weight and stopped smoking in order to reduce his operative risk. Pre-operative data are presented for the 84 patients and partners or family members (hereafter referred to as the partners) and post-operative data for the remaining 80 subjects. The partners (all female) of the 4 patients lost to follow-up withdrew from the study. The number of subjects who refused the invitation to participate in the study was not known because the researcher only had access to those who agreed to participate, indicated by the returned recruitment letter and signed consent forms from the patients and partners (Appendix I and II). Only three patients returned the letter to say that they did not want to participate in the study with no reason given for non-participation. No differences were found between participants and non-participants in age, occupation, marital status etc.

5.2.1 *Background socio-demographics*

Data were collected on the patients' and partners' socio-demographics, non-modifiable and modifiable risk factors for CHD and concomitant medical conditions. Descriptive pre-operative data pertaining to the 84 patients and partners are presented in Table 4.1. The mean age of patients was 64.54 (SD 9.22) years, which was significantly older than the partners (mean 61.05, SD 10.80) years ($t = 4.03$, $df = 83$, $p < 0.001$). The majority of subjects were married or cohabiting (94%). The patients had a mean 11.5 (SD 2.59) years of education, compared to the partners 11.04 (SD 2.21) years (N/S). There was a noticeable shift away from full-time employment toward retirement in patients in the time since CABG surgery. Only 9 (11%) patients had returned to work at 4 months follow-up and 25 (31%) of the partners. The patients mean alcohol intake was 8.52 (SD 11.76) unit per week, compared to the partners (mean 4.45, SD 6.07) ($t = 2.721$, df 83, $p = 008$). More partners than patients exceeded the Government's guidelines on maximum weekly alcohol intake (Table 5.1), which are 14 units of alcohol per week for females and 21 units of alcohol per week for males.

5.2.2 *Modifiable and non-modifiable CHD risk factors*

Almost three-quarters of the patients had a premature family history of CHD recorded as the total number of male relatives who had suffered a heart attack or angina before the age of 55 years and female relatives before the age of 60 years (Table 5.1). More patients than partners were ex-smokers although more partners were current smokers. The majority of patients (86%) were either not very active or physically inactive pre-operatively and 54% of partners were not very active or physically inactive. A significant number of partners (98%) did not know whether they had normal or elevated blood cholesterol. Most patients (75%) had elevated blood cholesterol and 86% of patients were taking cholesterol-lowering drugs.

Table 5.1 Patient and partner pre-operative socio-demographics and risk factors

Characteristics	Patient	Partner
Age in years (medium, range)	65.00 (40-83)	63.00 (24-82)
Socio-demographics:	n (%)	n (%)
Employment:		
Employed	17 (20%)	31 (37%)
Unemployed	7 (8%)	11 (13%)
Retired	60 (71%)	42 (50%)
Years of education (median, range)	10.00 (9-21)	10.00 (9-21)
Occupation:		
Professional - intermediate	26 (31%)	11 (13%)
Skilled non manual –skilled manual	19 (23%)	20 (24%)
Partly skilled - unskilled	39 (46%)	53 (63%)
Deprivation:		
Depcat 1 - 2	24 (28%)	-
Depcat 3 – 5	41 (49%)	-
Depcat 6 – 7	19 (23%)	-
Family history of CHD	61 (73%)	N/A
Smoking status:		
Smoker	11 (13%)	19 (23%)
Ex-smoker	49 (58%)	32 (38%)
Never smoked	24 (29%)	33 (39%)
Physical activity:		
Very active – fairly physically active	12 (14%)	39 (46%)
Not very active – physically inactive	72 (86%)	45 (54%)
Body mass index (BMI):		
< 25.0 normal weight	19 (23%)	30 (36%)
25.0 – 29.9 overweight	41 (49%)	39 (46%)
30.0 – 35^+ obese/very obese	24 (28%)	15 (18%)
Informed cholesterol elevated:		
Normal (<5.0mmol/L)	18 (21%)	1 (1%)
Elevated (5.1mmol/L or over)	63 (75%)	1 (1%)
Don't know	3 (4%)	82 (98%)
Alcohol intake per week:		
Males (> 21 units/week)	6 (8%)	2 (18%)
Females (> 14 units/week)	0 (0%)	5 (7%)
Concomitant medical conditions:		
Diabetes mellitus	19 (23%)	2 (2%)
Hypertension	53 (63 %)	7 (8%)

Pre-operatively nearly a quarter of patients had diabetes mellitus and 20% were taking either oral hyperglycaemic agents or insulin therapy. Sixty-three per cent of the patients had hypertension**,** defined as blood pressure above the targets levels identified by the British Hypertension Society (Ramsay et al 1999). The researcher measured the patients' blood pressure manually pre- and post-operatively. The pre-operative systolic and diastolic blood pressures are presented in Figure 5.1.

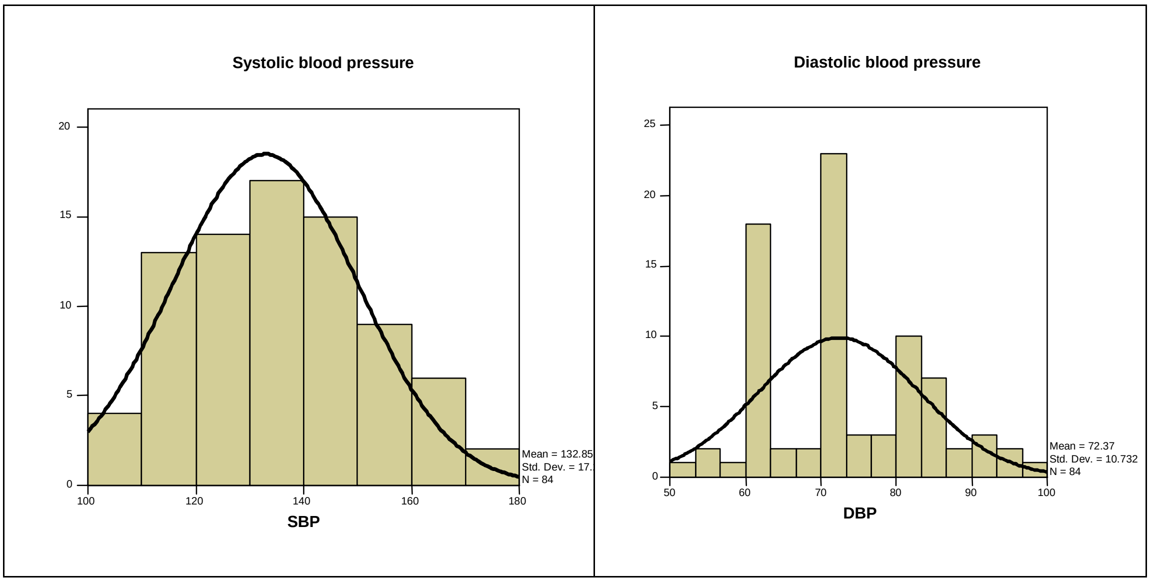


Figure 5.1 Patients' pre-operative systolic and diastolic blood pressure

5.2.3 *Changes in the patients' and partners' modifiable CHD risk factors*

The patients' and partners' main modifiable CHD risk factors i.e. smoking status, current level of physical activity, weight (BMI) and blood cholesterol were identified by self-report before and 4 months after CABG surgery. Over 60% of patients were prescribed anti-hypertensive medication. There were no significant changes in the patients' pre-operative SBP and DBP when assessed at 4 months follow-up.

The data obtained for the main modifiable pre- and post-operative CHD risk factors are presented in Table 5.2.

Table 5.2 Patients' and partners' modifiable pre- and post-operative CHD risk factors

Risk factors		N	Current smoker	Physically inactive	BMI 25 - 35	Elevated Cholesterol
			(%)	(%)	(%)	(%)
Patients	Pre-op	84	13	86	77	75
	Post-op	80	6	49	75	44
Partners	Pre-op	84	23	54	64	1
	Post-op	80	18	71	62	1

As can be seen from Table 5.2, 6% of patients had started smoking again at 4 months follow-up (5 – 30 cigarettes/day) and 18% of partners were still smoking. Post-operatively, more patients were physically active compared to pre-operative numbers, but a greater number of partners (71%) were physically inactive post-operatively. Notably, there was no significant change in the number of patients and partners with a BMI greater than 25 from pre-to 4 months post-operatively. Fewer patients reported an elevated blood cholesterol level (> 5.0 mmol/l or above) post-operatively. The partners were no more informed about their blood cholesterol i.e. whether elevated or not than pre-operatively. The patients' and partners' main modifiable CHD risk factors are presented individually and as a total number of risk factors in Table 5.3.

Table 5.3 Patients' and partners' individual, total number of modifiable CHD risk factors

Risk factors	N		No risk factors	1 risk factor	2 risk factors	3 risk factors	4 risk factors	Total risk factors
			(%)	(%)	(%)	(%)	(%)	Mean (SD)
Patients	84	Pre-op	2	11	25	56	6	2.51 (0.84)
	80	Post-op	10	29	37	22	2	1.76 (0.97)
Partners	84	Pre-op	19	30	42	9	0	1.42 (0.98)
	80	Post-op	11	33	50	6	0	1.54 (0.78)

Pre-operatively the patients had a mean 2.51 (SD 0.84) total number of main modifiable CHD risk factors, which were significantly reduced post-operatively (mean 1.76, SD 0.97) (t = 8.334, df 79, $p < 0.00$). In contrast, the partners had a lower total number of pre-operative risk factors (mean 1.42, SD 0.98) that significantly increased post-operatively (mean 1.54, SD 0.78) (t – 2.330, df 79, p = 0.022).

5.2.4 Differences between patients’ and partners’ modifiable CHD risk factors

The patients’ and partners’ 4 main modifiable CHD risk factors were summed to give a total risk factor score pre- and post-operatively to allow for further statistical analysis. The minimum score was 0 (no risk factors) and the maximum score was 4. Table 5.4 shows the change scores for the patients’ and partners’ pre- and post-operative risk factors and the results of the repeated measures ANOVA.

Table 5.4 Changes in the patients’ and partners’ total number of modifiable CHD risk factors and differences between them pre- and post-operatively

Risk factors	CABG surgery	Patients Mean (SD)	Partners Mean (SD)	Mean (SD) Difference	F (df) Time* ptpart	Sig
	Pre-op	2.51 (0.84)	1.42 (0.98)	+ 1.09 (1.07)		
	Post-op	1.76 (0.97)	1.54 (0.78)	+ 0.22 (1.08)	43.28 (1,79)	**< 0.001**

The patients’ total number of modifiable CHD risk factors were significantly reduced from pre- to 4 months post-operatively. In contrast, the partners’ total number of modifiable CHD had not changed significantly post-operatively. Figure 5.4 displays the level and direction of the differences between the patients’ and partners’ at the mean group level for the pre- and post-operative total number of modifiable CHD risk factors.

The repeated-measures ANOVA showed a significant time effect (interaction) for the total number of modifiable CHD risk factors pre- and post-operatively (F (1, 79) = 43.28, $p < 0.001$), with an overall effect size of 0.354 (Eta^2). Thirty-five per cent of the variance in the scores was accounted for by the differences between the groups over the two time periods.

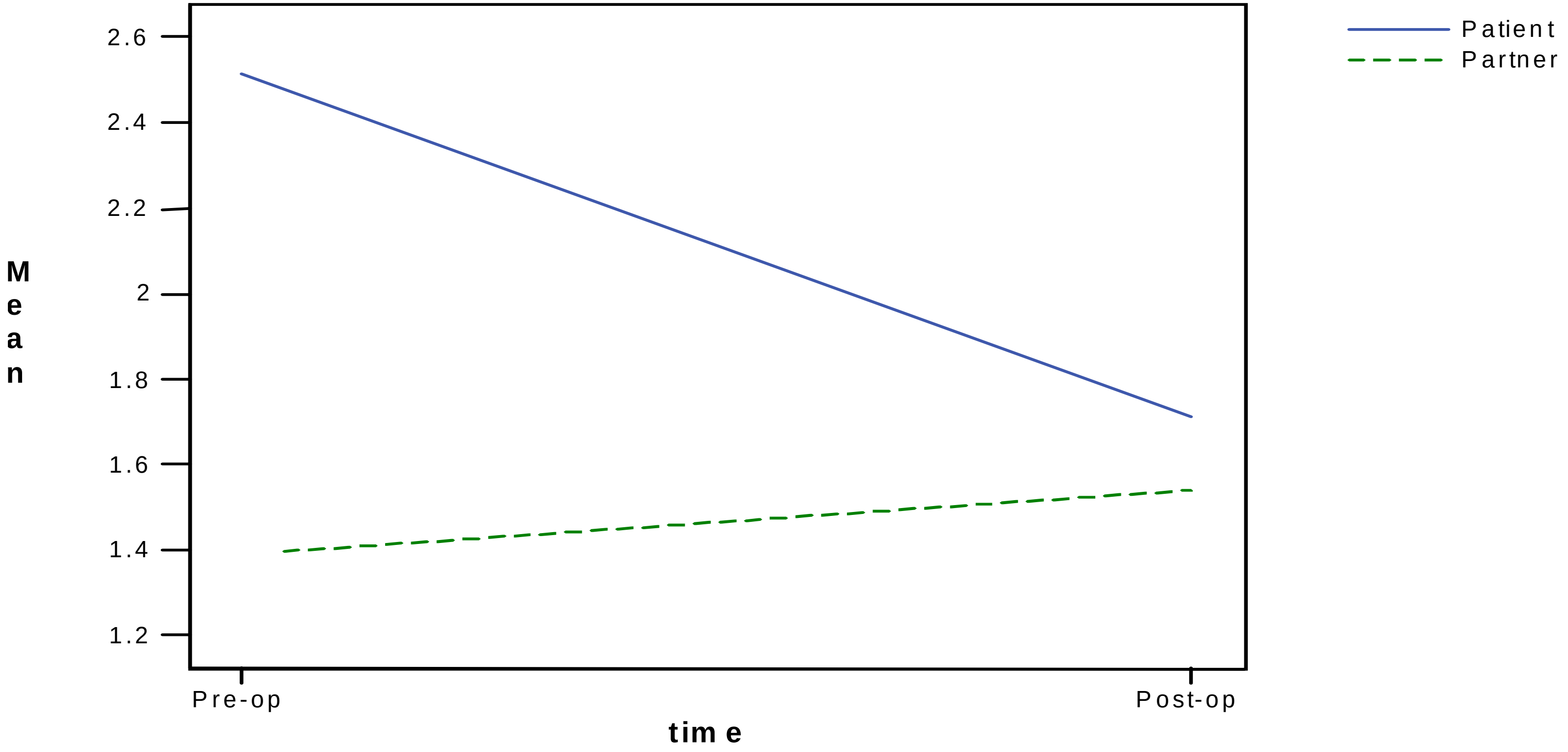


Figure 5.4 Differences between the patients' and partners' pre- and post-operative total number of modifiable CHD risk factors

5.3 CLINICAL ASSESSMENT, SURGERY AND RECOVERY

5.3.1 *Introduction*

Data were collected on the patients’ history of CHD, clinical assessment, type of surgery and recovery and the patients’ and partners’ total number of troublesome health problems. This information is presented in Table 5.5.

5.3.2 *Clinical assessment information*

Most of the patients (93%) suffered from angina pre-operatively and about a third had a myocardial infarction before CABG surgery (Table 5.5). The mean age of onset of angina was 54.8 years (SD 18.30). About half of the patients experienced breathlessness. Fifty per cent of the patients had angina with strenuous but not ordinary activity or after 2 flights of stairs (Canadian Cardiovascular Scale (CCS) grade of 1 – 2) and 43% of the patients had a grade of 3 – 4 CCS, indicating that angina occurs at rest or with minimal activity. Fifty- six per cent of the patients had a NYHA classification 3 – 4, indicating that less than ordinary activity results in fatigue, palpitations, dyspnoea or angina, or symptoms occurred at rest. Twenty four per cent of the patients had moderate impairment of left ventricular function, indicated by an ejection fraction of 30-49% and 3% had severe impairment (an ejection fraction of less than 30%). Fifty-one per cent of patients had significant coronary artery stenosis (70% or more) in three vessels i.e. triple vessel disease and 34% of the patients had two-vessel disease (Table 5.5).

Table 5.5 Clinical assessment information and details of surgery and recovery

	Patient	Partner
Angina	78 (93%)	N/A
Age of onset in years (median, range)	60.00 (30-79)	
Breathlessness	46 (55%)	N/A
Myocardial infarction	32 (38%)	N/A
Age of 1st MI (years) (median, range)	60.50 (32-75)	
Number of first MI	27 (32%)	
Canadian Cardiovascular Society (CCS)		
CCS 1 - 2	42 (50%)	N/A
CCS 3 – 4	36 (43%)	
Missing or no chest pain	6 (7%)	
New York Heart Association (NYHA)		
Class 1 – 2	32 (38%)	N/A
Class 3 – 4	47 (56%)	
Missing	5 (6%)	
Ejection fraction		
➢ 50%	55 (65%)	N/A
30 – 49%	20 (24%)	
29% or	2 (3%)	
Missing	7 (8%)	
Number of diseased vessels	7 (8%)	N/A
Single-vessel disease	28 (34%)	
Two-vessel disease	43 (51%)	
Three-vessels	6 (7%)	
Missing		
EuroSCORES	34 (40%)	N/A
1 – 2 low risk	37 (44%)	
3 – 5 medium risk	13 (16%)	
6 plus high risk		
Total number of troublesome health problems	31 (37%)	37 (44%)
None	36 (43%)	32 (38%)
One problem	17 (20%)	9 (11%)
Two problems	0 (0%)	6 (7%)
Waiting time for surgery (days)	63	N/A
Type of surgery		
CABG	80 (100%)	N/A
CABG and valve replacement	10 (10%)	
Length of hospital stay in days (median, range)	7 (4-21)	
Hospital readmissions	20 (25%)	N/A
	50 (60%)	N/A
Attendance at cardiac rehabilitation	77 (62%)	2 (2%)

5.3.3 *Operative risk*

Forty-four per cent of the patients had a EuroSCORE of between 3 – 5, indicating that they were at medium risk of complications of surgery and 16% of patients had a EuroSCORE of $6^{+,}$ indicating high operative risk (Table 5.5). Operative risk was based on personal factors such as age, CHD risk factors, disease severity and other aspects shown to influence operative risk. The patients reported troublesome health problems that did not change significantly from pre- to 4 months post-operatively, and similarly the partners (Table 5.5). Most of the patients (43%) had at least one other troublesome health problem, apart from CHD and 38% of the partners reported at least one troublesome health problem. The most commonly reported problems were related to the : respiratory tract, peripheral vascular disease, thyroid disorders, stroke or transient ischaemic attack (TIA), gall bladder problems or other gastro-intestinal disorders, arthritis, urological conditions or diseases of the eye. Only one patient and none of the partners reported that they were depressed. The patients' had a mean waiting time of 63.17 days for surgery, recorded as the number of days from when it was first confirmed by the Cardiac Surgeon (or Registrar) that they would be put on the waiting list for elective CABG surgery up until the date of the operation. All of the patients had CABG surgery and in addition, 10 of these patients also had valve replacement surgery (7 aortic and 3 mitral valve replacements).

5.3.4 *Recovery*

Although the patients having CABG and valve replacement surgery may have slightly different recovery patterns the pooling of these two groups was supported by one-way analysis of variance, which revealed no significant differences between the groups for the variables of interest. The patients' length of hospital stay varied (medium 7.0 days, range 4-29) and 20 patients reported that they had been readmitted to hospital for complications related to surgery (Appendix XVII). Two of the patients attended a cardiac rehabilitation programme prior to surgery and 62% of the patients reported attending cardiac rehabilitation at 4 months follow-up. None of the partners participated in the cardiac rehabilitation programme pre- or post-operatively. Two partners (2.5%) reported attending the cardiac rehabilitation programme to provide transport for the patient, but they did not join in the information/education classes or exercises.

5.4 PERCEIVED SYMPTOM SEVERITY

5.4.1 *Introduction*

The patients were asked pre-operatively about the severity of their symptoms as an indicator of the burden of disease. Perceived symptom severity was assessed represented by angina severity, limitation of activities due to angina, dependence on medication and severity of breathlessness. Each of these aspects were measured on a numerical rating scale (NRS) ranging from 0 – 10, where 0 represented no limitation or no dependence to 10 extreme limitation or extreme dependence. The pre-operative ratings for perceived symptom severity were as follows: angina severity (n = 84, mean 5.55, SD 2.80); limitation of activities to prevent the onset of angina (n = 84, mean 6.05, SD 3.21); dependence of medication (n = 82, mean 6.71, SD 3.28) and limitation of activities to prevent breathlessness (n = 60, mean 6.67 SD 1.99). The highest pre-operative rating was for dependence on medication and there was a positive correlation between perceived angina severity and limitation of activities to prevent the onset of angina (+ rho 0.498, n = 84, $p < 0.001$, two-tailed).

5.4.2 *Changes in the patients' perceived symptom severity*

There were 8 patients with residual symptoms of angina at 4 months follow-up, therefore perceived symptom severity was re-assessed in these patients. The pre- and post-operative ratings for the 8 patients are presented in Table 5.6.

Table 5.6 Changes in the patients' perceived symptoms severity from pre- to post-operatively

Group	NRS 0 - 10	Pre-operative Mean (SD)	Post-operative Mean (SD)	Change scores	Paired t test p
Patients (n = 8)	Angina severity	7.25 (1.39)	3.50 (1.60)	+ 3.75	**0.005**
	Limitation (angina)	8.63 (1.77)	1.25 (1.90)	+ 7.38	**0.011**
	Dependence (med)	9.13 (1.72)	3.50 (3.46)	+ 5.63	**0.025**
	Limitation (breath)	7.00 (1.95)	5.00 (2.16)	+ 2.00	0.136

As can be seen from Table 5.6 the mean ratings for angina severity, limitation of activity to prevent the onset of angina and dependence on medication decreased significantly from pre- to 4 months post-operatively, but not limitation of activity due to breathlessness. This indicated that the patients although not entirely free from angina following CABG had significantly less severe angina, less limitation of activity due to angina and less dependence on medication compared to pre-operatively. The results for the changes in perceived symptom severity should be interpreted with caution given the particularly small sample size. Nonetheless, they do give some indication that they patients improved post-operatively.

5.5 PERCEIVED HEALTH STATUS

5.5.1 *Introduction*

The patients' and partners' self-completed the UK version of the Short-Form 12 (SF-12) Health Survey before and 4 months after CABG surgery. The two sub-domains were calculated for perceived physical health (physical component score PCS) and mental health status (mental component score MCS). The minimum possible score for each component was 0 and the maximum score was 100 (with 50 being the population average). The patients' and partners' pre- and post-operative PCS and MCS scores are presented in Table 5.7.

5.5.2 *Changes in the patients' and partners' perceived health status*

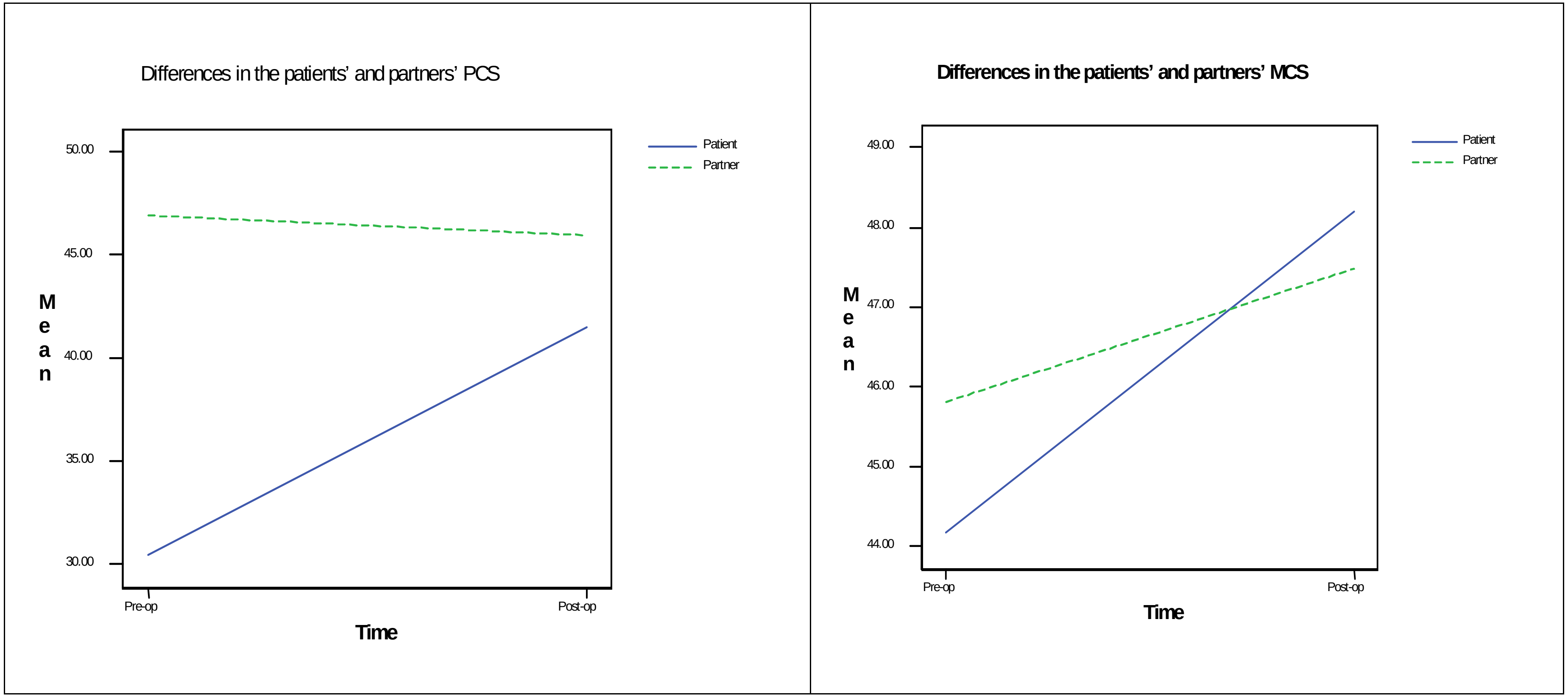
The patients' physical health (PCS) had significantly improved from pre- to 4 months post-operatively (t = -10.812, df 79, p < 0.001), and similarly their mental health (MCS) significantly improved (t = - 3.046, df 79, p = 0.003). In contrast, there was no significant improvement in the partners' physical health (PCS) (t = 0.878, df 79, p = 0.382) or their mental health (MCS) (t = - 0.902, df 79, p = 0.370), from pre- to 4 months post-operatively. Notably, the patients' and partners' post-operative PCS and MCS scores both remained below the population average of 50 (Jenkinson and Layte 1997, Jenkinson et al 1997).

Table 5.7 Changes in the patients' and partners' perceived health status and differences pre- and post-operatively

SF-12	CABG surgery	Patients Mean (SD)	Partners Mean (SD)	Mean (SD) Difference	F (df) Time* ptpart	Sig
PCS	Pre-op	30.45 (8.64)	46.92 (10.92)	-16.47 (12.68)		
	Post-op	41.47 (10.94)	45.94 (11.13)	- 4.47 (10.68)	67.77 (1,79)	**< 0.001**
MCS	Pre-op	44.17 (11.50)	45.81 (11.34)	- 1.64 (13.69)		
	Post-op	48.19 (11.63)	47.48 (11.48)	- 0.71 (14.30)	3.30 (1,79)	0.073

5.5.3 Differences between patients' and partners' perceived health status

Figures 5.5 and 5.6 display the level and direction of differences between the patients' and partners' at the group level for physical health (PCS) and mental health (MCS).



Differences in the patients' and partners' PCS

Differences in the patients' and partners' MCS

Figures 5.5 and 5.6 Differences between the patients' and partners' pre- and post-operative physical health (PCS) and mental health (MCS)

There were significant differences between the patients' and partners' pre- and post-operatively for physical health (Figure 5.5 (left). Repeated-measures ANOVA showed a significant time effect (interaction) between the patients' and partners' PCS pre- and post-operatively (F (1, 79) = 67.77, p < 0.001), with an effect size of 0.462 (Eta^2). Forty-six per cent of the variance in the scores was accounted for by differences between the groups by differences over the two time periods. Repeated-measures ANOVA showed that there was no significant time effect (interaction) between the patients' and partners' mental health (MCS) (Figure 5.6 right) pre- and post-operatively (F (1, 79) = 3.30, p = 0.073). Whilst the patients' PCS scores had improved significantly from pre- to post-operatively there was no corresponding improvement in the partners' PCS scores.

5.6 QUALITY OF LIFE OF PATIENTS

5.6.1 *Introduction*

All the patients were asked pre-operatively to self-complete the UK version of the Seattle Angina Questionnaire (UK-SAQ) (Garratt et al 2001). The 3 sub-domains of the UK-SAQ were calculated for physical limitation, angina frequency and perception, and treatment satisfaction. The minimum possible score for each domain was 0 (lowest level of functioning or satisfaction) and the maximum score was 100 (highest level of functioning or satisfaction). The pre-operative SAQ scores for the total sample were as follows: physical limitation (n = 84, mean 48.76, SD 24.47); angina frequency and perception (n = 84, mean 31.25, SD 19.23); treatment satisfaction (n = 84, mean 84.52, SD 14.06).

5.6.2 *Changes in the patients' quality of life*

There were 8 patients with residual symptoms of angina when assessed at 4 months follow-up. Only these patients completed the UK-SAQ post-operatively for it asks patients specifically about chest pain and related activity limitation. It was therefore not appropriate for use with the patients that had relief of angina after CABG surgery. The pre- and post-operative UK-SAQ scores for the 8 patients with residual symptoms of angina are presented in Table 5.8.

Table 5.8 Changes in the patients' pre- and post-operative quality of life

Group	Sub-domains (SAQ)	Pre-operative Means (SD)	Post-operative Means (SD)	Change Score	Paired t test
Patients (n = 8)	Physical limitation	29.46 (17.78)	66.07 (23.30)	- 36.61	**0.004**
	Angina frequency	18.28 (15.22)	52.65 (28.67)	- 34.37	**0.033**
	Treatment satisfaction	71.87 (10.85)	65.50 (27.81)	- 6.37	0.380

As can be seen from Table 5.8 the mean scores for physical limitation and angina frequency and perception increased significantly from pre- to 4 months post-operatively, but not treatment satisfaction. This indicated that the patients although not entirely free from angina had gained some benefits from surgery. The results for changes in scores from pre- to post-operatively should be interpreted with caution given the particularly small sample size. However, they provide some indication that the patients experienced less physical limitation due to angina and less frequency of angina, compared to pre-operatively. They did, however, still have a sub-optimum level of functioning.

5.7 QUALITY OF LIFE OF PARTNERS

5.7.1 *Introduction*

The partners self-completed the Quality of Life in Cardiac Spouses (QL-SP) questionnaire (Ebbesen et al 1990) both pre- and post-operatively. Two sub-domains were calculated for: emotional function dimension (EFD) and physical and social function dimension (PSFD), or lifestyle component. The minimum possible score for the EFD was 0 (lowest level of functioning) and the maximum score was 98 (highest level of functioning), and the minimum possible score for the PSFD was 0 (lowest level of functioning) and the maximum score was 84 (highest level of functioning).

5.7.2 Changes in the partners' quality of life

The partners' pre- and post-operative scores for the QL-SP are presented in Table 5.9

Table 5.9. Changes in the partners' quality of life of life from pre – to 4 months post-operatively

Group N = 80	QL-SP	Pre-operative Means (SD)	Post-operative Means (SD)	Change Score	Paired t test p
Partners	EFD PSFD	64.00 (15.25) 57.09 (12.26)	73.86 (15.40) 64.87 (10.60)	- 9.86 - 7.78	**< 0.001** **< 0.001**

As can be seen from Table 5.9, the partners mean scores for the emotional function dimension (EFD) and physical and social function dimension (PSFD) improved significantly from pre-to post-operatively, although there was still a sub-optimum level of functioning.

5.8 PATIENTS' SELF-EFFICACY AND PARTNERS' EFFICACY JUDGEMENTS

5.8.1 *Introduction*

The patients and partners completed a 16-item Cardiac Self-Efficacy Questionnaire (Sullivan et al 1998) before and 4 months after CABG surgery. The questionnaire was reworded slightly for the partners (to reflect the different relationships), who were asked about the patient's cardiac self-efficacy. The paired *t*-test was used to examine the differences between the patients' ratings for the self-efficacy items and the partners' ratings of the patient's cardiac capacity. The statistics are presented for the 16 items on the questionnaire (Table 5.10). Following Bonferroni correction for multiple comparisons (0.05 divided by 2, as two sub-domains) there were two items in which the patients' and partners' differed significantly : 'how to take cardiac medications ?' (p < 0.001) and 'maintain usual activities at home with the family?' (p = 0.002).

In addition, the scores for the two sub-scales for patients' self-efficacy for controlling symptoms (SE-CS) and self-efficacy for maintaining function (SE-MF) were summed; and similarly for the partners' efficacy judgements about the patient's confidence for controlling symptoms (SE-CS) and maintaining function (SE-MF). The sub-domain for SE-CS contained 8 items and the sub-domain for SE-MF had 5 items. The minimum score for SE-CS was 0 and the maximum score was 32. The minimum score for SE-MF was 0 and maximum score was 20. Higher scores represented greater patient confidence or greater partner confidence in the patients' cardiac capabilities. There were three behavioural items that were not included in the summary scores; 'lose weight (if you are overweight?'); 'stop smoking (if your do?'; and 'change your diet (if your doctor recommended this)?', in accordance with the approach taken by (Sullivan et al 1998).

Table 5.10 Differences between the patients' self-efficacy and partners' efficacy judgements about the patient's cardiac capabilities

Cardiac self-efficacy	Sub-domain		Patient means	Patient N/A (%)	Partner means	Partner N/A (%)	Uncorrect Sig	Corrected Sig
How confident are you that you (your partner) know(s): When you should call or visit your doctor about your disease ?	SE-CS	Pre-op	2.76	0.0	2.63	0.0	0.290	
		Post-op	3.26	0.0	3.04	0.0	0.068	
How to make your doctor understand your concerns about your heart ?	SE-CS	Pre-op	2.89	0.0	2.64	0.0	**0.040**	N/S
		Post-op	3.21	0.0	3.06	0.0	0.218	
How to take your cardiac medications ?	SE-CS	Pre-op	3.64	0.0	3.35	0.0	**0.009**	N/S
		Post-op	3.75	0.0	3.44	0.0	**< 0.001**	**S/S**
How much physical activity is good for you ?	SE-CS	Pre-op	1.39	0.0	1.23	0.0	0.233	
		Post-op	2.55	1.2	2.41	0.0	0.290	
How confident are you that you (your partner) can: Control your chest pain by taking your medication ?	SE-CS	Pre-op	2.65	8.3	2.36	7.1	**0.033**	N/S
		Post-op	3.88	88.7	3.86	91.2	1.000	
Control your chest pain by changing your activity levels ?	SE-CS	Pre-op	2.26	8.3	2.23	8.3	0.883	
		Post-op	3.20	88.7	3.56	90.0	0.169	
Control your breathlessness by taking your medication ?	SE-CS	Pre-op	2.10	26.2	2.06	15.5	0.684	
		Post-op	2.57	91.2	2.43	76.2	0.788	
Control your breathlessness by changing your activity level ?	SE-CS	Pre-op	2.42	26.2	2.21	14.3	0.191	
		Post-op	3.14	91.2	2.43	75.0	0.220	
Get regular exercise (work up a sweat and increase your heart rate) ?	SE-MF	Pre-op	0.42	0.0	1.15	38.1	**0.039**	N/S
		Post-op	2.78	16.2	2.51	7.5	0.395	
Maintain your usual activities at work ?	SE-MF	Pre-op	1.44	81.0	1.37	9.5	0.524	
		Post-op	2.55	0.0	2.28	10.0	0.107	
Maintain your usual social activities ?	SE-MF	Pre-op	1.81	0.0	1.87	1.2	0.567	
		Post-op	3.13	0.0	2.87	2.5	0.075	
Maintain your usual activities at home with your family ?	SE-MF	Pre-op	1.94	0.0	1.90	2.4	0.860	
		Post-op	3.29	0.0	2.88	2.5	**0.002**	**S/S**
Maintain your sexual relationship with your partner ?	SE-MF	Pre-op	1.06	35.7	1.22	35.7	0.546	
		Post-op	2.29	40.0	1.98	35.0	0.118	
Lose weight (if you are overweight) ? *	_	Pre-op	2.08	22.6	1.82	27.4	0.429	
		Post-op	2.08	22.5	1.88	37.5	0.381	
Stop smoking (if you do) ? *	_	Pre-op	1.50	85.7	1.74	77.4	0.293	
		Post-op	1.63	91.2	1.75	88.7	0.875	
Change your diet (if your doctor recommended this) ? *	_	Pre-op	3.17	15.5	2.80	10.7	**0.037**	N/S
		Post-op	3.06	28.7	2.89	10.0	0.382	

N/A, % of subjects that rated self-efficacy question as not appropriate; * Behavioural items; Uncorrect Sig, statistical significance 0.05; Corrected Sig; statistical significance at 0.025 Bonferroni correction (in bold)

5.8.2 Changes in the patients' and partners' self-efficacy

The patients' and partners' pre- and post-operative scores for SE-CS and SE-MF are presented in Table 5.11. The patients' scores for SE-CS improved significantly from pre- to 4 months post-operatively (t = 5.769, df = 79, p < 0.001), and similarly the partners' judgments about the patients' SE-CS improved signficantly (t = 5.558, df = 79, p < 0.001). Since most of the patients were free from symptoms post-operatively only 4 out of the original 8 items in the SE-CS sub-scale were applicable: 'when you should call or visit your doctor about your disease?'; 'how to make your doctor understand your concerns about your heart ?'; 'how to take your cardiac medication?'; and 'how much physical activity is good for you?'. Therefore, the post-operative data for the SE-CS presented in Table 5.11 is out of a highest possible score of 16 (instead of 32 as pre-operatively), which is why the scores seem lower.

