CHAPTER-II
REVIEW OF LITERATURE

A study is usually undertaken with the context of an existing knowledge base. Literature review is undertaken to familiarize the researcher with relevant knowledge base. A comprehensive search strategy was developed to obtain all relevant studies. The following subject headings or key words were used in the search: CABG surgery, preoperative education, anxiety, quality of life, functional status, recovery, bio feedback and relaxation exercise.

2.1 RELATED LITERATURE OF THE STUDY

The related literature reviewed is presented as follows:

2.1.1 Prevalence of preoperative anxiety

2.1.2 Prevalence of quality of life

2.1.3 Functional status among patients subjected to CABG surgery

2.1.4 Anxiety and its relationship to quality of life and functional status

2.1.5 Preoperative education and biofeedback assisted relaxation on anxiety

2.1.6 Preoperative education on quality of life

2.2 Conceptual Framework

2.1.1 Prevalence of preoperative anxiety

Coronary artery bypass graft surgery (CABG) is a major incident with a main psychological and emotional impact on patients and their families. Psychological factors play a significant role for predictive of cardiac surgery outcomes. In this way in review of literature, anxiety was examined before and after CABG surgery.

Shahmansouri, Koivula, Ahmadi, Arjmandi, & Karim (2012) identified the prevalence of anxiety and most common fears among the CABG surgery patients (N=277). The results showed, 19.70% of the patients had low, 69.14% of the patients had moderate and 11.15% had severe levels of anxiety. The most common fears among patients were, fear of pain after surgery, fear of health deterioration, fear of myocardial infarction and fear of CABG surgery. Fear was observed to be more common amongst the female respondents, while age had no significant correlation with fear.

Chaudhury, Sharma, Pawar, Kumar, Srivastava, & Sudarsanan (2006) identified the incidence of anxiety and depression in patients both before and after CABG surgery. The psychological outcomes such as anxiety and depression were studied among 30 patients undergoing CABG at a service hospital. The results revealed, 13 (43.33%) of the patients had anxiety and 9 (30%) had depression during preoperative period. Even after successful CABG, 11 (36.67%) patients had definite anxiety and 12 (40%) had depression.
Rymaszewska, Kiejna & Hadrys (2003), assessed the anxiety in 53 patients subjected to coronary artery bypass graft surgery, which reported that approximately 55% of the patients had high level of anxiety preoperatively. 34% had anxiety shortly after the surgery and 32% of them had clinically relevant level of anxiety after three months. This study concluded that it is imperative to identify the preoperative anxiety and need to be treated since this may reduce morbidity and mortality among CABG patients.

Krannich, Weyers, Lueger, Schimmer, Faller, & Elert (2008), evaluated the presence of anxiety among 142 patients before and after CABG. Results revealed 34% of patients were clinically anxious before CABG and 24.7% of patients were clinically anxious after CABG. The relationship between age and anxiety revealed, younger patients were more anxious before CABG than older ones and showed a decline in symptoms post operatively while elderly patients hardly showed any change.

Gallagher & McKinley (2007) described the concerns of (n = 172) patients undergoing CABG surgery and associated the concerns with higher levels of anxiety. Patients were interviewed before discharge and ten days after discharge. The predictors of increased anxiety after surgery to be pain, discomfort, resuming lifestyle, taking anxiolytic or antidepressant medications, being inaccessible to personal things and difficulty in sleeping. Patients with
higher anxiety levels after discharge were in pain/discomfort. The study concluded that patients waiting for coronary artery bypass surgery should be routinely assessed for anxiety before the procedure and interventions to prevent or reduce anxiety should be provided. Interventions must be multifactorial, including information, support for pain management, realistic information about surgery schedules and resuming lifestyle after the surgery.

Parvan, Zamanzadeh, Dizaji, Shabestari, & Safaie (2013) determined the perceived stressors associated with CABG among 68 patients. In the analysis of data, the highest stressors were “pain and discomfort”, “the need to have heart surgery”, “death due to illness or surgery”, “being away from home and work” and “having chest tube”. The study concluded that the intrapersonal stressors were perceived more than interpersonal and extra personal stressors by patients. The study suggested that nurses should emphasize on identification and elimination of intrapersonal stressors based on the needs of patients.

