DISCUSSION

The cardiovascular system is subject to a number of disorders. Some of these are due to congenital defects—that is, defects present at birth—and others, to infection. By far, however, the major threats to the cardiovascular system are due to damage over the course of life that produces cumulative wear and tear (Taylor, 2012). Lifestyle, in the form of diet, exercise, smoking, and stress exposure, among other factors, heavily affects the development of cardiovascular disease (Ogden, 2004).

According to Taylor (2012), **Atherosclerosis** - The major cause of heart disease is atherosclerosis, a problem that becomes worse with age. It is caused by accumulation of cholesterol and other substances around the arterial walls. It leads to formation of plaques and further narrows down the arteries. The presence of atherosclerotic plaques reduces the flow of blood through the arteries and interferes with the passage of nutrients from the capillaries into the cells—a process that can lead to tissue damage. Damaged arterial walls also lead to the formation of blood clots, which in turn can completely obstruct a vessel and cut off the flow of blood. Atherosclerosis is, in part, a disease of lifestyle. It is associated with a number of poor health habits, such as smoking and a high-fat diet.

Atherosclerosis is associated with several primary clinical manifestations (Taylor, 2012):

- **Angina pectoris**, or chest pain, which occurs because the muscle tissue of the heart must continue its activity without sufficient supply of oxygen or adequate removal of carbon dioxide and other waste products.
- **Myocardial infarction (MI)**, which is most likely to occur when a clot has developed in a coronary vessel and blocks the flow of blood to the heart. A myocardial infarction, also known as a heart attack, can cause death.
• **Ischemia** is a condition characterized by lack of blood flow and oxygen to the heart muscle. Sometimes ischemia occurs with no pain (also called silent ischemia) and may consequently lead to heart attack with no prior warning. People with angina also may have undiagnosed episodes of silent ischemia.

Other major disorders of the cardiovascular system include the following (Taylor, 2012):

• **Congestive heart failure (CHF)** occurs when the heart’s delivery of oxygen rich blood to the body is inadequate to meet the body’s need. Congestive heart failure can be caused by: diseases that weaken the heart muscle, diseases that cause stiffening of the heart muscles, or diseases that increase the oxygen demand beyond the capability of the heart to deliver.

• **Arrhythmia** refers to irregular beatings of the heart. Sudden arrhythmia death syndrome (SADS) is a disorder of the electrical system of the heart. The problem centers on the length of time it takes the electrical system to recharge following a heartbeat. This is known as the QT interval. People who have a long QT interval are more vulnerable to a very fast, abnormal heart rhythm. When this rhythm occurs, no blood is pumped out from the heart, and the brain quickly becomes deprived of blood, causing sudden loss of consciousness and sudden death (Taylor, 2012).

**PREVALENCE OF CORONARY HEART DISEASE IN IRAN**

It is very important to know the prevalence rates in order to plan and promote public health measures. The incidence of Coronary Heart Disease varies from country to country, and culture to culture. Among Middle East countries Iran has the highest burden of Ischemic Heart Disease (Gaziano, Bitton, Anand, Abrahams-Gessel, and Murphy, 2010; Talaei, Sadeghi,
Discussion

Marshall, Thomas, Iranipour, Nazarat, and Sarrafzadegan, 2013). According to statistics, 2 million Iranians are suffering from Coronary Heart Disease (Nekouei, Yousefy, and Manshaee, 2012). The Research Committee of the Iranian Society of Cardiac Surgeons has announced that the age of exposure to cardiovascular disease in Iran is approximately 7 to 10 years less than other countries. In developed countries, people are exposed to this disease in the sixth decade of their lives. However, people in Iran are exposed to this disease during the fifth decade of their life. There are about 50 thousand heart surgeries performed annually in Iran (Nekouei et al., 2012). A high incidence of CHD has been found in the younger population especially in women (Talaei et al., 2013). Self reported history of CHD or ECG-defined CHD was 21.8% in 2009. Variables independently associated with CHD have been gender (particularly females), age, systolic blood pressure, body mass index and waist to hip ratio (Hadaegh, Harati, Ghanbarian, and Azizi, 2009).

Coronary Bypass Surgery is an accepted treatment procedure to improve the symptoms of Coronary Heart Disease. The number of patients undergoing this procedure has an increasing trend in most countries (Thom, Haase, Rosamond, Howard, Rumsfeld, Manolio, and Lloyd-Jones, 2006). However, one study in Iran showed a 4% decline in the country (Karimi, Ahmadi, Davoodi, Movahedi, Marzban, Abbasi, and Fallah, 2008). Recently, interest in measuring the quality has spread from industries into the health care system too. Traditional evaluation of coronary bypass surgery outcomes has focused on objective measures such as mortality, morbidity and clinical function. But in recent years, the emphasis has directed to include more subjective parameters, especially the psychosocial factors that contribute to recovery from surgery. Main domains include general perceptions of health and well-being, coping styles, emotional and cognitive status, personality characteristics and disease-specific symptoms (Azzopardi and Lee, 2009).
Patients undergoing any kind of surgery require a great degree of psychological mental preparation and mental toughness to be able to deal with the consequences of surgery, such as, taking leave from workplace, loss of duties and roles towards household (especially among women), inability to be able to live life to the most optimal level and many other factors. Therefore, it is very important to study the psychological factors that determine success of surgery and patient’s attitude towards it (Snyder, 2009). One factor related to psychological reaction to surgery is recovery process- recovery physically and psychologically. Often individuals view recovery as a physical process only, however, some researchers argue that undergoing major heart surgery requires a great deal of psychological elements as well. Factors like substance abuse, depression, anxiety, surgical distress that play a negative role in recovery and positive protective factors like hardiness, problem focused coping, spirituality, psychological maturity play a major role in predicting successful surgical outcomes (Snyder, 2009).

Therefore, the aim of the present study was to investigate Recovery Process and its dimensions viz. Perceived Recovery and Objective Recovery among bypass coronary surgery patients with Marital Adjustment, Stress Coping Styles, Well Being, and Optimism. Gender differences among these patients were also studied.

To measure dimensions of Marital Adjustment, The Locke-Wallace Short Marital- Adjustment Test (1959) was used. Psychological Well-being was measured by using Ryff’s Psychological Well-Being Scale (Ryff, 1989). The scale gave scores for six subscales viz. Autonomy, Environmental mastery, Personal Growth, Positive Relationships with Others, Purpose in Life, and Self-Acceptance. Life Orientation Test-Revised (LOT-R) by Scheier, Carver, and Bridges (1994) was used to measure Optimism. For measuring dimensions of Stress, the Stress Symptoms Rating Scale developed by Heilbrun and Pepe (1985) and Perceived Stress Scale by Cohen, Kamarck and Mermelstein(1983)
were used. For measuring coping, the Tehran Coping Styles Scale (TCSS) - Farsi version of COPE (Carver, Scheier and Weintraub, 1989) developed by Besharat (2007) was used. It yields three dimensions viz. Problem-oriented coping style (Instrumental social support, Active coping, Restraint, Suppression of competing activities, Planning), Positive emotion-oriented coping style (Positive reinterpretation and growth, Turning to religion, Humour, Emotional social support, Acceptance) and Negative emotion-oriented coping style (Behavioral disengagement, Mental disengagement, Focusing on and venting of emotions, Denial, Drug abuse). The Recovery Process Questionnaire (RPQ) constructed by Pourang (2008) was used to measure the variable of Recovery Process. This scale gave three measures: Total Recovery Process, Perceived Recovery process (patient’s self evaluation) and Objective Recovery Process (based on doctor’s medical evaluation).

The raw scores were subjected to various statistical analyses. Before carrying out statistical tests, the assumptions of normality and homogeneity of variance were checked. Keeping in view the objectives of the study, Means, S.D, and t-tests were used. Intercorrelation analysis was done for the total sample, and for males and females, respectively. Stepwise multiple regression analysis with recovery process as the dependent variables was employed. Further, stepwise multiple regression analysis with perceived recovery and objective recovery as the dependent variables was also carried out. It was also done separately for male and female patients.