The patients' scores for SE-MF improved significantly from pre- to 4 months post-operatively (t = -10.768, df = 79, p < 0.001) and similarly, the partners' scores for judgments about the patients' SE-MF (t = - 7.157, df = 79, p < 0.001). The pre-operative scores for SE-MF were particularly low and whilst these improved significantly post-operatively, they were still sub-optimal.

Table 5.11 Changes in the patients' and partners' pre- and post-operative self-efficacy, and differences between the patients and partners

Self-Efficacy	CABG surgery	Patients Mean (SD)	Partners Mean (SD)	Mean (SD) Difference	F (df) Time* ptpart	Sig
SE-CS	Pre-op	18.52 (6.12)	17.54 (5.93)	0.98 (6.45)	-	-
	Post-op	14.02 (4.04)	13.91 (4.41)	0.11 (3.87)	-	-
SE-MF	Pre-op	5.12 (4.71)	6.34 (5.42)	- 1.22 (4.47)		
	Post-op	12.95 (5.24)	11.16 (5.00)	+ 1.79 (4.07)	16.61 (1,79)	**< 0.001**

There was a significant positive correlation between the patients' pre-operative SE-CS and SE-MF (rho = 0.405, N = 84, p < 0.001, and likewise the partners' pre-operative

SE-CS and SE-MF (rho = 0.409, N = 84, p < 0.001). This indicated that the patients' and partners' who had greater pre-operative confidence for controlling symptoms also had greater pre-operative confidence for maintaining function.

5.8.3 *Differences between the patients' and partners' self-efficacy*

Figure 5.7 displays the level and direction of mean differences between the patients and partners, using the total scores for SE-MF.

There were significant differences between the patients' and partners' pre- and post-operatively (Figure 5.7) for SE-MF. Repeated-measures ANOVA showed a significant time effect (interaction) between the patients and partners SE-MF pre- and post-operatively (F (1, 79) = 16.13, p < 0.001), with an effect size of 0.174 (Eta^2). Seventeen per cent of the variance in the scores was accounted for by differences between the groups by differences over the two time periods. Whilst the partners had greater confidence than the patients pre-operatively for SE-MF, the patients were significantly more confidence than the partners when re-assessed at 4 months follow-up.

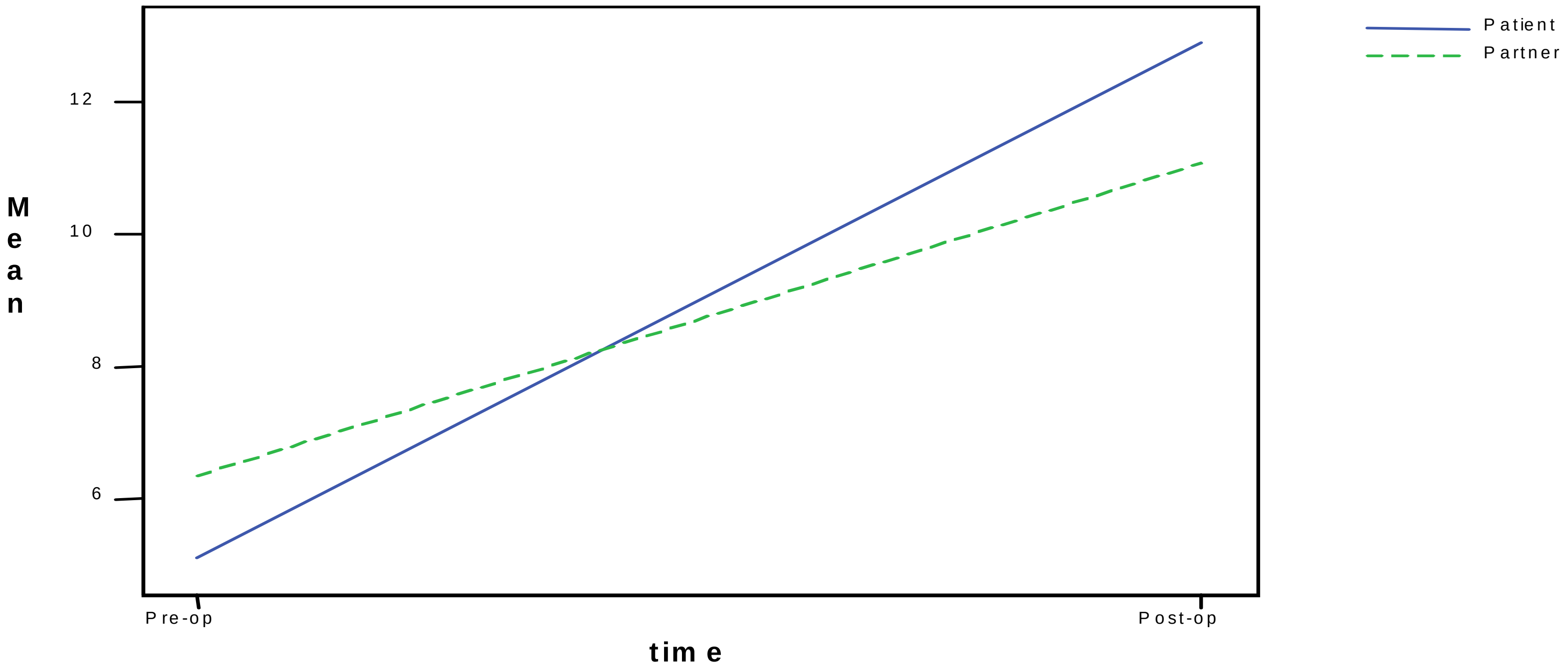


Figure 5.7 Differences between the patients' and partners' for pre- and post-operative SE-MF

5.9 TREATMENT BELIEFS

5.9.1 *Introduction*

The patients' and partners' perceptions of treatment benefits and risks were examined pre- and 4 months post-operatively using a modified version of the questionnaire developed by Kee et al (1997). In addition, data were collected on the patients' expected and realised benefits of surgery (Gortner et al 1985). Information on the expected and realised benefits of CABG can be found in Appendix (XV). The data were presented in accordance with the categories identified by Gortner et al (1985), Gortner et al (1989), Gortner et al (1994). The data for both the patients' and partners' treatment beliefs are presented for the following categories: treatment benefit- mortality risk reduction, general health and well-being and anticipated gains in life expectancy; and treatment risks (or disadvantages) to general health and well being and the percentage complication rates related to surgery. The questions about treatment benefits - mortality risk reduction were measured on a scale of 0 to 5, where 0 = don't know, 1 = no effect, 2 = little, 3 = moderate, 4 = substantial, and 5 = great. Don't know was treated as missing data. Therefore, the minimum score for mortality risk reduction was 1 (no benefit) and the maximum score was 5 (great benefit). The level of agreement (sureness) for each of the ratings was recorded as 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, and 5 = strongly agree. The data for each of the categories of treatment beliefs were presented as a percentage figure for clarity. The NRSs for treatment benefits and – general health and well-being were rated by the participants on a scale of 0 – 10, where 0 represented no benefit and 10 great benefit, and similarly 0 represented no risks (or disadvantages) and 10 great risks. The minimum possible score for perceived risks (or disadvantages) – general health and well-being was 0 (no risks) and the maximum score was 10 (great risks).

5.9.2 *Treatment beliefs pertaining to each treatments*

Tables 5.12 – 5.23 show the patients' and partners' scores for treatment benefits and risks. These are presented as percentage figures because different scales were used for mortality risk reduction, general health and well-being (NRS), anticipated years of life expectancy. As can be seen from Tables 5.12- 5.15, pre-operatively the majority of patients (and partners) thought that treatment would substantially or greatly reduce.

Table 5.12 Patients' pre-operative beliefs about treatment benefit – mortality risk reduction

Treatment benefits – Mortality risk reduction	D'know/ Missing	None/ A little	Moderate	Substantial/ Great
	%	%	%	%
Stopping smoking	7	6	17	70
Increasing physical activity	23	11	19	47
Weight loss	0	4	19	77
Reduce dietary cholesterol	6	4	12	78
Medication	6	6	23	65
CABG	5	0	7	88

Table 5.13 Partners' pre-operative beliefs about treatment benefit – mortality risk reduction

Treatment benefits – Mortality risk reduction	D'know/ Missing	None/ A little	Moderate	Substantial/ Great
	%	%	%	%
Stopping smoking	7	6	14	73
Increasing physical activity	16	17	25	42
Weight loss	5	0	13	82
Reduce dietary cholesterol	4	2	14	80
Medication	8	11	24	57
CABG	1	1	7	91

Table 5.14 Patients' post-operative beliefs about treatment benefit – mortality risk reduction

Treatment benefits – Mortality risk reduction	D'know/ Missing	None/ A little	Moderate	Substantial/ Great
	%	%	%	%
Stopping smoking	18	4	14	64
Increasing physical activity	17	5	5	73
Weight loss	11	1	13	75
Reduce dietary cholesterol	12	2	12	74
Medication	17	1	18	64
CABG	12	4	9	75

Table 5.15 Partners' post-operative beliefs about treatment benefit – mortality risk reduction

Treatment Mortality risk reduction	D'know/ Missing	None/ A little	Moderate	Substantial/ Great
	%	%	%	%
Stopping smoking	11	6	11	72
Increasing physical activity	13	8	13	66
Weight loss	11	0	11	78
Reduce dietary cholesterol	12	1	5	83
Medication	11	6	20	63
CABG	10	4	13	73

their mortality risk (or someone of their age with CHD), and help them live a bit longer. When rating the benefits of treatment- mortality risk reduction for increasing physical activity, the patients and partners were less sure about this compared with the other preventive activities considered. Post-operatively, fewer patients and partners thought that CABG would substantially or greatly reduce mortality risk. Overall, the patients' and partners' had very similar beliefs for treatment benefit - mortality risk reduction pre- and post operatively.

Table 5.16-5.19 show the patients' and partners' scores for treatment benefit – to general health and well-being from preventive activity (stopping smoking, increasing physical activity, weight loss, a diet to reduce cholesterol), medication and CABG. Pre-operatively, the majority of patients and partners thought CABG surgery would be very beneficial to general health and well-being, rated high as 9 – 10 on the numeric rating scale (NRS). The patients thought the next most highly beneficial treatment – for general health and well-being was stopping smoking and the partners a diet to reduce cholesterol. Notably, there were more 'don't know' or missing answers pre-operatively for the benefits of increasing physical activity to general health and well-being, compared to the other preventive activities. Post-operatively, fewer patients and partners thought that CABG surgery would be most beneficial and they were still mostly unsure about the benefits of preventive activities for general health and well-being.

Table 5.20-5.23 shows the patients' and partners' scores for treatment risks (or disadvantages) – to general health and well-being from preventive activity (stopping smoking, increasing physical activity, weight loss, a diet to reduce cholesterol), medication use and CABG. Pre-operatively the majority of patients and partners thought that CABG and increasing physical activity would pose the greatest risk to general health and well-being, rated as 5 – 10 on the NRS. Post-operatively, a greater number of participants thought that CABG would carry the most risk. Surprisingly,

Table 5.16 Patients' pre-operative beliefs about treatment benefit - general health and well-being

Treatment benefits	D'know/Missing	0 - 5	6 - 8	9 - 10
NRS 0 - 10	%	%	%	%
Stopping smoking	6	6	25	63
Increasing physical activity	13	11	49	27
Weight loss	0	7	42	51
Reduce dietary cholesterol	1	4	42	53
Medication use	4	3	49	44
CABG surgery	4	6	18	72

NRS- numeric rating scale (0 – 10) treatment benefit

Table 5.17 Partners' pre-operative beliefs about treatment benefit -general health and well-being

Treatment benefits	D'know/Missing	0 - 5	6 - 8	9 - 10
NRS 0 -10	%	%	%	%
Stopping smoking	4	7	31	58
Increasing physical activity	12	23	38	27
Weight loss	4	2	34	60
Reduce dietary cholesterol	5	5	27	63
Medication use	6	8	50	36
CABG surgery	1	5	18	76

NRS- numeric rating scale (0 – 10) treatment benefit

Table 5.18 Patients' post-operative beliefs about treatment benefit-general health and well-being

Treatment benefits -	D'know/Missing	0 - 5	6 - 8	9 - 10
NRS 0 -10	%	%	%	%
Stopping smoking	18	6	19	57
Increasing physical activity	16	2	30	52
Weight loss	12	0	31	57
Reduce dietary cholesterol	13	1	27	59
Medication use	16	4	36	44
CABG surgery	12	11	32	45

NRS- numeric rating scale (0 – 10) treatment benefit

Table 5.19 Partners' post-operative beliefs about treatment benefit-general health and well-being

Treatment	D'know/Missing	0 - 5	6 - 8	9 - 10
NRS 0 - 10	%	%	%	%
Stopping smoking	12	2	24	62
Increasing physical activity	12	5	40	43
Weight loss	12	4	28	56
Reduce dietary cholesterol	12	1	26	61
Medication use	13	2	42	43
CABG surgery	7	8	39	46

NRS- numeric rating scale (0 – 10) treatment benefit

Table 5.20 Patients' pre-operative beliefs about treatment risks (disadvantages) - general health and well-being

Treatment risks	D'know/Missing	0 - 1	2 - 4	5 - 10
NRS 0 - 10	%	%	%	%
Stopping smoking	6	40	36	18
Increasing physical activity	14	15	46	25
Weight loss	0	87	6	7
Reduce dietary cholesterol	1	83	11	5
Medication use	5	44	36	15
CABG surgery	4	18	55	23

NRS- numeric rating scale (0 – 10) treatment risks (or disadvantages)

Table 5.21 Partners' pre-operative beliefs about treatment risks (disadvantages) - general health and well-being

Treatment risks	D'know/Missing	0 - 1	2 - 4	5 - 10
NRS	%	%	%	%
Stopping smoking	5	50	33	12
Increasing physical activity	13	18	49	20
Weight loss	5	77	11	7
Reduce dietary cholesterol	5	77	13	5
Medication use	1	41	39	14
CABG surgery	1	18	61	20

NRS- numeric rating scale (0 – 10) treatment risks (or disadvantages)

Table 5.22 Patients' post-operative beliefs about treatment risks (disadvantages) - general health and well-being

Treatment risks	D'know/Missing	0 - 1	2 - 4	5 - 10
NRS 0 -10	%	%	%	%
Stopping smoking	16	59	20	5
Increasing physical activity	13	50	25	12
Weight loss	12	76	12	12
Reduce dietary cholesterol	14	81	5	0
Medication use	14	65	16	5
CABG surgery	12	25	33	30

NRS- numeric rating scale (0 – 10) treatment risks (or disadvantages)

Table 5.23 Partners' post-operative beliefs about treatment risks (disadvantages) - general health and well-being

Treatment risks	D'know/Missing	0 - 1	2 - 4	5 - 10
NRS 0 - 10	%	%	%	%
Stopping smoking	12	66	20	2
Increasing physical activity	13	40	43	4
Weight loss	12	76	11	1
Reduce dietary cholesterol	12	80	7	1
Medication use	12	57	27	4
CABG surgery	7	21	47	25

NRS- numeric rating scale (0 – 10) treatment risks (or disadvantages)

fewer partners than patients rated the risks attached to increasing physical activity as 5 – 10 on the NRS post-operatively.

5.9.3 *Anticipated gains in life expectancy*

The patients and partners were asked pre-operatively to estimate the likely gains in life expectancy from preventive activity (stopping smoking, increasing physical activity, weight loss, a diet to reduce cholesterol), medication use and CABG. For example, 'how many extra years or months of life would you estimate that you (patient) or someone of your age, or your partners age with CHD might gain 1 month after a heart attack by giving up the habit (smoking). The Wilcoxon matched pairs signed ranks test was used to identify patients' estimates for gains in life expectancy, comparing one treatment with another, and similarly with the partners' scores. The patients' anticipated significantly more gains in life expectancy for CABG, compared to stopping smoking ($z = 3.794$, N-ties = 15, $p < 0.001$), increasing physical activity ($z = 3.794$, N-ties = 15, $p < 0.001$), weight loss ($z = 4.550$, N-ties = 13, $p < 0.001$), a diet to reduce cholesterol ($z = 4.311$, N-ties = 15, $p < 0.001$), or medication use ($z = 3.712$, N-ties = 10, $p < 0.001$). Similarly, the partners' anticipated significantly more gains in life expectancy for CABG compared to stopping smoking ($z = 3.442$, N-ties = 22, $p = 0.001$), increasing physical activity ($z = 4.140$, N-ties = 12, $p < 0.001$), weight loss ($z = 4.689$, N-ties = 19, $p <$

0.001), a diet to reduce cholesterol (z = 4.227, N-ties = 17, p = 0.001), or medication use (z = 4.309, N-ties = 14, p = 0.001).

5.9.4 *Patients' recall of information about their operative risk*

The patients were asked if they could identify the percentage operation risk that was conveyed to them by the Cardiac Surgeon in the OP Clinic (assessed immediately after their consultation with the Cardiac Surgeon), or if they had difficulty in doing this to identify a risk category that applied to them from one of 4 pre-determine categories: 1 in 2; 1 in 50; 1 in 100; 1 in 1000. Most patients (74%) recalled the percentage operative risk given to them. Ten per cent of patients could not recall the exact figure, but remembered being told that there was a risk of death, stroke or infection. One patient who had a 5% plus operative risk elaborated in terms of him needing CABG and valve replacement surgery and his increasing age. Overall there was consistency between what the Cardiac Surgeons had documented as the patients' operative risk and what patients reported i.e. 1% mortality risk and between 2 - 4% morbidity risk (stroke and infection), although this was usually reported by the patients as a percentage mortality risk.

5.9.5 *Totalled scores for treatment beliefs*

The patients' scores for mortality risk reduction for stopping smoking, increasing physical activity, weight loss, diet to reduce cholesterol, medication use and CABG were summed to give a total score for treatment benefits – mortality risk reduction. Similarly, the patients' scores for treatment benefits – general health and well-being were totalled for stopping smoking, increasing physical activity, weight loss, diet to reduce cholesterol, medication use and CABG; and similarly for perceived risks – to general health and well-being from the various treatments, and likewise the partners' scores. An overall cost-benefit score was calculated by subtracting the total treatment benefit score from the total risk score. This allowed for further statistical analysis and for consistency in the approach taken data analyses elsewhere in the thesis. Therefore, in reporting the patients' and partners' perceptions of treatment benefits and risks, the scores were presented first for each treatment separately (Table 5.12-5.23), and then for the totalled scores (Table 5.24).

5.9.6 Changes in the patients' and partners' totalled scores for treatment beliefs

The patients' totalled scores for mortality risk reduction did not change significantly from pre- to 4 months post-operatively (t = - 1.866, df =79, p = 0.066). The total score for perceived benefits – to general health and well-being significantly increased from pre – to 4 months post-operatively (t = - 2.899, df = 79, p = 0.005) and the total score for perceived risks – health and well-being significantly decreased (t = 5.540, df = 79, p < 0.001), and treatment benefits – risks significantly increased (t = - 5.327, df = 79, p < 0.001). In contrast, the partners' total score for mortality risk reduction significantly increased from pre- to 4 months post-operatively (t = - 3.144, df = 79, p = 0.002), and the overall treatment benefits – risks score (t = - 3.064, df = 79, p = 0.003). Perceived risks – general health and well-being significantly decreased post-operatively (t = 5.292, df = 79, p < 0.001), and the benefits – to general health and well-being were largely unchanged (t = - 0.285, df = 79, p = 0.777).

Table 5.24 Changes in the patients' and partners' treatment beliefs, and differences between the patients and partners pre- and post-operatively

Treat beliefs		Patients Means (SD)	Partners Means (SD)	Mean (SD) Difference	F (df) Time*ptpart	Sig
MortRR	Pre-op	23.17 (4.86)	23.47 (4.71)	- 0.30 (5.21)		
	Post-op	24.25 (5.57)	24.97 (4.43)	- 0.72 (4.32)	0.68 (1,79)	0.411
B – HW	Pre-op	49.80 (6.77)	50.60 (6.81)	- 0.80 (6.85)		
	Post-op	51.85 (6.26)	50.99 (7.77)	- 0.86 (9.07)	2.30 (1,79)	0.133
R – HW	Pre-op	11.70 (6.88)	12.02 (6.80)	- 0.32 (6.67)		
	Post-op	7.44 (5.55)	8.09 (4.79)	- 0.65 (5.72)	0.12 (1,79)	0.730
B-R - HW	Pre-op	38.21 (10.8)	38.56 (11.7)	- 0.35 (10.65)		
	Post-op	44.35 (10.2)	42.90 (10.0)	- 1.45 (12.07)	1.62 (1,79)	0.207

MortRR, mortality risk reduction; B – HW, benefits to health and well-being; R – HW, risks to health and well-being; B-R – HW, overall benefits – risks. Higher MortRR, B –

HW, B-R - HW scores denote greater perceived treatment benefits; higher R- HW scores denote greater treatment risks.

5.9.7 *Differences between the patients' and partners' for treatment beliefs*

Repeated-measures ANOVA revealed no significant effect of time (interactions) for treatment beliefs (totalled scores) between the patients and partners pre and post-operatively for: treatment benefit -mortality risk reduction (F (1, 79) = 0.68, p = 0.411) treatment benefit – to general health and well-being (F (1, 79) = 2.30, p = 0.133), treatment risks (disadvantages) – to general health and well-being (F (1, 79) = 0.12, p = 0.730); and treatment benefits- risks (F (1, 79) = 1.62, p = 0.207). This indicated that overall the patients and partners had very similar perceptions of treatment benefits and risks that did not change significantly over time.

5.10 PERCEIVED SOCIAL SUPPORT

5.10.1 *Introduction*

The patients' and partners' self-completed the Medical Outcome Study (MOS) Social Support questionnaire (Sherbourne and Stewart 1991), before and 4 months after CABG surgery. Four sub-domains were calculated for: emotional and informational support, tangible support, positive social interaction and affectionate support. The minimum possible score for each sub-domain was 0 and the maximum score was 100. Higher scores represented greater perceived availability of social support. In addition, one structural support item was recorded pre-operatively for the patients' and partners' total numbers of close friends or relatives, which provided an indication of the size of the social network. The patients' had a mean 8.77 (median 7.00, SD 5.53) total number of close friends or relatives and the partners a mean of 8.00 (median 7.00, SD 5.53) close friends and relatives. The patients' and partners' pre- and post-operative social support scores are presented in Table 5.25.

5.10.2 *Changes in the patients' and partners' perceived social support*

The patients' emotional and informational support significantly improved from pre- to 4 months post-operatively (t = - 2.704, df = 79, p = 0.008) and similarly, positive social interaction (t = - 10.436, df = 79, p < 0.001) and affectionate support (t = - 15.750, df = 79, p < 0.001), but not tangible support (t = - 1.161, df = 79, p = 0.249). In contrast, there were no significant improvements in the partners' emotional and informational support (t = - 1.104, df = 79, p = 0.273), tangible support (t = - 1.203, df = 79, p = 0.233), affectionate support (t = 0.001, df = 79, p = 0.999), or positive social interaction (t = - 0.484, df = 79, p = 0.629). Emotional support referred to the expression of positive affect, empathetic understanding and encouragement of feelings; informational support to advice, information, guidance or feedback; tangible support to the provision of material aid or behavioural assistance; affectionate support to the expression of love and affection; and positive social interaction to the availability of other people to do fun things with (Sherbourne and Stewart 1991).

Table 5.25 Changes in patients' and partners' perceived social support, and differences between the patients and partners pre- and post-operatively

Social support	CABG surgery	Patients Mean (SD)	Partners Mean (SD)	Mean (SD) Difference	F (df) Time*ptpart	Sig
Emot/inf	Pre-op	81.88 (15.45)	77.37 (21.75)	+ 4.51 (25.17)		
	Post-op	86.99 (15.45)	80.04 (19.79)	+ 6.95 (22.58)	0.49 (1,79)	0.485
Tangible	Pre-op	87.65 (17.43)	73.51 (24.32)	+ 14.14 (26.14)		
	Post-op	90.70 (16.03)	77.26 (21.90)	+ 13.44 (25.43)	0.91 (1,79)	0.911
Affect	Pre-op	71.58 (13.65)	86.51 (17.87)	- 14.92 (21.22)		
	Post-op	91.98 (16.80)	87.08 (17.78)	+ 4.89 (23.22)	81.45 (1,79)	**< 0.001**
PosSInt	Pre-op	66.90 (15.53)	75.79 (24.16)	- 8.89 (26.57)		
	Post-op	84.58 (21.87)	76.46 (23.96)	+ 8.12 (26.28)	50.49 (1,79)	**< 0.001**

Emot/inf, emotional and information support; Tangible, tangible support; Affect, affectionate support; PosSInt, positive social interaction

5.10.3 *Differences between patients' and partners' perceived social support*

Figures 5.8-5.11 display the level and direction of the differences between the patients' and partners' at the mean group level for emotional and informational support, tangible support, affectionate support and positive social interaction.

There were no significant differences between the patients' and partners' scores pre- and post-operatively for emotional and informational support (Figure 5.8 top left). Repeated-measures ANOVA showed no significant effect (interaction) between the patients' and partners' for emotional and informational support pre- and post-operatively ($F (1, 79) = 0.49$, $p = 0.485$). Similarly, there were no significant differences between the patients' and partners' pre- and post-operatively for tangible support (Figure 5.10 bottom left) or interaction ($F (1, 79) = 0.013$, $p = 0.911$).

In contrast, there were significant differences between the patients' and partners' pre- and post-operatively for affectionate support (Figure 5.9 top right). Repeated-measures ANOVA showed a significant effect of time (interaction) between the patients' and partners' for affectionate support pre- and post-operatively ($F (1, 79) = 81.45$, $p < 0.001$), with an effect size of 0.508 (Eta^2). Fifty-one per cent of the variance in the scores was accounted for by differences between the groups by differences over the two time periods. Whilst the patients' affectionate support increased significantly from pre- to post-operatively, there was no corresponding increase in the partners' affectionate support.

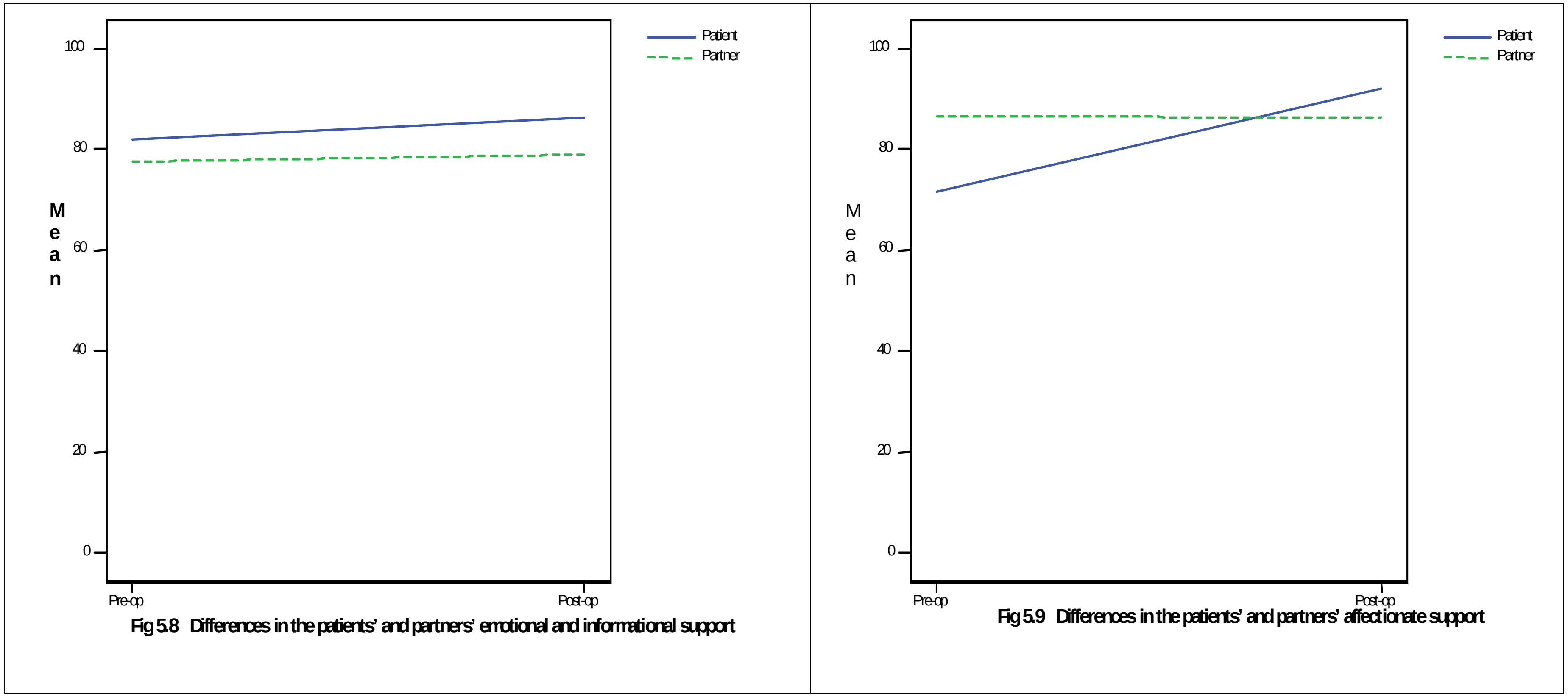


Fig 5.8 Differences in the patients' and partners' emotional and informational support

Fig 5.9 Differences in the patients' and partners' affectionate support

Figures 5.8-5.9 Differences between the patients' and partners' for pre- and post-operative emotional and informational support and affectionate support

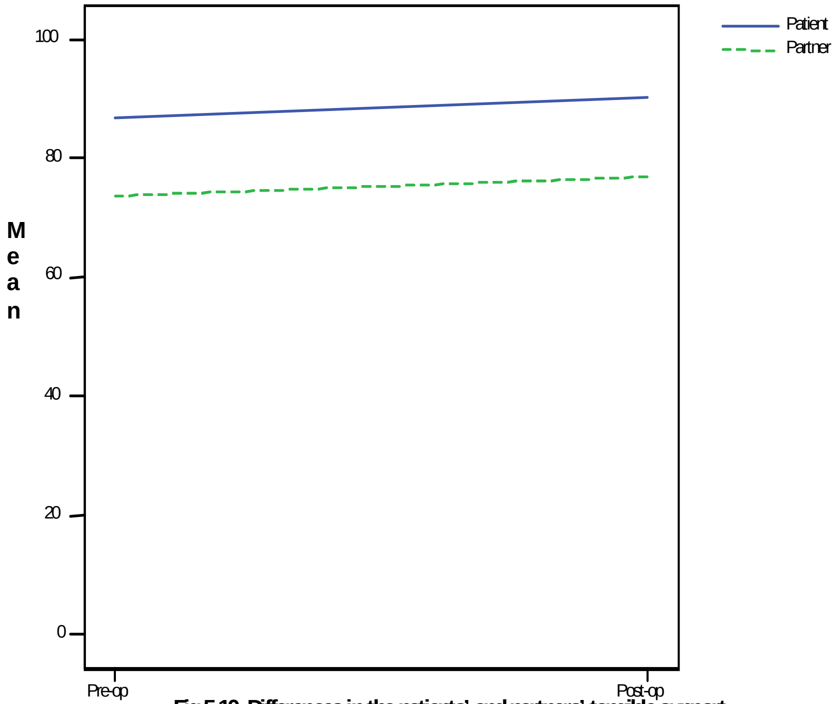


Fig 5.10 Differences in the patients' and partners' tangible support

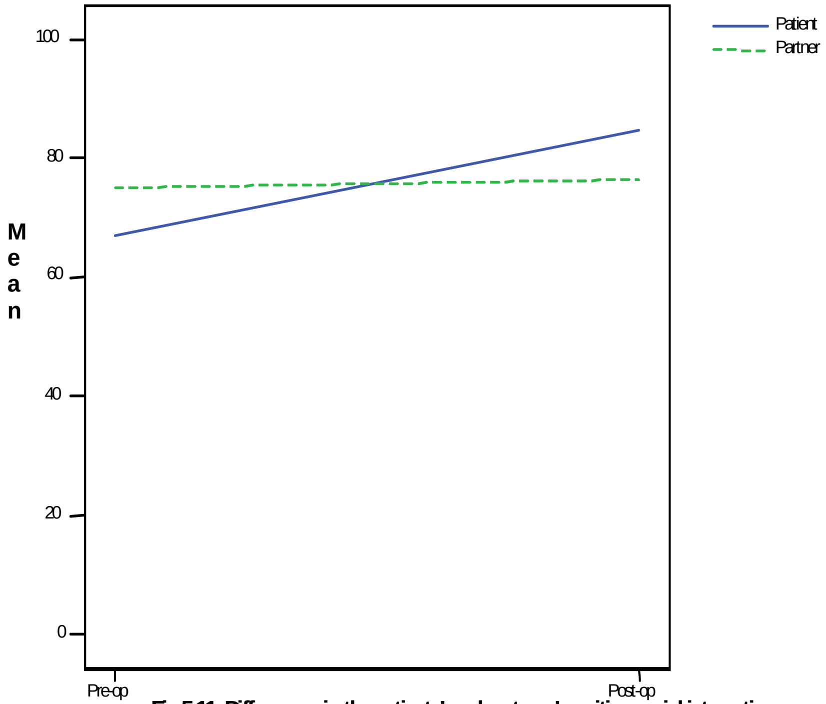


Fig 5.11 Differences in the patients' and partners' positive social interaction

Figures 5.10-5.11 Differences between the patients' and partners' for pre- and post-operative tangible support and positive social interaction

There were significant differences between the patients' and partners' pre- and post-operatively for positive social interaction (Figure 5.11 bottom right)**.** Repeated-measures ANOVA showed a significant effect of time (interaction) between the patients' and partners' for positive social interaction pre- and post-operatively (F (1, 79) = 50.49, p < 0.001), with an effect size of 0.390 (Eta^2). Thirty-nine per cent of the variance in the scores was accounted for by differences between the groups by differences over the two time periods. Notably, whilst the patients' positive social interaction increased significantly from pre- to post-operatively there was no corresponding increase in the partners' positive social interaction.

5.11 SELF-PERCEIVED NEEDS

5.11.1 *Introduction*

The patients' and partners' self-completed a Needs Assessment Scale (Moser et al (1993), before and 4 months after CABG surgery. Pre-operatively, the patients' five most highly rated important needs were: to feel hope that I would have a high quality of life; to receive information about the physical course of the disease; to feel appreciated and valued by my family; to have honest explanations given in understandable terms; to receive specific instructions about care. The most highly rated important needs unmet were: to receive information about feelings/emotions I may have during my recovery; to receive information about return to sexual activity; to be told about other people or groups who can help with problems; to receive information about psychological course; to talk to someone about the anger and frustration I may be experiencing. In contrast, the partners' five most highly rated pre-operative important needs were: to feel hope that my partner (the patient) will have a high quality of life; to receive information about what to do in an emergency; to receive information about the physical course of the disease; to have honest explanations given in understandable terms; to be able to talk with my partner about his or her concerns. The partners' 5 most highly rated important needs unmet were: to receive information about psychological course; to receive information about return to sexual activity; to receive information about feelings/emotions I may have during my recovery; to have help with financial concerns; to be told about other people or groups who can help with problems. Therefore, the patients and partners had some similar and yet discrete important needs met or unmet.

5.11.2 *Differences in patients' and partners' individual needs statements*

The paired *t*-test was used to examine the differences between the patients' and partners' pre- and post-operatively for the individual needs statements. The statistics are presented for the 28 needs statements on Table 5.26. Following Bonferroni correction for multiple comparisons (0.05 divided by 2, for needs met and unmet) there were 4 significant pre-operative differences between the patients and partners and 7 significant post-operative differences (see table 5.26).

5.11.3 *Totalled scores for self-perceived needs*

In addition, two sub-scales were computed for the participants' total number of important needs met and unmet, which allowed for further statistical analysis. The total number of important needs met was computed by taking the score for each of the 28 need statements (e.g. 3.0 for very important) and multiplying it by whether the need was met or not (needs met = 1 and needs unmet = 0). To enable the needs unmet to be calculated the variable was re-coded from 0 to 2 and divided by 2 before totalling the 28 statements. The minimum score for the total number of important needs met was 0 and the maximum score was 84 (28 questions x 3). Higher scores denote a greater total number of important needs met. The minimum score for the total number of important needs unmet was 0 and the maximum possible score was 28 (28 questions x 2 divided by 2).