Koivula, & Tarkka (2002) examined the psychological adjustment among 170 patients, nine years following CABG surgery who were aged under 65 years with depressive symptoms and were found to exhibit a variance of 51-57% in anxiety. It was concluded that anxiety in people with coronary heart disease can be alleviated by developing social support from peers and professionals. Those aged under 65 years should be recognized to be at a greater risk with a predictor of long-term fear and anxiety after CABG.
Gallagher, McKinley, & Dracup (2003) studied the anxiety and the perceptions of control among patients who underwent (n = 155) CABG surgery during, before and two weeks after discharge. The results showed, 38.7% of patients had low levels of anxiety before surgery and 38.6% of patients had moderate level of anxiety after discharge. Depression levels were low, but increased over time (p < 0.001). Patients had low to moderate perceptions of control over their illness before surgery, which increased over time (p < 0.001). Patients with stronger perceptions of control were less anxious or depressed at all times and those who were more anxious before surgery continued to be so afterwards.

Fathi et al. (2014) evaluated preoperative anxiety among patients subjected to heart surgery. Descriptive anxiety levels showed that mean score of state anxiety was 41.60 and mean score of trait anxiety was 42.14 among patients and the mean score were in moderate anxiety category. But the total mean anxiety score of state and trait anxiety was 84.00 which was in the severe category.

### 2.1.2 Prevalence of Quality of Life

Hunt, Hendrata, & Myles (2000) assessed the relationship between preoperative risk factors, postoperative chronic pain, sleep and gender on perceptions of quality of life (QoL) among patients twelve months after CABG surgery. Significant improvements in QoL were seen in physical functioning
(p<.0001), bodily pain (p=.024), social functioning (p=.011) and role limitations resulting from emotional status (p =.003). Significant associations (p=.002) were found between poor QoL, severe pain and poor quality sleep. CABG surgery results showed improved QoL for the majority of patients with extensive coronary artery disease. Nevertheless, some patients continue to have severe pain, sleep disturbances and altered relationship with their spouse twelve months after surgery.

Penckofer, Maureen, Barrett, & Holm (2005) determined the effect of CABG surgery on the quality of life among women. Participants included 61 women who provided information about the self-report questionnaires before and three months after surgery. The major findings of the study showed that women had significantly improved quality of life (p = .004) due to increased satisfaction with health and physical functioning (p< .001) at three months following CABG surgery. They experienced less angina (p<.001) and shortness of breath (p =.014), although fatigue was unrelieved for the majority of women. Psychological well being improved after surgery for most women (p<.001) with lower anxiety levels (p< .001), greater levels of well being (p = .021), feelings of health (p < .001) and vitality (p = .023). Women reported less use of emotive coping (p = .043), indicating less emotional distress. Nevertheless, 25% of the sample continued to experience severe psychological distress three months after surgery, indicating the need for continued follow-up.
Taghipour, Naseri, Safarian, Dadjoo, Pishgoo, Mohebbi, & Kabir (2011) determined the quality of life one-year after the CABG surgery. The study found the mean physical and mental component summary scores to be 59.5 and 60.2 respectively. CABG has led to higher and more satisfactory outcomes for physical functioning, role physical and role emotional but lower in other scales. It could mostly be attributed to unmodified risk factors and progression of existing co morbidities.

Azzopardi, & Lee (2009) examined health-related quality of life and depressive symptoms two years after CABG surgery among 87 participants before surgery; six weeks, one year and two years postoperatively using the Short Form-36 (SF-36) health survey questionnaire. The results indicated an overall improvement in all aspects of QOL, with a statistically significant improvement in the physical component summary (p <0.05). Comparison of first and second year SF-36 scores revealed a moderate, non significant deterioration in the physical component summary and the mental component summary in the second year than the first year. This has important implications for the planning of nursing care and patient education after CABG.

Elliott, Lazarus, & Leeder (2006) assessed the quality of life (QoL) among patients before surgery, on discharge and six months after CABG surgery. The results revealed, the scores of several domains of QoL to have deteriorated at hospital discharge when compared with pre surgery. There were significant improvements in health status at six months post discharge except
the mental health and social functioning. It was concluded that preoperative information that focused on patient expectations further improved patient care and support after discharge.

Peric, Borzanovic, Stolic, Jovanovic, Dimkovic, & Marcetic (2008) evaluated the change of quality of life (QoL) and identified the related predictors of worsening of QoL among patients six months after CABG. The comparison between mean preoperative and postoperative scores showed an improvement in all sections of quality of life (p < 0.001). The results indicated that the QoL of patients worsened by CABG were as follows: female gender in the pain section (p = 0.002), diabetes mellitus in the physical mobility section (p = 0.003), low ejection fraction in the physical mobility section (p = 0.047), emotional reaction section (p=0.03), postoperative complications in the social isolation section (p = 0.002), sleep (p = 0.03) and pain (p = 0.005) sections.