The sample comprised of bypass coronary surgery patients in the age range of 45-65 years. 75 male and 75 female patients were selected from Shahid Rajayi Hospital, Shohada Tajrish Hospital, Baghiyatollah Hospital and Imam Khomaini Hospital in Tehran. Patients having undergone bypass surgery at least three to six months before the study were selected. Only married and literate individuals were selected.
A.1. RECOVERY FROM BYPASS CORONARY SURGERY, PSYCHOLOGICAL WELL BEING AND OPTIMISM

- It was hypothesized that Recovery Process from bypass coronary surgery was expected to be negatively* related to the dimensions of Psychological Well Being viz. self acceptance, positive relations with others, autonomy, environmental mastery, purpose in life and personal growth, and Optimism.

A glance at inter correlation matrices (Tables 3.1- 3.3) showed that Recovery Process was significantly related to Self-Acceptance, Positive Relation with Others, Autonomy and Personal Growth among total sample and among male bypass coronary surgery patients. For females, Recovery Process did not show a significant relationship with psychological well being dimensions. A further glance at inter correlation matrices (Tables 3.1- 3.3) showed that Recovery Process was significantly and negatively related to Optimism among the total sample, male and female bypass coronary surgery patients.*

A perusal of Stepwise Multiple Regression Equation (Tables 4.1- 4.3) revealed that Environmental Mastery was a significant predictor of Recovery Process among male bypass coronary surgery patients. Perusal of Stepwise Multiple Regression Equation (Tables 4.4- 4.6) revealed that Self Acceptance was a significant predictor of Perceived Recovery among the total sample and that Positive Relations with Others was a significant predictor of Perceived Recovery among female sample only. Stepwise Multiple Regression Equations (Tables 4.7- 4.9) also showed Autonomy as a significant predictor of Objective Recovery among the total sample and Positive relations with others as a significant predictor of Objective Recovery among female coronary artery bypass surgery patients.

* A negative relationship implies patients high on optimism and psychological well being show better recovery
Further glance at Stepwise Multiple Regression Equations (Tables 4.1-4.3) showed Optimism to be a significant predictor of Recovery Process among the total sample only. Tables 4.4-4.6 and Tables 4.7-4.9 revealed Optimism to be a significant predictor of Perceived Recovery and Objective Recovery among all the three groups.

Therefore, the hypothesis regarding the role of Psychological Well Being and Optimism in Recovery from coronary artery bypass surgery was upheld in most cases.

Prior studies have also reported similar trends. Symptoms of depression and anxiety were found to predict short-term health related quality of life (HRQOL) (3 months after treatment) in a study done by Höfer, Doering, Rumpold, Oldridge and Benzer (2006). Doering, Moser, Lemankiewicz, Luper and Khan (2005) conducted a study to evaluate emotional and physical recovery after bypass surgery and investigated the associations between depressive symptoms, infections and impaired wound healing in patients with high and low levels of depressive symptoms. A nonrandomized, comparative, longitudinal design was used to study 72 bypass surgery patients without serious noncardiac comorbidities. Patients completed questionnaires to assess depressive symptoms, emotional recovery, and physical recovery within 48 hours after extubation, at discharge from the hospital, and 6 weeks later. They also performed 6-minute walk tests at the last 2 sessions. Infections and impaired wound healing were also identified. At discharge, patients with higher depressive symptoms reported poorer emotional recovery and poorer physical recovery. They achieved shorter walking distances than did patients with lower scores (indicating fewer symptoms). Six weeks after discharge, emotional and physical recovery remained lower in patients with more depressive symptoms. Infections and impaired wound healing were more common among patients with higher depressive symptom scores than among patients with lower scores (Doering et al., 2005).
In terms of autonomy and its relationship with recovery from CABG, Menon, Charvat, Gordon, Roberts, Pashkow, Ribisl, and Rocco (2009) found that when people felt more in control over their outcomes, they were more optimistic about their prospects and hence more likely to act. In contrast, people who were not optimistic were likely to feel less in control and hence were less likely to take action. Thus, low comparative optimism driven by perceptions of low control may be demotivating, resulting in low levels of precautionary health behaviors that may have placed the sample in the study at increased risk.

In an intervention based, observational study Manzoni, Villa, Compare, Castelnuovo, Nibbio, Titon, and Gondoni (2011) evaluated the short-term within-group effects of a four-week multi-factorial inpatient Cardiac Rehabilitation (CR) programme specifically addressed to weight loss, fitness improvement and psychological health increase on 176 obese in-patients with coronary heart disease. Outcome measures were exercise capacity, body mass index and psychological well-being. Results showed statistically significant improvements in all the psychological well being sub-scales viz. anxiety, depression, positive well-being, self control, general health and vitality. Significant correlations were found between body mass index and weight reductions with psychological well-being. The study highlighted the need for interventions to target psychological well-being and general health of patients undergoing bypass surgery during their recovery phase.

In line with the findings of the current research, a total of 106 patients scheduled for coronary angiography were interviewed before (baseline) and 12 to 24 months after coronary angiography (Manzoni, Castelnuovo, and Proietti, 2011). The General Health Questionnaire was used for measuring psychological well-being (anxiety, depression), the Maastricht interview was used for measuring vital exhaustion, and the Type D questionnaire was used for measuring personality along with a measure of Health Related Quality of Life
Discussion

(HRQOL) (assessing physical and mental components). Linear regression results showed that psychological well-being (measured via depression and anxiety) significantly predicted both the mental and physical components of HRQOL over a long-term period (12-24 months after treatment) and that vital exhaustion was just as important as depression and anxiety in predicting HRQOL. Vital exhaustion, which is usually characterized by experiencing unusual fatigue (not resulting from exercise or hard work, lack of energy, and increased irritability) was found to be an independent risk factor especially for the first myocardial infarction and coronary heart disease onset. Vital exhaustion increased the risk for next myocardial infarction, coronary bypass surgery, need of revascularization, and cardiac death in patients with already diagnosed cardiac disease. Manzoni et al. (2011) further reported that psychological characteristics were more significant than functional status or type of treatment after coronary angiography in predicting health related quality of life (HRQOL) among patients with CHD. Also, psychosocial characteristics expressing mental health (anxiety, depression, vital exhaustion) were more important in predicting HRQOL than stable personality traits (hostility, Type D personality). This finding might be of importance in planning psychologically oriented intervention strategies focusing on improving quality of life and psychological well-being among patients with coronary disease.

With regard to adaptation after cardiac events, associations between dispositional optimism and more effective recovery from cardiac surgery have been described, with lower rates of rehospitalization after coronary artery bypass graft in more optimistic individuals (Tindle, Belnap, Houck, Mazumdar, Scheier, Matthews, and Rollman, 2012). Hevey, McGee, and Horgan (2014) evaluated the levels of comparative optimism among patients with coronary heart disease (CHD) and examined its relationship to health outcomes 12 months later. 164 patients completed self-report questionnaires at the end of cardiac rehabilitation and the number of adverse clinical events in the
following 12 months were recorded. Comparative optimism was assessed in relation to a typical other who had not had cardiac event, a typical other who had the same cardiac event as the respondent, and a typical member of the cardiac rehabilitation class. Clinical-demographic details and distress were assessed. Participants were comparatively optimistic in all three ratings. Logistic regression (controlling for age, gender, comorbidities, and distress) revealed that higher levels of adverse events were associated with older age, being male, and lower levels of overall comparative optimism. Comparative optimism was associated with decreased risk of adverse clinical events in the year following cardiac rehabilitation attendance.

Lamers, Bolier, Westerhof, Smit, and Bohlmeijer (2012) conducted a meta-analysis wherein they synthesized studies on emotional well-being as predictor of the prognosis of physical illness, while in addition evaluating the impact of putative moderators, namely constructs of well-being, health-related outcome, year of publication, follow-up time and methodological quality of the included studies. The search in reference lists and electronic databases (Medline and PsycInfo) identified 17 eligible studies examining the impact of general well-being, positive affect and life satisfaction on recovery and survival in physically ill patients. Meta-analytically combining these studies revealed a Likelihood Ratio of 1.14, indicating a small but significant effect. Higher levels of emotional well-being were beneficial for recovery and survival in physically ill patients. The findings showed that emotional well-being predicts long-term prognosis of physical illness. This suggested that enhancement of emotional well-being may improve the prognosis of physical illness, which should be investigated by future research.