Table 5.26 Differences in the patients' and partners' self-perceived need and percentage of subjects reporting needs not met

Need statement		Patient means	Patient need not met (%)	Partner means	Partner need not met (%)	Uncorrect Sig	Corrected Sig
To know specific facts about my (the patient's) condition	Pre-op	2.85	7.1	2.93	19.0	0.109	
	Post-op	2.86	8.7	2.91	5.0	0.418	
To have honest explanations given in understandable terms	Pre-op	2.90	10.7	2.95	26.2	0.251	
	Post-op	2.94	12.5	2.95	11.2	0.765	
To talk to a nurse about problems I or my family may be facing	Pre-op	2.50	44.0	2.62	58.3	0.310	
	Post-op	2.63	13.7	2.68	30.0	0.567	
To know the expected course of the disease process	Pre-op	2.86	28.6	2.93	42.9	0.134	
	Post-op	2.86	22.5	2.79	26.2	0.334	
To receive specific instructions about care	Pre-op	2.87	51.2	2.88	79.8	0.859	
	Post-op	2.88	27.5	2.84	38.7	0.634	
To feel hope that I (my family member) will have a high quality of life	Pre-op	2.94	23.8	3.00	39.3	**0.024**	**S/S**
	Post-op	2.96	21.2	3.00	17.5	0.083	
To receive information about what to do in an emergency	Pre-op	2.89	56.0	2.98	65.5	0.070	
	Post-op	2.90	38.7	2.95	27.5	0.397	
To receive information about expected physical course	Pre-op	2.93	40.5	2.96	50.0	0.320	
	Post-op	2.90	20.0	2.90	13.7	1.000	
To received information about how to go about making lifestyle changes	Pre-op	2.76	45.2	2.68	59.5	0.288	
	Post-op	2.75	11.2	2.69	23.7	0.469	
To feel appreciated and valued by my family member	Pre-op	2.93	4.8	2.82	9.5	0.060	
	Post-op	2.68	11.2	2.91	10.0	**0.001**	**S/S**
To receive information about lifestyle changes	Pre-op	2.75	40.5	2.65	60.7	0.219	
	Post-op	2.78	15.0	2.56	23.7	**0.019**	**S/S**
To have my partner assist me in making lifestyle changes	Pre-op	2.75	35.7	2.68	53.6	0.346	
	Post-op	2.48	26.5	2.55	32.5	0.318	
To feel as if others have my welfare in mind	Pre-op	2.67	23.8	2.67	21.4	1.000	
	Post-op	2.70	11.2	2.53	12.5	**0.043**	
To be able to talk with my family member about his/her concerns	Pre-op	2.85	16.7	2.94	9.5	0.059	
	Post-op	2.86	3.7	2.93	7.5	0.199	
To receive specific information about the return to sexual activity	Pre-op	2.06	66.7	1.68	82.1	**0.004**	**S/S**
	Post-op	1.91	56.2	1.61	68.7	**0.046**	N/S

To be able to talk with my family member about my fears/concerns	Pre-op	2.79	23.8	2.79	35.7	1.000	
	Post-op	2.69	13.7	2.78	20.0	0.265	
To receive information about expected psychological course	Pre-op	2.68	66.7	2.80	85.7	0.132	
	Post-op	2.60	47.5	2.75	53.7	0.096	
To talk to someone about my feelings	Pre-op	2.55	29.8	2.63	40.5	0.434	
	Post-op	2.55	20.0	2.59	31.2	0.688	
To have help with financial concerns	Pre-op	2.15	63.1	1.85	76.2	**0.040**	N/S
	Post-op	2.16	63.7	1.68	72.5	**0.002**	**S/S**
To receive information about feelings and emotions my spouse (I) may have during my (the patient's) recovery	Pre-op	2.62	71.4	2.69	83.3	0.434	
	Post-op	2.65	41.2	2.56	52.5	0.422	
To talk to someone about the anger/frustration I may be experiencing	Pre-op	2.27	56.0	2.12	72.6	0.273	
	Post-op	2.41	47.5	1.86	61.2	**< 0.001**	**S/S**
To talk to someone about my fears	Pre-op	2.55	45.2	2.45	51.2	0.413	
	Post-op	2.51	36.2	2.39	38.7	0.266	
To be told about other people or groups who can help with problems	Pre-op	2.12	66.7	1.93	81.0	0.117	
	Post-op	2.11	25.0	1.90	37.5	0.088	
To have time alone for myself	Pre-op	2.23	35.7	2.07	52.4	0.273	
	Post-op	2.17	12.5	2.34	15.0	0.170	
To be away from my family member without worrying	Pre-op	2.30	50.0	2.51	70.2	0.089	
	Post-op	2.31	15.0	2.70	30.0	**0.002**	**S/S**
To feel that others are going through same things, that my experience is not unusual	Pre-op	2.37	45.2	2.32	52.4	0.665	
	Post-op	2.39	18.7	2.31	18.7	0.500	
To talk to others going through the same things	Pre-op	2.24	57.1	1.94	78.6	**0.015**	**S/S**
	Post-op	2.34	22.5	1.88	48.7	**< 0.001**	**S/S**
To have someone run errands or help with the house and/or cooking	Pre-op	2.30	23.8	1.77	46.4	**0.002**	**S/S**
	Post-op	2.34	8.7	1.55	31.2	**< 0.001**	**S/S**
To be able to offer meaningful assistance to the patient	Pre-op	N/A	N/A	2.63	26.5	N/A	
	Post-op	N/A	N/A	2.59	25.0	N/A	

SD, standard deviation; N/A, not applicable; Uncorrect Sig, statistical significance 0.05, Corrected Sig, statistical significance at 0.025 Bonferroni correction (in bold)

5.11.4 *Changes in the patients' and partners' self-perceived needs*

The patients' and partners' pre- and post-operative total scores for important needs met and unmet are presented in Table 5.27. The patients' total number of important needs met increased significantly from pre- to 4 months post-operatively (t = - 5.410, df = 79, p < 0.001) and the total number of important needs unmet decreased significantly (t = 6.196, df = 79, p < 0.001). Similarly, the partners' total number of important needs met significantly increased from pre- to 4 months post-operatively (t = - 9.213, df = 79, p < 0.001) and the total number of important needs unmet decreased significantly (t = 11.015, df = 79, p < 0.001).

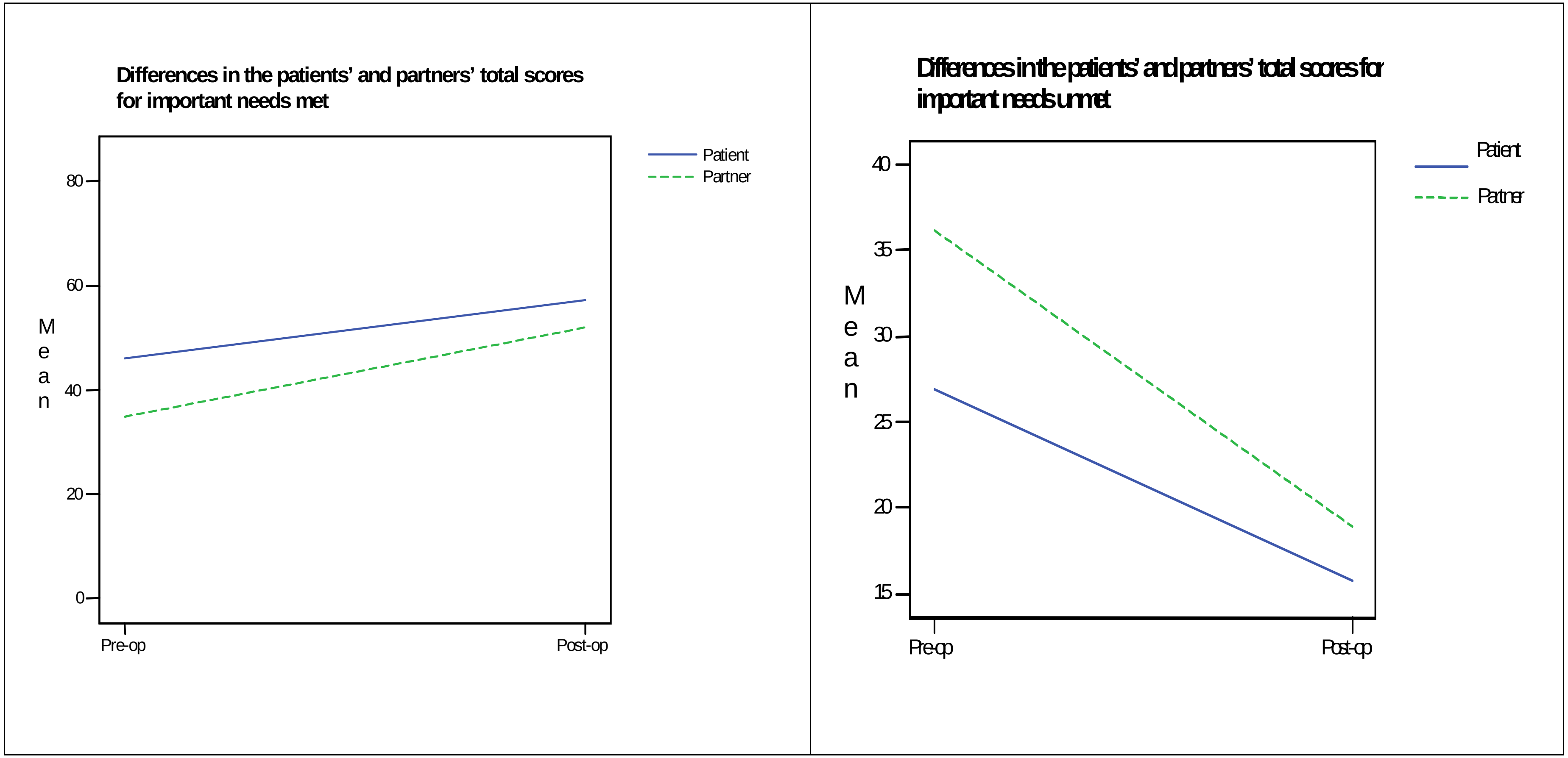
Table 5.27 Changes in the patients' and partners' self-perceived need, and differences between the patients and partners pre- and post-operatively

Needs	CABG surgery	Patients Means (SD)	Partners Means (SD)	Mean (SD) Difference	F (df) Time*ptpart	Sig
Needs met	Pre-op Post-op	45.99 (21.10) 57.23 (18.01)	35.07 (16.14) 51.84 (18.20)	+ 10.99 (20.07) + 5.39 (20.04)	5.74 (1,79)	**0.019**
Needs unmet	Pre-op Post-op	26.98 (19.04) 15.54 (14.52)	36.19 (13.96) 18.62 (14.16)	- 9.21 (18.59) - 3.08 (17.32)	8.83 (1,79)	**< 0.001**

SD, standard deviation; ANOVA; repeated-measures analysis of variance

5.11.5 *Differences between patients' and partners' self-perceived needs*

Figures 5.12 and 5.13 display the level and direction of difference between the patients' and partners' at the mean group level for the total number of important needs met and the total number of important need unmet.



Differences in the patients’ and partners’ total scores for important needs met

Differences in the patients’ and partners’ total scores for important needs unmet

Figures 5.12-5.13 Differences between the patients and partners for pre- and post-operative self-perceived needs (met or unmet)

Repeated-measures ANOVA showed a significant time effect (interaction) between the patients' and partners' important needs met pre- and post-operatively (F (1, 79) = 5.74, p = 0.019), with an effect size of 0.068 (Eta^2). Seven per cent of the variance in the scores was accounted for by differences between the groups by differences over the two time periods.

In addition, there were differences between the patients' and partners' pre- and post-operatively (Figure 5.13, right) for important needs unmet. Repeated-measures ANOVA showed a significant effect (interaction) between the patients' and partners' for important needs unmet pre- and post-operatively (F (1, 79) = 8.834, p < 0.001), with an effect size of 0.101 (Eta^2). Ten per cent of the variance in the scores was accounted for by differences between the groups by differences over the two time periods. Although the partners' total scores on important needs met increased significantly from pre- to post-operatively they were still significantly lower than the patients. The patients' and partners' important needs unmet decreased significantly post-operatively, but the partners still had a greater number of needs unmet compared to the patients.

5.12 SUMMARY

This chapter presented the results of the patients' and partners' pre- and post-operative modifiable CHD risk factors, perceived health status, quality of life, self-efficacy, treatment beliefs, social support and self-perceived need and changes in scores from pre- to 4 months post-operatively. A summary of all the pre- and post-operative scores is presented in Table 5.28. Results indicated the patients' physical and mental health improved significantly from pre- to 4 months post-operatively, but the partners' perceived physical and mental health status was largely unchanged. There was a significant effect of time (interaction) between the patients and partners for the total number of modifiable CHD risk factors, physical health, self-efficacy for maintaining function, affectionate support, positive social interaction and important needs met and unmet. The patients had significantly reduced their total number of modifiable CHD risk factors, but the partners increased their CHD risk factors. The majority of patients were free from angina at 4 months follow-up and those with residual symptoms experienced less severe angina. The partners' perceived physical and mental health was largely unchanged at 4 months follow-up, with both the patients and partners perceived health status remaining below the population average. There was significant improvement in the partners' quality of life (QL-SP) post-operatively, although this remained sub-optimum. Patient confidence for maintaining function improved significantly from pre- to post-operatively and similarly, the partners' efficacy judgments about the patient. Whilst the partners were more confident than the patients' pre-operatively, they were less confident post-operatively. The patients' and partners' had very similar perceptions of treatment benefits and risks. They were more unsure about benefits of increasing physical activity pre-operatively. Overall, the patients understood the risks related to surgery. Notably both the patients and partners had unrealistic expectations about the benefits of CABG surgery. The patients reported more perceived social support compared to the partners, and they also perceived a greater number of needs met. The total number of important needs met increased significantly from pre- to post-operatively and the number of unmet needs unmet decreased signficantly.

Table 5.28 All patients and partners pre- and post-operative scores for variables of interest

	Patient				**Partner**		
Variable	Time 1 (n = 84)	Time 2 (n = 80)	Change		Time 1 (n = 84)	Time 2 (n = 80)	Change
	Mean (SD)	Mean (SD)			Mean (SD)	Mean (SD)	
SF-12							
- Physical health (PCS)	30.45 (8.64)	41.47 (10.94)	S/S		46.92 (10.92)	45.94 (11.13)	N/S
- Mental health (MCS)	44.17 (11.50)	48.19 (11.63)	S/S		45.81 (11.34)	47.48 (11.48)	N/S
Cardiac self-efficacy							
- Control symptoms (SE-CS)	18.52 (6.12)	14.02 (4.04)	S/S		17.54 (5.93)	13.91 (4.41)	S/S
- Maintain function (SE-MF)	5.12 (4.71)	12.95 (5.24)	S/S		6.34 (5.42)	11.16 (5.00)	S/S
Total scores treatment beliefs							
- Total mortality score	23.17 (4.86)	24.25 (5.57)	N/S		23.47 (4.71)	24.97 (4.55)	S/S
- Benefits (NRS)	49.80 (6.77)	51.85 (6.26)	S/S		50.60 (6.81)	50.99 (7.77)	N/S
- Risks (NRS)	11.70 (6.88)	7.44 (5.55)	S/S		12.02 (6.80)	8.09 (4.79)	S/S
- Benefits – risks score	38.21 (10.81)	44.35 (10.28)	S/S		38.57 (11.88)	42.90 (10.02)	S/S
Total number of main modifiable CHD risk factors	2.51 (0.84)	1.76 (0.97)	S/S		1.42 (0.98)	1.54 (0.78)	S/S
Perceived social support							
- Tangible support	87.65 (17.43)	90.70 (16.03)	N/S		73.51 (24.32)	77.26 (21.90)	N/S
- Emotional support	81.88 (15.45)	86.99 (15.45)	S/S		77.37 (21.75)	80.04 (19.79)	N/S
- Affectionate support	71.58 (13.65)	91.98 (16.80) 84.58	S/S		86.51 (17.87)	87.08 (17.78)	N/S
- Positive social interaction	66.90 (15.53)	(21.87)	S/S		75.79 (24.16)	76.46 (23.96)	N/S
Self-perceived needs							
- Important needs met	45.99 (21.10)	57.23 (18.01)	S/S		35.07 (16.14)	51.84 (18.20)	S/S
- Important needs unmet	26.98 (19.04)	15.54 (14.52)	S/S		36.19 (13.96)	18.62 (14.16)	S/S

Patient only scores					**Partner only scores**			
Variable	Time 1 (n = 8)	Time 2 (n = 8)	Change		Variable	Time 1 (n = 84)	Time 2 (n =80)	Change
	Mean (SD)	Mean (SD)				Mean (SD)	Mean (SD)	
Seattle angina questionnaire					QL-SP			
- Physical limitation	29.46 (17.78)	66.07 (23.30)	S/S		- Emotional	64.00 (15.25)	73.86 (15.40)	S/S
- Angina frequency	18.28 (15.20)	52.65 (28.67)	S/S		- Physical/social	57.09 (12.26)	64.87 (10.60)	S/S
- Treatment satisfaction	71.87 (10.85)	65.50 (27.81)	N/S					
Perceived symptom severity								
- Angina severity	7.25 (1.39)	3.50 (1.60)	S/S					
- Limitation due to angina	8.63 (1.77)	1.25 (1.90)	S/S					
- Angina frequency	9.13 (1.72)	3.50 (3.46)	S/S					
- Breathlessness severity	7.00 (1.95)	5.00 (2.16)	N/S					

Change, denotes change scores from pre- operatively (TP1) to 4 months post-operatively (TP2); S/S, statistically significant; N/S, non-significant

CHAPTER 6

RESULTS

PRE-OPERATIVE FACTORS THAT PREDICT THE PATIENTS' AND PARTNERS' OUTCOMES(S) 4 MONTHS AFTER CABG SURGERY

CHAPTER 6

RESULTS

THE PRE-OPERATIVE FACTORS THAT PREDICT THE PATIENTS' AND PARTNERS' OUTCOME(S) 4 MONTHS AFTER CABG SURGERY

6.1 INTRODUCTION

Following on from the previous chapter in which changes in the patients' and partners' variables (research question 1) and pre- and post-operative differences between the patients' and partners' (research question 2) were reported, this chapter presents information on the patient and partner pre-operative factors that predict patient and partner outcome(s) 4 months after CABG surgery (research question 3). It was hypothesised that there would be patient pre-operative factors that predict their post-operative outcomes i.e. physical health, mental health and total number of modifiable CHD risk factors and similarly that there would partner pre-operative factors that predict their post-operative outcomes i.e. physical health, mental health, quality of life and total number modifiable CHD risk factors. It was also hypothesised that patient pre-operative factors predict partner outcome(s) and that partner pre-operative factors predict patient outcome(s) 4 months after CABG. The aim of the study was to explore the complex factors that influence patient and partner and dyad outcome 4 months after CABG surgery. The outcome variables and sub-domains to be examined are presented in Table 6.1.

Table 6.1 Patient and partner outcome variables and sub-domains

Patient	Partner
Perceived health status (SF-12) Physical component score (PCS) Mental component score (MCS)	Perceived health status (SF-12) Physical component score (PCS) Mental component score (MCS)
	Quality of life (QL-SP) Emotional function dimension (EFD) Physical/social function dimension (PSFD)
Total number of CHD risk factors	Total number of CHD risk factors

As far as possible the same patient and partner outcome (dependent) variables were computed such as perceived health status as measured by the SF-12 Health Survey (Jenkinson and Layte 1997) and the same modifiable CHD risk factors were examined. Since most of the patients were free from angina following CABG surgery the Seattle Angina Questionnaire (SAQ) (Garratt et al 2001), which asks them to respond to questions about chest pain was not used in the multivariate analysis. Only the post-operative SAQ scores were calculated for the 8 patients with residual symptoms of angina (see Chapter 5 results). The two sub-domains of the Quality of Life in Cardiac Spouses (QL-SP) (Ebbesen et al 1990) questionnaire i.e. emotional function dimension (EFD) and physical and social function dimension (PSFD) were tested as outcome variables because they were still relevant to the partners' experience post-operatively.

6.2 STATISTICAL ANALYSIS AND MODELLING

To determine what patient pre-operative clinical and quality of life variables were associated with their post-operative physical health (physical component score, PCS) a correlation matrix was constructed to test the bivariate relationships (Model 1). Second, to determine what patient pre-operative social and psychological variables were associated with their post-operative PCS another correlation matrix was constructed (Model 2). The independent variables from models 1 and 2 that significantly correlated with the PCS (dependent variable) were combined to form model 3, which was then used as a basis for the multivariate analysis. The variables (independent) in model 3 that correlated with the PCS at 0.30 or above were included in the multivariate analysis. This was in keeping with the recommendations of Tabachnick and Fidell (2001) who advise that when there are several independent variables, the weaker ones should be eliminated to simplify the model, whilst still maintaining the strong predictors. The same modelling procedure was used to test the independent variables that correlated with the other patient outcome (dependent) variables, namely, mental health (mental component score, MCS) and the total number of modifiable CHD risk factors.

Similarly, the partners' pre-operative medical and quality of life variables (model 1), and social and psychological variables (model 2) were tested to see if they correlated with each of the partner outcome (or dependent) variables, namely physical health (PCS), mental health (MCS), emotional function dimension (EFD), physical and social function dimension (PSFD) and total number of modifiable CHD risk factors.

In order to address the hypotheses what patient pre-operative factors predict partner outcome(s) and what partner pre-operative factors predict the patients' outcome(s) the same modelling procedure was followed, as previously described. This time the patients' pre-operative factors were tested against the partners' outcome(s) and visa versa, the partners' pre-operative factors were tested against the patients' outcomes(s) in a correlation matrix to identify the independent variables that significantly correlated with the outcome variables, prior to conducting the multivariate analysis.

Multiple linear regression or multiple logistic regression can be used when looking to examine relationships between three or more variables (Dancy and Reidy 2002, Polit 1996, Hair et al1998, Tabachnick and Fidell 2001, Field 2005). When the outcome variable was normally distributed multiple linear regression was used and any skewed distributions transformed prior to conducting the analyses (Tabachnick and Fidell

2001). When the outcome variable was bimodal in distribution then multiple logistic regression was used (Tabachnick and Fidell 2001). The steps taken and the criteria used in carrying out these statistics will now be discussed.

6.2.1. Multiple linear regression

Multiple linear regression is a useful technique because it allows for examination of the influence of one independent variable while holding the influence of the others constant. In conducting the multiple linear regression several steps were undertaken.

Step 1: Involved consideration of both continuous and binary variables for inclusion in the model. When the independent variables were binary they were recoded as dummy variables, for example, the coding for gender was 1 for males and 0 for females. When there were more than two categories the variables were recoded as c – 1 etc (Tabachnick and Fidell 2001, Field 2005). A missing data dichotomy was used when there were missing binary variables as it was important to maintain the sample size. Missing data for continuous variables were replaced with the mean value (Cohen and Cohen 1983). When there were a number of missing values, for instance, for anticipated gains in life expectancy (treatment beliefs) this variable was excluded from the analysis. A final check was made on the ratio of predictor variables-to-dependent variables to ensure that the sample size was sufficient for multiple regression.

Step 2: Involved investigating the normality of the dependent variables by assessing for skewness and kurtosis. Any outliers were identified and removed. The data were checked visually by use of distribution curves and boxplots. Any skewed data were transformed and distributions re-checked for skewness. Multiple linear regression was conducted on the raw data scores and the transformed scores, but only the latter are reported.

Step 3: Involved examination of the correlations amongst the independent variables in the models to check for multicollinearity; to ensure that none of the independent variables were too highly correlated ($r > 0.85$). Tolerance was examined in the output, using cut off at 0.1. Hair et al (1998) identify tolerance as i (TOL_i) is $1 – R^{2*}_{I}$, where R^{2*}, is the coefficient for the prediction of the variable i by the other independent variables. As the tolerance value becomes smaller the variable is more highly predicted by the other independent variables (collinearity).

Step 4: Involved conducting the multiple linear regression using the Enter method for robustness. The advantage of the Enter method is that each variable in the model has an equal chance of emerging as important (Brace et al 2000). The Enter method is the safest to use when there are a relatively low number of cases because minor variations in the data due to sampling errors can have a large effect on the order in which the variables are entered and therefore retained in the model **(**Brace et al 2000).

Step 5: involved examining the normal probability plots, the P-P plots of the standardised residuals, and the scatterplots for normality, linearity, homescedasticity and independence. Residual outliers were examined as they may impact on the regression solution and affect the precision of estimation of the regression weights (Tabachnick and Fidell 2001, Field 2005).

Step 6: Involved the statistical reporting from the analyses. The following variables are presented :

1. The F values, the R, the adjusted R^2 and the significance, as well as the % variance accounted for by the model.
2. The variables (predictors) in the model, the standardised beta coefficients (B), the t values and significance levels are presented. This allows for comparison of the relative explanatory power of the predictor variables.

3. The lower and upper confidence intervals of the Bs are also presented.

6.2.2 Multiple logistic regression

Multiple logistic regression is a useful technique because it allows for examination of the relationships between several independent variables and a dichotomous dependent variable (Tabachnick and Fidell 2001). Multiple logistic regression evaluates the odds (probability) of there being membership of one group, based on the combination of values of the predictor variables. The goal of analysis is to correctly predict the category of the outcome for individual cases. Multiple logistic regression was used in the study when the data were bimodal in distribution, which indicated that there are two distinct groups within the sample. For example, some patients had high scores for physical health (PCS) and others had low to moderate scores. The steps taken in conducting the multiple logistic regression and multiple linear regression are conceptually similar, but mechanically different (Tabachnick and Fidell 2001). Similarities include checking of the independent and dependent variables, checking the sample size requirements, the elimination of outliers, handling of the missing data and checking the final model solution. In conducting multiple logistic regression the following steps were undertaken.

Step 1: Involved checking both the continuous and binary variables to be included in the analysis. The outcome variables were recoded into dichotomous (dummy) variables. Convention is to code the dependent variable of greatest interest as 1 and the one of least important as 0 (Tabachnick and Fidell 2001, Field 2005). The values to be included in each group were determined by the medium split method and visual inspection of the biomodal distributions.

Step 2: of the multiple logistic regression was similar to step 3 of the multiple linear regression. This involved examination of the correlations amongst the independent variables in the model to check for multicollinearity. This helped to ensure that none of the independent variables were extremely highly correlated ($r < 0.85$). Missing data were handled in accordance with that described for multiple linear regression.

Step 3: Multiple logistic regression (Enter method) was used. The model chi-square was used to test the null hypothesis that all the b_1 to b_k coefficients are zero. Because of the large number of variables in the study and the sample size requirements of multiple logistic regression if there were a number of correlated variables only those that correlated at a significance level of 0.30 or above were included in the model.

Step 4: Involved conducting the multiple logistic regression using the Enter method and the statistical reporting of results from the analyses. The following variables are presented:

1. The beta regression coefficient (B), the standard error of the B weight (SE), and the Wald test (z-ratio), which is distributed as a chi-square (Polit 1996).
2. The variables (predictor) in the model, significance levels and confidence intervals.
3. The log-likelihood for the full model i.e. the - 2 Log likelihood and the Nagelkerke R^2 ; % of variance of the dependent variable accounted for by the model, adjusted to account for the number of predictor variables in the model).

6.3 PATIENTS' PRE-OPERATIVE FACTORS THAT PREDICT THEIR PHYSICAL HEALTH, MENTAL HEALTH AND CHD RISK FACTORS AFTER CABG

To answer the research question, what patient pre-operative factors predicted their post-operative physical health (physical component score PCS) ?, a multivariate model was constructed, as described.

6.3.1 Patients' pre-operative factors that correlated with their post-operative physical health

The models included the patients' pre-operative clinical and quality of life (Model 1), and social and psychological variables (Model 2) that significantly correlated (correlation matrix) with their post-operative physical health (PCS). This information is presented in Table 6.2.

Table 6.2 Patients' pre-operative variables that correlated with their post-operative physical health

Patient pre-operative variables (n = 80)	r	p
Clinical and quality of life (model 1)		
Angina	0.277	**0.013**
Current physical activity level	- 0.231	**0.003**
Body mass index	- 0.230	**0.041**
Total number modifiable CHD risk factors	- 0.239	**0.033**
Angina severity (NRS)	- 0.238	**0.032**
Limitation of activity due to angina (NRS)	- 0.261	**0.019**
Limitation of activity due to breathlessness (NRS)	- 0.313	**0.005**
Physical component score (PCS)	0.584	**< 0.001**
Mental component score (MCS)	0.320	**0.004**
Physical limitation (SAQ)	0.491	**< 0.001**
Angina frequency and perception (SAQ)	0.431	**< 0.001**
Diastolic blood pressure	0.313	**0.005**
Social and psychological variables (model 2)		
Gender	- 0.318	**0.004**
Self-efficacy-maintain function	0.246	**0.028**
Tangible support	0.287	**0.010**
Positive social interaction	0.274	**0.014**

As can be seen from Table 6.2 there were a number of patient pre-operative variables that moderately or weakly correlated with the post-operative physical health (PCS). Only the variables correlated at 0.30 or above were included in the multiple logistic regression.

6.3.2 Multiple logistic regression model for the patients' post-operative physical health

Multiple logistic regression was used to test the patients' post-operative physical health (PCS) (dependent variable) as the data were bimodal in distribution (Appendix XI). The PCS was encoded as 1 for the group with the lowest score (19.29 – 45.84) and 0 for the group with the normal or above score (46.42 – 61.48), using the medium split method. This model was statistically significant (chi-square 41.298, $p < 0.001$, - 2 Log Likelihood of 64.552 and Nagelkerke R^2 of 0.550). The multiple logistic regression table for the PCS is presented in Table 6.3.

Table 6.3 Multiple logistic regression for the patients' post-operative physical health

Model	B	S.E.	Wald	df	Sig
	14.138	3.898	13.153	1	**< 0.001**

Variables	Beta	S.E.	Significance	95% CI of Beta Lower	Upper
Limitation (breath)	0.102	0.120	0.394	0.876	1.440
PCS	- 0.204	0.073	**0.005**	0.707	0.940
MCS	- 0.135	0.043	**0.002**	0.803	0.951
Physical limitation	0.022	0.024	0.364	0.975	1.073
Angina frequency	0.071	0.033	**0.032**	1.006	1.145
DBP	- 0.077	0.033	**0.021**	0.867	0.988
Gender	- 0.301	1.028	0.769	0.099	5.548

Limitation (breath), limitation of activity due to breathlessness (NRS); PCS, physical component score; MCS, mental component score; DBP, diastolic blood pressure; CI, confidence interval

In this model there were 4 significant predictors of the patients' post-operative physical health (PCS) – their pre-operative physical health (PCS), mental health (MCS), angina frequency and severity (SAQ) and diastolic blood pressure. The PCS and MCS showed negative beta coefficients, indicating that the patients' poorer post-operative physical health was predicted by their poorer pre-operative physical health, poorer mental health, greater angina frequency and severity, and higher diastolic blood pressure. Because I was particularly interested in the more subtle underlying variables, and the same variable is likely to correlate highly over time, the post-operative physical health (PCS) was tested again with the pre-operative PCS omitted.

The second model was statistically significant (chi-square 30.598, p < 0.001, - 2 Log likelihood of 75.253 and Nagelkerke R^2 0.433). The multiple logistic regression table for the PCS is presented in Table 6.4.

Table 6.4 Multiple logistic regression for the patients' post-operative physical health with the pre-operative PCS omitted

Model	B	S.E.	Wald	df	Sig
	8.984	3.041	8.727	1	**0.003**
				95% CI of Beta	
Variables	Beta	S.E.	Significance	Lower	Upper
Limitation (breath)	0.055	0.104	0.597	0.861	1.296
MCS	- 0.083	0.033	**0.012**	0.862	0.982
Physical limitation	- 0.018	0.019	0.345	0.948	1.019
Angina frequency	- 0.033	0.025	0.183	0.984	1.086
DBP	- 0.066	0.029	**0.024**	0.883	0.991
Gender	- 0.425	0.957	0.657	0.100	4.261

Limitation (breath), limitation of activity due to breathlessness (NRS); MCS, mental component score; DBP, diastolic blood pressure; CI, confidence interval

In this model there were 2 significant predictors of the patients' post-operative physical health (PCS) – their pre-operative MCS and diastolic blood pressure. The MCS and DBP showed negative beta coefficients, indicating that the patients' poorer post-operative physical health (PCS) was predicted by their poorer pre-operative mental health (MCS) and higher diastolic blood pressure.

6.3.3 *Patients' pre-operative factors that correlated with their post-operative mental health*

To answer the research question what patient pre-operative factors predicted their post-operative mental health (mental component score - MCS), a multivariate model was constructed, as described. The models included the patients' pre-operative clinical and quality of life (Model 1), and social and psychological variables (Model 2) that significantly correlated (correlation matrix) with the post-operative physical health (MCS). This information is presented in Table 6.5.

Table 6.5 Patients' pre-operative variables that significantly correlated with their post-operative MCS

Patient pre-operative variables (n = 80)	r	p
Clinical quality of life (model 1)		
Smoking status	0.245	**0.029**
Total number of troublesome health problems	- 0.290	**0.009**
Physical component score (PCS)	0.300	**0.007**
Mental component score (MCS)	0.429	**< 0.001**
Physical limitation (SAQ)	0.356	**0.001**
Treatment satisfaction (SAQ)	0.321	**0.004**
Social and psychological variables (model 2)		
Gender	- 0.252	**0.024**
Marital status	0.248	**0.027**
Postcode	- 0.280	**0.012**
Perceived risks of CABG surgery	- 0.344	**0.029**
Emotional support	0.298	**0.007**
Tangible support	0.375	**0.001**
Positive interaction	0.413	**< 0.001**
Affectionate support	0.248	**0.002**
Total number of important needs met	0.317	**0.004**

As can be seen from Table 6.5 the patients' pre-operative mental health (MCS) was moderately correlated with their post-operative mental health (MCS). The other variables were significantly but weakly correlated (0.25 – 0.41) with the post-operative MCS. Only the variables correlated at a significance level of 0.30 or above were included in the multiple logistic regression.

6.3.4 *Multiple logistic regression model for the patients' post-operative mental health*

Multiple logistic regression was used to test the patients' post-operative mental health (MCS) (dependent variable) as the data were bimodal in distribution (Appendix XII). The MCS was encoded as 1 for the group with the lowest score (19.04 – 51.10) and 0 for the group with the normal – or above scores (51.94 - 65.41), using the medium split method. This model was statistically significant (Chi-square of 37.739, P < 0.00, - 2 Log likelihood of 73.115 and Nagelkerke R^2 of 0.502). The multiple logistic regression for the MCS is presented in Table 6.6.

Table 6.6 Multiple logistic regression of the patients' post-operative mental health

Model	B	S.E.	Wald	df	Sig
	8.539	3.435	6.181	1	**0.013**

				95% CI of Beta	
Variables	Beta	S.E.	Significance	Lower	Upper
MCS	- 0.077	0.033	**0.021**	0.868	0.986
Physical limitation	- 0.024	0.015	0.106	0.948	1.005
Treatment satisfaction	- 0.009	0.024	0.725	0.945	1.040
RiskCABG	0.228	0.220	0.301	0.815	1.933
Tangible support	- 0.025	0.027	0.358	0.925	1.028
PosSInteraction	- 0.047	0.049	0.339	0.866	1.051
TotImportnmet	- 0.039	0.018	**0.035**	0.928	0.997

MCS, mental component score; RiskCABG, risks (disadvantages) of CABG to general health and well-being; PosSInteraction, positive social interaxction; TotImportnmet, total number of important needs met; CI, confidence interval

In this model there were 2 significant predictors of the patients' post-operative mental health (MCS), their pre-operative MCS and the total number of important needs met. Both these items showed negative beta coefficients, indicating that the patients' poorer post-operative mental health (MCS) was predicted by their poorer pre-operative mental health and a lower total number of important needs met. Because I was particularly interested in the more subtle underlying variables and the same variable is likely to correlate highly over time, the mental health (MCS) was tested again with the pre-operative MCS omitted.

The second model (with the pre-operative MCS omitted) was borderline statistically significant (Chi-square of 31.886, P < 0.001, - 2 Log likelihood 78.967 and Nagelkerke R^2 of 0.438). The multiple logistic regression table for the MCS is presented in Table 6.7.

Table 6.7 Multiple logistic regression of the patients' post-operative mental health (with the pre-operative MCS omitted)

Model	B	S.E.	Wald	df	Sig
	5.792	3.028	3.659	1	**0.056**

				95% CI of Beta	
Variables	Beta	S.E.	Significance	Lower	Upper
Physical limitation	- 0.033	0.014	**0.020**	0.941	0.995
Treatment satisfaction	- 0.011	0.023	0.617	0.946	1.033
RiskCABG	0.379	0.203	0.062	0.981	2.173
Tangible support	- 0.020	0.638	0.425	0.934	1.029
PosSInteraction	- 0.056	0.045	0.214	0.866	1.033
TotImportnmet	- 0.022	0.016	0.156	0.949	1.008

MCS, mental component score; RiskCABG, risks (disadvantages) of CABG to general health and well-being; PosSInteraction, positive social interaxction; TotImportnmet, total number of important needs met; CI, confidence interval

In this model there were 1 significant predictor of the patients' post-operative mental health (MCS), their pre-operative physical limitation (SAQ). This item showed a negative beta coefficient, indicating that the patient's poorer post-operative mental health was predicted by their poorer pre-operative mental health and greater physical limitation.