### 2.1.3 Functional Status among patients subjected to CABG surgery

Oliveira, Carvalho, Pereira, Cacau, Afrânio, & Luiz (2014) identified the determinants of the distance walked in six-minute walk test (6MWT) in 60 patients who underwent cardiac surgery at hospital discharge. The assessment was performed preoperatively and at discharge. The multivariate analysis showed that the type of surgery (p = 0.001), duration of cardiopulmonary bypass (CPB) (p = 0.001), functional independence measure (p = 0.004) and body mass index (p=0.007) were the determinants of six minutes walking distance.
Barnason, Zimmerman, Anderson, Mohr-Burt, & Nieveen (2000) examined the impact of selected patient characteristics (ie, age, sex, comorbidities and cardiac rehabilitation participation) on functional status outcomes among patients with CABG at baseline, three, six and twelve months after CABG surgery. The results did not demonstrate any significant differences between three, six and twelve months activity levels. Women and subjects with more than one comorbidity had a significantly lower preoperative level of physical functioning. The results of the study provided a basis for determining the areas of functional limitations during recovery from CABG surgery and also be the foundation for evaluating outcomes when specific interventions (eg, pain management, psychosocial support, physical strengthening and fatigue management) are implemented during hospitalization, home recovery and rehabilitation to target optimal psychosocial and physiologic functioning of patients with CABG.

Baptista, Palhares, Oliveira, Vilarinho, Severino, & Petrucci (2012) evaluated the quality of life in patients undergoing myocardial revascularization using the six minute walk test. Patients were evaluated preoperatively and divided into two groups according to the six minute walking test: the group with a walking course of more than 350 meters and the group with a walking course of less than 350 meters at the preoperative time. The quality of life was lower in the group with a walking course of less than 350 meters compared to the group with a walking course of more than 350 meters.
in the preoperative period. Quality of life improved after two months in both the groups. This study concluded that the six-minute walk test at the preoperative period is associated with the quality of life after two months of CABG surgery.

Nery, Martini, Vidor, Mahmud, Zanini, & Loureiro (2010) checked changes in the functional capacity of patients who underwent CABG surgery by testing six-minute walk test (6MWT) two years later. This study followed 179 patients for two years classified into active and sedentary physical activity. 52 patients were classified as active before and two years after surgery and the six-minute walk distances performed had been 359 meters and 439 meters respectively (p= 0.016). 45 patients were classified as sedentary before and two years after surgery and the six-minute walk distances performed had been 255 meters and 376 meters, respectively (p < 0.001). 82 patients transited between these two groups, 71 passed from sedentary to active and walked before and after surgery 289 meters and 380 meters, respectively (p= 0.001). The eleven patients who were active and passed to the sedentary group walked 221 meters and 384 meters, respectively (p= 0.007). The functional capacity of the patients submitted to CABG surgery had a significant improvement in a medium period of follow-up.

Dimattio, & Tulman (2009) analyzed the functional status following CABG surgery in women who were interviewed before hospital discharge and by telephone at second, four and six weeks after discharge. Functional status
was assessed by SF 36 patient assessment questionnaire. Women experienced significant gains in the functional status over six weeks, particularly between second and four weeks. They engaged most frequently in personal care and low level household activities during the study period and most of them reported improvement in their overall functional status. The women experienced significant decrease in fatigue and surgical pain, but continued to experience both at 6 weeks. Fatigue and surgical pain were significantly correlated at all time periods.

2.1.4 Anxiety and its relationship to Quality of Life and Functional Status

Patients experiencing level of preoperative distress were more likely to report decrements in several domains of Quality of life after their operation. In this way in review of literature examined the relationship among anxiety, physical functioning and mental health domains of quality of life and functional status before and after CABG surgery.

Geyer, Mogotlane, Young, Black, & Hawks (2009) stated that patients confronted with a life-threatening disease experience intense anxiety, frustration and fear which can activate the stress response. The stress response stimulates the sympathetic nervous system, the adrenal medulla and the angiotension-aldosterone system, causing an increase in preload, afterload, contractility and heart rate. These effects can be detrimental to the already weakened heart. The sympathetic nervous system mediates cardiovascular stimulation with increased catecholamine blood levels causing tachycardia,
hypertension, myocardial ischaemia and infarction. These responses may have detrimental effects on the coronary circulation of higher risk patients, which can lead to increased morbidity and mortality.