Boehm and Kubzansky (2012) investigated the association between positive psychological well-being (PPWB) and cardio-vascular disease (CVD) using a qualitative literature review approach. They considered the mechanisms by which Positive Psychological Well-Being (PPWB) may be linked with
cardiovascular health, focusing on health behaviors like, smoking, alcohol consumption, physical activity, sleep quality and quantity, and food consumption as well as biological functions (e.g., cardiovascular, inflammatory, and metabolic processes) that are most relevant for cardiovascular health. They rationalized that since PWB is a broad concept, not all aspects of PWB may be associated with cardiovascular health. Thus, they distinguished between eudaimonic well-being, hedonic well-being, optimism, and other measures of well-being when reviewing the literature. Findings suggested that PPWB protects consistently against CVD, independently of traditional risk factors and ill-being. Specifically, optimism was most robustly associated with a reduced risk of cardiovascular events. In general, PPWB was also positively associated with restorative health behaviors and biological function and inversely associated with deteriorative health behaviors and biological function. Cardiovascular health was more consistently associated with optimism and hedonic well-being than with eudaimonic well-being, although this could be due in part to more limited evidence being available concerning eudaimonic well-being.

Other studies have also reported that heart failure was associated with reduced quality of life and psychological well-being and that comorbid depression was associated with worsening of Heart Failure symptoms, physical and social function, quality of life, rehospitalisation (Morgan, Villiers-Tuthill, Baker and McGee, 2014; Ladwig, Schoefinius, Dammann, Danner, Gürtler, and Herrmann, 2014), and reduced quality of life in patient’s spouses (Chung, Moser, Lennie, and Rayens, 2009). Morgan, Villiers-Tuthill, Baker, and McGee (2014) studied the role of illness perceptions in psychological well-being of heart failure patients and studied its relationship with anxiety and depression. 95 patients were tested on Depression, Anxiety, and Illness perceptions. Regression analyses showed that illness perceptions accounted for a significant proportion of the variance in both depression and anxiety. The
contribution of illness perceptions was greater than that made by traditional covariates (socio-demographic variables and functional status). Results highlighted the dynamic interrelations between perceptions of illness and mental health indices. The findings highlighted the need for interventions to maximize psychological well being by targeting the cognitive status of the cardiac patients.

Carver and Scheier (2014) found that optimists took a proactive approach to health promotion. They were less likely to smoke, more likely to exercise, have more healthy diets, and were more likely to improve their diets than pessimists, which promoted their recovery after coronary artery bypass surgery. Another reason for better health followed from the better profile of emotional responses to adversity displayed by optimists - less distress and more positive emotions. This pattern of overall emotional experiences, which followed in part from the coping reactions that optimists used (Carver et al., 2010), doubtlessly resulted in lower physiological strain over time, resulting in better health and recovery from bypass surgery.

Ronaldson, Molloy, Wikman, Poole, Kaski and Steptoe (2015) hypothesized that greater optimism would lead to more effective physical and emotional adaptation after acute coronary syndrome and would buffer the impact of persistent depressive symptoms on clinical outcomes. The main outcomes studied in their research were physical health status, depressive symptoms, smoking, physical activity, and fruit and vegetable consumption measured 12 months after Acute Coronary Syndrome (ACS), and composite major adverse cardiac events (cardiovascular death, readmission with reinfarction or unstable angina, and coronary artery bypass graft surgery) assessed over an average of 45.7 months. Results revealed that optimism predicted better physical health status 12 months after ACS independently of baseline level for physical health, age, sex, ethnicity, social deprivation, and clinical risk factors. Greater optimism also predicted reduced risk of depressive
Discussion

symptoms, more smoking cessation, and more fruit and vegetable consumption at 12 months. Persistent depressive symptoms 12 months after ACS predicted major adverse cardiac events over subsequent years, but only among individuals low on optimism. Not only was optimism associated with better physical health status 12 months after ACS, it also seemed to predict greater psychological well-being. Depressive symptoms are common after cardiovascular events and are associated with poor recovery and quality of life as well as mortality among ACS patients (Dickens, Cherrington, and McGowan, 2012). Dispositional optimism may therefore, protect against depression in people with serious physical illness.

Some studies also show differential role of unrealistic optimism. Why do people fail to engage in positive behaviors which will promote their health and well-being? Researchers addressing this question adopt primarily one of two perspectives, drawing either on theories of health behavior, such as the Health Belief Model (HBM), or on theories of risk perception, such as unrealistic optimism. To overcome this compartmentalization, two studies of cancer screening behavior assessed the extent to which unrealistic optimism occurred in relation to each of the elements of the HBM: severity and curability of cancer and the benefits of, and barriers to, having a screening test. Data were collected using telephone interviews, dialing numbers randomly selected from the telephone directory. In the first study 164 women aged 50 to 70 years responded to questions about breast cancer and screening mammography, while in the second study 200 men aged 45 to 60 years responded to questions about prostate cancer and screening using the prostate specific antigen test. Women had an optimistic bias in relation to breast cancer risk and severity and barriers to having a screening mammogram but not in relation to the benefits of screening. For prostate cancer, there was an optimistic bias for all Health Belief Model variables: risk and severity of prostate cancer and barriers to and
benefits of screening. It was concluded that unrealistic optimism is broader than perceived risk, being evident for all elements of the Health Belief Model (Clarke, Lovegrove, Williams, and Machperson, 2000). Consistent with this notion is the finding that smokers who exhibit unrealistic absolute optimism reported lower intentions to quit smoking (Dillard, McCaul, and Klein, 2006).

Coleho (2010) found that unrealistic optimism is all around us, and it is a well documented psychological phenomenon. It has important implications in many economic and managerial contexts. Coelho (2010) provided psychological evidence that most people are prone to groundless optimism when faced with critical decisions. Highly optimistic health patients believed that nothing will happen to them and therefore, neglected the necessary health care practices needed to cope with their illness.

A robust finding in health psychology and social psychology is that people judge negative events as less likely to happen to themselves than to the average person, a behavior interpreted as showing that people are “unrealistically optimistic” in their judgments of risk concerning future life events. However, Harris and Hahn (2011) demonstrated how unbiased responses can result in data patterns commonly interpreted as indicative of optimism for purely statistical reasons. Specifically, they showed how extant data from unrealistic optimism studies investigating people’s comparative risk judgments were plagued by the statistical consequences of sampling constraints and the response scales used, in combination with the comparative rarity of truly negative events. They concluded that the presence of such statistical artifacts raised questions over the very existence of an optimistic bias about risk and implies that to the extent that such a bias exists, we know considerably less about its magnitude, mechanisms, and moderators than previously assumed.
A.2. RECOVERY FROM BYPASS CORONARY SURGERY AND MARITAL ADJUSTMENT

It was hypothesized that recovery process from bypass coronary surgery would be negatively related to marital adjustment.

A glance at correlation tables (Table 3.1 to Table 3.3) showed insignificant relationship between Recovery Process and Marital Adjustment for the total sample, as well as for males and females. A glance at regression tables (Table 4.1- Table 4.9) did not reveal marital adjustment as a significant predictor of recovery process and its dimensions viz. objective recovery and perceived recovery. Therefore, the hypothesis regarding the role of marital adjustment in recovery from bypass surgery was not upheld.

These findings are inconsistent with previous researches. Studies have shown the role of social support and being married as an effective factor for speedy recovery. However, very few studies have examined the quality of marital relationship in relation to recovery from coronary artery bypass surgery. Auerbach, Kiesler, Wartella, Rausch, Ward, and Ivatury (2005) showed that married couples who dwelled on the negative aspects of a traumatic experience and blamed each other, experienced more distress, slower recovery from cardiac surgery and reduced marital adjustment. A communal or cooperative problem-solving process involves appraising a stressor (the patient’s heart condition) as “our” issue rather than “yours” or “mine” and taking cooperative “we” based action to address it. In particular, use of first-person plural pronouns (we, us, our) in the context of couple communication appeared to mark relational commitment, shared identity, and effective problem solving by relationship partners, thereby increasing marital satisfaction (Simmons, Gordon and Chambless, 2005).