6.3.5 ***Patients' pre-operative factors that correlated with their post-operative total number of modifiable CHD risk factors***

To answer the research question what patient pre-operative factors predicted their post-operative total number of modifiable CHD risk factors, a multivariate model was constructed, as described. The models included the patients' pre-operative clinical and quality of life (Model 1), and social and psychological variables (Model 2) that significantly correlated (correlation matrix) with the post-operative total number of modifiable CHD risk factors. This information is presented in Table 6.8.

Table 6.8 Patients' pre-operative variables that significantly correlated with their post-operative total number of modifiable CHD risk factors

Patient pre-operative variables (n = 80)	r	p
Clinical and quality of life (model 1)		
Current physical activity level	0.381	**< 0.001**
Body mass index (BMI)	0.459	**< 0.001**
Total number of modifiable CHD risk factors	0.613	**< 0.001**
Canadian Cardiovascular Scale (CCS)	0.262	**0.019**
Breathlessness (frequency)	0.273	**0.001**
Total number-health problems	0.235	**0.036**
Physical component score (PCS)	- 0.363	**0.001**
Mental component score (MCS)	- 0.311	**0.005**
Physical limitation (SAQ)	- 0.300	**0.007**
Angina frequency and perception (SAQ)	- 0.248	**0.026**
Social and psychological variables (model 2)		
Gender	0.389	**< 0.001**
Occupation	0.393	**< 0.001**
Years of education	- 0.300	**0.007**
Postcode	0.282	**< 0.001**
Self-efficacy maintain function (SE-MF)	- 0.300	**0.006**
Emotional support	- 0.272	**0.015**
Tangible support	- 0.242	**0.031**
Positive interaction	- 0.360	**0.001**
Affectionate support	- 0.292	**0.009**

As can be seen from Table 6.8, the patients' pre-operative total number of modifiable CHD risk factors and BMI were moderately correlated with the post-operative CHD risk factors. The other variables were significantly but weakly correlated (0.23 – 0.39) with the post-operative CHD risk factors. The patients' pre-operative BMI and current physical activity were excluded from further analyses since they were already counted in the total number of modifiable CHD risk factors. Only the variables correlated at a significance level of 0.30 or above were included in the multiple linear regression.

6.3.6 *Multiple linear regression model for the patients' post-operative total number of modifiable CHD risk factors*

Multiple linear regression was used to test the patients' post-operative total number of modifiable CHD risk factors as the data were normally distributed. This model was statistically significant (F = 11.741, P < 0.001, using the Enter method); 49% of the variance was accounted for by the 7 variables in the equation. The multiple linear regression table for the total number of modifiable CHD risk factors is presented in Table 6.9.

Table 6.9 Multiple linear regression of the patients' post-operative total number of modifiable CHD risks factors

Model	SS	df	F	R	Adjusted R^2	Sig
	39.704	7,72	11.741	0.730	0.49	< **0.001**
					95% CI of Beta	
Variables	Beta	T	Significance		Lower	Upper
TotalRFs	0.534	4.960	**< 0.001**		0.319	0.749
PCS	- 0.026	- 1.811	0.074		- 0.055	0.003
MCS	- 0.011	- 1.324	0.190		- 0.028	0.006
Physical limitation	0.007	1.246	0.217		- 0.004	0.019
Gender	0.564	2.467	**0.016**		0.108	1.021
Occupation	0.256	1.391	0.168		- 0.111	0.622
PosSInteraction	- 0.006	- 1.069	0.289		- 0.018	0.005

TotalRFs, total number of modifiable CHD risk factors; PCS, physical component score; MCS, mental component score; PosSInteraction, positive social interaction; CI, confidence interval

In this model there were 2 significant predictors of the patients' post-operative total number of modifiable CHD risk factors – their pre-operative total number of modifiable CHD risk factors and gender. The patients' post-operative greater total number of modifiable CHD risk factors was predicted by a greater total number of pre-operative CHD risk factors and by being female. Again because this thesis was particularly interested in the more subtle underlying variables, the total number of modifiable CHD risk factors was tested again with the pre-operative CHD risk factors omitted.

The second model was statistically significant (F = 7.252, P < 0.001, using the Enter method). The adjusted R^2 was 0.322. The multiple linear regression table for post-operative total number of modifiable CHD risk factors (with the pre-operative CHD risk factors omitted) is presented in Table 6.10.

Table 6.10 Multiple linear regression for the patients post-operative total number of modifiable CHD risks factors (with pre-operative CHD risk factors omitted)

Model	SS	df	F	R	Adjusted R^2	Sig
	27.818	6,73	7.252	0.373	0.322	< **0.001**

Variables	Beta	T	Significance	95% CI of Beta Lower	95% CI of Beta Upper
PCS	- 0.040	- 2.498	**0.015**	- 0.073	- 0.008
MCS	- 0.015	- 1.492	0.140	- 0.034	0.005
Physical limitation	0.010	1.468	0.146	- 0.003	0.023
Gender	0.584	2.219	**0.030**	0.059	1.109
Occupation	0.579	2.931	**0.005**	0.185	0.973
PosSInteraction	- 0.011	- 1.685	0.096	- 0.024	0.002

PCS, physical component score; MCS, mental component score; PosSInteraction, positive social interaction; CI, confidence interval

In this model there was 3 significant predictors of the patients' post-operative total number of modifiable CHD risk factors – their pre-operative physical health (PCS), gender and occupation. The PCS should a negative beta coefficient, indicating that the patients' greater post-operative total number of CHD risk factors was predicted by their poorer pre-operative physical health (PCS). Being female and belonging to the skilled manual, partly skilled and unskilled occupations significantly predicted the patients' greater post-operative total number of CHD risk factors.

6.4 PARTNERS' PRE-OPERATIVE FACTORS THAT PREDICT THEIR PHYSICAL HEALTH, MENTAL HEALTH AND CHD RISK FACTORS AFTER CABG

To answer the research question what partner pre-operative factors predicted their post-operative physical health (physical component score PCS) ?, a multivariate model was constructed, as described.

6.4.1 *Partners' pre-operative factors that correlated with their post-operative physical health*

The model included the partners' pre-operative medical and quality of life (Model 1), and social and psychological variables (Model 2) that significantly correlated (correlation matrix) with the post-operative physical health (PCS). This information is presented in Table 6.11.

Table 6.11 Partners' pre-operative variables that significantly correlated with their post-operative physical health

Partner pre-operative variables (n = 80)	r	p
Medical and quality of life (model 1)		
Total number troublesome health problems	- 0.423	**< 0.001**
Physical component score (PCS)	0.576	**< 0.001**
Mental component score (MCS)	0.281	**0.012**
Emotional function dimension (EFD)	0.251	**0.025**
Social and psychological variables (model 2)		
Occupation	- 0.275	**0.014**

As can be seen from Table 6.11, the partners' pre-operative PCS and total number of troublesome health problems moderately correlated with post-operative physical health (PCS). There were few correlated variables and because they all were significant with the PCS they were included in the multiple linear regression.

6.4.2 Multiple linear regression model for the partners' post-operative physical health

Multiple linear regression was used to test the partners' post-operative physical health (PCS) (dependent variable) as the data were normally distributed. This model showed a statistically significant model (F = 8,662, P < 0.001, using the Enter method). The adjusted R^2 was 0.327. The multiple linear regression table for the partners' physical health (PCS) is presented in Table 6.12.

Table 6.12 Multiple linear regression for partners' post-operative physical health (PCS)

Model	SS	df	F	R	Adjusted R^2	Sig
	3611.248	5.74	8.662	0.369	0.327	< **0.001**
					95% CI of Beta	
Variables	Beta	T	Significance		Lower	Upper
TotalNoHealthP	- 0.757	- 0.490	0.626		- 3.837	2.323
PCS	0.527	4.131	**< 0.001**		0.273	0.782
MCS	0.210	1.584	0.117		- 0.057	0.475
EFD	- 0.127	- 1.252	0.214		- 0.330	0.075
Occupation	- 0.832	- 1.238	0.220		- 2.172	0.507

TotalNoHealthP, total number of troublesome health problems; PCS, physical component score; MCS, mental component score; EFD, emotional function dimension; CI, confidence interval

In this model there was 1 statistically significant predictor of the partners' post-operative physical health (PCS) – their pre-operative physical health. The partners' poorer post-operative physical health (PCS) was predicted by their poorer pre-operative physical health (PCS).

The second model (with the pre-operative PCS omitted) showed a statistically significant model (F = 4.540, P = 0.002, using the Enter method). The adjusted R^2 was 0.152. The multiple linear regression table for the model is presented in Table 6.13.

Table 6.13 Multiple linear regression for partners' post-operative physical health (PCS)

Model	SS	df	F	R	Adjusted R^2	Sig
	1906.684	4,75	4.540	0.442	0.152	**0.002**
					95% CI of Beta	
Variables	Beta	T	Significance		Lower	Upper
TotalNoHealthP	- 4.407	- 2.969	**0.004**		- 7.364	- 1.450
MCS	0.147	0.989	0.328		- 0.150	0.443
EFD	- 0.033	- 0.291	0.772		- 0.258	0.192
Occupation	- 1.598	- 0.631	0.220		- 6.643	3.447

TotalNoHealthP, total number of troublesome health problems; MCS, mental component score; EFD, emotional function dimension; CI, confidence interval

In this model there was 1 statistically significant predictor of the partners' post-operative physical health (PCS) – their pre-operative total number of other troublesome health problems. The partners' pre-operative total number of troublesome health problems showed a negative beta coefficient, indicating that the partners' poorer post-operative physical health (PCS) was predicted by a greater total number of pre-operative troublesome health problems.

6.4.3 *Partners' pre-operative factors that correlated with their post-operative mental health*

To answer the research question what partner pre-operative factors predicted their post-operative mental health (mental component score - MCS), a multivariate model was constructed, as described. The model included the partners' pre-operative medical and quality of life (Model 1) and social and psychological variables (Model 2) that significantly correlated (correlation matrix) with the post-operative mental health (MCS). This information is presented in Table 6.14.

Table 6.14 Partners' pre-operative variables that significantly correlated with their post-operative MCS

Partner pre-operative variables	r	p
Medical and quality of life (model 1)		
Total number troublesome health problems	- 0.367	**0.001**
Physical component score (PCS)	0.223	**0.047**
Mental component score (MCS)	0.515	**< 0.001**
Emotional function dimension (EFD)	0.418	**< 0.001**
Physical and social function dimension (PSFD)	0.338	**0.002**
Social and psychological variables (model 2)		
Age	- 0.252	**0.024**
SE-MF	- 0.398	**< 0.001**
Reduction in mortality risk from CABG	0.375	**0.001**

As can be seen in Table 6.14, the partners' pre-operative mental health (MCS) and emotional function dimension (EFD) were moderately correlated with post-operative mental health (MCS) (dependent variable). All the variables that correlated at a level of 0.30 or above were included in the multiple linear regression.

6.4.4. *Multiple linear regression model for the partners post-operative mental health*

Multiple linear regression was used to test the partners' post-operative mental health (MCS). The data were skewed so it was transformed by logarithmic transformation prior to conducting the analyses (Tabachnick and Fidell 2001). This model showed a statistically significant model (F = 5.742, P < 0.001, using the Enter method). The adjusted R^2 was 0.231. The multiple linear regression table for the MCS is presented in Table 6.15.

Table 6.15 Multiple linear regression for partners' post-operative mental health (MCS)

Model	SS	df	F	R	Adjusted R^2	Sig
	22.720	5,74	5.742	0.529	0.231	**< 0.001**

Variables	Beta	T	Significance	95% CI of Beta Lower	Upper
TotalNoHealthP	0.179	1.394	0.168	- 0.077	0 .435
MCS	- 0.031	- 2.439	**0.017**	- 0.057	- 0.006
EFD	0.005	0.391	0.697	- 0.021	0.031
PSFD	- 0.008	- 0.602	0.549	- 0.035	0.019
MortRRCABG	- 0.223	- 1.924	0.058	- 0.454	0.008

TotalNoHealthP, total number of main troublesome health problems; MCS, mental component score; EFD, emotional function dimension; PSFD, physical and social function dimension; MortRRCABG, benefits of CABG – mortality risk reduction; CI, confidence interval

In this model there was 1 significant predictor of the partners' post-operative mental health (MCS) – their pre-operative mental health (MCS). This item showed a negative beta coefficient, indicating that the partners' poorer post-operative mental health (MCS) was predicted by their poorer pre-operative mental health (MCS). Because I was particularly interested in the more subtle underlying variables, mental health was tested again with the pre-operative MCS omitted.

The second model (with the pre-operative MCS omitted) was statistically significant (F = 5.338, P = 0.001, using the Enter method). The adjusted R^2 was 0.180. The multiple regression table for mental health (pre-operative MCS omitted) is presented in Table 6.16.

Table 6.16 Multiple linear regression of the partners' post-operative mental health (with the pre-operative MCS omitted)

Model	SS	df	F	R	Adjusted R^2	Sig
	18.012	4,75	5.338	0.222	0.180	**0.001**

Variables	Beta	T	Significance	95% CI of Beta Lower	Upper
TotalNoHealthP	0.223	1.780	0.079	- 0.028	0.493
EFD	- 0.011	- 0.955	0.343	- 0.034	0.012
PSFD	- 0.005	- 0.391	0.697	- 0.033	0.022
BenefitsRRCABG	- 0.248	- 2.085	**0.041**	- 0.486	- 0.011

TotalNoHealthP, total number of main troublesome health problems; EFD, emotional function dimension; PSFD, physical and social function dimension; BenefitsRRCABG, benefits of CABG – mortality risk reduction; CI, confidence interval

In this model there was 1 significant predictor of the partners' post-operative mental health (MCS) – their pre-operative beliefs about the benefits of CABG – mortality risk reduction. This item showed a negative beta coefficient, indicating that the partners' poorer post-operative mental health was predicted by their less strong pre-operative beliefs about the benefits of CABG – mortality risk reduction.

6.4.5 *Partners' pre-operative factors that correlated with their post-operative emotional function dimension*

To answer the research question, what partner pre-operative factors predicted their post-operative emotional function dimension (EFD), a multivariate model was constructed, as described. The model included the partners' pre-operative medical and quality of life (Model 1), and social and psychological variables (Model 2) that significantly correlated (correlation matrix) with the post-operative emotional and functional dimension (EFD). This information is presented in Table 6.17.

Table 6.17 Partners' pre-operative variables that significantly correlated with their post-operative emotional function dimension

Partner pre-operative variables (n = 80)	r	p
Medical and quality of life (model 1)		
Total number troublesome health problems	- 0.456	**< 0.001**
Physical component score (PCS)	0.446	**< 0.001**
Mental component score (MCS)	0.630	**< 0.001**
Emotional function dimension (EFD)	0.635	**< 0.001**
Physical and social function dimension (PSFD)	0.455	**< 0.001**
Social and psychological variables (model 2)		
Perceived risks of CABG surgery	0.275	**0.014**
Emotional and informational support	0.266	**0.017**
Positive social interaction	0.236	**0.037**

As can be seen in Table 6.17, the partners' pre-operative total number of troublesome health problems, PCS, MCS, EFD and physical and social function dimension (PSFD) were moderately correlated with post-operative emotional function dimension (EFD). The variables correlated with the post-operative EFD at a significance level of 0.30 or above were included in the multiple logistic regression.

6.4.6 Multiple logistic regression model for the partners' post-operative emotional function dimension

Multiple logistic regression was used to test partner post-operative emotional function dimension (EFD) (dependent variable) as the data were bimodal in distribution (Appendix XIII). The EFD was encoded as 1 for the group with the lowest EFD (35.00 – 64.00) and 0 for the group with the normal – or above normal scores (66.00 - 98.00), using the medium split method. This model was statistically significant (chi-square was 40.217, P < 0.001, Nagelkerke R^2 was 0.561 and – 2 Log likelihood 58.647). The multiple logistic regression table for EFD is presented in Table 6.18.

Table 6.18 Multiple logistic regression of the partners' post-operative emotional function dimension

Model	B	S.E.	Wald	df	Sig
	8.678	3.003	8.349	1	**0.004**
				95% CI of Beta	
Variables	Beta	S.E.	Significance	Lower	Upper
TotalNoHealthP	0.036	0.420	0.932	0.455	2.362
PCS	- 0.087	0.037	**0.018**	0.852	0.985
MCS	- 0.086	0.041	**0.035**	0.846	0.994
EFD	- 0.090	0.048	0.059	0.833	1.004
PSFD	0.085	0.048	0.078	0.990	1.197
PosSInteraction	- 0.140	0.015	0.371	0.958	1.016

TotalNoHealthP, total number of troublesome health problems; PCS, physical component score; MCS, mental component score; EFD, emotional function dimension; PSFD, physical and social function dimension; PossSInteraction, positive social interaction; CI, confidence interval

In this model there were 2 significant predictors of the partners 'post-operative emotional function dimension (EFD) – their pre-operative physical health (PCS) and mental health (MCS). These items both showed negative beta coefficients, indicating that the partners' poorer post-operative emotional function dimension (EFD) was predicted by their poorer pre-operative physical health and mental health.

6.4.7 *Partners' pre-operative factors that correlated with their post-operative physical and social function dimension*

To answer the research question what partner pre-operative factors predicted their post-operative the physical and social function dimension (PSFD) ?, a multivariate model was constructed, as described. The model included the partners' pre-operative medical and quality of life (Model 1), and social and psychological variables (Model 2) that significantly correlated (correlation matrix) with the post-operative physical and social dimension (PSFD). This information is presented in Table 6.19.

Table 6.19 Partners' pre-operative variables that significantly correlated with their post-operative physical and social function dimension

Partners pre-operative variables (n = 80)	r	p
Medical and quality of life (model 1)		
Total number troublesome health problems	0.358	**< 0.001**
Physical component score (PCS)	0.425	**< 0.001**
Mental component score (MCS)	0.432	**< 0.001**
Emotional function dimension (EFD)	0.469	**< 0.001**
Physical and social function dimension (PSFD)	0.500	**< 0.001**
Social and psychological variables (model 2)		
Emotional and informational support	0.249	**0.026**
Tangible support	0.248	**0.026**
Positive social interaction	0.265	**0.017**
Affectionate support	0.306	**0.006**

As can be seen in Table 6.19, the partners' pre-operative PCS, MCS, EFD and PSFD were moderately correlated with the post-operative physical and social function dimension (PSFD). The variables correlated with the post-operative PSFD at a significance level of 0.30 or above were included in the multiple logistic regression.

6.4.8 *Multiple logistic regression model for the partners post-operative physical and social function dimension*

Multiple logistic regression was used to test the partners' post-operative physical and social functional dimension (PSFD) (dependent variable) as the data were bimodal in distribution (Appendix XIV). The PSFD was encoded as 1 for the group with the lowest PSFD (38.00 – 63.00) and 0 for the group with the normal – or above normal scores (64.00 - 84.00), using the medium split method. This model was statistically significant (chi-square 31.598, P < 0.001, Nagelkerke R^2 0.445 and –2 Log likelihood 74.252). The multiple logistic regression table for the PSFD is presented in Table 6.20.

Table 6.20 Multiple logistic regression of the partners' post-operative physical and social dimension

Model	B	S.E.	Wald	df	Sig
	9.457	3.033	9.720	1	**0.002**

				95% CI of Beta	
Variables	Beta	S.E.	Significance	Lower	Upper
TotalNoHealthP	0.205	0.410	0.617	0.550	2.740
PCS	- 0.012	0.033	0.706	0.926	1.053
MCS	- 0.060	0.035	0.084	0.880	1.008
EFD	0.016	0.035	0.640	0.949	1.089
PSFD	- 0.088	0.042	**0.037**	0.842	0.995
Affectionate support	- 0.034	0.017	**0.043**	0.935	0.999

TotalNoHealthP, total number of troublesome health problems; PCS, physical component score; MCS, mental component score; EFD, emotional function dimension; PSFD, physical and social function dimension; CI, confidence interval

In this model there were 2 statistically significant predictors of the partners' post-operative physical and social function dimension (PSFD) – their pre-operative PSFD and affectionate support. These items both showed negative beta coefficients, indicating that the partners' poorer post-operative physical and social functional dimension (PSFD) was predicted by their poorer pre-operative PSFD and lack of perceived affectionate support. Because I was particularly interested in the more subtle underlying variables, the PSFD was tested again with the pre-operative PSFD omitted.

The second model was statistically significant (chi-square 26.749, $P < 0.001$, Nagelkerke R^2 0.387 and – 2 Log likelihood 79.101). The logistic regression table for the physical and social functional dimension (with the pre-operative PSFD omitted) is presented in Table 6.21.

Table 6.21 Multiple logistic regression of the partners' post-operative physical and social dimension (with the pre-operative PSFD omitted)

Model	B	S.E.	Wald	df	Sig
	7.603	2.767	5.234	1	**0.006**
				95% CI of Beta	
Variables	Beta	S.E.	Significance	Lower	Upper
TotalNoHealthP	0.238	0.394	0.546	0.586	2.747
PCS	- 0.022	0.032	0.482	0.919	1.040
MCS	- 0.050	0.034	0.141	- 0.891	- 1.017
EFD	- 0.035	0.026	0.182	0.918	1.016
Affectionate support	- 0.033	0.016	**0.041**	0.938	0.999

TotalNoHealthP, total number of troublesome health problems; PCS, physical component score; MCS, mental component score; PSFD, physical and social function dimension; CI, confidence interval

In this model there was 1 significant predictor of the partners' post-operative physical and social dimension (PSFD) – their pre-operative affectionate support. This showed a negative beta coefficient, indicating that the partners' poorer post-operative PSFD was predicted by their pre-operative lack of perceived affectionate support.

6.4.9 *Partners' pre-operative factors that correlated with post-operative total number of modifiable CHD risk factors*

To answer the research question what partner pre-operative factors predicted their post-operative total number of modifiable CHD risk factors, a multivariate model was constructed, as described. The model included the partners' pre-operative medical and quality of life (Model 1), and social and psychological variables (Model 2) that significantly correlated (correlation matrix) with the post-operative total number of CHD risk factors. This information is presented in Table 6.22.

Table 6.22 Partners' pre-operative variables that significantly correlated with the post-operative total number of modifiable CHD risk factors

Partner pre-operative variables	r	p
Medical and quality of life (model 1)		
TotalRFs	0.758	**< 0.001**
Emotional function dimension (EFD)	- 0.281	**0.012**
Physical and social function dimension (PSFD)	- 0.329	**0.003**
Social and psychological variables (model 2)		
Occupation	0.223	**0.046**
Years of education	- 0.245	**0.028**
Postcode	0.291	**0.009**
Partners beliefs about patients' SE-MF	- 0.398	**< 0.001**
Perceived risks (VAS) increasing physical activity	0.244	**0.029**

As can be seen in Table 6.22**,** the partners' pre-operative total number of modifiable CHD risks factors were moderately correlated with the post-operative CHD risks factors. The other variables were significantly but weakly correlated with the post-operative total number of modifiable CHD risk factors. The variables correlated with the post-operative total number of modifiable CHD risk factors at a significance level of 0.30 or above were included in the multiple logistic regression.

6.4.10 *Multiple linear regression model for the partners' post-operative total number of modifiable CHD risk factors*

Multiple linear regression was used to test the partners' post-operative total number of modifiable CHD risk factors as the data were normally distributed. This model showed a statistically significant model (F = 36.388, P < 0.001, using the Enter method). The adjusted R^2 was 0.573. The multiple linear regression table for the total number of modifiable CHD risk factors is presented in Table 6.23.

Table 6.23 Multiple linear regression for the partners' post-operative total number of modifiable CHD risks factors

Model	SS	df	F	R	Adjusted R^2	Sig
	36.388	3,76	36.388	0.768	0.573	< **0.001**

				95% CI of Beta	
Variables	Beta	T	Significance	Lower	Upper
TotalRFs	0.642	9.438	**< 0.001**	0.506	0.777
PSFD	- 0.008	- 1.629	0.097	- 0.018	0.002
PartBptsSE-CS	0.002	0.208	0.836	- 0.017	0.022

TotalRFs, total number of modifiable CHD risk factors; PSFD, physical and social functional dimension; PartBptsSE-CS, partner confidence in the patients' capacity to control symptoms; CI, confidence interval

In this model there was 1 significant predictor of the partners' post-operative total number of modifiable CHD risk factors – their pre-operative CHD risk factors. The partners' greater post-operative total number of CHD risk factors was predicted by their greater pre-operative CHD risk factors. Because I was particularly interested in the more subtle underlying variables, the total number of modifiable CHD risk factors was tested again with the pre-operative CHD risk factors omitted.

The second model was statistically significant (F = 4.683, P = 0.012, using the Enter method), with 8% of the variance being accounted for by the 2 variables in the equation. The adjusted R^2 was 0.085. The multiple linear regression table for the post-operative total number of modifiable CHD risk factors (with pre-operative CHD risk factors omitted) is presented in Table 6.24.

Table 6.24 Multiple linear regression of the partners' post-operative total number of CHD risks factors (with pre-operative CHD risk factors omitted)

Model	SS	df	F	R	Adjusted R^2	Sig
	5.194	2,77	4.683	0.108	0.085	**0.012**
					95% CI of Beta	
Variables	Beta	T	Significance		Lower	Upper
PSFD	- 0.021	- 3.006	**0.004**		- 0.035	- 0.007
PartBptsSE-CS	- 0.001	- 0.045	0.964		- 0.029	0.028

PSFD, physical and social functional dimension; PartBptsSE-CS, partners' confidence in the patients' capacity to control symptoms; CI, confidence interval

In this model there was 1 significant predictor of the partners' post-operative total number of modifiable CHD risk factors – their pre-operative physical and social functional dimension (PSFD). The partners' post-operative greater total number of CHD risk factors was predicted their poorer pre-operatively physical and social function dimension.

6.5 PATIENTS' PRE-OPERATIVE FACTORS THAT PREDICT THE PARTNERS' PHYSICAL HEALTH, MENTAL HEALTH AND CHD RISK FACTORS AFTER CABG

To answer the research question what patient pre-operative factors predict the partners' post-operative physical health (physical component score PCS) ?, a multivariate model was constructed, as described.

6.5.1 *Patients' pre-operative factors that correlated with the partners' post-operative physical health*

The model included the patients' pre-operative clinical and quality of life (Model 1), and social and psychological variables (Model 2) that significantly correlated (correlation matrix) with the partners' post-operative physical health (PCS). This information is presented in Table 6.25.

Table 6.25 Patients' pre-operative variables that significantly correlated with the partners' post-operative physical health (PCS)

Patients' pre-operative variables (n = 80)	r	p
Clinical and quality of life (model 1)		
Mental component score (MCS)	0.229	**0.041**
Angina frequency and perception (SAQ)	0.241	**0.031**
Current physical activity level	- 0.231	**0.039**
Diabetes mellitus	0.227	**0.047**
Social and psychological variables (model 2)		
Reduction in mortality risk from CABG	0.272	**0.015**

Table 6.25 presents the patients' pre-operative variables that significantly correlated with the partners' post-operative physical health (PCS). These variables though weakly correlated were significant so they were all included in the multiple linear regression.

6.5.2 *Multiple linear regression model for the patients' pre-operative factors that predict the partners' post-operative physical health*

Multiple regression of the partners' post-operative physical health (PCS) showed a statistically significant model (F = 2.499, P = 0.038, using the Enter method). The adjusted R^2 was 0.087. The multiple linear regression table for the patients' pre-operative factors that predict partners post-operative PCS is presented in Table 6.26.

Table 6.26 Multiple linear regression of the patients' pre-operative factors that predict the partners' post-operative physical health

Model	SS	df	F	R	Adjusted R^2	Sig
	1413.206	5,74	2.499	0.380	0.087	**0.038**

Variables	Beta	T	Significance	95% CI of Beta Lower	Upper
MCS	0.122	1.046	0.299	- 0.110	0.354
Angina frequency	0.068	0.894	0.374	- 0.084	0.221
Physical activity	- 0.919	- 0.249	0.804	- 8.258	6.421
Diabetes mellitus	- 3.405	- 1.111	0.270	- 9.509	2.700
MortalityRRCABG	2.313	1.147	**0.047**	0.028	4.599

MCS, mental component score; MortalityRRCABG, treatment beliefs - benefit mortality risk reduction from CABG; CI, confidence interval

In this model there was 1 significant predictor of the partners' post-operative physical health (PCS) – the patients' pre-operative beliefs about the benefits of CABG - mortality risk reduction. The partners' poorer post-operative physical health was predicted by the patients' less strong pre-operative beliefs about the benefits of CABG – mortality risk reduction.

6.5.3 *Patients' pre-operative factors that correlated with the partners' post-operative mental health*

To answer the research question what patient pre-operative factors predicted the partners' post-operative mental health (mental component score -MCS), a multivariate model was constructed, as described. The model included the patients' pre-operative clinical and quality of life (Model 1), and social and psychological variables (Model 2) that significantly correlated (correlation matrix) with the partners' post-operative mental health (MCS). This information is presented in Table 6.27.

Table 6.27 Patients' pre-operative variables that significantly correlated with the partners' post-operative mental health

Patients' pre-operative variables (n = 80)	r	p
Clinical and quality of life (model 1)		
Physical component score (PCS)	0.229	**0.041**
Physical limitation (SAQ)	0.323	**0.003**
Age of onset of angina	- 0.250	**0.025**
Limitation of activity due to breathlessness (NRS)	- 0.261	**0.020**
Diastolic blood pressure	0.233	**0.037**
Social and psychological variables (model 2)		
Age (patient)	- 0.262	**0.019**

Table 6.27 presents the patients' pre-operative variables that significantly correlated with the partners' post-operative mental health (MCS). These variables were mostly

weakly correlated. When the 6 variables were included in multiple linear regression, the model was not statistically significant.

6.5.4 ***Patients' pre-operative factors that correlated the partners' post-operative emotional function dimension***

To answer the research question what patient pre-operative factors predicted the partners' post-operative emotional function dimension (EFD), a multivariate model was constructed. The model included the patients' pre-operative clinical and quality of life (Model 1), and social and psychological variables (Model 2) that significantly correlated (correlation matrix) with the partners' post-operative emotional function dimension (EFD). This information is presented in Table 6.28.

Table 6.28 Patients' pre-operative variables that significantly correlated with partners' post-operative emotional function dimension

Patients' pre-operative variables (n = 80)	r	p
Clinical and quality of life (model 1)		
Physical component score (PCS)	0.298	**0.007**
Mental component score (MCS)	0.417	**< 0.001**
Physical limitation (SAQ)	0.412	**< 0.001**
Angina frequency and perception (SAQ)	0.306	**0.006**
Smoking status	0.250	**0.025**
Current physical activity level	- 0.266	**0.017**
Diastolic blood pressure	0.283	**0.011**
Social and psychological variables (model 2)		
Reduction in mortality risk from CABG	0.319	**0.004**

Table 6.28 presents the patients' pre-operative variables that significantly correlated with the partners' post-operative emotional and functional dimension (EFD). The patients' pre-operative mental health (MCS) and physical limitation were moderately correlated with the partners' post-operative EFD. The other variables were significantly but weakly correlated with the post-operative EFD. The variables correlated with the

partners' post-operative EFD at a level of 0.30 or above were included in the multiple logistic regression.

6.5.5 *Multiple logistic regression model for the patients' pre-operative factors that predict the partners' post-operative emotional function dimension*

Multiple logistic regression was used to test the partners' post-operative EFD (dependent variable). The EFD was encoded as 1 for the group with the lowest EFD (35.00 – 64.00) and 0 for the group with the normal – above EFD (66.00 – 98.00), using the medium split method. This model was statistically significant (chi-square 29.471, $P < 0.001$, Nagelkerke R^2 0.433 and –2 Log likelihood 69.903). The multiple logistic regression table for the partners emotional function dimension is presented in Table 6.29.

Table 6.29 Multiple logistic regression of the patients' pre-operative factors that predict the partners emotional function dimension

Model	B	S.E.	Wald	df	Sig
	7.194	2.210	10.594	1	**0.001**
				95% CI of Beta	
Variables	Beta	S.E.	Significance	Lower	Upper
MCS	- 0.047	0.032	0.138	0.897	1.015
Physical limitation	- 0.050	0.022	**0.021**	0.912	0.992
Angina frequency	0.006	0.021	0.780	0.965	1.048
MortalityRRCABG	- 0.903	0.376	**0.016**	0.194	0.847

MCS, mental component score; MortRRCABG, treatment benefit- mortality risk reduction from CABG; CI, confidence interval

In this model there were 2 significant predictors of the partners' post-operative EFD – the patients' pre-operative physical limitation and treatment beliefs – CABG mortality risk reduction. These 2 items both showed negative beta coefficients, indicating that the partners' poorer post-operative emotional function dimension (EFD) was predicted by the patients' less strong pre-operative beliefs about the benefits of CABG – mortality risk reduction and their greater pre-operative physical limitation.

6.5.6 *Patients' pre-operative factors that correlated with the partners' post-operative physical and social function dimension*

To answer the research question what patient pre-operative factors predicted the partners' post-operative physical and social dimension (PSFD), a multivariate model was constructed, as described. The model included the patients' pre-operative clinical and quality of life (Model 1), and social and psychological variables (Model 2) that significantly correlated (correlation matrix) with the partners' post-operative physical and social function dimension (PSFD). This information is presented in Table 6.30.

Table 6.30 Patients' pre-operative factors that significantly correlated with the partners' post-operative physical and social function dimension

Patients' pre-operative variables (n = 80)	r	p
Clinical and quality of life (model 1)		
Physical component score (PCS)	0.227	**0.042**
Mental component score (MCS)	0.447	**< 0.001**
Physical limitation (SAQ)	0.402	**< 0.001**
Angina frequency and perception (SAQ)	0.281	**0.012**
Current physical activity level	- 0.233	**0.046**
Diastolic blood pressure	0.333	**0.002**
Social and psychological variables (model 2)		
Reduction in mortality risk from CABG	0.348	**0.002**

Table 6.30 presents the patients' pre-operative variables that significantly correlated with the partners' post-operative physical and social function dimension (PSFD). The patients' pre-operative mental health (MCS) and angina frequency and perception were moderately correlated with the partners' post-operative PSFD. The other variables that correlated with the partners' post-operative EFD at a significance level of 0.30 or above were included in the multiple logistic regression.

6.5.7 Multiple logistic regression model for patients' pre-operative factors that predicted the partners' post-operative **physical and social function dimension**

Multiple logistic regression was used to examine the partner post-operative physical and social function dimension (PSFD) (dependent variable). The PSFD was encoded as 1 for the group with the lowest PSFD (38.00 – 63.00) and 0 for the group with the normal – above PSFD (64.00 – 84.00), using the medium split method. This model was statistically significant (chi-square 24.582, $P < 0.001$, Nagelkerke R^2 0.361 and –2 log likelihood 81.268). The multiple logistic regression table for the partners' PSFD is presented in Table 6.31.

Table 6.31 Multiple logistic regression of the patients' pre-operative factors that predict the partners' post-operative physical and social function dimension

Model	B	S.E.	Wald	df	Sig
	5.302	1.644	10.399	1	**0.001**
				95% CI of Beta	
Variables	Beta	S.E.	Significance	Lower	Upper
MCS	- 0.065	0.029	**0.023**	0.886	0.991
Physical limitation	- 0.032	0.015	**0.028**	0.940	0.996
MortalityRRCABG	- 0.352	0.262	0.178	0.421	1.174

MCS, mental component score; MortRRCABG, treatment benefit- mortality risk reduction from CABG; CI, confidence interval

In this model there were 2 statistically significant predictors of the partners' post-operative PSFD – the patients' pre-operative mental health (MCS) and physical limitation. Both these items showed negative beta coefficients, indicating that the partners' poorer post-operative physical and social dimension was predicted by the patients' poorer pre-operative mental health (MCS) and their greater physical limitation.

6.5.8 *Patients' pre-operative factors that correlated with the partners' post-operative total number of modifiable CHD risk factors*

To answer the research question what patient pre-operative factors predicted the partners' post-operative total number of modifiable CHD risk factors, a multivariate model was constructed, as described. The model included the patients' pre-operative clinical and quality of life (Model 1) and social and psychological variables (Model 2) that significantly correlated (correlation matrix) with the partners' post-operative total number of CHD risk factors. This information is presented in Table 6.32.