See comment in PubMed Commons belowSzékely, Balog, Benkö, Breuer, Székely, & Horkay (2007) explored the long-term effect of anxiety on outcome after CABG surgery. In total, 180 patients were prospectively studied and followed up for four years. Anxiety (Spielberger State-Trait Anxiety Inventory) was assessed. Psychological self-report questionnaires were completed preoperatively, 6, 12, 24, 36 and 48 months after discharge. Average preoperative STAI-Trait score was 44.6 +/- 10. In multivariate models, postoperative congestive heart failure (p = .009) and preoperative STAI-Trait (p = .05) were independently associated with mortality. The occurrence of cardiovascular hospitalization was independently associated with postoperative intensive care unit days (p = .045) and post discharge sixth month STAI-Trait score (p = .03). The results of the study suggested that the assessment of psychosocial factors, particularly anxiety could help in risk stratification, identification of patients at risk of mortality and cardiovascular morbidity after cardiac surgery.

Douki (2011) examined the presence of anxiety in patients before and after CABG and its relationship to patient's QoL. The study showed significant positive association between pre and postoperative state anxiety. Pre and post
operative mental health negative correlations were found between preoperative mental health and preoperative state anxiety (p=0.0001), postoperative physical functioning and postoperative state anxiety (p=0.0001). It was concluded that identifying patients likely to experience anxiety before CABG surgery will improve their QOL.

Pfaffenberger, Doering, & Puffinger (2010) had assessed health-related quality of life as well as the level of anxiety and depression in patients undergoing CABG. The findings revealed the identification of significant improvements in health-related quality of life three months after surgery; preoperative anxiety significantly correlated with health-related quality of life three months after surgery. The study concluded that providing information about the probable course of quality of life and surgery is quite necessary.

Tung, Hunter, & Wei (2007) examined the relationship between anxiety, coping and quality of life (QoL) among 100 (50 men and 50 women) patients subjected to CABG. The mean post CABG duration was 27.1 month for male and 16.4 months for female. The mean state anxiety was 42.7 and 44.6 for men and women respectively. The mean Quality of life score was 45.3 for men and 41.8 for women. Anxiety was negatively correlated to physical dimension (p < .01) and mental dimension of Quality of life (p < .01). Better QoL was associated with lower anxiety level, greater use of problem-focused coping strategies and those who had more gender role responsibility such as the house
hold activities and social activities. Women scored lower on the physical dimensions of QoL, used more self-blaming coping strategies and experienced slightly higher levels of anxiety compared to men. Multiple regression analysis revealed that 37% of variability in quality of life was accounted by the anxiety (p <.001). It was concluded that the results will help nurses design specific interventions intended to lower anxiety levels, promote the use of problem-focused strategies and identify patients' values, necessary to achieve optimal QoL.

Phillip, Robert, Deborah, & Helen (2008) determined the association between depression, anxiety and general stress symptoms with hospital readmissions among 226 patients after CABG surgery. These results showed that symptoms of depression and anxiety are associated with morbidity following coronary artery bypass graft surgery. More than two-fold increase in readmission risk was attributable to preoperative anxiety and postoperative depression. The findings emphasize the need to develop suitable interventions for anxiety and depression among patients.

Simon, Tringer, Berényi, & Veress (2007) identified that the psychological factors considerably influence the results of six minute walk test after coronary bypass surgery. Physical exercise capacity of cardiac patient can be assessed by the simple, low-cost six minute walk test (6MWT). The results of the test mainly depend on the psychological factors such as cooperation, fear,
anxiety and depression which can influence the results in patients early after coronary artery bypass surgery. 358 patients who arrived to phase II cardiac rehabilitation were included in the study. Six minute walk test was performed at the beginning and at the end of three weeks program. Hospital Anxiety and Depression Scale (HADS), Type-D personality test were filled in three weeks after surgery. The results of six minute walk test revealed that patients with high level of anxiety (16.5%) had lower walking distance compared to non anxious patients both at the beginning and the ending test (274 +/- 97 m vs. 320 +/- 106 m, p < 0.01 and 374 +/- 110 m vs. 413 +/- 104 m, p < 0.05), and evaluated higher rate of perceived exertion (12.5 +/- 1.1 vs. 11.9 +/- 1.4, p < 0.05 and 11.7 +/- 0.8 vs. 11.3 +/- 1.3, p < 0.05). It was concluded that anxiety considerably influenced the walking distance after CABG surgery.