Numerous studies across illness domains supported that spouses’ trait neuroticism predicted their own caregiving burden and distress (Ruiz,
Matthews, Scheier, and Schulz, 2006). Conversely, more optimistic spousal caregivers reported greater resilience to the demands of caregiving including less depressive symptoms over time. In addition to within-person effects, spouses also influenced the experience of one another. Relationship experts suggested not only that interpersonal influences occurred between individuals but also the frequency and magnitude of these effects were greater between people who shared a close relationship such as with marital couples (i.e., interdependence theory; Rusbult and Van Lange, 2003). Research supported the idea that the current affect of one spouse may influence the current affect of his or her partner—called contagion effects (Nieboer, Schulz, Matthews, Scheier, Ormel, and Lindenberg, 1998). In a study of 1,040 older couples, Bookwala and Schulz (1996) found that the current affect of one spouse was associated with the partner’s affect. These results suggested that if one spouse was distressed following CABG surgery, the partner was likely to be distressed as well. Contagion effects may be an additional important determinant of post-CABG depressive symptoms in both patients and their spouses (Ruiz, Matthews, Scheier, and Schulz, 2006).

Rohrbaugh, Mehl, Shoham, Reilly and Ewy (2008) hypothesized that partners’ ‘we’ talk might also mark an effective communal approach to coping with a serious health problem such as chronic heart failure and in terms of predicting a favorable course of the patient’s illness. The results suggested that we talk in couples coping with heart failure has prognostic significance for the patient’s health. As hypothesized, the use of first-person plural pronouns during a conjoint discussion about coping with the patient’s heart condition predicted positive changes in heart failure symptoms over the next 6 months. Strikingly, however, this result appeared for we talk by the spouse and not the patient, creating a statistical partner effect in the absence of a corresponding actor effect. Exploratory analyses suggested further that the spouse using the active first-person plural pronoun (we) contributed more to predicting symptom
change than passive first-person plural forms (us, our), although this was not the case for predicting change in the patient’s general health. The patient’s (or spouse’s) gender, however had no moderating effects on any results obtained.

A meta-analysis by Holt-Lunstad, Smith, and Layton (2010) included 12 studies that specifically examined people with cardiovascular disease. They found a marginally significant association between relationship measures and mortality risk. Holt-Lunstad et al. (2010) noted that their findings may underestimate the impact of social relationships on mortality risk, because they did not account for relationship quality.

Idler, Boulifard and Contrada (2011) talked about how marriage has long been linked to lower risk for adult mortality in population and clinical studies. In a regional sample of 569 patients undergoing cardiac surgery, Idler, Boulifard and Contrada (2011) compared 5-year hazards of mortality for married persons with those of widowed, separated or divorced, and never married persons using data from medical records and psychosocial interviews. After adjusting for demographics and pre- and postsurgical health, unmarried persons had 1.90 times the hazard of mortality of married persons; the disaggregated widowed, never married, and divorced or separated groups had similar hazards, as did men and women. The adjusted hazard for immediate postsurgical mortality was 3.33; the adjusted hazard for long-term mortality was 1.71, and this was mediated by married persons’ lower smoking rates. Unmarried patients were 122 percent more likely to die following their surgery than those who were married. The findings underscored the role of spouses (both male and female) in caregiving during health crises and the social control of health behaviors.

King and Reis (2011) examined the effects of marital status and marital satisfaction on survival after coronary artery bypass grafting. Marital status at the time of surgery and marital satisfaction 1 year after surgery were used to
predict survival 15 years after surgery. Married people were 2.5 times more likely to be alive 15 years after CABG than those who were not married. This finding was true for men and women, although the result for women was marginally significant adjusting for age. Those in high-satisfaction marriages were 3.2 times more likely to be alive 15 years after CABG compared with those reporting low marital satisfaction. Highly satisfied men were 2.7 times and highly satisfied women were 3.9 times more likely to be alive adjusting for age. Being married, especially being in a highly satisfying marriage, offered a significant benefit to long-term survival after CABG.

Why marital status and marital satisfaction have this effect on survival was multifactorial, most likely a combination of spousal support and survivor motivation to adopt a healthy lifestyle, along with the provision of emotional support to the survivor. After recovery from the surgery itself, survival had a lot to do with lifestyle changes to manage underlying coronary heart disease (Eagle, Montoye, Riba, DeFranco, Parrish, Skorcz, and Roychoudhury, 2004). Spouse support to adopt specific health habits—for example, cessation of smoking, increase in physical activity, dietary changes, and adherence to medications—may help explain some of the effect of marriage on long-term survival. Support can take the form of simply encouraging healthy behaviors. It can also facilitate behavioral change in a participatory manner, for example, adopting the same health habits as the survivor by changing the family diet or engaging in a joint walking program, which is more likely to come from a close family member (King and Reis, 2011). Spouses were also likely to notice harmful behaviors or health changes, which provided an impetus for healthier behaviors. Emotional support also conveyed a sense of caring, thus enhancing the person’s feeling of self-worth and feeling of belongingness.

Thomson, Molloy and Chung (2012) assessed differences in social support and quality of life in patients and partners awaiting CABG, and examined whether patients’ and partners’ perceived social support predicted
their own, as well as their partner’s quality of life before CABG. This cross-sectional study recruited 84 dyads. Perceived social support, informational/emotional support, affectionate support, tangible support, positive social interaction, quality of life and dyadic data were assessed. Results revealed that the patients’ informational/emotional support exhibited an actor effect on their own mental health, indicating those with low informational/emotional support as having poorer mental health. There was a partner effect of the patients’ informational/emotional support on their partner’s mental health, indicating the patients’ informational/emotional support as associated with the partner’s mental health (Thomson et al., 2012).

Smith, Uchino, Berg, and Florsheim (2012) reported that marital discord was associated with greater levels of asymptomatic cardio artery disease. Marital discord has been found to be associated with higher risk at early stages of coronary heart disease. 150 healthy couples with an average age of 63.5 years completed a marital disagreement discussion; self report inventories of anxiety and anger during disagreement and marital adjustment. Results showed that 31% of couples were characterized as discordant, with higher levels of hostility and dominance and lower levels of warmth compared with nondiscordant group. Discordant couples reported lower marital adjustment and greater negative effect during their discussions. They further showed greater coronary artery calcification.

While much empirical research suggests that coronary artery bypass graft surgery is stressful for the patient, the patient’s spouse may be under more stress than the patient (Moser, 2007; Baird and Eliasziw, 2011). The spouse may demonstrate poorer psychological adjustment and higher levels of anxiety and depression than the patient, both immediately and following acute cardiac events, as well as during the first 3 months after hospital discharge. During and after acute cardiac interventions, spouses may well be “forgotten” in an environment devoted to the patient. Spouses may also be more immediately


Discussion

classified about the changing marital roles, as the burden of care giving and other responsibilities falls on their shoulders (Manorcha and Manorcha, 2013).

Partners of acute coronary syndrome patients were studied using an observational design (Leigh, Wickman, Molly, Randall and Steptoe, 2014). 80 partners of ACS patients completed validated questionnaires at three time points. The predictor variables, marital satisfaction and optimism were assessed three weeks after patient hospital discharge (time 1). The outcomes, depressive symptoms and physical health status (from a quality of life scale) were measured 6 months (time 2) and 12 months (time 3) post-discharge, and scores were combined to indicate the long-term response. Depressive symptoms and physical health status were the main outcome measures. Partner depressive symptoms increased and physical health status deteriorated over the months following the patients’ Acute Coronary Syndrome. After controlling for demographics, clinical severity of Acute Coronary Syndrome and time 1 levels of the outcome variable, partners’ long-term depressive symptoms were predicted by poor marital satisfaction and low optimism at time 1, and poor physical health status was predicted by low optimism at time 1. Psychosocial factors were, therefore, predictors of long-term distress for Acute Coronary Syndrome partners. Partners in an unhappy marriage or with low optimism after Acute Coronary Syndrome were at an increased risk of depression and low physical health status.