Table 6.32 Patients' pre-operative variables that significantly correlated with the partner's post-operative total number of modifiable CHD risk factors

Patients' pre-operative variables (n = 80)	r	p
Clinical and quality of life (model 1)		
Physical component score (PCS)	- 0.296	**0.008**
Physical limitation (SAQ)	- 0.282	**0.011**
Treatment satisfaction (SAQ)	0.227	**0.043**
Current physical activity level	0.379	**0.001**
Body mass index	0.241	**0.031**
Systolic blood pressure	0.237	**0.034**
Social and psychological variables (model 2)		
Self-efficacy controlling symptoms (SE-CS)	- 0.229	**0.041**
Self-efficacy maintaining function (SE-MF)	- 0.337	**0.002**

Table 6.32 presents the patients' pre-operative factors that significantly correlated with the partners' post-operative total number of modifiable CHD risk factors. Since there were only 8 variables these were all tested by multiple linear regression. There were no significant predictors of the partners' post-operative total number of modifiable CHD risk factors. The patients' SE-CS and SE-MF negatively correlated with partners' total number of modifiable CHD risk factors, indicating that patients with low pre-operative SE-CS and low SE-MF i.e. low confidence were associated the partners who themselves had a greater total number of modifiable CHD risk factors post-operatively.

6.6 PARTNERS' PRE-OPERATIVE FACTORS THAT PREDICT THE PATIENTS' PHYSICAL HEALTH, MENTAL HEALTH AND CHD RISK FACTORS AFTER CABG

To answer the research question what partner pre-operative factors predicted the patients' post-operative physical health (PCS) ?, a multivariate model was constructed, as described.

6.6.1 *Partners' pre-operative factors that correlated with the patients' post-operative physical health*

The model included the partners' pre-operative medical and quality of life (Model 1), and social and psychological variables (Model 2) that significantly correlated (correlation matrix) with the patients' post-operative physical health (PCS). This information is presented in Table 6.33.

Table 6.33 Partners' pre-operative variables that significantly correlated with the patients' post-operative physical health

Partners' pre-operative variables (n = 80)	r	p
Medical and quality of life (model 1)		
Physical component score (PCS)	0.455	**< 0.001**
Mental component score (MCS)	0.288	**0.010**
Emotional function dimension (EFD)	0.265	**0.018**
Total number troublesome health problems	- 0.345	**0.002**
Social and psychological variables (model 2)		
Gender	0.348	**0.002**
Occupation	- 0.275	**0.014**
Years of education	0.262	**0.019**
Deprivation category Postcode	- 0.267	**0.017**

Table 6.33 presents the partners' pre-operative variables that significantly correlated with the patients' post-operative physical health (PCS). The partners' pre-operative physical health (PCS) was moderately correlated with the patients' post-operative PCS. The variables correlated with the patients' post-operative PCS at a significance level of 0.30 or above were included in the multiple logistic regression.

6.6.2 *Multiple logistic regression model for the partners' pre-operative factors that predict patients' post-operative physical health*

Multiple logistic regression was used to test the patients' post-operative physical health (PCS) (dependent variable) against the partners' pre-operative factors. The PCS was encoded as 1 for the group with the lowest score (19.29 – 45.84) and 0 for the group with the normal or above score (46.42 – 61.48), using the medium split method This model was statistically significant (chi-square 14.828, $P < 0.001$, Nagelkerke R^2 0.231 and –2 log likelihood 91.022). The multiple logistic regression table for the patients' post-operative PCS is presented in Table 6.34.

Table 6.34 Multiple logistic regression of the partners' pre-operative factors that predict the patients' post-operative physical health

Model	B	S.E.	Wald	df	Sig
	3.678	1.557	5.579	1	**0.018**
				95% CI of Beta	
Variables	Beta	S.E.	Significance	Lower	Upper
PCS	- 0.074	0.030	**0.013**	0.876	0.985
Gender	1.941	1.105	0.079	0.799	6.766
TotalNoHealthP	0.439	0.511	0.390	0.570	4.225

PCS, mental component score; TotalNoHealthP, total number of other troublesome health problems; CI, confidence interval

In this model there was 1 significant predictor of the patients' post-operative physical health (PCS) – the partners' pre-operative physical health (PCS). This item showed a negative beta coefficient, indicating that patients' poorer post-operative physical health (PCS) was predicted by the partners' poorer pre-operative physical health (PCS).

6.6.3 Partners' pre-operative factors that correlated with the patients' post-operative mental health

To answer the research question what partner pre-operative factors predicted the patients' post-operative mental health (MCS), a multivariate model was constructed, as described. The model included the partners' pre-operative medical and quality of life (Model 1), and social and psychological variables (Model 2) that significantly correlated (correlation matrix) with the patients' post-operative mental health (MCS). This information is presented in Table 6.35.

Table 6.35 Partners' pre-operative variables that significantly correlated with the patients' post-operative mental health

Partners' pre-operative variables (n = 80)	r	p
Medical and quality of life (model 1)		
None	-	
Social and psychological variables (model 2)		
Gender	0.280	**0.012**
Deprivation	- 0.280	**0.012**
RiskCABG	- 0.234	**0.038**

Table 6.35 presents the partners' pre-operative variables that significantly correlated with the patients' post-operative mental health (MCS). The partners' gender, postcode and pre-operative treatment beliefs- perceived risks of CABG were significantly but weakly correlated with the patients' post-operative mental health (MCS). These variables were included in the multiple logistic regression but there were no significant predictors.

6.6.4 *Partners' pre-operative factors that correlated with the patients' post-operative total number of modifiable CHD risk factors*

To answer the research question what partner pre-operative factors predicted the patients' post-operative total number of modifiable CHD risk factors a multivariate model was constructed, as described. The model included the partners' pre-operative medical and quality of life (Model 1) and social and psychological variables (Model 2) that significantly correlated (correlation matrix) with the patients' post-operative total number of CHD risk factors. The information is presented in Table 6.36.

Table 6.36 Partners' pre-operative variables that significantly correlated with the patients' post-operative total number of modifiable CHD risk factors

Partners' pre-operative variables (n = 80)	r	p
Medical and quality of life (model 1)		
Physical component score (PCS)	- 0.411	**< 0.001**
Mental component score (MCS)	- 0.248	**0.026**
Emotional function dimension (EFD)	- 0.258	**0.021**
Total number of troublesome health problems	0.225	**0.045**
Social and psychological variables (model 2)		
Deprivation	0.359	**0.001**
Perceived risks (disadv) diet to reduce cholesterol	0.233	**0.043**
Positive social interaction	- 0.282	**0.001**
Affectionate support	- 0.246	**0.028**

Table 6.36 presents the partners' pre-operative factors that significantly correlated with the patients' post-operative total number of modifiable CHD risk factors. The partners' pre-operative physical health (PCS) was moderately correlated with patients' post-operative CHD risk factors. The variables correlated with the patients' post-operative total number of CHD risk factors at a level of 0.30 or above were included in the multiple regression but there were no statistically significant predictors.

6.7 SUMMARY

This chapter presented information on the patient and partner pre-operative factors that predicted patient or partner outcome(s) 4 months after CABG surgery (research question 3). The patient and partner pre-operative clinical and quality of life and social and psychological factors (independent variables) that bivariately correlated significantly with the patient or partner outcome(s) (dependent variables) were combined and tested by multivariate analyses. These factors (independent variables) were clustered together in such a way to depict a biopsychosocial perspective and modelling of the factors that may influence patient or partner outcome(s) 4 months after CABG surgery. Significant predictors of the patients' poorer physical health (PCS) were their poorer pre-operative physical and mental health (MCS), greater angina frequency and severity (SAQ) and higher diastolic blood pressure. Significant predictors of their poorer mental health (MCS) were their poorer pre-operative mental health (SF-12) and a lower total number of important needs met. The patients' greater post-operative total number of modifiable CHD risk factors were predicted their greater pre-operative total number of CHD risk factors and by being female.

Significant predictors of partners' poorer physical health (PCS) were their poorer pre-operative physical health (SF-12). Significant predictors of their poorer mental health (MCS) were poorer pre-operative mental health (MCS). Significant predictors of the partners' poorer emotional function dimension i.e. quality of life were their poorer pre-operative physical health (PCS) and mental health (MCS). Significant predictors of their poorer physical and social function i.e. quality of life were their poorer pre-operative physical and social function (PSFD) and low perceived availability of affectionate support. The partners' greater total number of post-operative modifiable CHD risk factors was predicted by their greater total number of pre-operative risk factors.

Results indicated that the partners' poorer post-operative physical health (PCS) was predicted by the patients' pre-operative less optimistic beliefs about CABG – mortality risk reduction. Significant predictors of the partners' poorer post-operative emotional function (EFD) were the patients' pre-operative less optimistic beliefs about CABG – mortality risk reduction and their greater pre-operative physical limitation (SAQ). Significant predictors of the partners' poorer post-operative physical and social function (PSFD) were the patients' pre-operative mental health (MCS) and greater physical limitation (SAQ). In contrast, there was only one partner variable that significantly predicted patient outcome i.e. the partners’ poorer pre-operative physical health (PCS).

CHAPTER 7

RESULTS

DYADIC ASSESSMENT OF SIMILARITIES AND DIFFERENCES BETWEEN THE PATIENTS AND PARTNERS ; AND FACTORS THAT PREDICT DYAD OUTCOME

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DYADIC ASSESSMENT OF SIMILARITIES AND DIFFERENCES BETWEEN THE PATIENTS AND PARTNERS; AND FACTORS THAT PREDICT DYAD OUTCOME

7.1 INTRODUCTION

Previously in Chapter 5 the findings on significant changes and differences between the patients and partners pre- and post-operatively were presented for the variables of interest (research questions 1 and 2). Repeated measures ANOVA were used to identify the level and direction of difference between the dyad members at the mean level of analysis. It was not however suited to address the research questions about differences between the patients and partners dyads (couples) (Maguire 1999). Chapter 6 examined the patients' and partners' pre-operative factors that predicted patient or partner outcome 4 months after CABG surgery (research question 3). This chapter presents information on the dyads at different levels of analysis. First, it will present findings on the differences and similarities between the dyads and whether these significantly influence patient or partner outcome(s) 4 months after CABG surgery (research question 4). Three groups were tested by ANOVA i.e. the patients and partners with the 'same' score for the variables of interest; partners with higher scores than the patients; and patients with higher scores than the partners (- 1 to + 1 of a difference). This helped determine whether group membership was associated with patient or partner outcome(s) 4 months after CABG surgery. Inter-item analysis was carried out to determine whether similarities (agreement) exist between the patient's ratings for self-efficacy and the partner's judgements about the patient's cardiac capabilities for each item on the questionnaire. Second, this chapter presents information on the patient and partner pre-operative factors (independent variables) that significantly predict the post-operative health of the dyad (outcome) i.e. physical health, mental health and the total number of CHD risk factors i.e. the CHD risk factor profile of the dyad (research question 5).

7.2 STATISTICAL ANALYSES

To address research question 4 – are there differences and similarities between the dyads that significantly influence patient or partner outcome(s) 4 months after CABG surgery ?, a measure of difference (new variable) was computed for each patient and partner pair by subtracting the partner score from the patient score for: perceived health status, self-efficacy, treatment beliefs, total number of modifiable CHD risk factors, perceived social support and self-perceived need. The difference score for these variables were then coded for the purpose of statistical analysis. The patients and partners i.e. dyad members with the same score were coded as 0, the partners with a higher (different) score than the patients were coded as 1, and the patients with a higher (different) score than the partner were coded as 2. This allowed assessment of the 3 broad groupings (3 group differences) and testing of the influence of group membership on patient and partner outcome(s) 4 months after CABG surgery. The Partial Eta Squared (Eta^2) was used to test the magnitude of difference between the groups (Brace et al 2000). Similarities between the two members of the dyad for ratings of self-efficacy were examined by inter-item analysis. This involved the computation of intraclass correlations using the one-way random model (Howell 2007), which assessed the level of agreement between the two members of the dyad.

To address research question 5 – what patient and partner pre-operative factors significantly predict the post-operative physical health of the dyad ?, the scores for each patient and partner dyad were summed to obtain a total dyad score (new variable) for physical health (dependent variable). Likewise, the scores for each dyad were summed to obtain a total dyad score (new variable) for mental health (MCS) (dependent variable). Similarly, scores for each dyad were summed to obtain a total dyad score (new variable) for the CHD risk factor profile of the dyad (dependent variable). In order to test which patient and partner pre-operative factors significantly predicted the outcome variable(s) multiple linear regression was carried out. First, bivariate analyses were computed to identify which patient and partner pre-operative clinical and quality of life variables (Model 1) significantly correlated with the post-operative physical health of the dyad (physical component score, PCS). Second, bivariate analyses were computed to identify which patient and partner pre-operative social and psychological variables (Model 2) significantly correlated with the post-operative physical health of the dyad. The independent variables from models 1 and 2 that significantly correlated with the physical health of the dyad (dependent variable) were combined in model 3, which was then used as a basis for the multiple linear regression. The same procedure was used to identify the patient and partner pre-operative factors clinical and quality of life variables (Model 1) and social and psychological variables (Model 2) that significantly correlated with the mental health (MCS) of the dyad, and likewise for the CHD risk factor profile of the dyad. The patients' and partners' pre-operative factors from models 1 and 2 that significantly correlated with the mental health (MCS) and CHD risk factor profile of the dyad (outcome variables) were then tested by multiple linear regression (research question 5). The overall aim of the study was to explore the complex factors that influence patient and partner and dyad outcome 4 months after CABG surgery.

7.3 PATIENT AND PARTNER DIFFERENCES AND SIMILARITIES AS AN INFLUENCE ON THE OUTCOME OF CABG

Table 7.1 presents the differences and similarities between the dyads (3 groups) for pre- and post-operative perceived health status, self-efficacy, treatment beliefs, total number of modifiable CHD risk factors, perceived social support and self-perceived need. Initially, participants were included in the 'same' patient and partner group if their

Table 7.1 Differences and similarities between the dyads (3 groups) for the pre- and post-operative variables

Variables			Different partner $^{+}$	Different patient $^{++}$	Same patient-partner
			N (%)	N (%)	N (%)
Short-Form 12 Health Survey (SF12)	Physical component score (PCS)	Pre-op	76 (91%)	8 (9%)	0 (0%)
		Post-op	49 (61%)	28 (39%)	0 (0%)
	Mental component score (MCS)	Pre-op	42 (50%)	42 (50%)	0 (0%)
		Post-op	40 (50%)	40 (50%)	0 (0%)
Cardiac self-efficacy beliefs	Control symptoms (SE-CS)	Pre-op	33 (40%)	43 (51%)	8 (9%)
	Maintain function (SE-MF)	Pre-op	**39 (46%)**	**25 (30%)**	**20 (24%)**
		Post-op	15 (19%)	49 (61%)	16 (20%)
Treatment beliefs	Benefits – mortality risk reduction	Pre-op	37 (44%)	32 (38%)	15 (18%)
		Post-op	39 (49%)	34 (42%)	7 (9%)
	Benefits – general health and well-being	Pre-op	46 (55%)	33 (39%)	5 (6%)
		Post-op	35 (44%)	36 (45%)	9 (11%)
	Risks (or disadvantages) – general health and well-being	Pre-op	43 (51%)	37 (44%)	4 (5%)
		Post-op	42 (52%)	31 (39%)	7 (9%)
	Overall benefits-risks score	Pre-op	42 (50%)	38 (45%)	4 (5%)
		Post-op	35 (44%)	40 (50%)	5 (6%)
Total number of modifiable CHD risk factors	Total number	Pre-op	4 (5%)	58 (70%)	22 (25%)
		Post-op	**22 (28%)**	**30 (37%)**	**28 (35%)**
Perceived social support	Emotional and informational support	Pre-op	28 (33%)	43 (52%)	13 (15%)
		Post-op	**23 (29%)**	**37 (46%)**	**20 (25%)**
	Tangible support	Pre-op	14 (17%)	54 (64%)	16 (19%)
		Post-op	16 (20%)	50 (63%)	14 (17%)
	Affectionate support	Pre-op	66 (79%)	18 (21%)	0 (0%)
		Post-op	15 (19%)	31 (39%)	34 (42%)
	Positive social interaction	Pre-op	58 (69%)	26 (31%)	0 (0%)
		Post-op	13 (16%)	41 (52%)	26 (32%)
Self-perceived need	Total number important needs met	Pre-op	18 (21%)	63 (75%)	3 (4%)
		Post-op	32 (40%)	46 (57%)	2 (3%)
	Total number important needs unmet	Pre-op	59 (70%)	22 (26%)	3 (4%)
		Post-op	46 (58%)	28 (35%)	6 (7%)

Different partner +; partner with higher score than the patient; Different patient ++, patient with higher score than the partner; Same patient- partner; patient and partners with the same score **(exact same)** scores were exactly the same (Table 7.1). Not surprisingly, using this criterion there were few dyads in the ‘same’ group. There were a greater number of differences than similarities between the dyads for the variables examined at this level of analysis.

7.3.1 Differences as a factor in patient and partner outcome following CABG

When the dyads pre- and post-operative perceived health status, self-efficacy, treatment beliefs, total number of modifiable CHD risk factors, perceived social support and self-perceived were less strictly defined as - 1 to + 1 this evened up the groups more and allowed for ANOVA (Table 7.2). Pre-operatively, the greatest similarities between the groups were for self-efficacy controlling symptoms (SE-CS) and treatment beliefs – mortality risk reduction. Post-operatively, the greatest similarity between the groups was for treatment beliefs – mortality risk reduction, treatment beliefs- benefits to general health and well-being, treatment beliefs- risks (or disadvantages) to general health and well-being, and emotional and informational support. Overall, there were a greater number of differences than similarities between the dyads for the variables examined at this level of analysis (Table 7.2). Results from the ANOVA for pre-operative SE-CS revealed that pre-operative group membership was significantly associated with the partners’ post-operative mental health (MCS) (F (2, 77) = 3.39, p = 0.039) (Eta^2 11%), but not any of the patients’ outcomes, or other partner outcomes. Therefore, the partners with greater pre-operative confidence in the patients’ capabilities (than the patients themselves) had poorer post-operative mental health. The effect size was small (11%), but nonetheless significant. The Tukey HSD post-hoc test showed significant differences exist between the patient and partner in the similar SE-CS group and the partner higher SE-CS group (p = 0.21). There were no significant differences between the patient higher SE-CS group and the patient and partner similar SE-CS group (p = 0.061), or between the patient higher group and the partner higher SE-CS group (p 0.977).

Table 7.2 Differences and similarities between the dyads (3 groups) for pre- and post-operative variables

Variables			Different partner $^{+}$	Different patient $^{++}$	Similar patient–partner
		N = 80	N (%)	N (%)	N (%)
Short-Form 12 Health Survey (SF12)	Physical component score (PCS)	Pre-op	73 (87%)	7 (8%)	4 (5%)
		Post-op	44 (55%)	28 (35%)	8 (10%)
	Mental component score (MCS)	Pre-op	39 (47%)	37 (44%)	8 (9%)
		Post-op	34 (42%)	35 (44%)	11 (14%)
Cardiac self-efficacy beliefs	Control symptoms (SE-CS)	Pre-op	**27 (32%)**	**37 (44%)**	**20 (24%)**
	Maintain function (SE-MF)	Pre-op	33 (39%)	16 (19%)	35 (42%)
		Post-op	12 (15%)	44 (55%)	24 (30%)
Treatment beliefs	Benefits – mortality risk reduction	Pre-op	**27 (32%)**	**26 (31%)**	31 (37%)
		Post-op	**25 (31%)**	**21 (26%)**	**34 (43%)**
	Benefits – general health and well-being	Pre-op	37 (44%)	30 (36%)	17 (20%)
		Post-op	**28 (35%)**	**29 (36%)**	**23 (29%)**
	Risks (or disadvantages) – general health and well-being	Pre-op	35 (42%)	30 (36%)	19 (22%)
		Post-op	**36 (45%)**	**24 (30%)**	**20 (25%)**
	Overall benefits-risks score	Pre-op	36 (43%)	35 (42%)	13 (15%)
		Post-op	30 (38%)	36 (45%)	14 (17%)
Total number of modifiable CHD risk factors	Total number	Pre-op	1 (1%)	33 (39%)	50 (60%)
		Post-op	0 (0%)	14 (18%)	66 (82%)
Perceived social support	Emotional and informational support	Pre-op	28 (33%)	43 (52%)	13 (15%)
		Post-op	**23 (29%)**	**37 (46%)**	**20 (25%)**
	Tangible support	Pre-op	14 (17%)	56 (66%)	14 (17%)
		Post-op	16 (20%)	50 (62%)	14 (18%)
	Affectionate support	Pre-op	67 (80%)	17 (20%)	0 (0%)
		Post-op	15 (19%)	31 (39%)	34 (42%)
	Positive social interaction	Pre-op	58 (69%)	26 (31%)	0 (0%)
		Post-op	13 (16%)	41 (52%)	26 (32%)
Self-perceived need	Total number important needs met	Pre-op	15 (18%)	62 (74%)	7 (8%)
		Post-op	25 (31%)	49 (61%)	6 (8%)
	Total number important needs unmet	Pre-op	5 (6%)	3 (4%)	76 (90%)
		Post-op	4 (5%)	2 (2%)	74 (93%)

Different partner +; partner with higher score than the patient; Different patient ++, patient with higher score than the partner; Similar patient- partner; patient and partner with similar scores **(- 1 to + 1)**

7.3.2 Similarities between the patients and partners in self-efficacy

Similarities between the patients' and partners' self-efficacy items were examined by intraclass correlations. This was computed to identify the level of agreement between the patients' ratings for self efficacy and the partners' efficacy ratings of the patient's cardiac capabilities for each item on the questionnaire. The patients' and partners' mean scores for self-efficacy were presented previously in Chapter 5. However, this only examined the degree to which the patients' and partners' exhibited higher correlations (differences) than each other at the group level. The approach taken here was to conduct an inter-item analysis (intraclass correlation), using the one-way random model (Howell 2007), which provided a measure of similarity (or agreement) between the two members of the dyad for each item (Table 7.3). All but two of the intraclass correlations were positive, indicating similarity (agreement) between the patient's ratings of self-efficacy and the partner's ratings of the patient's self- efficacy for each item. Bonferroni correction was carried out since there were multiple comparisons, by dividing the significance level of 0.05 by 2 for the two sub-domains of the self-efficacy scale (SE-CS and SE-MF). The corrected and uncorrected items are presented in Table 7.3. Only one item previously significant item was non-significant following Bonferroni correction, i.e. 'to get regular exercise, work up a sweat and increase your heart rate'. The majority of the pre- and post-operative intraclass correlations were statistically significant at the 0.025 level indicating similarity (agreement) between the patient and partner ratings for self-efficacy.

7.4 PATIENT AND PARTNER PRE-OPERATIVE FACTORS THAT PREDICT THE PHYSICAL AND MENTAL HEALTH AND CHD RISK FACTORS OF THE DYAD

To address research question 5 – what patient and partner pre-operative factors predict the post-operative physical health of the dyad (dependent variable), a multivariate model was constructed, as previously described.

Table 7.3 Inter-item analysis of similarities between the patients' and partners' scores for self-efficacy

Cardiac Self-efficacy	Domain		Intraclass correlation	95% CI		Uncorrected Sig	Corrected Sig
				Lower	Upper		
How confident are you that you (your partner) know(s):							
When you should call or visit your doctor about your disease ?	SE-CS	Pre-op	0.422	0.230	0.582	**< 0.001**	**S/S**
		Post-op	0.345	0.136	0.524	**0.001**	**S/S**
How to make your doctor understand your concerns about your heart ?	SE-CS	Pre-op	0.428	0.237	0.587	**< 0.001**	**S/S**
		Post-op	0.357	0.151	0.534	**0.001**	**S/S**
How to take your cardiac medications ?	SE-CS	Pre-op	0.275	0.066	0.461	**0.005**	**S/S**
		Post-op	0.593	0.429	0.720	**< 0.001**	**S/S**
How much physical activity is good for you ?	SE-CS	Pre-op	0.460	0.273	0.613	**< 0.001**	**S/S**
		Post-op	0.663	0.520	0.770	**< 0.001**	**S/S**
How confident are you that you (your partner) can:							
Control your chest pain by taking your medication ?	SE-CS	Pre-op	0.535	0.355	0.677	**< 0.001**	**S/S**
		Post-op	- 0.111	- 0.764	0.696	0.588	N/S
Control your chest pain by changing your activity levels ?	SE-CS	Pre-op	0.451	0.254	0.612	**< 0.001**	**S/S**
		Post-op	- 0.091	- 0.720	0.652	0.580	-
Control your breathlessness by taking your medication ?	SE-CS	Pre-op	0.283	0.037	0.497	**0.012**	**S/S**
		Post-op	0.698	0.157	0.922	**0.009**	**S/S**
Control your breathlessness by changing your activity level ?	SE-CS	Pre-op	0.372	0.138	0.567	**0.001**	**S/S**
		Post-op	0.333	- 0.438	0.839	0.193	-
Get regular exercise (work up a sweat and increase your heart rate) ?	SE-MF	Pre-op	0.256	- 0.014	0.492	**0.031**	N/S
		Post-op	0.387	0.162	0.573	**0.001**	**S/S**
Maintain your usual activities at work ?	SE-MF	Pre-op	0.520	0.045	0.807	**0.017**	**S/S**
		Post-op	0.649	0.493	0.765	**< 0.001**	**S/S**
Maintain your usual social activities ?	SE-MF	Pre-op	0.621	0.469	0.737	**< 0.001**	**S/S**
		Post-op	0.553	0.379	0.690	**< 0.001**	**S/S**
Maintain your usual activities at home with your family ?	SE-MF	Pre-op	0.652	0.509	0.761	**< 0.001**	**S/S**
		Post-op	0.476	0.285	0.630	**< 0.001**	**S/S**
Maintain your sexual relationship with your partner ?	SE-MF	Pre-op	0.588	0.367	0.747	**< 0.001**	**S/S**
		Post-op	0.618	0.417	0.762	**< 0.001**	**S/S**
Lose weight (if you are overweight) ? *	-	Pre-op	0.343	0.097	0.551	**0.004**	**S/S**
		Post-op	0.420	0.159	0.627	**0.001**	**S/S**
Stop smoking (if you do) ? *	-	Pre-op	0.262	- 0.321	0.709	0.185	-
		Post-op	0.415	- 0.303	0.844	0.119	-
Change your diet (if your doctor recommended this) ? *	-	Pre-op	0.169	- 0.070	0.390	0.082	-
		Post-op	0.327	0.069	0.545	**0.007**	**S/S**

* Behavioural item; positive intraclass correlations denote similarity (agreement) between dyad members; negative intraclass correlations denote no similarity (agreement) between dyad member; CI, confidence interval; uncorrected Sig, statistical significance 0.05; corrected Sig, statistical significance on Bonferroni correction

7.4.1 *Patients' and partners' pre-operative factors that correlated with the post-operative physical health of the dyad*

The models included the patients' and partners' pre-operative clinical and quality of life (model 1), and social and psychological variables (Model 2) that significantly correlated (correlation matrix) with the post-operative physical health of the dyad. This information is presented in Table 7.4.

Table 7.4 Patients' and partners' pre-operative variables that significantly correlated with the post-operative physical health of the dyad

Pre-operative variables (n = 80)	r	p
Patient		
Clinical and quality of life (model 1)		
Angina severity (NRS)	- 0.229	**0.041**
Limitation of activity (angina)(NRS)	- 0.251	**0.025**
Breathlessness (NRS)	- 0.235	**0.036**
Breathlessness (frequency)	- 0.239	**0.032**
Physical component score (PCS)	0.417	**< 0.001**
Mental component score (MCS)	0.285	**0.010**
Physical limitation score (SAQ)	0.374	**0.001**
Angina frequency and perception (SAQ)	0.375	**0.001**
Social and psychological variables (model 2)		
Gender	0.241	**0.031**
Partner		
Clinical and quality of life (model 1)		
Physical component score (PCS)	0.252	**0.024**
Social and psychological variables (model 2)		
None	-	-

As can be seen from Table 7.4 several of the patients' pre-operative variables were significantly correlated (0.23 – 0.37) with the post-operative physical health of the dyad, but only one of the partners' pre-operative variables. Because there was more than one patient pre-operative variable only those that correlated at a significance level of 0.30 or above were included in the multiple linear regression.

7.4.2 *Multiple linear regression model for the post-operative physical health of the dyad*

Multiple linear regression was used to test the post-operative physical health (PCS) of the dyad. Results showed a statistically significant model (F = 4.445, P = 0.001, using the Enter method). The adjusted R^2 was 0.234. The multiple linear regression table for the physical health of the dyad (PCS) is presented in Table 7.5. The significant predictors are shown in bold.

Table 7.5 Multiple linear regression for post-operative physical health of the dyad

Model	SS	df	F	R	Adjusted R^2	Sig
	29483.59	7,72	4.445	0.549	0.234	< **0.001**

Variables	Beta	t	Significance	95% CI of Beta Lower	Upper
PCS (patient)	0.746	2.159	**0.034**	0.057	1.435
MCS	0.395	2.021	0.051	0.005	0.786
Angina severity	- 0.532	- 0.651	0.517	- 2.162	1.098
PCS (partner)	- 0.270	- 1.516	0.134	- 0.624	0.085
Limitation of activity	0.144	0.179	0.858	- 1.461	1.750
Physical limitation	- 0.043	- 0.303	0.763	- 0.323	0.238

PCS, physical component score; MCS, mental component score; CI, confidence interval

In this model there was 1 significant predictor of the post-operative physical health of the dyad – the patients' pre-operative physical health (PCS). The patients' better pre-operative physical health predicted the better post-operative physical health of the dyad. In contrast, the partners' pre-operative physical health did not contribute significantly to the post-operative physical health of the dyad.

7.4.3 *Patients' and partners' pre-operative factors that correlated with the post-operative mental health of the dyad*

To address research question 5 – what patient and partner pre-operative factors predict the post-operative mental health of the dyad (dependent variable), a multivariate model was constructed, as previously described.

The models included the patients' and partners' pre-operative clinical and quality of life (model 1), and social and psychological variables (Model 2) that significantly correlated (correlation matrix) with the post-operative mental health of the dyad. This information is presented in Table 7.6.

Table 7.6 Patients' and partners' pre-operative variables that significantly correlated with the post-operative mental health of the dyad

Pre-operative variables (n = 80)	r	p
Patient		
Clinical and quality of life (model 1)		
Physical limitation (SAQ)	0.432	**< 0.001**
Treatment satisfaction (SAQ)	0.281	**0.011**
Social and psychological variables (model 2)		
Tangible support	- 0.237	**0.034**
Positive social interaction	0.329	**0.003**
Partner		
Clinical and quality of life (model 1)		
None	-	-
Social and psychological variables (model 2)		
None	-	-

As can be seen from Table 7.6, the patients' pre-operative physical limitation (SAQ) was moderately correlated with the post-operative mental health of the dyad. The other variables were significantly but weakly correlated (0.23 – 0.33). Notably, none of the partners' pre-operative variables were significantly correlated with the post-operative mental health of the dyad. Because there were few patient pre-operative variables that significantly correlated with the outcome they were all included in the multiple linear regression.

7.4.4 *Multiple linear regression for the post-operative mental health of the dyad*

The multiple regression model showed a statistically significant model (F = 6.840, P < 0.001, using the Enter method). The adjusted R^2 was 0.228. The multiple linear regression for the mental health of the dyad (MCS) is presented in Table 7.7. The significant predictors are shown in bold.

Table 7.7 Multiple linear regression for post-operative mental health of the dyad

Model	SS	df	F	R	Adjusted R^2	Sig
	26030.43	4,75	6.840	0.517	0.228	< **0.001**

Variables	Beta	t	Significance	95% CI of Beta Lower	 Upper
PositiveSocInt	0.314	1.930	0.057	- 0.010	0.639
Treatment satisfaction	0.219	1.685	0.096	- 0.040	0.477
Physical limitation	0.258	3.216	**0.002**	0.098	0.418
Tangible support	- 0.064	- 0.505	0.615	- 0.314	0.187

PositiveSocInt, positive social interaction; CI, confidence interval

In this model there was 1 significant predictor of the post-operative mental health of the dyad – the patients' pre-operative physical limitation (SAQ). Patients with greater pre-operative physical limitation i.e. poorer quality of life due to angina contributed significantly to the poorer post-operative mental health of the dyad. In contrast, none of the partners' pre-operative variables correlated with the post-operative mental health of the dyad.

7.4.5 *Patients' and partners' pre-operative factors that correlated with the post-operative total number of CHD risk factors in the dyad*

To address research question 5 – what patient and partner pre-operative factors predict the post-operative total number of modifiable CHD risk factors in the dyad (dependent variable) a multivariate model was constructed, as previously described.

The models included the patients' and partners' pre-operative clinical and quality of life (model 1) and social and psychological variables (Model 2) that significantly correlated (correlation matrix) with the post-operative total number of CHD risk factors in the dyad. This information is presented in Table 7.8.

Table 7.8 Patients' and partners' pre-operative variables that significantly correlated with the post-operative CHD risk factors of the dyad

Pre-operative variables (n = 80)	r	p
Patient		
Clinical and quality of life (model 1)		
Physical limitation (SAQ)	- 0.397	**< 0.001**
Angina frequency and perception (SAQ)	- 0.278	**0.012**
Social and psychological variables (model 2)		
Gender	- 0.361	**0.001**
Deprivation	0.310	**0.005**
SE-MF	- 0.399	**< 0.001**
Positive social interaction	- 0.336	**0.002**
Partner		
Clinical and quality of life (model 1)		
None	-	-
Social and psychological variables (model 2)		
None	-	-

As can be seen from Table 7.8, the patients' pre-operative variables were significantly but weakly correlated (0.28 – 0.39) with the post-operative total number of CHD risk factors in the dyad. Notably, none of the partners' pre-operative variables significantly correlated with the post-operative CHD risk factor profile of the dyad. Since there were only 6 patient pre-operative variables that significantly correlated with the post-operative CHD risk factors in the dyad these were all included in the multiple linear regression.

7.4.6 Multiple linear regression for the post-operative total number of CHD risk factors of the dyad

The multiple regression showed a statistically significant model (F = 6.405, P < 0.001, using the Enter method). The adjusted R^2 was 0.291. The multiple linear regression table for the total number of modifiable CHD risk factors of the dyad is presented in Table 7.9. The significant predictors are shown in bold.

Table 7.9 Multiple linear regression for the post-operative total number of CHD risk factors of the dyad

Model	SS	df	F	R	Adjusted R^2	Sig
	133.000	6,73	6.405	0.587	0.291	< **0.001**

				95% CI of Beta	
Variables	Beta	t	Significance	Lower	Upper
Angina frequency	0.012	1.276	0.206	- 0.007	0.330
Deprivation	0.812	1.434	0.156	- 0.317	1.940
Gender	- 0.620	- 1.698	0.094	- 1.348	0.108
PositiveSocInt	- 0.019	- 2.226	**0.029**	- 0.037	0.002
SE-MF	- 0.077	- 2.583	**0.012**	- 0.136	- 0.018
Physical limitation	- 0.016	- 2.184	**0.032**	- 0.030	- 0.001

SE-MF, self-efficacy for maintaining function; PositiveSocInt, positive social interaction; CI, confidence interval

In this model there were 3 significant predictors of the post-operative total number of CHD risk factors in the dyad – the patients' pre-operative physical limitation (SAQ), SE-MF and positive social interaction. The item for physical limitation showed a negative beta coefficient, indicating that greater pre-operative physical limitation i.e. poorer quality of life due to angina predicted the greater post-operative total number of modifiable CHD risk factors in the dyad. Similarly, low pre-operative patient self-efficacy for maintaining function and low positive social interaction predicted a greater post-operative total number of CHD risk factors in the dyad.

7.5 SUMMARY

This chapter presented the findings on the differences and similarities between the dyads and the factors that significantly predicted dyad outcome 4 months after CABG surgery. Results indicated that there were more differences than similarities between the dyads for most of the pre- and post-operative variables. Pre-operatively, the greatest similarities between the groups were for self-efficacy controlling symptoms (SE-CS) and treatment beliefs – mortality risk reduction. The ANOVA of SE-CS revealed that the partners with greater pre-operative confidence in the patients' capabilities for controlling symptoms (than the patients themselves) had poorer post-operative mental health. Inter-item analysis of the individual self-efficacy items showed that were significant similarities (agreement) between the patients and partners i.e. dyad members in the way they rated most of questionnaire items pre- and post-operatively. Notably, there was significant agreement between the patients' and partners' post-operatively for: 'get regular exercise' and 'maintain usual activities at work', which were not evidenced pre-operatively. When the dyad was examined as an outcome variable of interest, multiple linear regression showed that the patients' better pre-operative physical health predicted the better post-operative physical health of the dyad 4 months after CABG surgery. The patients' greater pre-operative physical limitation (SAQ) significantly predicted the poorer post-operative mental health of the dyad. Further, the patients' greater pre-operative physical limitation, low self-efficacy for maintaining function and less positive social interaction significantly predicted a higher post-operative total number of CHD risk factors in the dyad. Notably, none of the partners' pre-operative factors significantly predicted the physical health, mental health or the CHD risk factor profile of the dyad at 4 months follow-up. Only the partners' pre-operative physical health significantly correlated with the post-operative physical health of the dyad. Table 7.10 presents a summary of all the main results from Chapters 5, 6 and 7.