2.1.5 Preoperative education and biofeedback assisted relaxation on anxiety

Mind-body approaches such as stress reduction techniques have long been known to have beneficial effects on cardiovascular diseases. A number of studies have demonstrated the positive influence of stress reduction techniques on physiological processes and psychological states, such as reducing blood pressure, increasing pain tolerance and improving coping ability thus enhancing a range of postoperative outcomes. Evidences suggest that relaxation therapy may improve psychological outcomes in CABG surgery patients.
Dehdari, Heidarnia, Ramezankhani, Sadeghian, & Ghofranipour (2009) evaluated the effect of progressive muscular relaxation (PMR) training in decreasing anxiety and improving quality of life among 110 anxious patients after CABG surgery. Patients were allocated to receive both exercise training and lifestyle education plus relaxation therapy (relaxation group; n=55) and the control group or the recipient of usual care group; n=55). Duration of the relaxation therapy was six weeks and in the case of usual care was eight weeks. Both the groups were followed up one month after completion of intervention. Anxiety and quality of life in the two treatment groups were compared. The results showed significant reductions in state anxiety (p<0.01) and trait anxiety (p<0.01) levels in relaxation group after intervention compared to control group.

Dixhoorn, & White (2004) established the effects of relaxation therapy on the recovery from a cardiac ischaemic event and secondary prevention. The physiological outcomes such as reduction in resting heart rate, increased heart rate variability, improved exercise tolerance and increased high-density lipoprotein cholesterol were found. The psychological outcomes like state anxiety and depression was reduced. The cardiac effect like the frequency of occurrence of angina pectoris, the occurrence of arrhythmia and exercise induced ischaemia were reduced. The factor return to work improved. The study concluded that intensive supervised relaxation practice enhanced recovery from an ischaemic cardiac event in addition to exercise and education.
Sabzmakan, Hazavei, Rabiei, Hashemi, & Sadeghi (2012) assessed the effects of an educational program on depression levels in patients with CABG surgery. The intervention group received the educational program that consisted of relaxation, breathing exercises and appropriate physical exercises. The patients were followed up for two months post intervention. The results showed that the mean scores of self-helping behaviors significantly increased in the intervention group compared to the control group. In addition, a significant decrease in mean scores of depression was observed in the intervention group than the control group.

Sebregts, Falger, Appels, & Kester (2005) evaluated the effects of intervention on behavioral risk factor modification in patients with CAD or CABG on type A behavior, vital exhaustion and depression. Patients were assessed before intervention, directly after intervention and at nine months follow-up. The intervention was effective in reducing hostility and total type A behavior at post intervention and at nine months follow-up. The results indicated that the behavioral intervention for CABG can result in relatively large and persistent reductions in type A behavior, hostility and depression.

Michalsen, Grossman, Lehmann, & Nicola (2005) analyzed the effect of a comprehensive stress reduction and lifestyle program on depression, anxiety and quality-of-life outcomes among patients in study and control group with CAD. The results revealed that the adherence to the relaxation practice was
excellent in the lifestyle group (p >0.001). Both groups improved comparably in most dimensions of QoL and significantly greater improvements in the lifestyle group were found on physical function and physical sum score (p = 0.046 and p = 0.045). Depression, anxiety, anger and perceived stress were reduced similarly in both groups.

Freedland, & Skala (2009) conducted a randomized study to determine the effect of cognitive behavior therapy (CBT) on major or minor depression among patients one year after CABG surgery. The study report showed that more patients in the CBT and supportive stress management experienced remission of their depression than in the usual care group after three, six and nine months. The study concluded that the educational intervention was effective in treating post surgical depression after CABG surgery.

Nilsson (2009) conducted a study to assess the effect of bed rest with music intervention on stress level response in patients undergoing CABG surgery. Physiological determinants (respiratory rate, heart rate and serum cortisol level) and psychological determinants (pain and anxiety) were assessed before and after the music intervention. Patients were allocated to receive a 30 minutes of uninterrupted bed rest with music intervention. The study result showed that there was significant decrease in all determinants of stress.
Asilioglu & Celik (2004) evaluated the effect of preoperative teaching method on anxiety levels of the patients. This study consisted of 100 patients having open cardiac surgery. Of 100 patients, 50 were in the intervention group and the remaining 50 were in the control group. The patients in the intervention group were given a planned teaching according to the patient education booklet. Patients in the control group were informed about preoperative and postoperative routines by a nurse. The anxiety level of the patients in the control and intervention groups was measured on the third day after the operation by using the State and Trait Anxiety Inventory. The mean postoperative state and trait anxiety score in the control group was slightly higher than the mean score of the patients in the intervention group. In addition, all patients in the intervention group (p<.01) stated that they were satisfied with the preoperative teaching given by the researcher.