Chronic heart failure (CHF) influences daily life and may cause great suffering for both patients and their partners. Therefore, Agren, Evangelista, Hjelm, Strömberg (2014) aimed to evaluate the effects of an integrated dyad care program with education and psychosocial support to patients with CHF and their partners, 3-months post-discharge following acute exacerbation of CHF. A randomized, controlled design with a follow up assessment after 3 months was used. The dyads in the control group received usual care. The experimental group participated in an integrated intervention, delivered in three
modules through nurse-led face-to-face counseling, a computer-based education and other written teaching materials to assist dyads develop self-care and problem-solving skills. The intervention improved perceived control in patients and helped the partner’s understand the strategies required to strengthen their caregiving roles.

However, in the present study marital adjustment played no role in recovery from bypass surgery.

**A.3. RECOVERY FROM CORONARY BYPASS SURGERY, PERCEIVED STRESS AND STRESS SYMPTOMS**

- It was hypothesized that Recovery process from bypass coronary surgery would be positively related to Stress Symptoms and Perceived Stress.

A glance at inter correlation matrices *(Tables 3.1- 3.3)* showed that Recovery Process was significantly related to Perceived stress and Stress symptoms among the total sample, and among male and female bypass coronary surgery patients.

A perusal of Stepwise Multiple Regression Equation *(Tables 4.1- 4.3)* revealed that Perceived Stress was a significant predictor of Recovery Process for the total sample, males and females. Stress Symptoms did not emerge as a significant predictor of Recovery Process for the total sample, male and female bypass coronary surgery patients.

A further perusal of Stepwise Multiple Regression Equation *(Tables 4.4-4.6)* revealed that Perceived Stress was a significant predictor for Perceived Recovery Process among male patients only. Stress Symptoms did not emerge as a significant predictor of Perceived Recovery Process among all the three groups of bypass coronary surgery patients.
Stepwise Multiple Regression Equation (Tables 4.7-4.9) showed that Perceived Stress was a significant predictor of Objective Recovery Process for the total sample and for female sample. Stress Symptoms did not emerge as a significant predictor of Objective Recovery Process among all the three groups of bypass coronary surgery patients.

Therefore, the above results clearly show that the hypotheses regarding the role of Perceived Stress and Stress Symptoms was upheld for role of perceived stress only, and not Stress Symptoms.

The results are in line with prior research work in relation to Recovery Process and Stress. In a prospective study, Rothenhausler, Grieser, Nollert, Reichart, Schelling, and Kapfhammer (2005) followed up for 1 year, 30 of the original 34 patients who had undergone cardiac surgery with cardiopulmonary bypass (CPB). Patients were assessed preoperatively, before discharge, and at 1 year after surgery with the Structural Clinical Interview for DSM-IV and a series of neuropsychological tests. Psychometric scales were administered to evaluate cognitive functioning, depressive symptomatology, posttraumatic stress symptoms and Health Related Quality of Life (HRQOL). Delirium Rating Scale was used daily over the course of intensive care unit treatment. Postoperative delirium developed in 11 of the 34 patients. Short-term consequences of cardiac surgery included adjustment disorder with depressed features, posttraumatic stress disorder, major depression and clinically relevant cognitive deficits. At 12 months, the severity of depression and anxiety disorders improved and returned to the preoperative level, and 6 out of the 30 followed-up patients displayed cognitive deficits. Patients' health related quality of life self-reports significantly improved compared with baseline quality of life data. However, overall lower cognitive function scores were associated with lower health related quality of life. The study highlighted the role of recovery and surgery mediated by stress symptoms.
Studies have shown how certain personality traits make an individual highly vulnerable to experiencing greater stress symptoms and consequentially influence their cardiac health. One such study was conducted by Denollet, Pederson, Vrints and Conrads (2006). They investigated the relative effect of stress and type D personality on prognosis at 5-year follow-up. At baseline, 337 patients with CHD who participated in cardiac rehabilitation filled in the General Health Questionnaire (psychological stress) and the Type D personality scale. Patients were followed for 5 years. The end point was major adverse cardiac events, which were defined as a composite of cardiac death, myocardial infarction, and cardiac revascularization. There were 46 major adverse cardiac events at follow-up, including 4 deaths and 8 myocardial infarctions. Type D patients had an increased risk of death/infarction compared with non-type D patients, independent of disease severity. Stress and type D were related to an increased risk of developing a major adverse cardiac event after adjusting for gender, age, and biomedical risk factors.

Dimsdale (2008) reviewed effects of acute versus long-term stressors on cardiac functioning. Extensive data was found which confirmed that stressors contributed to diverse pathophysiological changes including sudden death, myocardial infarction, myocardial ischemia and wall motion abnormalities. Stressors further slowed down the recovery process of cardiac patients by altering the changes in sympathetic nervous system activity and hemostasis. Research had further highlighted the importance of acute and chronic life events in causing stress and increased CHD incidence.

Ami, Lad, Peterson, Cook, Shearer and Koenig (2010) also examined the joint effects of pre-operative mood state, secular and religious coping strategies and interleukin-6 (IL-6) on negative effects such as, depression, anxiety and hostility in patients following open-heart surgery. Patients with high hope experienced less post-operative depression. Spiritual struggles, anger coping, and medical comorbidity predicted post-operative hostility. The study
showed the importance of stress management during post-operative and pre-operative patient care by incorporating spiritual and religious ways of coping with surgery. Two weeks before cardiac surgery, trained research assistants conducted an interview with these middle-aged and older patients on their preoperative day. Mood states and psychosocial functioning were assessed. Poor psychological functioning and anxiety, as well as bodily pain and body mass index, were correlated with plasma. The triangle between anxiety, anger and spiritual struggle prior to IL-6 suggested that patients who were not only frustrated but also very angry were more likely to undergo spiritual struggle prior to a life-altering operation. Nevertheless, only those who experienced spiritual struggle manifested physiological alteration with respect to excess plasma IL-6. A question arose concerning why anxiety and anger coping were not linked with IL-6 but with spiritual struggle. One possibility was that stress and/or emotions alone could not alter plasma levels of IL-6 (Ellins, Halcox, Donald, Field, Brydon, Deanfield, and Steptoe, 2008), but that the intensity of internal conflicts and powerful negative emotions elicited by severe spiritual and existential stress could.

Yilmaz, Sexer, Gurler and Bekar (2011) aimed to study levels of preoperative anxiety in patients undergoing elective surgery and the relationship between preoperative anxiety and social support. In addition, predictors of preoperative anxiety were studied in surgical inpatients. Major life changes were significant factors that caused anxiety and hospitalization and surgery were among such changes. Social support decreased the anxiety associated with surgery. This study included 500 patients in a surgery clinic. Five hundred patients participated in this research: 59.6% were females, 54.6% were 65 years of age or older, 80.6% were married, 70.4% were literate and 62% of the patients had moderate level surgery. There was a significant relationship between the sociodemographic patient features, the level of preoperative anxiety, the presence of social support and the severity of anxiety.
Discussion

The age and level of anxiety were not significant factors. The results of this study showed that the preoperative anxiety of patients awaiting surgery was associated with demographic characteristics as well as social support resources.

Guo, East and Arthur (2012) randomized 153 adult patients undergoing cardiac surgery into a trial, 77 to a usual care control group and 76 to preoperative education group comprising of usual care plus an information leaflet and verbal advice. Measurement was conducted before randomization and at seven days following surgery. The primary outcome was change in anxiety measured by the Hospital Anxiety and Depression Scale (HADS). Secondary outcomes were change in depression (HADS), change in pain as measured by subscales of the Brief Pain Inventory-short form (BPI-sf), length of Intensive Care Unit stay and postoperative hospital stay. Of 153 participants randomized, 135 (88.2%) completed the trial. Participants who received preoperative education experienced a greater decrease in anxiety score and a greater decrease in depression score compared with those who did not. There was no difference between groups in average pain, current pain, and interference in general activity, mood and walking ability. Patients randomized to the preoperative education group reported less interference from pain in sleeping. There was some evidence to suggest a reduced number of hours spent in the Intensive Care Unit among preoperative education patients but no difference in length of postoperative hospital stay.