Table 7.10 Summary of all the main results from Chapters 4, 5 and 6

Chapters	**Hypothesis**	**Findings**
Chapter 5 **(Research question 1)**	Patients and partners will show a significant improvement (change) in health status, quality of life, CHD risk factors, self-efficacy, treatment beliefs, social support and self-perceived need from pre-to 4 months post-operatively	• Patients' physical health (PCS) and mental health (MCS) improved significantly at 4 months post CABG; no significant change seen in partners. • Patients with residual symptoms of angina showed significant improvement in physical limitation, less angina frequency and severity (SAQ) and less perceived symptom severity (NRS). Partners' EFD and PSFD quality of life dimensions improved significantly post CABG. • Patients' had significantly reduced their total number of modifiable CHD risk factors at 4 months follow-up. Partners' significantly increased their CHD risk factors post-operatively. • Patients' and partners' total scores for treatment beliefs changed overall significantly from pre- to 4 months post-operatively. • Patients' self-efficacy beliefs and the partners' efficacy judgements about the patient's cardiac capabilities increased significantly. • Patients' informational and emotional support, affectionate support and positive social interaction increased significantly at 4 months. No significant change in the partners' perceived social support. • Patients and partners total number of important needs met increased significantly at 4 months follow-up, important needs unmet decreased.
Chapter 5 (**Research question 2**)	Significant differences exist between the patients and partners pre- and post-CABG for health status, CHD risk factors, self-efficacy, treatment beliefs, social support and self-perceived need	Significant differences exist between the patients' and partners' pre- and post-operatively for : • Physical health (PCS) • The total number of modifiable CHD risk factors. • Patients' self-efficacy and partners' efficacy judgements about the

		patient's capabilities to maintain function. - Affectionate support and positive social interaction. - Total number of important needs met and unmet.
Chapter 6 **(Research question 3)**	Patients' pre-operative factors predict their outcome(s) 4 months after CABG surgery	Patients' poorer post-operative : - Physical health (PCS) significantly predicted by their poorer pre-operative PCS, mental health (MCS), greater angina frequency /severity and higher diastolic blood pressure. - Mental health (MCS) significantly predicted by their poorer pre-operative mental health (MCS) and lower total number of important needs met. - Total number of CHD risk factors significantly predicted by greater total pre-operative CHD risk factors and by being female.
	Partners' pre-operative factors predict their outcome(s) 4 months after CABG surgery	Partners' poorer post-operative : - Physical health (PCS) significantly predicted by their poorer pre-operative physical health (PCS). - Mental health (MCS) was significantly predicted by their poorer pre-operative mental health (MCS). - EFD significantly predicted by their poorer pre-operative physical health (PCS) and mental health (MCS). - PSFD significantly predicted by their poorer pre-operative PSFD and low affectionate support. - Total number of CHD risk factors was significantly predicted by their greater pre-operative CHD risk factors.
	Patients' pre-operative factors predict partners' outcome(s) 4 months after CABG surgery	Partners' poorer post-operative : - Physical health (PCS) significantly predicted by patients' pre-operative beliefs about CABG – mortality risk reduction - EFD significantly predicted by the patients' pre-operative beliefs about CABG – mortality risk reduction and greater pre-operative physical limitation (SAQ). - PSFD significantly predicted by the patients' poorer pre-operative mental health (MCS) and greater physical limitation (SAQ).

	Partners' pre-operative factors predict patients' outcome(s) 4 months after CABG surgery	Patients' poorer post-operative : • Physical health (PCS) significantly predicted by the partners' poorer pre-operative physical health (PCS).
Chapter 5 **(Research question 4)**	Significant differences exist between the patients and partners for self-efficacy and self-perceived need on inter-item analysis	• Some significant similarities exist for patients' self-efficacy and partners' efficacy judgements about the patient; and significant differences for self-efficacy and self-perceived needs statements
Chapter 7 **(Research question 4)**	Differences and similarities exist between the patients and partners that influence patient or partner outcome 4 months after CABG	• The partners' higher pre-operative scores for self-efficacy controlling symptoms (compared to the patients themselves) associated with their poorer post-operative mental health (MCS)
Chapter 7 **(Research question 5)**	Patients' or partners' pre-operative factors predict the post-operative health of the dyad (outcome)	Dyads' poorer post-operative: • Physical health (PCS) significantly predicted by the patients' poorer pre-operative physical health (PCS) • Mental health (MCS) significantly predicted by the patients' greater pre-operative physical limitation (SAQ) • CHD risk factor profile of dyad significantly predicted by the patients' greater pre-operative physical limitation (SAQ), low SE-MF and less positive social interaction

PCS, physical component score; MCS, mental component score; EFD, emotional and functional dimension; PSFD, physical and social dimension; SE-CS, self-efficacy for controlling symptoms; SE-MF, self-efficacy for maintaining function

CHAPTER 8

DISCUSSION AMD CONCLUSIONS

CHAPTER 8

DISCUSSSION

8.1 INTRODUCTION

This study of CABG patients and their partners involved interviewing them briefly in the Cardiac Surgery OP Clinic after they had seen the Cardiac Surgeon and it was confirmed that the patient would go on the waiting list for elective CABG surgery, followed by a more in-depth home interview with each of them about 1 week later. The patients and partners were given questionnaires to take home to self-complete and return to the researcher. About 4 months after CABG surgery, the patients and partners were interviewed again and the same questionnaires completed. This study was unique in collecting data from both CABG patients and their partners early in the waiting period for surgery. Previous studies have demonstrated the significance of recruiting early in the treatment trajectory, having identified that patients often experience fear, uncertainty, anxiety or depression in the wait for CABG surgery (Kiovula et al 2001, Fitzsimons et al 2003, McCormick et al 2006). Subsequently, nursing interventions have been designed to help decrease patient anxiety, modify CHD risk factors, improve exercise capacity, and quality of life (McHugh et al 2001, Goodman et al 2003, Mooney et al 2007). However, relatively few studies (Raleigh et al 1990, Lindsay et al 1997) have examined the pre-operative information, education and support needs of CABG patients and their partners or close family members awaiting cardiac surgery. The pre-operative quality of life, treatment beliefs and health care needs of CABG patients and their partners may be significant factors affecting the outcome of CABG surgery.

The aim of the study was to explore the complex factors that influence patient and partner and dyad outcome 4 months after CABG surgery. CHD remains a leading cause of death and disability in Scotland, the UK and elsewhere in the developed world. Considerable progress has been made in the prevention of CHD and in treatment. CABG surgery has been shown to be a highly effective intervention for the relief of angina, improving quality of life and increasing life expectancy in high risk groups (Coronary artery surgery study (CASS 1983, Pocock et al 1995, The CABRI Trial 1995, and The BARI Investigators 1996) However, health care professionals still face considerable challenges in improving the outcomes of CABG, in particular helping the patients' readjustment to CHD as a chronic health problem following surgery. It is proposed in this study that there is a need for a wider biopsychosocial approach that considers quality of life outcomes and CHD risk factor reduction in both CABG patients and their partners. The impetus for this comes from increasing evidence of the significant relationship between cardiac patients' and their partners' emotional health (Coyne and Smith 1991, Moser and Dracup 2004, Mahrer-Imhof et al 2007), concordance in physical and mental health (Kim et al 2006**)** and health behaviours in couples (Venters et al 1984, Lewis and Rook 1999, Sher and Baucom 2001, Juri et al 2006, Lewis et al 2006) and CHD risk factors in couples (Macken et al 2000). There is a pressing need for health care services to focus on CABG patients and their partners as individuals, and as a dyad, since their health and well-being and functioning are closely interrelated. In collecting data from the CABG patients and their partners, the connections between one partner's activities or qualities and the other partner's actions were identified. This study uniquely examined a number of patient and partner variables in parallel using the same questionnaires, whenever possible. A summary of the main findings with regards to the aim of the study and the research questions outlined in Chapters 5, 6 and 7 are presented in Table 7.10 (Chapter 7). This chapter will now discuss the findings from the study, the methodological limitations, clinical implications and the directions for future research.

The first research question was formulated to identify what changes occurred in the patients' and partners' CHD risk factors, perceived health status, quality of life, treatment beliefs, self-efficacy, social support and self-perceived need from pre- to 4 months post-operatively (Chapter 5), and the second research question was devised to identify what differences exist between the patients' and partners' pre- and post-operatively for the variables of interest (Chapter 5). Some sub-group differences between the dyads were examined (Chapters 5 and 7, research question 4) and similarities and differences between the patient-partner pairs (Chapter 7, research question 4). The results from these analyses will be discussed in two main sections. The first section looks at changes in the variables from pre- to post-operatively and similarities and differences between the patients and partners, and the factors that predicted their outcome(s) following CABG surgery. The second section discusses the partner as an influence on patient outcome(s) following CABG and visa versa, the patient as a factor influencing partner(s) outcome 4 months after surgery. In addition, the pre-operative factors in patients and partners that influence dyad outcome at 4 months follow-up will be discussed. Before discussion of these findings the nature and generalisability of the sample will be considered.

8.2 THE SAMPLE

It was important that the sample obtained for this work was representative in order to generalise the results and conclusions of the study. Therefore, a relatively large sample of CABG patients and their partners or close family was recruited, consisting of 79 patient-partner pairs and 5 patient-family pairs. The number of refusals was very small, but the number of patients who did not to return the recruitment form was potentially larger. It was generally the patients who consented to be involved in the study who returned the recruitment form. There were 4 patients and partners lost to follow-up. Two male patients died whilst on the waiting list for CABG; one patient died within 24 hours of surgery due to complications and 1 patient had surgery postponed until he had lost weight and stopped smoking to reduce his operative risk. The patients were predominantly male as is typical of CHD studies, especially studies of CABG patients (Wenger 2002, Grace et al 2004). Almost four-fifths of the patients were male with a mean age of 64 years and a range from 40 to 83, which was similar to the Greater Glasgow Health Board population of patients having surgery about the same time. In contrast, the partners were significantly younger than the patients and almost four-fifths were female with a mean age of 61 years and a range of 24 to 82. The participants were drawn from five Scottish Health Board areas that included a mix of socio-economic groups. Almost a quarter of the sample came from areas of high socio-economic deprivation (McLoone and Boddy 1994). A significant number of the patients and partners were in semi-skilled or unskilled occupations (Registered General's Social Class 2007). This finding is consistent with the results from the Scottish Health Survey (SEHD 2003), which showed that ischaemic heart disease and stroke were more common in people in equivalent social positions as measured by the socio-economic classification (NS-SEC). The patients in the study were therefore fairly representative of other CABG patients in Scotland in terms of age, socio-deprivation and employment status and of the wider population of patients having CABG surgery.

Co-morbid conditions such as diabetes mellitus and poorly controlled hypertension contribute significantly to the efficacy and outcome of CABG surgery (Stahle et al 1991, Nashef et al 1999, Whang and Bigger 2000, Bridgewater et al 2003). Twenty-three per cent of the study patients had diabetes mellitus, which is slightly higher than the figure of 18% reported in the Scottish Coronary Revascularisation Register (Pell and Slack 2004), and similarly more patients had hypertension (63% vs 59%). The patients with diabetes can be more difficult to revascularise because they usually have more widespread disease (Pell and Slack 2004) and they may be sicker and more inclined to have post-operative complications and re-hospitalisation (Nashef et al 1999, Whang and Bigger 2000, Deaton and Thourani 2008). Two per cent of the partners had a history of diabetes mellitus and 8% had hypertension, which in addition to other risk factors may increase their risk of cardiovascular disease (Emberson et al 2003, Wood et al 2005 on behalf of the Joint British Societies' guidelines on the Prevention of Cardiovascular Disease in Clinical Practice, JBS). The prevalence of diabetes mellitus and hypertension in the general population is increasing and both contribute significantly to cardiovascular risk (BHF 2006).

Other factors such as severity of disease may contribute significantly to the efficacy and outcome of CABG (Pocock et al 1995, The Bari Investigators 1996). The majority of patients had triple CABG surgery for coronary artery disease and 10% of the patients in addition had a valve replacement for aortic or mitral valve disease. The association of coronary artery disease with heart valve disease is now frequently encountered in clinical practice because degenerative lesions are the most frequent cause of valve disease in western countries (Iung 2000). The peri-operative mortality rate in the study was 1.25% for males and zero for female patients. The percentage of male deaths was comparable with those reported in the Scottish Coronary Revascularisation Register for time trends 1997-2003 (Pell and Slack 2004). The finding for female patients was unusual because they are often sicker than males and frequently have CABG later (O'Connor et al 1992, Weintraub et al 1992). However, the small numbers females in the study do not allow comparisons to be drawn. The percentage of patients in the study experienced complications following CABG that contributed significantly to their perioperative morbidity and delayed recovery from surgery (Appendix XVll). No objective data were available on the complications from surgery although the reported nature and incidence of the complications were consistent with those found in other studies (Szabo and Svedjeholm 2002, Deaton and Thourani 2008). The proportion of patients readmitted to hospital during the 4 months follow-up period was about 20%, which is comparable with the rate of re-admissions identified in other studies of CABG (Pell et al 2002, Oxlad et al 2006).

Overall, the patients in the study were fairly typical of others in Scotland having CABG surgery and elsewhere in the developed world. National and International statistics show co-morbidity is increasing and perioperative survival from CABG is improving (Pell et al 2002, World health Organisation 2007). The sample was fairly representative of patients having CABG surgery in the Western Infirmary Glasgow in 2003/4**.** The small number of female patients was disappointing but this is fairly typical of CABG studies. Because of the small sample of women in the study the remainder of the results for men and women are not reported separately. The sample size was large compared to previous studies of CABG patients and their partners, but not as big as most studies of CABG patients. The study was sufficiently powered to address the overall aim because summary scores were mostly used in the analysis.

8.3 CHANGES FROM PRE-TO POST-CABG, SIMILARITIES/DIFFERENCES BETWEEN THE PATIENTS AND PARTNERS AND PREDICTORS OF OUTCOME

8.3.1 *CHD risk factors*

Results (see Table 7.10 of main findings) confirmed the hypothesis that the patients showed a significant improvement in their total number of modifiable CHD risk factors 4 months after CABG surgery (research question 1, hypothesis accepted), but not the partners actually increased their CHD risk factors (hypothesis rejected). The patients still had a mean 1.78 CHD risk factors and the partners on average 1.54 risk factors. The results showing uncorrected modifiable CHD risk factors in patients after CABG surgery is consistent with the findings from other studies (McKibbin 1994, Salmon 2001, Barnason et al 2003). Previous studies have been limited in the variables examined, especially in relation to the partners of CABG patients. No studies were found that explored the CHD risk factors of CABG partners. Previous studies have established that the wives of patients post myocardial infarction are at an increased risk of developing CHD (Wood et al 1997, Papamichael et al 2002) and that there is concordance of risk factors in female spouses of male patients with CHD (Macken et al

2000). This study was unique in examining both the CABG patients and their partners CHD risk factors before and after surgery.

In the study, the patients and partners total body weight, defined as body mass index, was a particular concern with no significant change found in this risk factor at 4 months follow-up. This finding is consistent with the reported lifestyle habits of the patients surveyed in 22 countries as part of the EUROASPIRE 111 survey (Jennings et al 2008a), which identified overweight and obesity as being very prevalent in patients following a cardiac event, including CABG surgery. In the study more patients than partners were physically inactive prior to CABG, but this pattern was reversed after surgery with significantly more partners than patients reporting that they were physically inactive. It may be the partners relapsed after CABG on their previous efforts to stay physically active. Despite the patients having increased their physical activity levels post-operatively many of them were still overweight at 4 months follow-up. It may be that they had not yet reached the threshold level of activity that would enable them to lose more weight. Most of the patients would just have about started a structured programme of cardiac rehabilitation about this time.

The results from this study showed that 62% of patients attended a cardiac rehabilitation programme following CABG, but only 2 (2.5%) patients attended rehabilitation in the wait for surgery. Only two partners attended cardiac rehabilitation post-CABG and none pre-operatively. Moreover, the partners only attended cardiac rehabilitation to provide transport for the patients, rather than participating in the exercise rehabilitation classes themselves. The uptake of cardiac rehabilitation is low in the study compared to other studies of CABG patients in Scotland (62% vs 75%) (Lindsay et al (2003), but comparatively more than in a recent UK survey of cardiac rehabilitation in which only 33 - 56% of patients having CABG enrolled into a programme (Bethell et al 2001). Adherence to cardiac rehabilitation as well as low programme uptake rates is a major health concern. Lindsay et al (2003) reported incomplete attendance (less than 50% of the time) in 10% of CABG patients. No studies were found suggesting that the CABG partners participation in cardiac rehabilitation acts to increase programme adherence. Sadly, most programmes of cardiac rehabilitation still centre around the patient when in fact CABG surgery and subsequent recovery and readjustment is a family affair (McMurray 1998). Whilst the patient is advised that CABG surgery is not a cure for heart disease and that known risk factors such as diet, weight, smoking, stress and physical activity need to be addressed on an on-going basis, the partners CHD risk factors and health promotion needs are not usually addressed. If we are serious about reducing CHD mortality and morbidity every opportunity must be taken to address the prevention of CHD, for example, by targeting the partners of CABG patients who may themselves be at an increased risk of CHD given the shared environment and likely lifestyle,

Results confirmed the hypothesis that significant differences exist between the patient and partner groups over the two time periods (pre- and post-operatively) for the total number of main CHD risk factors (research question 2). A pattern emerged showing there was a move towards concordance because the patients had reduced some of their CHD risk factors at 4 months follow-up, but not the partners. This finding is consistent with the evidence that shows similarities in health and risk factors in couples (Macken et al 2000). Notably, the patients' pre-operative total number of modifiable CHD risk factors significantly predicted their higher number of post-operative CHD risk factors, and similarly for the partners (Table 7.10, research question 3 – hypothesis accepted). These findings indicate a pressing need to address the health behaviours of couples (Macken et al 2000, Goldsmith et al 2006) and risk determinants that may be modified by couples interventions believed to reduce CHD mortality and morbidity (Sher and Baucom 2001, Sher et al 2002, Jennings et al 2008b on behalf of EUROACTION 2008). The findings from the EUROACTION study in particular provide strong evidence from 645 patients and their partners in 6 European countries of the need for lifestyle and risk factor management programmes that target couples. Patients who make the most changes to their risk factors were more likely to be associated with the partners who also make the most changes (Jennings et al 2008b).

The risk factor data for the CABG patients and their partners was obtained by self-report, which may limit the interpretation of data. The use of self-report relies on the individuals' perception of what constitutes a particular risk factor, which may be subject to inter individual-variability (Moore et al 2007). The approach taken however was similar to other studies of CABG patients (Barnason et al 2003), which used the self-report method. More objective physiological measures such as the patients and partners weight, blood cholesterol, exercise levels etc could be used in future studies. It was not feasible to record these risk factors more objectively for both the CABG patients and their partners therefore the decision was taken to use the self-report method for consistency. The study's findings on CHD risk factors indicate the potential that pre-operative rehabilitation and the use of interventions pre- and post-operatively, which target the dyad have for the primary and secondary prevention of CHD. Results also highlight the potential for improved management of patients having CABG through their better preparation for surgery, and the scope for improved outcomes through CHD risk factor reduction, possibly contributing to a reduction in future CHD events.

8.3.2 *Quality of life*

This section of the discussion pertains to the patients' and partners' quality of life, which resembles the consideration of data given to perceived health status. Since data were collected using both a disease specific and generic measure the results from both are discussed. The majority of the study's patients experienced immediate symptomatic improvement following CABG surgery. There were eight patients (10%) with residual symptoms of angina who showed significant improvement in quality of life at 4 months follow-up as assessed by the UK version of the Seattle Angina Questionnaire (SAQ-UK) (Garratt et al 2001) (see Table 7.10 summary of main results) (research question 1 – hypothesis accepted). Because the wording of the SAQ-UK asks patients specifically about chest pain only those who reported residual symptoms of angina were re-assessed at follow-up. The patients' greater pre-operative angina frequency and severity (SAQ-UK) was a significant predictor of their poorer post-operative physical health (physical component score, PCS). Other significant predictors of the patients' poorer post-operative physical health (PCS) were their poorer pre-operative physical health (PCS), mental health (MCS) and high diastolic blood pressure (see Table 7.10**,** research question 3 – hypothesis accepted). The patients' poorer post-operative mental health was predicted by their poorer pre-operative mental health (MCS) (SF-12), and lower total number of important needs met (Table 7.10, research question 3 – hypothesis accepted). Important needs met will be discussed later in the chapter. The results from this study are consistent with the findings from several large randomised controlled trials that showed the benefits of CABG in terms of relief of symptoms and improvement in quality of life (Pocock et al 1995, The CABRI Trial 1995, The BARI Investigators 1996). Non-randomised studies have also shown that physical health is the biggest predictor of outcome following CABG surgery, and to a lesser extent mental health (Sjoland et al 1997, Kiebzak et al 2002, LeGrande et al 2006). Research has revealed that despite good physical recovery, psychological disorders such as anxiety and depression may occur in patients after CABG surgery (Doering et al 2005), with as many as 20–25% of patients showing problems at 4 months (Duits et al 1997).

Results confirmed the hypothesis (Table 7.10, research question 1) that the partners' quality of life changed significantly from pre-to 4 months post-operatively, as measured by the Quality of Life of Cardiac Spouses Questionnaire (QL-SP) (Ebbesen et al 1990). Specifically, the partners' emotional function dimension and physical and social function dimensions of quality of life had improved at 4 months follow-up, having exceeded pre-operative levels. This improvement in the partners' emotional health is consistent with the findings of Mahler and Kulik (2002) who found that female partners of CABG patients were at an elevated risk of emotional distress during the initial months after surgery. The partners' poorer pre-operative physical health (PCS) and mental health (MCS) (SF-12) significantly predicted of their poorer post-operative emotional and functional dimension (EFD) (Table 7.10, research question 3 – hypothesis accepted). No studies were found that allowed direct comparison of these predictors with the particular outcomes examined. However, the results are consistent with the findings of studies that have examined anxiety and depression and its effect on patients' psychosocial recovery following CABG (Moser and Dracup 1995, Lindquist et al 2003, Doering et al 2005) and the relationship between physical, psychological and social recovery patterns after CABG surgery (Lopez et al 2006)

Results showed that the partners' poorer pre-operative quality of life i.e. physical and social functional dimension (PSFD) and low affectionate support were significant predictors of their poorer post-operative PSFD (Table 7.10, research question 3 – hypothesis accepted). These results indicated that the partners' pre-operative physical and social quality of life dimensions determined their post-operative physical health. The partners' poorer pre-operative perceived physical health as measured by the SF-12 was a significant predictor of their poorer post-operative physical health, and similarly their poorer pre-operative mental health was a significant predictor of their poorer mental health post-operatively (Research question 3 – hypothesis accepted). These findings pertaining to the partners' pre-operative health indicate that they may not be well positioned to support and care for the patient as is often assumed, especially in the immediate post CABG period. Future research might want to further explore the impact of CABG surgery on the partners' quality of life and perceived health status and how they might best be supported in their role in caring for the patient.

8.3.3 *Perceived health status*

Results (see Table 7.10) confirmed the hypothesis that the patients' perceived health status as measured by the SF-12 Health Survey (Jenkinson and Layte 1997) changed significantly from pre- to 4 months post-operatively (research question 1). These findings concur with other short-term studies of CABG patients that have examined perceived health status as an outcome (Sjoland et al 1997, Kiebzak et al 2002, LeGrande et al 2006). Notably, results from the study showed that the patients' perceived mental health did not improve to the same extent as their physical health, but then the baseline values were not as low. Moreover, CABG aims to relieve angina, improve physical capacity and reduce the need for medication so it was to be expected that the patients' physical health status would improve more markedly following surgery. In contrast, there was no significant improvement in the partners' perceived physical or mental health status at 4 months follow-up (Table 7.10, hypothesis rejected – research question 1).

Results from this study confirmed the hypothesis that significant differences exist between the patients' and partners' pre- and post-operatively for perceived physical health (SF-12) (hypothesis accepted - research question 2). A pattern emerged showing convergence in the patients' and partners' scores as the patients' physical health improved. In contrast, the patients' and partners' perceived mental health (SF-12) was not statistically different (hypothesis rejected - research question 2). This finding of similarities in mental health between the patients and partners is consistent with the literature that shows concordance in mental health in couples (Kim et al 2006).

Notably, the patients' and partners' scores for perceived physical and mental health (SF-12) were below the population average both before and after surgery indicating that there was still significant room for improvement. This study uniquely examined the perceived health status and quality of life of CABG patients and their partners early in the treatment trajectory using different instruments. The story that has emerged has been largely one of a move towards concordance in health. Data was collected early in the treatment trajectory when it was first confirmed that the patient would go on the waiting list for CABG surgery (mean waiting time of 63.71 days). Longitudinal studies of assessment of changes in general health status or quality of life in CABG patients have often collected data nearer to the point of surgery (Lindsay et al 2000, Rumsfeld et al 2004, LeGrande et al 2006). This study measured the perceived mental health of CABG patients rather than anxiety or depression. The SF-12 proved satisfactory (face validity); the questions all seemed acceptable and the Cronbach Alpha for the patients were PCS 0.774, MCS 0.782 and for the partner PCS 0.772, MCS 0.779). Despite the Quality of Life of Spouses Questionnaire (QL-SP) not being used before to assess the quality of life of CABG partners it revealed some interesting findings. The results were consistent with other studies that have identified emotional distress is a problems for partners in the recovery period after CABG surgery (O'Farrell et al 2000, Moser and Dracup 2004). At present there are no comparative data in Scotland or equivalent sample data from similar CABG partners to compare the study findings for physical and social quality of life dimensions as measured by the QL-SP. The only comparison of findings that could be contemplated is with Ebbesen et al (1990), who developed and used the QL-SP to examine quality of life of partners of patients' post-myocardial infarction. Compared to Ebbesen et al (1999), the CABG partners' had similar post-operative scores for the emotional functional dimension (EFD) and physical and social functional dimension (PSFD). Based on the literature reviewed in Chapter 3 and piloting of the instrument the QL-SP was appropriate for use with the partners of CABG patients. It showed good internal consistency (Cronbach alpha of 0.825).

Although the UK version of the Seattle Angina Questionnaire (SAQ-UK) has not been used as widely in CHD patients as the original SAQ that was developed and validated in the US (Spertus et al 1994), it has been shown to have comparable validity (Garratt et al 2001). The SAQ-UK proved satisfactory when used in the study (Cronbach alpha was 0.886). Since the wording of the questionnaire asks about chest pain it was only used post-operatively for the patients with residual symptoms of angina, otherwise, the patients free from angina might have subconsciously integrated other symptoms (e.g. sternal wound pain) when considering their physical limitations. This study demonstrated the need to use a generic measure in assessing perceptions of changes in the patients' and partners' state of health over time and how this affects their lives and daily functioning. Previous studies have focused primarily on the partners' proxy ratings of the patients' health following CABG surgery (Hunt et al 2000, Phillips et al 2003, Halm et al 2007), neglecting to asses the partners' own perceived health status.

8.3.4 *Perceptions of treatment benefits and risks*

Results (see Table 7.10) confirmed the hypothesis that the patients' perceptions of treatment benefits and risks changed significantly from pre- to 4 months post-operatively, except their perceptions of mortality risk. Post-operatively, they were more optimistic about the likelihood of treatment improving their general health and well-being and they thought that there were more benefits than risks associated with treatment. Similarly, the results (see Table 7.10) confirmed the hypothesis that the partners' perceptions of treatment benefits and risks changed significantly post-operatively (hypothesis accepted – research question 1) with the exception of their perceptions of the benefits of treatment for general health and well-being. Post-operatively, the partners were more optimistic about treatment reducing the patient's risk of dying prematurely and they thought that there were more benefits than risks from treatment. Overall, the patients and partners both had unrealistic expectations about treatment, especially pertaining to CABG. These findings are significant because the patients and partners require to have realistic expectations of treatment, having been informed about the benefits and risks involved so as to make an informed choice about surgery.

The results presented in Tables 5.16 – 5.23 show that the patients and partners viewed surgery as being more effective than preventive activities, such as stopping smoking, increasing physical activity, weight loss, a diet to reduce cholesterol and medication use in the control of heart disease. These results have considerable implications for practice for several studies, including this one, have found that patients often have uncorrected modifiable risk factors after CABG, indicating to some authors that the participants may feel cured of their disease following surgery (Bethell et al 2001). The results from this study are unique in showing the effects re: CABG. The only published study of this kind (Kee et al 1997) showed similar results in patients having PTCA, but this study looked at the treatment beliefs of CABG patients and partners. There is a need to target both CABG patients and their partners to counter unrealistic expectations about treatment and to give them extra information and support, as appropriate. This may help improve communication and reinforce the benefits of treatment, especially when patients are free from angina post-operatively and lifestyle change seems unnecessary. The partner is a key source of information and support for the patient therefore it is vital that they understand about CHD and its treatment and that any negative perceptions do not go unaddressed.

This study used a modified version of the Kee et al (1997) treatment beliefs questionnaire that was shown to have content validity when tested previously (Thomson et al 2004 unpublished). Given the length of the questionnaire and the sensitive nature of some of the questions it was decided that after piloting the instrument should be administered by the researcher and this proved effective in helping to eliminate incomplete answers. The different scores for treatment benefit (mortality risk reduction from preventive activities - stopping smoking, increasing physical activity, weight loss and a diet to reduce cholesterol, medication use and CABG) were summed to give a total score, and likewise the scores for treatment benefits (NRS), treatment risks (NRS) and overall treatment (benefits-risks). The advantage of having summed the scores in this way was that it allowed for further statistical analysis. This may be considered a limitation of the study for participants might not necessarily think about the benefits of stopping smoking, for example as having the same benefits of CABG and this might be reflected in the scoring. However, the scores for each of the treatments are also presented separately (Tables 5.16 – 5.23). The individual benefits and risks scores for each of the treatment (not the totalled scores) were used in the computation of multiple linear and logistic regression, which helped to determine the particular treatment beliefs that influence patient and partner outcome following CABG surgery.

This study was the first to examine the patients' and partners' perceptions of treatment benefits and risks before and after CABG surgery. In addition, it provided information on the patients' expected and realised benefits of CABG. Previous studies of treatment beliefs or representations about treatment have measured the CHD patients' or partners' perceptions of treatment but not on both occasions allowing changes to be examined (Kee et al 1997, Thomson et al 2004 unpublished, Karner et al 2004, Hirani et al 2004, Ivarsson et al 2007). Overall, this study found that the patients' and their partners' had very similar views about treatment that did not change significantly over time. Therefore, the hypothesis that there would be significant differences between the patients' and partners' pre- and post-operatively for treatment beliefs was rejected (Table 7.10, research question 2). None of the patients' and partners' pre-operative treatment beliefs significantly predicted their own outcome(s) following surgery (Table 7.10, research question 3, hypothesis rejected).

There is considerable scope for the improved management of patients through their increased understanding of CHD and its treatment, especially the benefits of preventive activities. Patients' beliefs about treatment may differ from their beliefs about their illness (Hirani and Newman 2005). Whilst increasing attention has been paid to illness beleifs or perceptions in research (Pertrie and Weinman 1996, Petrie et al 1996, Cooper et al 1999, Gump et al 2001, Hirani et al 2006) considerably less attention has been given to patients' treatment beliefs. There are some similarities between the concepts in that illness perceptions and treatment beliefs both take account of the individual's beliefs about cure/control i.e. whether treatment resolves the illness and returns the patient to a normal life. The illness perception framework also considers identify, timeline and consequences, whereas treatment beliefs are more focused on the patients concerns about undergoing treatment, the necessity for treatment and decision satisfaction. Both frameworks may be used to help explain differences in health behaviours and preferences for treatment in patients with CHD (Kee et al 1997, Gump et al 2001). The health care professionals looking after CABG patients need to be aware of their treatment beliefs and that they might be different from their own. Any discordance between the two might best be explored using shared models of decision-making.

8.3.5 *Patients' self-efficacy beliefs and partners' efficacy judgements about the patient's cardiac capabilities*

Results (see Table 7.10) confirmed the hypothesis that the patients' cardiac self-efficacy beliefs changed significantly from pre- to 4 months post-operatively as measured by the Sullivan et al (1998) questionnaire (research question 1). These findings are consistent with the results of other studies that found patient confidence generally increases over time with recovery after CABG surgery (Gortner and Jenkins 1990, King et al 2001, Baranson et al 2003). However, these studies all measured quite specific areas of self-efficacy, which makes the comparison of results difficult.

The only comparison of the study findings that could be contemplated is with Berkhuysen et al (1999) who used the Sullivan questionnaire to examine self-efficacy in high and low-frequency exercises during cardiac rehabilitation, although most of the patients were post-myocardial infarction. Compared to Berkhuysen et al (1999), the CABG patients' post-operative scores for self-efficacy maintaining function were low (12.95 vs 15.0-15.5). Results (see Table 7.10) confirmed the hypothesis that the partners' efficacy judgements about the patient's cardiac capabilities changed significantly from pre- to 4 months post-operatively (research question 1) i.e. they were more confidence in the patient's ability to maintain function. The patient and partner self-efficacy items for controlling symptoms that were still relevant at 4 months follow-up (most patients were free from angina) increased significantly. This study has been the only one to report self-efficacy for controlling symptoms and maintaining function in CABG patients and partners both pre- and post-operatively. Overall, the results are consistent with other studies that show partner confidence in the patient's capabilities increase significantly over time with recovery following CABG surgery (Allen 1990, Bastone and Kerns 1995).

Results (see Table 7.10) from this study confirmed the hypothesis that there were significant differences between patients and partners for self-efficacy for maintaining function (SE-MF) (research question 2). The partners' scores for SE-MF were higher than the patients SE-MF pre-operatively, but this pattern was reversed post-operatively. Comparison of the results is difficult for previous studies have looked at differences in patient and partner self-efficacy at the level of the dyad. Studies have also mostly involved a single assessment of the patients' and their wives, for example, following myocardial infarction (Coyne and Smith 1994) or used a generalised self-efficacy scale to assess dyadic coping with CABG surgery (Schroder et al 1997).

Results from the study did not show patient self-efficacy as a predictor of the outcome of CABG surgery (Table 7.10, research question 3 – hypothesis rejected). These results are contrary to the findings of other studies that have shown that patient self-efficacy predicts the resumption of daily activities (Sullivan et al 1998) and recovery following myocardial infarction (Ewart et al 1983, Coyne and Smith 1991). This inconsistent finding may be due to the measurement scale used, the different outcomes measured or the different times to follow-up. Similarly, the partners' pre-operative efficacy judgements about the patient's cardiac capabilities did not show as a significant predictor of their outcomes (Table 7.10, research question 3 – hypothesis rejected).

Results (see Table 7.10) confirmed the hypothesis that significant differences exist between the patient and partner pairs for self-efficacy controlling symptoms (hypothesis accepted - research question 4). The partner's higher pre-operative scores for self-efficacy for controlling symptoms (compared to the patient's themselves) were associated with the partners' poorer post-operative mental health. At present there are no equivalent sample data from similar CABG studies to compare the self-efficacy findings for the three groups of patient and partner pairs. It can be only speculated that the partner's pre-operative over optimistic beliefs contributed to their poorer post-operative mental health.

When individual items on the self-efficacy scale were examined results showed that there were very few significant differences (means) between the patients' and partners' ratings (hypothesis rejected - research question 4). Following Bonferroni correction for Type 1 error, most of the differences in the individual items became insignificant, indicating that differences were trivial and negligible. The two items that remained significant indicated that the partners were significantly less confident than the patients that they ‘knew how to take their cardiac medication’, and ‘to maintain usual activities at home with the family’.

In contrast, when similarities between the patients’ and partners’ for individual items on the self-efficacy questionnaire were examined using intra-class correlations, there was significant agreement. Most of the items were strongly correlated (Table 7.10, hypothesis accepted, research question 4, Chapter 7) and remained significant on Bonferroni correction for multiple comparisons.

Therefore, self-efficacy was examined in different ways in the study to address questions that were dyadic in nature. Overall, the results showed that the patients’ and partners’ self-efficacy increased from pre- to 4 months post-operatively. The partners were more confident in the patient’s capacity to maintain function pre-operatively than the patients themselves, but this was reversed post-operatively. When the dyads were examined the partners with higher pre-operative self-efficacy (compared to the patients themselves) had poorer post-operative mental health. When individual items on the questionnaire were examined there was mostly agreement between the patients and partners for self efficacy. The results contribute to new knowledge through assessment of the CABG patients’ and partners’ self-efficacy expectations relating to controlling symptoms and maintaining function. It did not measure the actual performance of these behaviours or activities. Pre-operative self-efficacy did not should as a predictor of patient or partner outcome(s) following CABG surgery, which was disappointing. Further research is required in this area.

8.3.6 *Perceived social support*

Results (see Table 7.10) from the study showed that the patients’ tangible support did not change significantly from pre-to post-operatively as measured by the Medical Outcomes Study (MOS) Social Support Survey (Sherbourne and Stewart 1991) (hypothesis rejected, research question 1). The patients' tangible support was high pre-operatively so there was likely the ceiling effect post-operatively. The results from the study are consistent with some other studies that have looked at tangible support in the short-medium term (6 months) recovery of patients having CABG surgery (Yates 1995, Barry et al 2006). The partners' tangible support did not change significantly at 4 months follow-up (Table 6.10, hypothesis rejected – research question 1). Results from this study are consistent with the findings of Monahan et al (1996) and Artinian (1992) who showed that overall social support resources did not decline immediately after surgery for most spouses. Artinian (1992) examined tangible aid, affect and affirmation using the Norbeck Social Support questionnaire and showed that despite the spouses having moderate levels of tangible support following CABG this decreased over time contributing to role strain suggesting their need for ongoing support. It may be that if data had been collected beyond 4 months in this study that the CABG partners' tangible support might have declined.