Parry (2009) conducted a Cardiac Home Education and Support Trial (CHEST) among patients undergoing CABG surgery. Patients allocated to usual care received standard preoperative and postoperative education. Patients in the peer support group received individualized education and support via telephone from trained cardiac surgery peer volunteers for eight weeks following hospital discharge. Peer volunteers made an average of twelve calls, less than 30 minutes in duration over the eight-week recovery period. Patients were satisfied with their peer support. The intervention group reported improved physical function, role function, less pain and improved cardiac rehabilitation enrollment.
Rajendran, Manoj, Karthikeyan, & Davis (2004) had evaluated the effectiveness of structured cardiac rehabilitation program in Indian set up among patients prior to CABG surgery. The patients were initiated into lifestyle changes based on diet, relaxation, exercise, attitude and motivation (DREAM) on discharge post operatively and were advised unsupervised walking exercise based on target heart rate of 60 – 75% based on age. The follow-up was made once every 15 days. Results revealed that there was a significant improvement in the functional capacity, resting heart rate, blood pressure, fasting blood sugar, total cholesterol, triglycerides. The results suggested an encouraging pattern for effective cardiac rehabilitation program which can be used for secondary prevention of CAD in India.

Hartford (2005) determined the effectiveness of telephone intervention on anxiety among patients during recovery after CABG surgery. The intervention consisted of a series of protocols delivered by a cardiac nurse at discharge and on days one, two, four, seven and at second and seventh weeks. Subjects in the control group received standard care. The Beck Anxiety Inventory (BAI) was used to measure anxiety at baseline (in hospital), on day three and at weeks four and eight. Anxiety levels for both groups were found to be moderate to severe prior to discharge. Mean scores of anxiety for the experimental group was significantly lower than that of the control group.
Tsai, (2004) evaluated the effect of an audio-visual relaxation training (RT) treatment involving deep breathing exercise compared with routine nursing care on anxiety, sleep, and relaxation in Chinese adults with cardiac disease. This research was a quasi-experimental, two-group, pretest-posttest study, undertaken for one year. The results revealed that the RT significantly reduced the anxiety, improved the sleep, and the relaxation in the study group as compared to the control group. It was concluded that the audio-visual RT might be a beneficial adjunctive therapy for adult cardiac patients.

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Utriyaprasit, Moore, & Chaiseri (2010) tested the effect of an audiotape containing preparatory information strategies on symptoms and psychological distress among patients undergoing CABG surgery. The results showed that the intervention group had fewer symptoms of shoulder, back or neck pain, loss of appetite and increased physical activity after discharge, compared to the control group. However, no statistically significant difference in psychological distress was observed. This study recommended that nurses can use an audiotape containing preparatory information during the few weeks after discharge in order to improve its effect on psychological distress and improve outcomes for patients having CABG surgery.

Burke, Margaret, Purden, Nancy, Frasure, & Smithet. (2013) determined whether coronary artery bypass graft surgery patients and their caregivers who received telehealth follow-up had greater improvements in anxiety levels from pre-surgery to three weeks after discharge than those who received standard
care. Secondary outcomes included changes in depressive symptoms and patients' contacts with physicians. No group differences were noted in changes in anxiety and depressive symptoms, but patients in the tele health group had fewer physician contacts \( (p = .04) \). Female caregivers in the tele health group had greater decreases in anxiety than those in standard care \( (p < .001) \), and caregivers of both genders in the tele health group had greater decreases in depressive symptoms \( (p = .03) \).

Rollman (2009) tested the effectiveness of telephone-delivered collaborative care on depression among post CABG patients \( (150, \text{ intervention}; 152, \text{ usual care}) \). Eight months of telephone-delivered collaborative care was provided by nurses and patients were supervised by a psychiatrist and primary care physician. Quality of life (QoL), depression and functional status were measured. The results reported that men with depression were particularly likely to benefit from the intervention \( (p = .001) \). Compared with usual care, telephone-delivered collaborative care for treatment of post-CABG depression resulted in improved QoL, physical functioning and mood symptoms \( (p < .001) \) at eight month follow-up.

Ku, Ku, Ma (2002) assessed the effects of phase I cardiac rehabilitation intervention on anxiety of patients hospitalized for CABG surgery. The experimental group received individual instruction in progressive exercises and daily activities. The control group received the routine care. The results revealed that the mean anxiety for all subjects before undergoing CABG
surgery was 42.6. The mean anxiety was lower in the experimental group than the control group on the day before undergoing CABG surgery and on the day of discharge. This finding suggests that application of phase I cardiac rehabilitation intervention to reduce the anxiety level.