Psychological distress and coping related to a breast cancer diagnosis can profoundly affect psychological adjustment, possibly resulting in the disruption of circadian rest/activity and cortisol rhythms, which are prognostic for early mortality in metastatic colorectal and breast cancers, respectively. A study conducted by Dedert, Lush, Chagpar, Dhabhar, Segerstrom, Spiegel, and Sephton (2012) aimed to explore the relationships of cancer-specific distress and avoidant coping with rest/activity and cortisol rhythm disruption in the period between diagnosis and breast cancer surgery. Fifty-seven pre-surgical
breast cancer patients provided daily self-reports of cancer-specific distress and avoidant coping as well as actigraphic and salivary cortisol data. Distress and avoidant coping were related to rest/activity rhythm disruption (daytime sedentariness, inconsistent rhythms). Patients with disrupted rest/activity cycles had flattened diurnal cortisol rhythms. Maladaptive psychological responses to breast cancer diagnosis were associated with disruption of circadian rest/activity rhythms. Given that circadian cycles regulate tumor growth, we need greater understanding of possible psychosocial effects in cancer-related circadian disruption.

Similarly, 30 male patients diagnosed as having coronary heart disease were selected for a study on relationship between specific personality traits and CHD (Khan, Hassan, Kumar, Mishra and Kumar, 2012). The results showed that patients with CHD had low frustration tolerance for unsatisfactory conditions, were neurotically fatigued, easily annoyed and emotional. They were suspicious and self-opinionated. These personality factors caused significant amount of distress, thus, making the individual prone to CHD. The study showed that these people tended to worry, felt anxious and guilt-striken over difficulties (Factor O). They were dissatisfied with the degree to which they were able to meet the demands of life and to achieve what they desired (anxiety factor). These people tended to follow their own impulses and they did not act according to others values or out of a sense of duty (Factor control). They tended to be apprehensive and emotionally reactive and found it very difficult to cope with hassles of daily life (Factor neuroticism). They lacked self-control needed to meet deadlines and group productivity goals (Factor leadership). This study clearly explained the psychological profile of CHD patients and factors that made them more prone to stress and illness (Khan et al., 2012). Thus, the above-mentioned personality traits lowered down the recovery of patients by influencing their lifestyle choices and cognitive styles.
Research to date indicates that the number of coronary artery bypass graft (CABG) surgery patients affected by depression (i.e., major, minor, dysthymia) and stress approximates between 30% and 40% of all cases (Tully and Baker, 2012). Tully and Baker (2012) suggested that both depression and anxiety increased the risk for mortality and morbidity after CABG surgery independent of medical factors. Though neither depression nor anxiety seemed to markedly affect neuropsychological dysfunction, depression conferred a risk for incident delirium. Practical advice is described for clinicians taking into consideration possible screening aids to improve recognition of anxiety, stress and depression among CABG surgery patients.

A.4. RECOVERY FROM BYPASS CORONARY SURGERY AND COPING STYLES

The following hypotheses were proposed in relation to coping styles:

- Recovery process from coronary bypass surgery was expected to be negatively related to problem oriented coping style and positive emotion oriented coping style
- Recovery process from coronary bypass surgery was expected to be positively related to negative emotion oriented coping style.

A glance at inter correlation tables (Tables 3.1-3.3) showed mixed results. The results revealed that Recovery Process was significantly related to Positive Emotion Oriented Coping Style among the total sample, male and female bypass coronary surgery patients. A glance at Stepwise Multiple Regression Equations (Tables 4.1-4.3) revealed that positive oriented coping style, positive emotion oriented coping style and negative emotion oriented coping style were not significant predictors of Recovery Process. Similarly, a perusal at Stepwise Multiple Regression Equations (Table 4.4-4.6) showed that positive oriented coping style, positive emotion oriented coping style and negative emotion oriented coping style were not significant predictors of
Discussion

Perceived Recovery. None of the above mentioned coping styles emerged as significant predictors of Objective Recovery (Table 4.7-4.9).

The above results show that hypothesis regarding the role of different coping styles in predicting recovery from coronary artery bypass surgery was not upheld in most cases. Only Positive Emotion Oriented Coping Style showed a significant relationship with recovery process.

Present results are not completely in line with prior researches. Earlier researches stated that coping styles differentially affect recovery process.

Current findings regarding the role of positive emotion oriented coping style and recovery process are supported with a study which showed that when faced with acute stresses with little perceived control over outcomes and high levels of uncertainty, emotion-focused coping may be more effective, allowing reductions in distress and increase in support (Folkman and Moskowitz, 2004). The initial reactions to a partner’s impending CABG surgery may be most characterized by emotional coping to include distancing, self-control of emotion, escape/ avoidance, accepting responsibility, and confrontive coping. However, successful adaptation post surgically required active problem-focused coping efforts, as well Folkman and Moskowitz (2004) reviewed diverse research suggesting that social support coping is not just emotion focused, but has an important problem-solving component, as does positive reappraisal coping. Such problem-focused coping which is broadly defined to include positive reappraisal, meaning-focused, and social support aspects, may be difficult for older female spouses in a medical environment that may encourage passivity and escape or avoidance patterns.

Shen, McCreary and Myers (2004) examined the direct and mediated contributions of psychosocial variables to post treatment physical functioning among 142 patients receiving cardiac rehabilitation. Two models were proposed and tested. In the first model, psychosocial factors were correlated and made to predict baseline and 6-week physical functioning. The results
showed that after controlling for age, illness severity, baseline physical functioning, and other psychosocial correlates, optimism and social support significantly predicted better post-treatment physical functioning. In the second model, they explored both the direct and mediational relationships between psychosocial factors and physical health outcomes. Optimism and social support were found to contribute to health outcomes not only directly but also indirectly through the mediation of less engagement in detrimental coping and lower depressive symptoms, Hostility and negative coping only predicted outcomes indirectly through mediators (Shen et al., 2004).

Seeking instrumental social support was found to be associated with faster cardiovascular recovery for individuals presented with laboratory stressors. This relationship was even more prominent among participants experiencing higher number of life events’ stresses. The results showed that active coping did not predict either severity of depression or weak physical functioning. One explanation was that these patients were in a cardiac rehabilitation program, and therefore, in actuality, they were actively seeking treatment and engaging in positive coping actions (Shen et al., 2004).

Moore, Charvat, Gordon, Roberts, Pashkow, Ribisl, and Rocco (2006) studied lifestyle and coping factors of patients who had undergone a cardiac rehabilitation program. The study tested the effectiveness of CHANGE (Change Habits by Applying New Goals and Experiences), a life-style modification program designed to increase exercise maintenance in the year following a cardiac rehabilitation program. The CHANGE intervention consisted of 5 small-group cognitive–behavioral change counseling sessions in which participants were taught healthy coping skills, self-efficacy enhancement, problem-solving skills, and relapse prevention strategies to address exercise maintenance problems. 250 participants were randomly assigned to the CHANGE intervention (supplemental to usual care) or a usual-care-only group. Exercise was measured using portable wristwatch heart rate
monitors worn during exercise for 1 year. Cox proportional hazards regression was used to determine differences in exercise over the study year between the study groups. Participants in the usual-care group were 76% more likely than those in the CHANGE group to stop exercising during the year following a cardiac rehabilitation program when adjusting for the significant covariates such as, race, gender, comorbidity, muscle and joint pain, and baseline motivation. Most participants, however, had less than recommended levels of exercise amount and intensity. The authors concluded that counseling interventions that use contemporary behavior change strategies, such as the CHANGE intervention, can reduce the number of individuals who do not exercise following cardiac events.

Klein and Murray (2007) examined the relationship between coping styles, quality of life, and depressive symptoms in older cardiac patients. 80 cardiac patients seeking treatment in an outpatient clinic participated in a study examining depression, disability, and cardiac malfunctioning. Patients completed a clinical interview and questionnaires about mood, functional impairment, comorbid illness, quality of life, and coping. Cardiac malfunctioning Severity and maladaptive coping styles, including denial, self-distraction, and self-blame, negatively affected quality of life and depressive symptoms. The use of maladaptive coping strategies involved efforts that diverted attention from the illness. Researchers emphasized the need to provide cardiac patients the skills to directly address the stress associated with their illness.