Results (see Table 7.10) confirmed the hypothesis that the patients' emotional and informational support increased significantly from pre-to post-operatively, as measured by the Medical Outcomes Study (MOS) Social Support Survey (Sherbourne and Stewart 1991) (research question 1). Other studies have shown that emotional and informational support increases in patients post-CABG (Smith et al 1997, Barry et al 2006). In contrast, the partners' emotional and informational support did not change significantly at 4 months follow-up (Table 7.10, hypothesis rejected, research question 1). Results showed that the patients' and partners' perceived availability of emotional and informational support did not differ significantly pre- and post-operatively (see Table 7.10, hypothesis rejected - research question 2). They both reported feeling fairly well informed and emotionally supported. Emotional support is important especially to the patients' psychosocial adjustment after CABG surgery (Elizur and Hirsh 1999). It is thought to influence outcomes through the enhancement of self-esteem (Logsdon et al

1998, Ben-Sira and Eliezer 1990, Yates 1995). No comparative data were found for the findings pertaining to the partners' emotional and information support.

Results (see Table 7.10) confirmed the hypothesis that the patients' affectionate support increased significantly from pre-to post-operatively, as measured by the Medical Outcomes Study (MOS) Social Support Survey (Sherbourne and Stewart 1991) (research question 1). In contrast, the partners' affectionate support did not change significantly at 4 months follow-up (see Table 7.10, hypothesis rejected – research question 1). Results confirmed the hypothesis that significant differences exist between the patients' and partners' pre- and post-operatively for affectionate support (Table 7.10, research question 2). Results revealed that whilst the patients' affectionate was low pre-operatively it increased to exceed the partners' level of affectionate support in the post-operative period. Overall, the patients and partners scores were less different post-operatively. Low pre-operative affectionate support in partners predicted their poorer post-operative quality of life - physical and social function dimension as measured by the QL-SP. Results indicated that lack of affectionate support (expressions of love and affection) is detrimental to the quality of life of the partners of CABG patients. It may be that they felt no one loved or cared for them. Interestingly, this type of social support did not predict any of the patient outcomes. Results (see Table 6.10) confirmed the hypothesis that the patients' positive social interaction increased significantly from pre-to post-operatively as measured by the Medical Outcomes Study (MOS) Social Support Survey (Sherbourne and Stewart 1991) (research question 1). In contrast, the partners' positive social interaction did not change significantly at 4 months follow-up (Table 7.10, hypothesis rejected, research question 1). Positive social interaction refers to the perceived availability of other people to do fun things with. Results confirmed the hypothesis that significant differences exist between the patients' and partners' pre- and post-operatively for positive social interaction (Table 7.10, hypothesis accepted - research question 2).

Results showed that whilst the patients' positive social interaction was low pre-operatively it increased significantly post-operatively to exceed that of the partners', which did not change significantly.

Results revealed that overall the partners' social support was lower than the patients and this was despite them having a similar social network size (mean 8.00, SD 5.53 vs 8.7, SD 5.53). In summary, the partners' pre-operative lack of affectionate support contributed to their poorer post-operative physical and social function dimension of quality of life as measured by the QL-SP. There was very limited data available that could be used for comparison of the study's findings, especially for affectionate support and positive social interaction as these two aspects that not been well studied in cardiac patients or partners. The advantage of having used the MOS survey is that it allowed for assessment of the perceived availability of social support; it considers different types of social support and contains one structural support item. Previous studies of CABG patients have been limited by the assessment of one or two types of support, or by investigators focusing primarily on the social network (Mamalainen et al 1998, Schroder et al 1998, Lindsay et al 2001, Barry et al 2006). Limitation of the MOS survey is that it does not take into account the sources of support and similar to other instruments of its kind, it only assesses the positive dimensions of social support. No studies were found that considered the CABG partners perceived social support or its influence on patient or partner outcome following surgery. Although the MOS survey has not been used before with CABG patients and partners it showed excellent internal consistency (Cronbach alpha for the patient 0.958 and for the partner 0.860) and face validity and there were no particular problems identified in the pilot study. This study uniquely examined the CABG patients' and their partners' perceived availability of social support pre- and 4 months post-operatively. Future research is needed to confirm the study's findings, especially with respect to affectionate support and positive social interaction and their contribution to patient or partner outcome following CABG surgery.

8.3.7 *Self-perceived need*

Results (see Table 7.10) confirmed the hypothesis that the patients' self-perceived need changed significantly from pre- to 4 months post-operatively as measured by the Moser et al (1993) questionnaire (research question 1). The total number of important needs met i.e. informational and emotional needs achieved at 4 months exceeded pre-operative levels and the number of important needs unmet decreased significantly. Despite significant improvement from pre-to post-operatively the patients' needs were still not fully met. The pre-operative results are consistent with other studies (Jonsdottir and Baldursdottir 1998, Fleming et al 2002, Kattainen et al 2004) that have identified patients needs and concerns of patients awaiting CABG surgery. The post-operative results are consistent with studies that have identified unmet needs in patients in the recovery period following cardiac surgery (Moser et al 1992, Jaarsma et al 1995, Moore 1996, Goodman 1997).

Results (see Table 7.10) confirmed the hypothesis that the partners' self-perceived need changed significantly from pre- to 4 months post-operatively as measured by the Moser et al (1993) questionnaire (research question 1). Although the partners' total number of important needs met at 4 months exceeded pre-operative levels some of their important needs were still not fully met. If comparison of the total scores for self-perceived need were to be contemplated it would be with the literature on CABG partners as caregivers (Monahan et al 1996, Leske and Pelczynski 1999). Consistent with the results of this study, the findings from the caregiver studies showed that the partners of CABG patients wanted to know about the patients' likely prognosis, the emotional consequences of the disease, support groups, information about physical recovery and preparation for the responsibilities of caregiving.

Results (see Table 7.10) confirmed the hypothesis that significant differences exist between the patients' and partners' for the totalled number of important needs met and unmet (research question 2). A pattern emerged showing that the patients' and partners' totalled scores for important needs met increased post-operatively, converging as the partners' scores improved more. A similar pattern emerged for the total number of needs unmet post-operatively that showed convergence as the partners' total number of important needs unmet decreased more. Interestingly, the patients' lower total number of important needs met was a significant predictor of their poorer mental health (MCS) following CABG surgery (Table 7.10, research question 3 – hypothesis accepted).

This study used the Needs Assessment questionnaire developed by Moser et al (1993) to assess the CABG patients' and partners' self-perceived need i.e. important needs met and unmet. The scores for each of the needs statements were summed to give a total score for important needs met and needs unmet. The advantage of having summed the scores in this way was that it allowed for further statistical analysis. At present there are no data available for direct comparison of the totalled scores. However, the scale showed good internal consistency (Cronbach alpha was 0.910 for the patients and 0.881 for the partners) and face validity when used in this way.

In addition, the patients' and partners' ratings for the individual items on the Needs Assessment questionnaire were computed. Results (see Table 7.10) obtained confirmed the hypothesis that significant differences exist between the patients and partners for the individual needs statements (hypothesis accepted - research question 4). The results are consistent with those of Moser et al (1993) in identifying that the patients and their partners had some similar but yet disparate post-operative needs. The patients ranked many of their needs as having 'high importance' (means greater than 2.5) post-operatively. They ranked more of their needs as having ‘intermediate’ (means 2.0 – 2.5) importance compared to Moser et al (1993), for example, for ‘to receive information about return to sexual activity’, ‘to have my partner assist me in making lifestyle changes’ etc., and they rated none of their needs as having ‘low’ importance (mean < 1.5). Notably, the partners ranked several of their post-operative needs as having ‘high’ importance and in contrast to the findings of Moser et al (1993) they ranked fewer of their needs as having ‘intermediate’ importance, for example, ‘to talk to someone about my fears’, ‘to have time alone to myself’, ‘to feel that others are going through the same things that my experience is not unusual’. Surprisingly, the partners ranked more of their needs as having ‘low’ importance, for example, ‘to be told about other people or groups who can help with problems’. Following Bonferroni correction for Type 1 error most of the uncorrected needs statements remained statistically significant indicating that the differences between the patients’ and partners’ needs were not inconsequential. To feel hope that the patient would have a high (better) quality of life was particularly important for the partners. It was not particularly important for the partners to talk to others going through the same thing as themselves or to talk to someone about the anger/frustrating that they may be feeling in the post-operative period, which was surprising.

This study examined the CABG patients’ and their partners’ perceptions of need pre- and 4 months post-operatively. The Needs Assessment scale used in the study was developed and tested by Moser et al (1993) and shown to have content validity and test-retest reliability over a 1 week period. The stability of the instrument has not been demonstrated in the longer term and the scale has not been used before in the UK. However, it proved to be a useful and reliable measure for use in the study. The paired *t*-test was used for comparison of differences to be consistent with the approach taken elsewhere in the study. The advantage of having looked at the individual items on the questionnaire was that it helped identify specific deficits in patient and partner need.

The results of this study have shown that there is considerable scope for the improved management of CABG patients and their partners through an increased understanding of their needs as individuals and as a dyad in the wait for and the recovery period following surgery.

In summary, the first section of the discussion chapter dealt with changes in the patients' and partners' variables and differences between them pre- and post-CABG. It discussed differences and similarities between the patients and partners for some individual items and the effect of differences between the patients and partners on the outcome(s) of surgery. In examining the differences between the patients and partners on average the patients' scores were higher. Whilst there was generally discordance between the patients and partners prior to CABG there seemed to be a move to re-establish concordance after surgery. The pre-operative differences between the patients and partners may be a result of the patient's illness and the post-operative patterns related to progress towards recovery, which is perhaps more evident in physical health. The results suggest a new way of looking at the recovery patterns of CABG patients and their partners, but further research is needed in this area.

8.4 PATIENT AND PARTNER PRE-OPERATIVE FACTORS THAT PREDICT PATIENT AND PARTNER AND DYAD OUTCOME 4 MONTHS AFTER CABG

8.4.1 *Introduction*

The next section of the discussion chapter will focus on the findings that show the pre-operative factors in patients that predict partner outcome(s) and similarly the pre-operative factors in partners that predict patient outcome(s) 4 months after CABG surgery see Table 7.10 (research question 3). The final research question that was devised to identify the patient or partner pre-operative factors that predict the physical and mental health and CHD risk factor profile of the dyad after CABG surgery (see Table 6.10, research question 5) will also be discussed.

8.4.2 *Patient and partner pre-operative factors that predict others outcomes*

Results (see Table 7.10) confirmed the hypothesis that some of the patients' pre-operative factors predicted the partners' outcome(s) 4 months after CABG surgery (research question 3). For instance, the patients' lower scores for treatment beliefs-mortality risk reduction significantly predicted the partners' poorer perceived physical health (SF-12) post-operatively. This indicated that the patients' less optimistic beliefs about the benefits of CABG – mortality risk reduction reducing contributed significantly to the partners poorer perceived physical health as measured by the SF-12 Health Survey. Similarly, the patients' less optimistic beliefs about the benefits of CABG – mortality risk reduction and their greater pre-operative physical limitation (SAQ-UK) significantly predicted the partners' poorer post-operative emotional function dimension, as measured by the QL-SP (hypothesis accepted, research question 3). The patients' poorer pre-operative mental health (SF-12) and greater pre-operative physical limitation significantly predicted the partners' poorer post-operative physical and social function dimension as measured by the QL-SP. These results highlight the importance of addressing the patients' pre-operative treatment beliefs and their mental health, in particular, and the relationship to the partners' emotional function dimension and physical and social function dimension (QL-SP). It may be that the patients thinking the operation was not going to work – impacted negatively on the partners' perceived physical health and mental health. It may be the patients rather than having over-optimistic beliefs about treatment were in fact being more realistic. Further research is needed in this area. Future interventions might want to consider dyadic education with patients and their spouses focusing on their beliefs about treatment and coping strategies, and the effects on the mental health of the partners. Interventions designed to provide information and support to patient-partner dyads after CABG surgery have proved useful in reducing anxiety (Harford et al 2002).

Results (see Table 7.10) additionally showed that the patients' pre-operative mental health and greater physical limitation were significant predictors of the partners' physical and social function dimension as measured by the QL-SP (Ebbesen et al 1990) (Hypothesis accepted, research question 3). Therefore, the findings pertaining to the patients' pre-operative treatment beliefs and mental health may be part of a pattern of arrangement that indicate the negative influence of the patient on partner outcome following CABG surgery. This uni-dimensional influence of the patient on the partner is demonstrated elsewhere in the study. Results from this study contribute to the evidence base relating to the influence of the CABG patient on their partner's health and well-being. The study is limited in that it did not assess caregiving burden, but unlike previous studies, it measured the partners' perceived health status and quality of life outcomes, using standard measures.

Results (see Table 7.10) confirmed the hypothesis that the partners' pre-operative physical health was a significant predictor of the patients' post-operative physical health, as measured by the SF-12 Health Survey (research question 3). This was the only model that showed partners' pre-operative characteristics predict patient outcome following CABG. More detailed and formalised assessment of the partners' pre-operative physical and psychosocial health may be necessary. Interventions to enhance the partners support may prove useful when implemented with cohabitating partners to help improve the patients' post-operative physical health and daily functioning, and that of the dyad.

8.4.3 *Patient and partner pre-operative factors that predict dyad outcome*

The approach taken in this study to analysing the dyad as an outcome variable of interest involved combining the data for each of the patient and partner pairs. This method revealed that the patients' pre-operative factors significantly predicted the post-operative physical health, mental health and CHD risk factor profile of the dyad 4 months after CABG surgery (see Table 7.10, hypothesis confirmed, research question 5). The patients' pre-operative physical health (SF-12) was a significant predictor of the physical health of the dyad, as measured by the SF-12 Health Survey. The patients' pre-operative physical limitation (SAQ-UK) showed as a significant predictor of the poorer mental health of the dyad (SF-12). Further, the patients' greater pre-operative physical limitation (SAQ-UK), low self-efficacy for maintaining function and less positive social interaction (MOS) were significant predictors of the CHD risk factor profile of the dyad. In contrast, none of the partners' pre-operative variables showed as significant predictors of the post-operative physical health or mental health or CHD risk factor profile of the dyad (see Table 7.20, research question 5, hypothesis rejected).

The approach taken in this thesis to dyad analysis goes beyond that taken by other researchers who either look at the 'joint effect' or the 'mutual joint effect' of the dyad. In interdependence theory (Gonzalez and Griffin 1999, Macguire 1999), for example, the 'joint effect' is the term used to explain that one's health and behaviour may be determined by oneself or one's partner's actions. The 'mutual joint effect' suggests that each partner's health and behaviour may be influenced both by their own actions and those of their partners (Lewis et al 2002). This study has looked at the patients' pre-operative variables as factors influencing partner outcome and conversely, the partners' pre-operative variables as factors influencing patient outcome after CABG surgery, and some similarities and differences within and between the dyads. In addition, in the analysis, it combined the outcome data for each patient and partner pair for physical health, mental health and CHD risk factors. This novel way of looking at the outcomes considers the dyad to be a single unit of analysis. Therefore, it measured the health and well-being of the dyads and separate patient and partner outcomes, and the factors that may influence them. The results of the study for dyad outcomes are consistent with the findings that have emerged from previous analyses, which points to what is predominantly the unilateral influence of the CABG patient on their partner.

8.5 LIMITATIONS

The data from this study came from a sample of predominantly male patients having CABG surgery. The sample was quite typical of other studies of CABG patients in Scotland and elsewhere in the developed world. The results may be generalised to other patients having CABG surgery but not to other groups of patients with CHD. A major strength of the study is that it collected data from both the CABG patients and their partners pre- and post-operatively. It was limited in that it only followed the patients and partners up to 4 months after CABG surgery. However, it used the best possible design in that it allowed for data collection early in the treatment trajectory when it was first confirmed that the patient would go on the waiting list for elective CABG surgery. Therefore, this study included observations at two time points, which has been useful in capturing the relationships between the different variables, and the nature of change in patients and their partners over time. The sample included a small group of patient-family pairs and this may be a limitation. However, results suggest that the inclusion of the patient-family pairs did not contaminate the sample, although results would not be generalisable to this sample. The main entry criterion was that the patient-partner/family pairs shared the same household and therefore most probably the same lifestyle and similar needs and concerns etc. in the wait for CABG and in the recovery period after surgery. Whenever possible standard well validated measures were used in the study. There were one or two non-standard measures used so the results should be interpreted with caution. More research is needed to validate the findings. A large number of comparisons were conducted increasing the risk of type 1 error. However, corrections were made for this and the results were plausible and consistent with the findings from other studies. A quantitative study was necessary to provide rigorous evidence that may be used to change care delivery. This study did not examine the patients' and partners' personal relationships that may enhance dyadic differences. Rather it used repeated measures ANOVA to examine of how the patients' and partners' changed as a group from pre- to 4 months post-operatively, and *t*-tests and intra-class correlations as indexes of dyad-member similarities and differences. Future research might use hierarchical linear modelling since it takes into account the direction of the difference between dyad members (Macguire 1999) or structural equation modelling as it takes into account the data from both members of the dyad and the likelihood of shared variance (Kenny et al 2006).

8.6 CONCLUSIONS

The aim of the study was to explore the complex factors that influence patient and partner and dyad outcome 4 months after CABG surgery. The outcomes examined were perceived health status, quality of life and CHD risk factors. The sample consisted of 80 patient-partner/family pairs recruited over a 14 month period. Data were gathered from both the patients and partners on two occasions; immediately after the patient was scheduled for CABG and four months after surgery. The study patient population was mainly male. Although this is typical for studies of CABG patients it does limit the generalisability of the findings. Results of the study showed that in general patients improve following CABG surgery, whereas partners do not. Both retained some CHD risk factors at four months post-operatively. It is possible that this might have changed if the follow up period had been extended to 7-8 months post operatively or beyond, after the patient had been involved in cardiac rehabilitation. Significant predictors of the patients' physical health were their pre-operative physical and mental health (SF-12), greater angina frequency and severity (SAQ) and higher diastolic blood pressure. Significant predictors of their post-operative mental health (SF-12) were their pre-operative mental health (SF-12) and lower total number of important needs met. The patients' greater total number of pre-operative modifiable CHD risk factors significantly predicted their higher post-operative risk factors.

A significant predictor of the partners' post-operative physical health was their pre-operative physical health (SF-12), and a significant predictor of their mental health was their pre-operative mental health (SF-12). Significant predictors of the partners' post-operative emotional function dimension (QL-SP) were their pre-operative physical health (SF-12) and mental health (SF-12). Significant predictors of their post-operative physical and social function dimension (QL-SP) were their pre-operative physical and social function dimension and low perceived affectionate support. The partners' greater pre-operative total number of CHD risk factors significantly predicted their higher post-operative risk factors.

Patient variables recorded pre-operatively significantly predicted a number of partner post-operative outcomes. For instance, the patients' less optimistic beliefs about CABG – mortality risk reduction significantly predictor of the partners' post-operative physical health (SF-12). Significant predictors of the partners' post-operative emotional function dimension (QL-SP) were the patients' less optimistic beliefs about CABG – mortality risk reduction and greater pre-operative physical limitation (SAQ). Significant predictors of the partners' post-operative physical and social function dimension (QL-SP) were the patients' pre-operative mental health (SF-12) and greater physical limitation (SAQ). In contrast, there was only one partner variable that significantly predicted the patients' post-operative physical (SF-12) i.e. the partners' pre-operative physical health (SF-12). This uni-dimensional relationship was also evident when dyadic outcomes were examined. The patients' pre-operative physical health, self-efficacy for maintaining function and positive social interaction significantly predicted the physical health and mental health of the dyad 4 months post-operatively. Interestingly, these patterns from pre to post-operatively could be interpreted as a move toward concordance, given the substantive evidence that measures of health and well-being in couples show substantial similarities. The possibility is that CABG surgery restores this concordance between the dyad, which may have been disrupted by the patient's illness.

The study's findings about the patient are mostly in line with the substantive literature on the effects of CABG, highlighting its positive effects, but also the need for secondary prevention to maintain the benefits of surgery. The consequences of surgery for the partners of CABG patients have largely been unexplored and the study's findings in this regard are important. They not only show the effects that the partner's health, well-being and beliefs and needs have on the patient, but also on themselves and their risk of CHD. The examination of outcome at the level of the dyad is a novel approach that has potential for use in subsequent studies and for the development and evaluation of appropriate interventions.

This study was unusual in collecting data on both patients and partners early in the treatment trajectory immediately after it had been confirmed that the patient would go on the waiting list for CABG surgery. At the time this study was carried out this was some 2-3 months pre-operatively, though the waiting time has since been reduced. The picture it provides of CHD risk factors, self-efficacy and treatment beliefs, and of unmet needs at that time point, suggests that the provision of more information and support pre-operatively is necessary, especially since the study established the predictive effects of some of these pre-operative variables.

The study adds to the literature which shows the effects of patient and partner psychosocial variables on their own and the other's outcomes following a significant health event, most commonly myocardial infarction. It is unique in demonstrating that this effect is evident post-CABG. The results were largely derived from data from co-habiting partners and cannot be extended beyond this group until subsequent research has been carried out.

This study involved the use of a large number of measures. Many of these are well established measures used widely in the study of coronary heart disease. Some were used in this study for the first time with the CABG patient population and partners, namely the cardiac self-efficacy scale (Sullivan et al 1998), the Quality of Life for Cardiac Spouse (QL-SP) questionnaire (Ebbesen et al 1990) and the Social Support Survey (Sherbourne and Stewart 1991). These measures were shown to be acceptable with good internal consistency and face validity suggesting that they may be useful in the study of CABG patients and partners, but they require further study to establish their psychometric properties. The study findings have considerable implications for health care practice and for cardiac nursing practice in particular.

8.7 IMPLICATIONS FOR PRACTICE

This study adds to our knowledge by identifying the factors associated with, or that predict patient and partner and dyad outcome 4 months after CABG surgery. It highlights the potential that pre-operative rehabilitation and the use of interventions pre- and post-operatively which target the dyad have for the primary and secondary prevention of CHD. The practice of organising health care around the patient and including the partner in the role of assisting patient recovery neglects the CHD risk factors and lifestyle of the partner, and their health needs and concerns. If we are serious about reducing CHD mortality and morbidity in Scotland every opportunity must be taken to address the prevention of CHD, for example, by targeting the partners of CABG patients who may themselves be at an increased risk of CHD given the shared environment and likely lifestyle.

Contemporary health care needs to be organised more around the dyad, taking into account how each partner’s health and behaviour may be influenced by their own actions and those of their partner. This has implications for care delivery, especially cardiac rehabilitation, which will need to consider the partner’s cardiovascular risk assessment and their involvement in exercise classes and educational support. The overall aim would be to work with the dyad and to help maintain their physical, psychological and social health and well-being and to help them better anticipate and pre-empt any decline in their health or condition before it becomes acute. This is in keeping with recent health policy, which advocates the greater involvement of patients and their family in decisions about treatment and care, and the scope for supporting self care across the whole spectrum of care (Scottish Executive 2007, 2008, Long Term Conditions Alliance Scotland 2008, Department of Health 2006).

The availability of resources are likely to be an issue and choice for the patients and partners i.e. whether they would prefer to exercise alone or with their partners. This needs to be carefully investigated within a model of shared decision and a menu-driven programme of cardiac rehabilitation to ascertain whether such strategies contribute to improved dyad functioning and better partnership working with health care professionals. Achieving the right balance of professional care and supported self care is crucial to population wide prevention, health improvement and health promotion. Cardiac rehabilitation as part of anticipatory care aims to contribute to the management of long-term conditions and co-morbidities and health improvement (Scottish Executive 2007).

There are implications for nurses working in cardiac rehabilitation in working with the dyad and understanding how the patient and partner interact and support each other, and how we might best work to optimise dyad functioning to help improve health outcomes. Many factors need to be considered including the patients' and partners' current lifestyle, perspectives on CHD and treatment, motivation for behaviour change, shared decision making, action plans and goal setting, training, and the availability of resources. Currently, there is a strong emphasis on building the skills of health care professionals and in planning anticipatory care initiatives (Better Health, Better Care, Scottish Executive 2007). Given the results of this study, it is therefore timely, to examine the expertise and skills sets of nurses in cardiac rehabilitation as a way of improving clinical effectiveness through clinical training in patient-dyad-centred consultation skills.

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LIST OF APPENDICES

Appendix I: Patient and partner recruitment letter

SAMPLE LETTER
(Headed notepaper)

Date

Dear Mr/Mrs.....................

Please find enclosed your appointment to see me at the Cardiac Surgery OP Clinic at the Western Infirmary, Glasgow on (date/time ....).

I write to advise you that we are currently undertaking research in the Department with cardiac patients and their spouses/partners and we would hope to recruit you and your spouse/partner to the study. You have been selected because it is likely that once I have seen you in the Cardiac Surgery OP Clinic that you will go on the waiting list for coronary artery bypass surgery.

We are interested to know about your views on coronary artery bypass surgery, lifestyle change and the type of support that is available to you and your spouse/partner before and after surgery. The study will help us to better understand the patient's (and spouse's/partner's) views about treatment and help to inform service delivery. You have unique insights into how heart disease has affected your everyday lives and about the worries and concerns that patients and spouses/partners have about surgery.

It is desirable to have both the patient and their spouse/partner involved in the study. However, if you wish to be involved but your partner does not or visa versa we would still like to recruit one of you to the study.

Mrs Patricia Thomson, Lecturer/Researcher in Nursing at Stirling University is the investigator for the study. She would like to interview you and your spouse/partner after I have seen you in the Cardiac Surgery O.P. Clinic and then again at 4 months after surgery. This will take approximately 20 minutes of your time.

If you and your spouse/partner are willing to take part in the study please complete the enclosed sheet and return it to my secretary in the prepaid envelope provided. Details will only be given to the Researcher if you give consent.

There is no obligation to be involved in the study and refusal will not affect your treatment in any way. Please note that all responses shall be kept confidential and any other data collected later in the study shall be kept confidential and secure and shall only be used for the purpose of this research. As a matter of routine your GP (and your spouse/partner GP) will be contacted about the study and will be informed if you agree to participate.

Please do not hesitate to contact Mrs P Thomson on Tel: 01786 466396 should you have any questions concerning the study at this stage.

Yours sincerely
Consultant Cardiac Surgeon

Appendix II: Consent form

Thank you for taking the time to read this letter.

Please tick one box below and sign the form to indicate your willingness (or otherwise) to participate in the study. If you indicate YES then you will be given an information sheet and consent form to sign when you attend the Cardiac Surgery OP Clinic. Should you and/or your spouse/partner indicate NO, then no further contact shall be made with that individual regarding the research. Details will only be given to the Researcher if you give consent.

PATIENT You are willing to participate in the study (please tick)	**SPOUSE/PARTNER** You are willing to participate in the study (please tick)
YES ☐ **NO** ☐	**YES** ☐ **NO** ☐

PATIENT NAME (PRINT)	**SPOUSE/PARTNER** NAME (PRINT)
PATIENT SIGNATURE	**SPOUSE/PARTNER** SIGNATURE

ADDRESS:

POSTCODE	TELEPHONE NUMBER

APPOINTMENT DATE/TIME

G.P. NAME (PATIENT)	**G.P. NAME (SPOUSE/PARTNER)**
ADDRESS	ADDRESS
POSTCODE	POSTCODE
TELEPHONE NUMBER	TELEPHONE NUMBER

Please return this form to Helen McKerracher, Departmental Secretary, Level 9, Western Infirmary Glasgow in the prepaid envelope provided.

Thank you

Appendix III: Patient and partner information sheet

Appendix IV: Letter to general practitioners

APPENDIX IV

UNIVERSITY OF
STIRLING

DEPARTMENT OF
NURSING AND MIDWIFERY

University of Stirling
Stirling FK9 4LA Scotland

Telephone: +44 (0)1786 466396
Facsimile: +44 (0)1786 466333
patricia.thomson@stir.ac.uk

Date:

Address:

Dear Dr

Patient-spouse/partner understanding and beliefs about coronary artery bypass surgery, lifestyle change and perceived social support

I am a Lecturer in Nursing at the University of Stirling undertaking the above research as part of my PhD studies.

I write to inform you that your patient who/whose spouse/partner is on the waiting list for Coronary Artery Bypass Surgery has agreed to participate in the above study.

Permission to recruit patients (and their spouse/partner) has been given by Mr ___________ Consultant Cardiac Surgeon at the Western Infirmary, Glasgow. Approval for the study has been obtained from the appropriate Ethics and Research Committees.

Please could you advise me if you have any concerns regarding your patient's involvement in the study. If so, please contact the Cardiac Surgery OP clinic Tel No: .... on date/time .... to make this known. If I do not hear from you by that date I will take it that you have no objections.

I would be happy to discuss the study further with you if you feel that would be necessary.

Yours sincerely

Patricia Thomson (Mrs)
Lecturer

Appendix V: Approval letter West Ethics Committee, WIG

Appendix VI: Trust Management Approval, Form of Indemnity, WIG

Appendix VII: Letter Ethics Approval, Department of Nursing & Midwifery

Appendix VIII: Section 1 Patient questionnaire booklet (time point 1)

APPENDIX VIII

QUESTIONNAIRE BOOKLET

PATIENT: CORONARY ARTERY BYPASS GRAFT SURGERY

TIME POINT 1

Study Number:

Cardiac Surgeon:

SECTION 1 (PATIENT) (APPENDIX VIII contd)

This section asks you for your views about your health. Please answer every question by marking one box. If you are unsure about how to answer, please give the best answer you can.

1. In general, would you say your health is:
(please tick one box)

Excellent	Very Good	Good	Fair	Poor
☐	☐	☐	☐	☐

The following questions are about activities you might do during a typical day. Does **your health now limit you** in these activities? If so, how much?
(please tick one box on each line)

		Yes Limited a Lot	Yes Limited a Little	No, Not Limited At All
2.	Moderate activities such as moving a table, pushing a vacuum cleaner, bowling or playing golf	☐	☐	☐
3.	Climbing several flights of stairs	☐	☐	☐

During the **past 4 weeks**, have you had any of the following problems with your work or other regular daily activities **as a result of your physical health?**
(please tick one box)

		YES	NO
4.	Accomplished less than you would like	☐	☐
5.	Were limited in the kind of work or other activities	☐	☐

During the **past 4 weeks**, have you had any of the following problems with your work or other regular daily activities **as a result of any emotional problems** (such as feeling depressed or anxious)? (please tick one box)

		YES	NO
6.	Accomplished less than you would like	☐	☐
7.	Didn’t do work or other activities as carefully as usual	☐	☐

8. During the **past 4 weeks**, how much did pain interfere with your normal work (including both work outside the home and housework)? (tick one box)

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

These questions are about how you feel and how things have been with you **during the past 4 weeks**. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the **past 4 weeks –** (please tick one box on each line)

	All Of the Time	Most of the Time	A Good Bit of the Time	Some of the Time	A Little of the Time	None of the Time
9. Have you felt calm and peaceful?	☐	☐	☐	☐	☐	☐
10. Did you have a lot of energy?	☐	☐	☐	☐	☐	☐
11. Have you felt downhearted and low ?	☐	☐	☐	☐	☐	☐

12. During the **past 4 weeks**, how much of the time has your **physical health or emotional problems** interfered with your social activities (like visiting with friends, relatives, etc.)? (please tick one box)

All of the time	Most of the Time	A good Bit of the time	Some of the Time	A little of the Time	None of the Time
☐	☐	☐	☐	☐	☐

1. The following is a list of activities that people often do during the week. Although for some people with several medical problems it is difficult to determine what it is that limits them, please go over the activities listed below and indicate how much limitation you have had **due to chest pain, chest tightness, or angina <u>over the past 4 weeks.</u>** (Place a tick in one box on each line)

	Severely Limited	Moderately Limited	Somewhat Limited	A Little Limited	Not Limited	
Dressing yourself	☐	☐	☐	☐	☐	☐
Walking indoors on level ground	☐	☐	☐	☐	☐	☐
Showering	☐	☐	☐	☐	☐	☐
Climbing a hill or a flight of stairs without stopping	☐	☐	☐	☐	☐	☐
Gardening, vacuuming, or carrying groceries	☐	☐	☐	☐	☐	☐
Walking more than a block at a brisk pace	☐	☐	☐	☐	☐	☐

Running or jogging	☐	☐	☐	☐	☐	☐
Lifting or moving heavy objects (e.g. furniture, children)	☐	☐	☐	☐	☐	☐
Participating in strenuous sports (e.g. swimming, tennis)	☐	☐	☐	☐	☐	☐

2. Compared with 4 weeks ago, how often do you have **chest pain, chest tightness, or angina** when doing your **most strenuous** level of activity ? I have had **chest pain, chest tightness, or angina...**

Much more often	Slightly more often	About the same	Slightly less often	Much less often
☐	☐	☐	☐	☐

3. Over the past 4 weeks, on average, how many times have you had **chest pain, chest tightness, or angina ?** I get **chest pain, chest tightness, or angina...**

4 or more times per	1-3 times per day	3 or more times per week but not every day	1-2 times per week	Less than once a week	None over the past 4 weeks
☐	☐	☐	☐	☐	☐

4. Over the past 4 weeks, on average, how many times have you had to take (nitroglycerin tablets/spray) for your **chest pain, chest tightness, or angina** ? I take nitros....

4 or more times per day	1-3 times per day	3 or more times per week but not every day	1-2 times per week	Less than once a week	None over the past 4 weeks
☐	☐	☐	☐	☐	☐

5. How bothersome is it for you to take your pills for **chest pain, chest tightness or angina** as prescribed ?

Very bothersome	Moderately bothersome	Somewhat bothersome	A little bothersome	Not bothersome	My doctor has not prescribed
☐	☐	☐	☐	☐	☐

6. How satisfied are you that everything possible is being done to treat your **chest pain, chest tightness, or angina ?**

Not satisfied at all	Mostly dissatisfied	Somewhat satisfied	Mostly satisfied	Highly satisfied
☐	☐	☐	☐	☐

7. How satisfied are you with the explanations your doctor has given you about your **chest pain, chest tightness, or angina ?**

Not satisfied at all	Mostly dissatisfied	Somewhat satisfied	Mostly satisfied	Highly satisfied
☐	☐	☐	☐	☐

8. Overall, how satisfied are you with the current treatment of your **chest pain, chest tightness, or angina ?**

Not satisfied at all	Mostly dissatisfied	Somewhat satisfied	Mostly satisfied	Highly satisfied
☐	☐	☐	☐	☐

9. Over the <u>past 4 weeks</u>, how much has your **chest pain, chest tightness, or angina** interfered with your enjoyment of life ?

It has severely limited my enjoyment of life	It has moderately limited my enjoyment	It has slightly limited my enjoyment of life	It has barely limited my enjoyment of life	It has not limited my enjoyment of life
☐	☐	☐	☐	☐

10. If you had spent the rest of your life with your **chest pain, chest tightness, or angina** the way it is right now, how would you feel about this ?

Not satisfied at all	Mostly dissatisfied	Somewhat satisfied	Mostly satisfied	Highly satisfied
☐	☐	☐	☐	☐

11. How often do you worry that you may have a heart attack or die suddenly ?

I can’t stop worrying about it	I often think or worry about it	I occasionally worry about it	I rarely think or worry about it	I never think or worry about it
☐	☐	☐	☐	☐

Thank you for taking the time to complete this questionnaire

SECTION 2 (PATIENT) (APPENDIX VIII contd)

Patients Details

Date __/ __/ __ **Sex** ____________________

Surname __________________________ **Forenames** ____________________

Employment status____________________ **Occupation** ________________

Date of birth ____/____/____ **Age** ___________________

GP _____________________ **Postcode** ___________________

Address _____________________ **Tel No:** ___________________

____

Marital status **1** Never married **2** Married/cohabiting **3** Widowed/divorced/sep
(please circle)

Employment status____________________ **Occupation** ________________

Date of birth ____/____/____ **Age** ____________________

GP _____________________ **Postcode** ____________________

Address _____________________ **Tel No:** ___________________

____

Family History

Have any members of your family suffered from CHD ? ☐ 1=yes, 2=no
(If your answer is yes, please give details)

Total number of **male relatives** who suffered a heart attack or angina **before age 55** (include father, brothers and sons) _________________

Total number of **female relatives** who suffered a heart attack or angina **before age 60** (include mother, sisters, daughters) _________________

Number of brothers and sisters __________________________________

Personal Details

Height (without shoes) ☐.☐ **Weight** ☐.☐☐ BMI ☐☐.☐

Smoking History Smoker ☐ 1=yes, 2=Ex, 3=never

If current smoker ☐☐ cigarettes/day Years smoking ☐☐

Alcohol intake per week ___________ units

Exercise level ____

Personal History of Coronary Heart disease

Angina ☐ 1=yes, 2=no Age at onset ☐☐ years

Heart Attack ☐ 1=yes, 2=no Age at 1st MI ☐☐ years No. of MI ☐

History of Breathlessness

Number of episodes of breathlessness in the last **two weeks** ?