Deyirmenjian, Karam, & Salameh (2006) assessed the impact of preoperative patient education on anxiety and recovery of the patients undergoing CABG surgery. The patients in the experimental group received a special educational session on their admission day and had a tour of the cardiac surgery unit. The control group followed the routine hospital protocol. The results indicated the statistically significant reduction of postoperative anxiety was noted in the experimental group than the control group. The experimental group had a shorter time from awakening to extubation than the control group.

Even though many studies have shown the effectiveness of relaxation therapy among CABG patients, when it is combined with biofeedback training it is found be a lot more effective (Schwartz, & Sprangers, 2003). The research to date suggests that biofeedback assisted relaxation exercise could be a useful alternative or adjunct to more conventional forms of treatment as it has been the promising treatment or management of several cardiovascular disorders. The following published articles support the applications of biofeedback, for a host of clinical ailments.
Giardino, Chan, & Borson (2004) determined the effectiveness of an intervention that included heart rate variability biofeedback and walking with pulse oximetry feedback to improve quality of life for patients suffering from chronic obstructive pulmonary disease. Twenty participants were studied over the course of nine sessions using the six minute walk distance test. The outcome showed a statistically and clinically significant improvement in walking distance and overall quality of life.

Harden, Houle, Green, Remble, Weinland, & Colio (2005), identified the effects of biofeedback on pain. The participants received biofeedback treatments over the course of four to six weeks. The results of the study showed that eight of the nine patients experienced reductions in pain that varied from 25-66 percent.

Rau, Buhrer, & Weitkunat (2003) explored the way biofeedback treatment affected patients with problematic blood pressures. Twenty-two participants received three individual sessions over the course of two weeks. Twelve of the participants had high blood pressure while the other ten experienced low pressures. The findings concluded that both high and low pressures were modified in a significant and positive way after three sessions of biofeedback.
Lehrer, Vaschillo, Vaschillo, Lu, Scardella, & Siddique (2004), evaluated the effectiveness of biofeedback as a complimentary treatment for asthma. Ninety-four adult volunteers with asthma participated. Results suggested that the participants required less steroid medications and averaged a decrease in one full level of asthma severity.

Flor, & Birbaumer (1993), compared three different types of treatments for chronic musculoskeletal pain to evaluate which would be most effective. The treatments compared were EMG biofeedback, cognitive-behavioral therapy and conservative medical treatment. At the twenty four month follow-up, only the biofeedback group maintained significant (p<0.001) reductions in pain severity.

Vasudeva, Claggett, Tietjen, & McGrady (2002) evaluated the effects of biofeedback on pain, depression and anxiety among patients experiencing migraines. The results showed that, after twenty sessions of biofeedback therapy, the patients experienced a reduction in pain, depression and anxiety.

2.1.6 Preoperative education on Quality of Life

Quality patient education can shorten the length of the hospital stay and improve self-care management skills. The main aim of this information is not only to make patients understand health but also to implement the information provided to them. Life style habits such as healthy nutrition and physical activity are vital for secondary prophylaxis among patients following CABG surgery.
Babaee, Keshavarz, Hidarnia, & Shayegan (2007) evaluated the ability of the health education program to improve quality of life of patients with CABG surgery. Patients in the experimental group received the educational intervention. These patients were followed up to one month. The results showed that significant improvements in all domains of quality of life between two groups. The findings demonstrated that health education improved the quality of life for patients with CABG.

Arthur, Daniels, McKelvie, Hirsh, & Rush (2006) determined the effect of a preoperative intervention on preoperative and postoperative outcomes in low-risk patients awaiting elective coronary artery bypass graft surgery. During the waiting period, the treatment group received exercise training twice per week, education and reinforcement and monthly nurse-initiated telephone calls. After surgery, participation in a cardiac rehabilitation program was offered to all patients. Postoperative length of stay was the primary outcome. Secondary outcomes were exercise performance, general health-related quality of life and anxiety. The results revealed that the length of stay differed significantly between groups. Patients who received the preoperative intervention spent one day lesser in the hospital and lesser time in the intensive care unit. During the waiting period, patients in the intervention group had a better quality of life than the control group. Improved quality of life continued up to six months after surgery.
Saeidi, Mostafavi, Heidari, & Masoudi (2013) evaluated the effects of a comprehensive cardiac rehabilitation program (CR) on quality of life in patients with coronary artery disease. The results revealed that the patients with age < 65 years had greater improvements in mental health (MH) and social function (SF) than patients with age ≥ 65 years. Women had greater improvement in physical functioning, vitality and mental health compared to men. These results indicated that CR can improve quality of life in cardiac patients especially in women. Elderly patients get the same benefit as other patients in physical domains.