Positive emotion focused coping style includes religious coping styles and they have been well-documented predictors of well-being (Ai, Park, Huang, Rodgers, and Tice, 2007). Ai et al. (2007) examined religious coping styles, hope, and social support as pathways of the influence of general religiousness (religious importance and involvement) on the reduced post-operative psychological distress of 309 cardiac patients in a prospective study.
Results of structural equation modeling indicated that controlling for preoperative distress, gender, education, and religiousness contributed to positive religious coping, which in turn was associated with less distress for cardiac patients. Furthermore, negative religious coping styles were associated both directly and indirectly with greater postoperative distress.

Another study was conducted on similar grounds. Pourang and Besharat (2008) investigated the relationship between coping styles and psychological adaptation with recovery process in a sample of Coronary Heart Disease (CHD) patients. 150 patients were included in this study at intake and forty-five patients participated in the follow-up study. All participants were asked to complete Tehran Coping Styles Scale (TCSS) and Mental Health Inventory (MHI). Recovery Process Questionnaire (RPQ) was completed by cardiologists with the help of patient's medical file and clinical examinations. Perceived recovery revealed a significant positive association with negative emotional-focused coping style (positive correlation implies opposite direction). It can be concluded that perceived recovery among coronary heart disease patients was negatively influenced by negative emotional-focused coping style. Patients experienced wide specter of emotions and resistances in the adaptation process. The most common were: denial, disbelief, feelings of helplessness, guilt, fear and suffering. Using unproductive coping style (negative emotional-focused) led to slower recovery since negative coping style involves the distinctive feature of avoiding stressful situations instead of directly dealing with the sources of stress. In the medical context, those who suffer from fatal and chronic diseases, usually use this strategy of not facing the pain. Using negative emotional-focused style, these patients dealt with the problem by denial. Provisionally, it resulted in the reduction of stress and increase of perceived recovery (Pourang and Besharat, 2008).

Sixty two patients enrolled in a hospital-based outpatient, Phase II cardiac rehabilitation program were assessed on stages of change scale and
Discussion

coping styles. The relationship showed how different coping styles are differentially related to the recovery process (Perosa, Prete, Racanelli, and Dammacco, 2010). Coping style was significantly related to change within the Contemplative, Action and Maintenance stages. It was not significantly associated with change in the Pre-contemplative Stage. The results of the regression analyses in this study revealed that Confrontive coping was significantly and positively related to change in the Contemplation, Action, and Maintenance Stage scores from pretest to posttest. The Distancing coping style and Positive Reappraisal also were significantly positively related to change in the Maintenance Stage scores from pretest to posttest. Planful Problem Solving coping and Escape-Avoidance coping were significantly negatively related to changes in the Contemplation, Action, and Maintenance Stages from pretest to posttest. Confrontive coping is a problem-focused coping strategy and is described as an aggressive interpersonal effort to alter the situation.

To investigate factors that may relate to the coping strategies used by individuals with chronic heart problems and how these coping strategies maybe associated with positive and negative affect, Nahlen and Saboonchi (2010) conducted a cross-sectional research on cardiac patients. Sense of coherence was negatively associated with denial, behavioural disengagement, venting and self-blame, and positively associated with acceptance. It was found that avoidant coping positively and sense of coherence negatively, predicted negative affect. Problem focused coping positively predicted positive affect. Socially supported coping predicted both negative and positive affect. The study found that the employment of different coping strategies and sense of coherence had an impact on affect and therefore, also on the emotional well-being of patients with chronic heart failure.

A significant proportion of patients experience chronic post-surgical pain (CPSP) following inguinal hernia surgery. Psychological models are useful in predicting acute pain after surgery, and in predicting the transition
from acute to chronic pain in non-surgical contexts. Powell, Johnston, Smith, King, Chambers, Krukowski and Bruce (2012) conducted a prospective cohort study to investigate psychological (cognitive and emotional) risk factors for CPSP after inguinal hernia surgery. Participants were asked to complete questionnaires before surgery and 1 week and 4 months after surgery. Data collected before surgery and 1 week after surgery were used to predict pain at 4 months. Psychological risk factors assessed included anxiety, depression, fear-avoidance, activity avoidance, catastrophizing, worry about the operation, activity expectations, perceived pain control and optimism. The study included 135 participants; follow-up questionnaires were returned by 119 (88.1%) and 115 (85.2%) participants at 1 week and 4 months after surgery respectively. The incidence of CPSP (pain at 4 months) was 39.5%. After controlling for age, body mass index and surgical variables (e.g. anaesthetic, type of surgery and mesh type used), lower pre-operative optimism was an independent risk factor for CPSP at 4 months; lower pre-operative optimism and lower perceived control over pain at one week after surgery predicted higher pain intensity at four months. No other emotional variables were independently predictive of CPSP. Further research is needed to focus on role of cognitive variables in pre-operative psychological preparation for better recovery after surgery.

B. GROUP COMPARISONS

GENDER DIFFERENCES IN RECOVERY FROM BYPASS CORONARY SURGERY

Gender differences were expected in Recovery Process from bypass coronary surgery and its correlates.

A glance at t-ratio table (Table 2.1) revealed no significant gender differences in Recovery Process and its dimensions viz. Perceived Recovery and Objective Recovery. Consequentially, our hypothesis regarding the main variable of recovery process was not supported.
However, significant gender differences emerged on Positive Relations with others, Marital Adjustment, Purpose in Life and Environmental Mastery. Male Patients scored higher than Female Patients on Positive Relation with others. Female Patients scored higher than Male Patients on Marital Adjustment, Purpose in Life and Environmental Mastery.

Prior researchers on gender differences have shown inconsistent findings. A few researches support the current findings while a few contradict. There has been a lack of agreement regarding whether women have poorer outcomes than men following cardiac surgery.

To compare women’s and men’s recovery symptoms during home recovery after coronary artery bypass grafting, Moore (1995) used a survey design and asked the subjects about their physical and emotional symptoms which they experienced after Coronary Artery Bypass Grafting at three measurement points: 1 day before discharge, 2 days after being discharged and 3 weeks later. More men than women reported fatigue, chest incision discomfort, and negative emotional symptoms. Unlike men, women described numbness and discomfort in their breasts during the first weeks of recovery. Women and men’s emotions centered on concerns associated with their social circumstance. Women were more likely to be older, unemployed, unmarried and living alone. They were anxious about who would care for them during home recovery and where that recovery would take pace. Men’s anxiety centered around their immediate physical recovery symptoms and then on long-term issues such as work issues or other activities that got obstructed due to surgery. An understanding of gender differences in CABG recovery is important for clinicians to tailor discharge planning to the specific needs of women and men, opined Moore (1995).

One of the earliest studies showing gender differences in factors influencing cardiac rehabilitation was conducted by Lieberman, Meana and Stewart (1998). They investigated gender differences in barriers and incentives
that were most influential in coronary patient’s decision to participate in cardiac rehabilitation. 129 attenders at cardiac rehabilitation programmes and 61 referred non-attenders completed questionnaires. For women who attended cardiac rehabilitation programme (CRP), encouragement from their adult children was most significantly influential than for men. Attention to health promotion was also a significantly more powerful motivator for women than for men. For CRP non-attenders, concomitant illness, transportation problems and inconvenient timings of the program were stated to be the three most important barriers to CRP participation across both genders.

To examine the effect of gender on early recovery from cardiac surgery, 60 men and 60 women who had undergone coronary artery bypass and/or valve surgery were selected (King, 2000). They completed the study by participating in interviews in the immediate preoperative period and monthly through the third postoperative month. Measures of quality of life, life satisfaction, expected/perceived recovery, functional status, global health status, and social support were examined. Preoperatively, women were more functionally limited, and reported lower life satisfaction and social support, than men. At three months postoperatively, there were few significant differences in outcome measures though women continued to report lesser social support. Women realized significantly greater improvement than men in functional status and neither age nor gender consistently predicted recovery.

Since, coronary heart disease (CHD) kills over 135,000 people each year, the underlying premise of a study done by Ruston and Clayton (2002) was that women might not assess themselves at risk because CHD has generally been perceived within popular culture, medicine and research as a man’s disease. In-depth interviews were conducted with 83 women, 50 who had been admitted to hospital with a CHD-related cardiac event and 33 without manifest CHD. They were found to adopt risk assessment strategies that enabled them to conceptually distance themselves from risk of CHD by:
attributing risky lifestyle behaviour to men; subjectively manipulating the potential threat posed by their own risk factors and by over-emphasizing the importance of social position to risk. The outcome of these strategies showed that women could be at risk for CHD if they adopted men’s lifestyle. This had important implications for the prevention of CHD in women (Emslie, 2005).