____

Apart from because of severe exertion e.g. running upstairs or after exercise, how do you rate the **severity** of your breathlessness on a scale of one to ten, where 0 represents no effect to your overall well-being and health and 10 represents complete disability, restriction to life ?

No limitation 1____2____3____4____5____6____7____8____9____10 Great limitation

Other medical problems

Do you suffer from any other troublesome health problems?

____

____

Life expectancy

This is a sensitive subject and you may find the questions difficult to answer.
Is it your belief that heart disease will shorten your life ?

Yes ☐ No ☐ Don’t know ☐

If so, by how much ? (years, months) Years ☐☐ Months ☐☐ Don’t know ☐

People with heart disease are often called upon to do many things to take care of themselves and manage their disease. We are interested in knowing how confident you are in your ability to do these things (please circle the appropriate number for each question)

	Not at all confident	Somewhat confident	Moderately confident	Very confident	Completely confident	N/A
How confident are you that <u>you know:</u>						
1. When you should call or visit your doctor about your disease ?	0	1	2	3	4	9
2. How to make your doctor understand your concerns about your heart ?	0	1	2	3	4	9
3. How to take your cardiac medications?	0	1	2	3	4	9
4. How much physical activity is good for you ?	0	1	2	3	4	9
How confident are you that you <u>can :</u>						
5. Control your chest pain by taking your medication ?	0	1	2	3	4	9
6. Control your chest pain by changing your activity levels ?	0	1	2	3	4	9
7. Control your breathlessness by taking your medication ?	0	1	2	3	4	9
8. Control your breathlessness by changing your activity level ?	0	1	2	3	4	9
9. Lose weight (if you are overweight ?)	0	1	2	3	4	9
10. Stop smoking (if you do) ?	0	1	2	3	4	9
11. Change your diet (if your doctor recommended this) ?	0	1	2	3	4	9
12. Get regular exercise (work up a sweat and increase your heart rate) ?	0	1	2	3	4	9
13 Maintain your usual activities at work ?	0	1	2	3	4	9
14. Maintain your usual social activities ?	0	1	2	3	4	9
15. Maintain your usual activities at home with your family ?	0	1	2	3	4	9
16. Maintain your sexual relationship with your partner ?	0	1	2	3	4	9

SMOKING

Benefits of giving up smoking

Please indicate your views on the following statements:

If YOU (or someone of your age with CHD) gave up smoking it would lower your risk of dying and help you live longer

	To what degree ?	**Relative risk reduction**
5	Greatly reduced risks of premature mortality	30-40%
4	Substantially reduced mortality risks	20-29%
3	Moderately reduced mortality risks	15-19%
2	A little lower mortality risks	5-10%
1	No effect on mortality risks	0-5%
0	Don’t know	

If YOU (or someone of your age with CHD) stopped smoking, it would lower your mortality risk and help you to live longer

5 Strongly Agree	4 Agree	**3** Undecided	**2** Disagree	**1** Strongly Disagree

How many extra years or months of life would YOU estimate that you (or someone of your age with CHD) might gain one month after a heart attack by giving up the habit *(ie the ADDITIONAL rather than just the remaining years)*

Sex	Years	Months

If you (or someone of your age with CHD) gave up smoking, how would you rate the benefits and also the disadvantages on a scale of 1 to 10, and what would these be ? *(Please circle one number)*

Benefits

No benefits 1____2____3____4____5____6____7____8____9____10 Great benefits

Perceived advantages:
(please comment) ____

Risks

No risks 1____2____3____4____5____6____7____8____9____10 Great risks

Perceived disadvantages:
(please comment) ____

PHYSICAL ACTIVITY

Benefits of taking more regular physical activity or exercise?

Please indicate your views on the following statements:

If YOU (or someone of your age with CHD) took more exercise it would lower your risk of dying and help you live longer

	To what degree ?	**Relative risk reduction**
5	Greatly reduced risks of premature mortality	30-40%
4	Substantially reduced mortality risks	20-29%
3	Moderately reduced mortality risks	15-19%
2	A little lower mortality risks	5-10%
1	No effect on mortality risks	0-5%
0	Don't know	

If YOU (or someone of your age with CHD) took more exercise it would lower your mortality risk and help you live longer

5 Strongly Agree	4 Agree	**3** Undecided	**2** Disagree	**1** Strongly Disagree

How many extra years or months of life would YOU estimate that you (or someone of your age with CHD) might gain from taking more exercise (if so advised by the doctor *(ie the ADDITIONAL rather than just the remaining years)*

Sex	Years	Months

If you (or someone of your age with CHD) took more exercise, how would you rate the benefits and also the disadvantages on a scale of 1 to 10, and what would they be ?
(Please circle one number)

Benefits

No benefits 1____2____3____4____5____6____7____8____9____10 Great benefits

Perceived advantages:
(please comment) ____

Risks

No risks 1____2____3____4____5____6____7____8____9____10 Great risks

Perceived disadvantages:
(please comment) ____

Do you currently attend a **cardiac rehabilitation** programme ? Yes ☐ No ☐

OBESITY / WEIGHT CONTROL

Benefits of weight loss ?

Please indicate your views on the following statements:

If you (or someone of your age with CHD) achieved a 10% loss (approx 8Kg) in weight (if needed), it would reduce your risk of dying and help you to live longer

	To what degree ?	**Relative risk reduction**
5	Greatly reduced risks of premature mortality	30-40%
4	Substantially reduced mortality risks	20-29%
3	Moderately reduced mortality risks	15-19%
2	A little lower mortality risks	5-10%
1	No effect on mortality risks	0-5%
0	Don't know	

If YOU (or someone of your age with CHD) achieved normal weight, it would lower your mortality risk and help you live longer

5 Strongly Agree	4 Agree	**3** Undecided	**2** Disagree	**1** Strongly Disagree

How many extra years or months of life would YOU estimate that you (or someone of your age with CHD) might gain one month after a heart attack by achieving a 10% weight
loss) 8 Kg)? *(ie the ADDITIONAL rather than just the remaining years)*

Sex	Years	Months

If you (or someone of your age with CHD) lost this weight, how would you rate the benefits and also the disadvantages on a scale of 1 to 10, and what would they be ? *(Please circle one number)*

Benefits

No benefits 1____2____3____4____5____6____7____8____9____10 Great benefits

Perceived advantages:
(please comment) ____

Risks

No risks 1____2____3____4____5____6____7____8____9____10 Great risks

Perceived disadvantages:
(please comment) ____

Dietary Habits

Benefits of eating a healthier diet ?

Please indicate your views on the following statements:

If you (or someone of your age with CHD) ate a low fat diet to lower blood cholesterol by 10% one month after a heart attack, it would reduce your risk of dying and help you live longer

To what degree ? **Relative risk reduction**

5	Greatly reduced risks of premature mortality	30-40%
4	Substantially reduced mortality risks	20-29%
3	Moderately reduced mortality risks	15-19%
2	A little lower mortality risks	5-10%
1	No effect on mortality risks	0-5%
0	Don't know	

If YOU (or someone of your age with CHD) ate a low fat diet to reduce your blood cholesterol level by 10%, it would lower your mortality risk and help you live longer

5 Strongly Agree	4 Agree	**3** Undecided	**2** Disagree	**1** Strongly Disagree

How many extra years or months of life would YOU estimate that you (or someone of your age with CHD) might gain by eating/maintaining a low fat diet to lower blood cholesterol by 10% ? *(ie ADDITIONAL rather than just the remaining years)*

Sex	Years	Months

If you (or someone of your age with CHD) reduced blood cholesterol by 10% through dietary measures, how would you rate the benefits and also the disadvantages on a scale of 1 to 10, and what would they be ? *(Please circle one number)*

Benefits

No benefits 1____2____3____4____5____6____7____8____9____10 Great benefits

Perceived advantages:
(please comment) ____

Risks

No risks 1____2____3____4____5____6____7____8____9____10 Great risks

Perceived disadvantages:
(please comment) ____

Prior to CABG surgery

Benefits of having CABG surgery ?

Please indicate your views on the following statements:
Undergoing CABG surgery would lower your risk of dying prematurely and help you live longer

	To what degree ?	**Relative risk reduction**
5	Greatly reduced risks of premature mortality	30-40%
4	Substantially reduced mortality risks	20-29%
3	Moderately reduced mortality risks	15-19%
2	A little lower mortality risks	5-10%
1	No effect on mortality risks	0-5%
0	Don't know	

Having CABG surgery would lower your mortality risk and help you live longer

5 Strongly Agree	4 Agree	**3** Undecided	**2** Disagree	**1** Strongly Disagree

How many extra years or months of life would YOU estimate that you might gain by having CABG surgery ? *(ie ADDITIONAL rather than just the remaining years)*

Sex	Years	Months

How would you rate the benefits and also the disadvantages of having CABG surgery on a scale of 1 to 10, and what would they be ? *(Please circle one number)*

Benefits

No benefits 1____2____3____4____5____6____7____8____9____10 Great benefits

Perceived advantages:
(please comment) ____

Risks

No risks 1____2____3____4____5____6____7____8____9____10 Great risks

Perceived disadvantages:
(please comment) ____

There are sometimes complications associated with CABG surgery, they include heart attack, stroke, going on to need further surgery, and some patients even die. What do you think your risk is of having one of these complications ?

% Risk	**1 in 2**	**1 in 10**	**1 in 100**	**1 in 1000**

Medication

Benefits of taking medication ?

Please indicate your views on the following statements:
Having drug treatment would lower your risk of dying prematurely and help you to live longer

	To what degree ?	**Relative risk reduction**
5	Greatly reduced risks of premature mortality	30-40%
4	Substantially reduced mortality risks	20-29%
3	Moderately reduced mortality risks	15-19%
2	A little lower mortality risks	5-10%
1	No effect on mortality risks	0-5%
0	Don't know	

Taking medication will lower your mortality risk and help you live longer

5 Strongly Agree	**4** Agree	**3** Undecided	**2** Disagree	**1** Strongly Disagree

How many extra years or months of life would YOU estimate that you might gain by having drug treatment ? *(ie ADDITIONAL rather than just the remaining years)*

Sex	Years	Months

You are on a series of medications for CHD, how would you rate the benefits and also the disadvantages of medication on a scale of 1 to 10, and what would they be ? *(Please circle one number)*

Benefits
No benefits 1____2____3____4____5____6____7____8____9____10 Great benefits

Perceived advantages:
(please comment) ____

Risks
No risks 1____2____3____4____5____6____7____8____9____10 Great risks

Perceived disadvantages:
(please comment) ____

There are sometimes side-effects associated with medication. What do you think your risk is of having any side effects as a result of your cardiac medication ?

% Risk	**1 in 2**	**1 in 10**	**1 in 100**	**1 in 1000**

Have you ever experienced any of the following side effects from your medication(s) for heart disease, and if so would you attribute any of these to any particular drug ?

Side Effects	**Yes**	**No**	**Side Effects**	**Yes**	**No**
Ankle swelling			Indigestion		
Cough/wheeze			Bleeding		
Tiredness/lethargy			Impotence		
Cold hands/feet			Headache		
Sleep disturbances			Abnormal bloods		
Slow heart rate			Gout		
Rashes			Others		

Information from patients casenotes or charts (Recorded by Researcher)

Name: ______________________ **Unit number:** __________________

Medical history

Blood pressure Systolic ☐☐☐ Diastolic ☐☐☐

a. Hypertensive ☐ 1=yes, 2=no

Medication for hypertension ? ☐ 1=yes, 2=no Drug(s) : _________________

b. Diabetes Mellitus ☐ 1=yes, 2=no

Medication for diabetes ? ☐ 1=yes, 2=no Drug(s) : _________________

c. Elevated cholesterol ? ☐ 1=yes, 2=no Level: _________________

Medication for high cholesterol? ☐ 1=yes, 2=no Drug (s): _________________

d. Other Medications ____

____

____

Anti-anginal ☐ 1=yes, 2=no Anti-platelet ☐ 1=yes, 2=no HRT ☐ 1=yes, 2=no

CCS classification ____________________

Date of coronary angiogram _________________

Angiographic findings
Vessels affected ____________________ **Degree of stenosis** ____________

____________________ ____________________

____________________ ____________________

____________________ ____________________

____________________ ____________________

LVEF ____________________

____

Previous Angioplasty ☐ 1=yes, 2=no Age ☐☐ years

Date of referral to cardiac surgeons ___________
(if different from above)

Any other relevant information:

____

____

____

Appendix IX: Section 1 Partner questionnaire booklet (time point 1)

APPENDIX IX

QUESTIONNAIRE BOOKLET

PARTNER: CORONARY ARTERY BYPASS GRAFT SURGERY

TIME POINT 1

Study Number:

Cardiac Surgeon:

<u>SECTION 1</u> (PARTNER) (APPENDIX IX contd)

This section asks you for your views about your health. Please answer every question by marking one box. If you are unsure about how to answer, please give the best answer you can.

1. In general, would you say your health is:
(please tick one box)

Excellent	Very Good	Good	Fair	Poor
☐	☐	☐	☐	☐

The following questions are about activities you might do during a typical day. Does **your health now limit you** in these activities? If so, how much?
(please tick one box on each line)

		Yes Limited a Lot	Yes Limited a Little	No, Not Limited At All
2.	Moderate activities such as moving a table, pushing a vacuum cleaner, bowling or playing golf	☐	☐	☐
3.	Climbing several flights of stairs	☐	☐	☐

During the **past 4 weeks**, have you had any of the following problems with your work or other regular daily activities **as a result of your physical health?**
(please tick one box)

		YES	NO
4.	Accomplished less than you would like	☐	☐
5.	Were limited in the kind of work or other activities	☐	☐

During the **past 4 weeks**, have you had any of the following problems with your work or other regular daily activities **as a result of any emotional problems** (such as feeling depressed or anxious)? (please tick one box)

		YES	NO
6.	Accomplished less than you would like	☐	☐
7.	Didn't do work or other activities as carefully as usual	☐	☐

8. During the **past 4 weeks**, how much did pain interfere with your normal work (including both work outside the home and housework)? (tick one box)

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

These questions are about how you feel and how things have been with you **during the past 4 weeks**. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the **past 4 weeks –** (please tick one box on each line)

		All Of the Time	Most of the Time	A Good Bit of the Time	Some of the Time	A Little of the Time	None of the Time
9.	Have you felt calm and peaceful?	☐	☐	☐	☐	☐	☐
10.	Did you have a lot of energy?	☐	☐	☐	☐	☐	☐
11.	Have you felt downhearted and low ?	☐	☐	☐	☐	☐	☐

12. During the **past 4 weeks**, how much of the time has your **physical health or emotional problems** interfered with your social activities (like visiting with friends, relatives, etc.)? (please tick one box)

All of the time	Most of the Time	A good Bit of the time	Some of the Time	A little of the Time	None of the Time
☐	☐	☐	☐	☐	☐

The following questions are about how you have felt during the **past 2 weeks**. Please choose one of the following options (please circle the appropriate number for each question)

		All of the Time	Most of the Time	A Good Bit of the Time	Some of the Time	A Little of the Time	Hardly any of the Time	None of the Time
1.	Felt concerned or worried	1	2	3	4	5	6	7
2.	Felt questioning or uniformed	1	2	3	4	5	6	7
3.	Felt tense or upset	1	2	3	4	5	6	7
4.	Felt sad or depressed	1	2	3	4	5	6	7
5.	Felt devoted to diet/nutritional habits or concerns	1	2	3	4	5	6	7
6.	Felt nervous or anxious	1	2	3	4	5	6	7
7.	Had trouble getting a good night's sleep, or found yourself watching your partner whilehe/she's sleeping	1	2	3	4	5	6	7

		All of the Time	Most of the Time	A Good Bit of the Time	Some of the Time	A Little of the Time	Hardly any of the Time	None of the Time
8.	Felt disappointed or discouraged	1	2	3	4	5	6	7
9.	Time devoted to changing exercise pattern	1	2	3	4	5	6	7
10.	Felt frustrated or angry	1	2	3	4	5	6	7
11.	Felt physically strained or low in energy	1	2	3	4	5	6	7
12.	Limited in travelling because of your partner’s condition	1	2	3	4	5	6	7
13.	Felt tearful or crying	1	2	3	4	5	6	7
14.	Time devoted to being concerned about or changing smoking habits	1	2	3	4	5	6	7
15.	Felt isolated, alone or lonely	1	2	3	4	5	6	7
16.	Felt your partner’s heart problem limited or interfered with sexual activity	1	2	3	4	5	6	7
17.	Time devoted to being concerned about or changing your weight	1	2	3	4	5	6	7
18.	Felt emotionally strained	1	2	3	4	5	6	7
19.	Blamed yourself for things or felt guilty	1	2	3	4	5	6	7
20.	Limited in your usual social activities	1	2	3	4	5	6	7
21.	Felt helpless or insecure	1	2	3	4	5	6	7
22.	Happy, satisfied or pleased with personal life	1	2	3	4	5	6	7
23.	Felt apprehensive or frightened	1	2	3	4	5	6	7
24.	Restricted or limited because of your partner’s heart problem	1	2	3	4	5	6	7
25.	Felt overprotective	1	2	3	4	5	6	7
26.	Happy, satisfied or pleased with communication with partner/family	1	2	3	4	5	6	7

Thank you for taking the time to complete this questionnaire

<u>SECTION 2</u> (PARTNER) (APPENDIX IX contd)

Partners Details

Date __/ __/ __ **Sex** ____________________

Surname __________________________ **Forenames** ____________________

Employment status____________________ **Occupation** ________________

Date of birth ____/____/____ **Age** ____________________

GP _____________________ **Postcode** ____________________

Address _____________________ **Tel No:** ____________________

____

Personal Details

Height (without shoes) ☐.☐ **Weight** ☐.☐☐ BMI ☐☐.☐

Smoking History Smoker ☐ 1=yes, 2=Ex, 3=never

If current smoker ☐☐ cigarettes/day Years smoking ☐☐

Alcohol intake per week _________ units

Exercise level ____

Other medical problems

Do you suffer from any troublesome health problems?

____

Life expectancy

This is a sensitive subject and you may find this questions difficult to answer.
Is it your belief that heart disease will shorten your partner's life ?

Yes ☐ No ☐ Don't know ☐

If so, by how much ? (years, months) Years ☐☐ Months ☐☐ Don't know ☐

People with heart disease are often called upon to do many things to take care of themselves and to manage their disease. We are interested in knowing how confident you are about your partner's ability to do these things (please circle the appropriate number for each question)

	Not at all confident	Somewhat confident	Moderately confident	Very confident	Completely confident	N/A
How confident are you that your partner knows:						
1. When he/she should call or visit the doctor about their disease ?	0	1	2	3	4	9
2. How to make the doctor understand their concerns about their heart ?	0	1	2	3	4	9
3. How to take their cardiac medications?	0	1	2	3	4	9
4. How much physical activity is good for them ?	0	1	2	3	4	9
How confident are you that your partner can :						
5. Control their chest pain by taking their medication ?	0	1	2	3	4	9
6. Control their chest pain by changing their activity levels ?	0	1	2	3	4	9
7. Control their breathlessness by taking their medication ?	0	1	2	3	4	9
8. Control their breathlessness by changing their activity level ?	0	1	2	3	4	9
9. Lose weight (if they are overweight ?)	0	1	2	3	4	9
10. Stop smoking (if they do) ?	0	1	2	3	4	9
11. Change their diet (if their doctor recommended this) ?	0	1	2	3	4	9
12. Get regular exercise (work up a sweat and increase their heart rate) ?	0	1	2	3	4	9
13. Maintain their usual activities at work ?	0	1	2	3	4	9
14. Maintain their usual social activities ?	0	1	2	3	4	9
15. Maintain their usual activities at home with the family ?	0	1	2	3	4	9
16. Maintain their sexual relationship with you ?	0	1	2	3	4	9

SMOKING

Benefits of giving up smoking

Please indicate your views on the following statements:

If YOUR partner (or someone of their age with CHD) gave up smoking it would lower their risk of dying and help them live longer

To what degree ? **Relative risk reduction**

5	Greatly reduced risks of premature mortality	30-40%
4	Substantially reduced mortality risks	20-29%
3	Moderately reduced mortality risks	15-19%
2	A little lower mortality risks	5-10%
1	No effect on mortality risks	0-5%
0	Don't know	

If YOUR partner (or someone of their age with CHD) stopped smoking, it would lower their mortality risk and help them to live longer

5 Strongly Agree	4 Agree	**3** Undecided	**2** Disagree	**1** Strongly Disagree

How many extra years or months of life would YOU estimate that YOUR partner (or someone of their age with CHD) might gain one month after a heart attack by giving up the habit? *(ie the ADDITIONAL rather than just the remaining years)*

Sex	Years	Months

If YOUR partner (or someone of their age with CHD) gave up smoking, how would you rate the benefits and also the disadvantages on a scale of 1 to 10, and what would they be ? *(Please circle one number)*

Benefits

No benefits 1____2____3____4____5____6____7____8____9____10 Great benefits

Perceived advantages:
(please comment) ____

Risks

No risks 1____2____3____4____5____6____7____8____9____10 Great risks

Perceived disadvantages:
(please comment) ____

Physical Activity

Benefits of taking more regular physical activity or exercise?

Please indicate your views on the following statements:

If YOUR partner (or someone of their age with CHD) took more exercise it would lower their risk of dying and help them live longer

	To what degree ?	**Relative risk reduction**
5	Greatly reduced risks of premature mortality	30-40%
4	Substantially reduced mortality risks	20-29%
3	Moderately reduced mortality risks	15-19%
2	A little lower mortality risks	5-10%
1	No effect on mortality risks	0-5%
0	Don’t know	

If YOUR partner (or someone of their age with CHD) took more exercise it would lower their mortality risk and help them to live longer

5 Strongly Agree	4 Agree	**3** Undecided	**2** Disagree	**1** Strongly Disagree

How many extra years or months of life would YOU estimate that YOUR partner (or someone of their age with CHD) might gain from taking more exercise (if so advised by the doctor *(ie the ADDITIONAL rather than just remaining years)*

Sex	Years	Months

If YOUR partner (or someone of their age with CHD) took more exercise, how would you rate the benefits and also the disadvantages on a scale of 1 to 10, and what would they be? *(Please circle one number)*

Benefits

No benefits 1____2____3____4____5____6____7____8____9____10 Great benefits

Perceived advantages:
(please comment) ____

Risks

No risks 1____2____3____4____5____6____7____8____9____10 Great risks

Perceived disadvantages:
(please comment) ____

Obesity / Weight Control

Benefits of weight loss ?

Please indicate your views on the following statements:

If YOUR partner (or someone of their age with CHD) achieved a 10% loss (approx 8Kg) in weight (if needed), it would reduce their risk of dying and help them to live longer

To what degree ? **Relative risk reduction**

5	Greatly reduced risks of premature mortality	30-40%
4	Substantially reduced mortality risks	20-29%
3	Moderately reduced mortality risks	15-19%
2	A little lower mortality risks	5-10%
1	No effect on mortality risks	0-5%
0	Don't know	

If YOUR partner (or someone of their age with CHD) achieved normal weight, it would lower their mortality risk and help them to live longer

5 Strongly Agree	4 Agree	**3** Undecided	**2** Disagree	**1** Strongly Disagree

How many extra years or months of life would YOU estimate that YOUR partner (or someone of their age with CHD) might gain one month after a heart attack by achieving a 10% weight loss) 8 Kg) ? *(ie the ADDITIONAL rather than just the remaining years)*

Sex	Years	Months

If YOUR partner (or someone of their age with CHD) lost this weight, how would you rate the benefits and also the disadvantages on a scale of 1 to 10, and what would they be ? *(Please circle one number)*

Benefits

No benefits 1____2____3____4____5____6____7____8____9____10 Great benefits

Perceived advantages:
(please comment) ____

Risks

No risks 1____2____3____4____5____6____7____8____9____10 Great risks

Perceived disadvantages:
(please comment) ____

Dietary Habits

Benefits of eating a healthier diet ?

Please indicate your views on the following statements:
If YOUR partner (or someone of their age with CHD) ate a low fat diet to lower blood cholesterol by 10% one month after a heart attack, it would reduce their risk of dying and help them to live longer

	To what degree ?	**Relative risk reduction**
5	Greatly reduced risks of premature mortality	30-40%
4	Substantially reduced mortality risks	20-29%
3	Moderately reduced mortality risks	15-19%
2	A little lower mortality risks	5-10%
1	No effect on mortality risks	0-5%
0	Don't know	

If YOUR partner (or someone of their age with CHD) ate a low fat diet to reduce their blood cholesterol level by 10%, it would lower their mortality risk and help them to live longer

5 Strongly Agree	4 Agree	**3** Undecided	**2** Disagree	**1** Strongly Disagree

How many extra years or months of life would YOU estimate that YOUR partner (or someone of their age with CHD) might gain by eating/maintaining a low fat diet to lower blood cholesterol by 10% ? *(ie ADDITIONAL rather than just remaining years)*

Sex	Years	Months

If YOUR partner (or someone of their age with CHD) reduced their blood cholesterol by 10% through dietary measures, how would you rate the benefits and also the disadvantages on a scale of 1 to 10, and what would they be ? *(Please circle one number)*

Benefits

No benefits 1____2____3____4____5____6____7____8____9____10 Great benefits

Perceived advantages:
(please comment) ____

Risks

No risks 1____2____3____4____5____6____7____8____9____10 Great risks

Perceived disadvantages:
(please comment) ____

Prior to CABG surgery

Benefits of having CABG surgery ?
Please indicate your views on the following statements:
Undergoing CABG surgery would lower YOUR partner's risk of dying prematurely and help them to live longer

	To what degree ?	**Relative risk reduction**
5	Greatly reduced risks of premature mortality	30-40%
4	Substantially reduced mortality risks	20-29%
3	Moderately reduced mortality risks	15-19%
2	A little lower mortality risks	5-10%
1	No effect on mortality risks	0-5%
0	Don't know	

Having CABG surgery, would lower your partner's mortality risk & help them to live longer

5 Strongly Agree	4 Agree	**3** Undecided	**2** Disagree	**1** Strongly Disagree

How many extra years or months of life would YOU estimate that YOUR partner might gain by having CABG surgery ? *(ie ADDITIONAL rather than just the remaining years)*

Sex	Years	Months

How would YOU rate the benefits and also the disadvantages of YOUR partner having CABG surgery on a scale of 1 to 10, and what would they be ? *(Please circle one number)*

Benefits
No benefits 1____2____3____4____5____6____7____8____9____10 Great benefits

Perceived advantages:
(please comment) ____

Risks
No risks 1____2____3____4____5____6____7____8____9____10 Great risks

Perceived disadvantages:
(please comment) ____

There are sometimes complications associated with CABG , they include heart attack, stroke, going on to need further surgery, and some patients even die. What do YOU think YOUR partners risk is of having one of these complications ?

% Risk	**1 in 2**	**1 in 10**	**1 in 100**	**1 in 1000**

Medication

Benefits of taking medication ?

Please indicate your views on the following statements:
Having drug treatment would lower YOUR partner's risk of dying prematurely and help them to live longer

To what degree ?		**Relative risk reduction**
5	Greatly reduced risks of premature mortality	30-40%
4	Substantially reduced mortality risks	20-29%
3	Moderately reduced mortality risks	15-19%
2	A little lower mortality risks	5-10%
1	No effect on mortality risks	0-5%
0	Don't know	

Taking medication will lower your partner's mortality risk-help them to live longer

5 Strongly Agree	4 Agree	**3** Undecided	**2** Disagree	**1** Strongly Disagree

How many extra years or months of life would YOU estimate that YOUR partner might gain by having drug treatment ? *(ADDITIONAL rather than remaining years)*

Sex	Years	Months

YOUR partner is on a series of medications for CHD, how would YOU rate the benefits and also the disadvantages of their medication on a scale of 1 to 10, and what would they be ? *(Please circle one number)*

Benefits

No benefits 1____2____3____4____5____6____7____8____9____10 Great benefits

Perceived advantages:
(please comment) ____

Risks

No risks 1____2____3____4____5____6____7____8____9____10 Great risks

Perceived disadvantages:
(please comment) ____

There are sometimes side-effects associated with medication. What do YOU think YOUR partner's risk is of having any side effects as a result of their medication?

% Risk	**1 in 2**	**1 in 10**	**1 in 100**	**1 in 1000**

Has your partner ever experienced any of the following side effects from the medication that he/she takes for heart disease, and if so would you attribute these to any particular drug ?

Side Effects	**Yes**	**No**	**Side Effects**	**Yes**	**No**
Swollen ankles			Indigestion		
Cough/wheeze			Bleeding		
Tiredness/lethargy			Impotence		
Cold hands/feet			Headache		
Sleep disturbances			Abnormal bloods		
Slow heart rate			Gout		
Rashes			Others		

SECTION 3 **(PARTNER) (APPENDIX IX contd)**

This section asks you some questions about the **support that is available to you**. If you are unsure about how to answer, please give your best answer.

1. About how many close friends and close relatives do you have (people you feel at ease with and can talk to about what is on your mind) ?

Write in number of close friends and close relatives: ☐☐

People sometimes look to others for companionship, assistance, or other types of support. How often is each of the following kinds of support available to you if you need it ? (circle one number on each line)

	None of the Time	A Little of the Time	Some of the Time	Most of the Time	All of the Time
2. Someone to help if you were confined to bed.....	1	2	3	4	5
3. Someone you can count on to listen to you when you need to talk…………………………...........	1	2	3	4	5
4. Someone to give you good advice about a crisis...	1	2	3	4	5
5. Someone to take you to the doctor if you needed it	1	2	3	4	5
6. Someone who shows you love and affection….....	1	2	3	4	5
7. Someone to have a good time with…………….....	1	2	3	4	5
8. Someone to give you information to help you understand a situation………………………….........	1	2	3	4	5
9. Someone to confide in or talk to about yourself or your problems…………………….........................	1	2	3	4	5
10. Someone who hugs you……………….................	1	2	3	4	5
11. Someone to get together with for relaxation……....	1	2	3	4	5
12. Someone to prepare your meals if you were unable to do it yourself……………………….........	1	2	3	4	5
13. Someone whose advice you really want……......	1	2	3	4	5
14. Someone to do things with to help you get your mind off things……………………………...........	1	2	3	4	5
15. Someone to help with daily chores if you were sick	1	2	3	4	5
16. Someone to share your most private worries and fears with……………………………………...........	1	2	3	4	5

	None of the Time	A Little of the Time	Some of the Time	Most of the Time	All of the Time
17. Someone to turn to for suggestions about how to deal with a personal problem………………………...........	1	2	3	4	5
18. Someone to do something enjoyable with…….......	1	2	3	4	5
19. Someone who understands your problems……......	1	2	3	4	5
20. Someone to love and make you feel wanted…….....	1	2	3	4	5

Patient's need for information differs. We are interested in knowing more about the **type of information that you would find useful**. Please rate the following needs in order of importance and **indicate whether these have been unmet or met** (please circle the appropriate number for each question)

Need statements	Not important	A Little important	Moderately important	Very important	Need unmet	Need met
Rate needs in order of importance:						
1. To know specific facts about my condition	0	1	2	3		
2. To have honest explanations given in understandable terms	0	1	2	3		
3. To talk to a nurse about problems I or my family member may be facing	0	1	2	3		
4. To know the expected course (direction) of the disease process	0	1	2	3		
5. To receive specific instructions about care	0	1	2	3		
6. To feel hope that I will have a high quality of life	0	1	2	3		
7. To receive information about what to do in an emergency	0	1	2	3		
8. To receive information about expected physical course/recovery	0	1	2	3		
9. To receive information about how to go about making lifestyle changes	0	1	2	3		
10. To feel appreciated/valued by my family member	0	1	2	3		

11. To receive information about lifestyle changes	0	1	2	3
12. To have my partner assist me in making lifestyle changes	0	1	2	3
13. To feel as if others have my welfare in mind	0	1	2	3
14. To be able to talk with my family member about his/her concerns	0	1	2	3
15. To receive specific instructions about the return to sexual activity	0	1	2	3
16. To be able to talk with my family members about my fears/concerns	0	1	2	3
17. To receive information about expected psychological course (recovery)	0	1	2	3
18. To talk to someone about my feelings	0	1	2	3
19. To have help with financial concerns	0	1	2	3
20. To receive information about feelings and emotions I may have during my recovery	0	1	2	3
21. To talk to someone about anger/ frustration I may be experiencing	0	1	2	3
22. To talk to someone about my fears	0	1	2	3
23. To be told about other people or groups who can help with problems	0	1	2	3
24. To have time alone for myself	0	1	2	3
25. To be away from family member without worrying	0	1	2	3
26. To feel that others are going through the same things, that my experience is not unusual	0	1	2	3
27. To talk to others going through the same things	0	1	2	3
28. To have someone run errands or help with the house and/or cooking	0	1	2	3

Thank you for taking the time to complete this questionnaire

Appendix X: SF-12 measurement model

Appendix XI: Histogram of patients post-operative PCS

Appendix XII: Histogram of patients post-operative MCS

Appendix XIII: Histogram of partners post-operative MCS

Appendix Xlll: Histogram of partners post-operative EFD

Appendix XlV: Histogram of patients post-operative PSFD

Appendix XV: Patients' expected and realised benefits of CABG

Realised benefits categorised	Subjects self-reports	Realised benefits achieved (%)
Prolonged life	9	11.2
Improvement in quality of life	35	43.7
Return to usual activities	30	37.5
Travel/recreation	4	5.0
Freedom from pain, breathlessness	32	40.0

Appendix XVI: Patients’ comments in relation to treatment benefits and risks

	Pre-operative	Post-operative
Stopping smoking	Benefits A healthier life Feel healthier, live longer and more money Smoking furs up arteries You would feel much better, smell better and financially be much better off Must help breathing Risks (or disadvantages) Missed the habit Perhaps it’s a bit too late as damage is already done Breaking the habit is difficult I’ve been stopped for 17 years – kicking the habit is hard and my wife still smokes	Benefits Quitting will lengthen time’ Doesn’t bother me now thought it would Not sure if heart disease can come back Need to look after your new arteries Risks (or disadvantages) Still get a craving, especially at when I’m stressed Putting on weight Makes you want to eat more Weight gain, mood swings
Increasing physical activity	Benefits If you can do even – makes you feel good about yourself and more agile I think any form of increased exercise would benefit not only your fitness but also your general health, energy levels Better mobility Risks (or disadvantages) Sudden death risk Bringing on a heart attack Might overdo things Got to want to do it Difficult as I’m so unfit just now Needs to be guided by your doctor	Benefits Group support, No worries now – even on a bike’ To meet others with the same condition I feel that CR has made me better quicker CR was fantastic – but period before felt constantly worried and unsupported CR gave you every type of talk – gave you good information – gives me confidence Risks (or disadvantages) I’m a quiet person –don’t like groups, parking inconvenient, CR staff in contact by phone. Feels wants to do more than currently advised in CR class. Not sure – not started yet due to re-admission – and my cousin died suddenly
Weight loss	Benefits Helps you look better and feel better – less strain on the heart. Less strain on your heart	Benefits Too risky to carry lot of weight. Quality of life improved If heavy got to work harder to pump blood through the heart/body

	<u>Risks (or disadvantages)</u> I'm ashamed of my weight gain, but less confident in myself – and more breathless.	<u>Risks (or disadvantages)</u> Weight loss slow in relation to effort Hard going -I just want to eat all the time
Diet to reduce cholesterol	<u>Benefits</u> Saves fat gathering round the heart Increased energy, improved skin, hair and nails <u>Risks (or disadvantages)</u> Don't enjoy food as much now	<u>Benefits</u> Didn't realise before what it was all about- eating healthier. Still needs a healthier diet – as fat still clogs up the arteries. <u>Risks (or disadvantages)</u> Feeling cold
CABG	<u>Benefits</u> Improvement in quality of life, all aspect of living. Relief of pain. <u>Risks (or disadvantages)</u> Comments to do with operative risk	<u>Benefits</u> Better than I thought I would be. Increases lifespan. Better sex life, more social benefits, friends, neighbours. Complete new lease of life after surgery <u>Risks (or disadvantages)</u> Don't feel much different, depressed at times Concentration poor – mood swings Appetite still poor, lost weight
Medication use	<u>Benefits</u> Stops angina pain, keeps BP normal. I feel that taking medication it is a preventative thing and psychologically it helps. Helps to keep you alive. <u>Risks (or disadvantages)</u> Side effects e.g. headaches. Previously had a reaction to statins	<u>Benefits</u> Wouldn't be worth going through CABG if didn't continue medication. Taking less tablets now. <u>Risks (or disadvantages)</u> I had dry cough in the morning with tablets. Bruising due to aspirin. Problem with aspirin – bleeding nose Taste disturbances

Appendix XVII: Reported complications of surgery

Complication	**Frequency**	**Percent**
Sternum infection	2	2.4
Irregular heart beat	3	3.6
Breathlessness, chest infection or fluid in lungs	8	10.7
Oedema	1	1.2
E coli	1	1.2
Chest pain	1	1.2
Blackouts	1	1.2
Cellulitus	2	1.2
Others	1	2.4
Re-admissions to hospital	20	25