Kristofferzon, Lofmark and Carlsson (2005) described gender differences in perceived coping, social support and quality of life 1, 4 and 12 months after myocardial infarction. A longitudinal, descriptive and comparative design was used for the study, which included 74 women and 97 men. At 12 months, 60 women and 88 men remained. Data were collected using the Jalowiec Coping Scale, a social support questionnaire, the SF-36 Health Survey (health-related quality of life) and the Quality of Life Index-Cardiac version (quality of life). The data were collected during the period 1999–2001.

No statistically significant changes over time in coping assessments emerged in the study group, except for fatalistic coping, which diminished over time in men. Women used more evasive coping than men at 4 and 12 months. The perceived efficiency in coping with physical aspects of the heart disease increased. More women than men perceived available support from grandchildren and staff of the church. Health-related quality of life increased in women and men in physical functioning, role-physical, vitality, social functioning, and role-emotional scales.

Moreover, an improvement in the mental health scale was evident in women and a reduction in pain in men. No statistically significant gender differences were found for quality of life at any point in time. The findings can be used to inform caregivers that optimistic, self-reliant and confrontational coping were the most frequently used by both women and men over the first year after myocardial infarction, and that confrontational coping has been shown to have positive outcomes in the long run. Women may be informed
about the importance of seeking prompt treatment and discuss health problems with caregivers and significant others.

Guru Fremes, Austin, Blackstone, and Tu (2006) compared men and women on death, due to cardiac problems, cardiac readmission (angina, heart failure, myocardial infarction), repeat revascularization (angioplasty or CABG), and stroke readmission after CABG. Women had a higher rate of cardiac readmission in the first year after surgery, and this increased risk persisted after 1 year. This was primarily due to readmissions for unstable angina and congestive heart failure. Propensity-matched women had similar rates of death and repeat revascularization. Women have a more complex clinical preoperative presentation and are more likely to be readmitted with unstable angina and congestive heart failure after CABG but experience survival similar to those seen in men. Gender differences in outcomes may be improved through durable revascularization strategies and close postoperative follow-up care targeted to women, opined Guru et al. (2006).

Gender differences exist in outcomes, particularly early mortality, for coronary artery bypass graft surgery (CABG) (Kim, Redberg, Pavlic and Eagle, 2007). Better understanding of this issue may target areas for improvement for all patients undergoing revascularization. Therefore, Kim et al. (2007) summarized the evidence on gender differences in CABG outcomes, particularly early mortality, and mediators of this difference. Using the key terms "women" or "gender," "revascularization," "coronary artery bypass," "angioplasty," "stent," and "coronary intervention," they searched MEDLINE from 1985 to 2005 for all randomized controlled trials (RCTs) and registries reporting outcomes by gender. Bibliographies and the Web sites of cardiology conferences were also reviewed. The literature was examined to identify gender differences in outcomes and mediators of these differences. They identified 23 studies reporting outcomes by gender for CABG and 48 studies reporting outcomes by gender for PCI. The majority of studies noted greater in-hospital
mortality in women than in men, with mortality differences resolving with longer follow-up. Power to detect gender differences after multivariate adjustment was limited by declining mortality rates and small sample size. Gender was an independent risk factor for complications after CABG. Women experienced greater complications and early mortality after revascularization.

Moore (2006) tested the effectiveness of CHANGE (Change Habits by Applying New Goals and Experiences), a lifestyle modification program designed to increase exercise maintenance in the year following a cardiac rehabilitation program. They examined gender differences in exercise maintenance and reaction to cardiac rehabilitation programme. They initially hypothesized that women will more likely to discontinue exercising. However, the results revealed opposite findings. Women were more responsive and particular about exercising behavior in comparison to men. This study showed gender differences in health consciousness following a cardiac rehabilitation programme.

Of particular relevance was a study by Kulik and Mahler (2006) who found that marital quality predicted the length of women’s, but not men’s, hospital stay following CABG. Kiecolt-Glaser and Newton (2001) described several pathways whereby gender would moderate the degree of impact that marriage has on health outcomes. Empirical studies of people with CVD have yielded mixed results. Of studies that include men and women, many report no gender differences in the effects of marital status or marital quality (Kop, Berman, Gransar, Wong, Miranda-Peats and White, 2005), while others have found an association between marital status and mortality among men but not among women (King and Reis, 2011). Furthermore, several studies have suggested that the health benefits of marital quality are stronger among women than among men (Rohrbaugh, Mehl, Shoham, Reilly, and Ewy, 2008).

A study examined the effect of gender on symptom evaluation, symptom response, and physical functioning following coronary artery bypass graft
surgery (Schulz, Zimmerman, Barnason, and Nieveen, 2007). Symptom evaluation and symptom response were measured at baseline and 2, 4, and 6 weeks and 3 months following surgery. Physical functioning was measured at baseline, 6 weeks, and 3 months. The sample included 46 men and 19 women randomly assigned to the routine care group of a larger study examining symptom management intervention influence on recovery outcomes in elderly coronary artery bypass graft patients. No significant differences were found in symptom evaluation, symptom response, or physical functioning by gender over time. Women reported consistently higher symptom evaluation scores for shortness of breath, fatigue, depression, sleep disturbance, swelling, and anxiety and lower mean physical and vitality subscale scores than men at every time point.

Participation rates in cardiac rehabilitation after myocardial infarction (MI) remain low. Studies investigating the predictive value of psychosocial variables are sparse and often qualitative. Dunlay, Witt, Allison, Hayes, Weston, Koepsell and Roger (2009) aimed to examine the demographic, clinical, and psychosocial predictors of participation in cardiac rehabilitation after Myocardial Injury in the community. Among 179 survey respondents 115 attended cardiac rehabilitation. The median (25th-75th percentile) number of sessions attended within 90 days of Myocardial Injury was 13 (5-20). Clinical characteristics associated with rehabilitation participation included younger age, male sex, lack of diabetes, ST-elevation Myocardial Injury, receipt of reperfusion therapy, in-hospital cardiologist provider, no prior Myocardial Injury, no prior cardiac rehabilitation attendance, and referral to rehabilitation in the hospital. Psychosocial predictors of participation included placing a high importance on rehabilitation, feeling that rehabilitation was necessary, better perceived health before Myocardial Injury, the ability to drive, and post-secondary education. In terms of gender differences, males were more responsive to cardiac rehabilitation participation.
Brummett, Boyle, Kuhn, Siegler, and Williams (2009) found that effects of well-being on recovery were stronger for males than for females. Similarly, Yilmaz, Sezer, Gürler, and Bekar (2011) studied predictors of preoperative anxiety before surgery. The demographic characteristics that were associated with preoperative anxiety were gender, marital status and education. Pre surgery anxiety scores were found to be higher among females than males. These associations were also been demonstrated by previous studies (Perks, Chakravarti and Manninen, 2009). However, one study showed no gender association with anxiety (Nishimori, Yamada, Hoshi, Akiyama, Hoshi, Morishima, and Kodera, 2002). It has been suggested that women more easily express their anxiety than men and that separation from the family affects women more. Consistent with prior studies, the results of this study showed that the women had higher levels of anxiety (Perks, Chakravarti, and Manninen, 2009).

In a study by Idler, Boulifard and Contrada (2011), women exhibited mixed indicators of pre-surgical health, including higher cardiac risk factor index and dyspnea scores and a similar level of angina compared with men. However, women had better ejection fractions and smaller numbers of diseased vessels. Post-surgically, women did less well, with more complications and longer hospital lengths of stay. Overall, 80 percent of the sample underwent CABG and 27 percent had valve procedures (some had both, and 2.1 percent had additional procedures); women were less likely to have CABG and more likely to have valve procedures. Women had less history of smoking i.e., 56 percent, compared with 71 percent of men. Men and women undergoing CABG both had mean BMI scores in the overweight range, respectively. These gender differences were attributed to women being more anxiety prone before and after surgery.