Mc Hugh Lindsay, Hanlon, Hutton, Brown, & Wheatley (2007) reported the effect of nurse led preoperative intervention on quality of life among CABG patients. The intervention group received the information about making lifestyle changes. Quality of life was measured by using the SF-36 questionnaire, a generic tool. The results revealed that the intervention participants were more likely to stop smoking, reduce obesity and reduce blood pressure. There was a statistically significant improvement in the physical composite summary score of the SF-36 in the intervention group than the control group.

evaluate changing lifestyle habits five years after CABG among 2269 patients. The results revealed that significant decrease in change of dietary habits after surgery. In addition, the desire for nutritional counseling decreased steadily over time. Notably, among patients 50-59 years old, fewer men than women followed a strict diet. Patients suffering from recurrent angina consulted nutritionists more often than patients without angina. It was concluded that patients obviously tend to delay lifestyle modification until symptoms occur. Hence they must be reminded of the importance of healthy nutrition and adequate physical activity.

Hsin-Hsin, Lin, Sai, & Lin (2010), explored the impact of a lifestyle-change intervention on cardiac risk factors in patients after CABG surgery. The experimental group received the therapeutic lifestyle-change programme. The results revealed that the cardiac risk factors such as amount of cigarette smoking, blood pressure control, frequency of physical activity and dietary behavior were modified in both the groups. Both the groups improved significantly in blood lipid profiles and fasting glucose levels from pre surgery to the first month after discharge and the experimental group improved even more. Three months after discharge, blood pressure control and frequency of physical activity in the experimental group were significantly (p<0.004) higher than the control group. It was concluded that incorporating a therapeutic lifestyle-change intervention into a postoperative cardiac rehabilitation
programme to effectively modify cardiac risk factors may improve postoperative recovery and prognosis.

Hartwell & Henry (2004) conducted a study to assess the effectiveness of dietary advice on nutritional intake following CABG surgery. Dietary intake was assessed pre-operatively, two months and one year after CABG surgery by using a questionnaire about the amount of food items and frequency of food intake which was followed by a dietary advice. Patient’s level of knowledge were assessed through pre-test and post test. The results showed an increase in the amount of dietary fat and cholesterol intake as increased 21%, 36% and 51% respectively. The study concluded that further nutritional advices are needed for the improvement in the health conditions of the patients.

Wintz, Kinney, & Pier (2007), examined the functional status during the first two months following hospital discharge among patients subjected to CABG surgery. The study used the RAND 36-item Health Survey. Response frequency of the ten items in the physical functioning subscale was calculated. The results showed that more than half of the study participants reported to have experienced more limitation two weeks after CABG surgery as compared to pre-CABG surgery and returned to baseline levels two months after CABG surgery for all items of physical functioning except vigorous activities. It was concluded that the decrease in physical function immediately following CABG surgery in the study group may be related to surgeon determined post-CABG
surgery limitations, fear of activity and/or habitual activity levels. In addition, the results suggest that rehabilitation and patient education need to be optimized for the patient population.

Zhang, Jiang, Yin, Chen, & Wang (2012) evaluated the effect of nurse-initiated preoperative education and counseling on postoperative complications and anxiety symptoms among patients following CABG surgery. All the patients received standard preoperative and postoperative care, but the study group patients also completed a structured education and counseling course supervised by designated nurses three days before the surgery. The results showed that there was no statistically significant difference in the baseline characteristics between the two groups. Following the surgery, the rate of complications such as lower extremity edema, urinary retention, constipation, respiratory infection and deep venous thrombosis in the study group were lower than the control group (p < .05). The mean postoperative self rating anxiety scores in the study group were lower than the control group (p = .01). Nurse-initiated preoperative education and counseling were associated with a reduced rate of post operative complications and a reduced level of anxiety following CABG.

Zimmerman, Barnason, Schulz, Nieveen, & Miller (2007) examined the effect of a symptom management intervention on postoperative symptom, physical functioning and physical activity among the female CABG
participants (N = 40) aged 65 years and older. The intervention group (n = 23) had significantly lower fatigue scores at six weeks (p < .05) and higher levels of physical activity (p < .05) as measured by the activity diary at three months after CABG. At six weeks and three months after surgery, there were significant correlations between cardiac surgery-related recovery symptoms (shortness of breath, fatigue, depression, incision pain, and sleep problems) and physical functioning (p < .05). Study findings support the need for a targeted (women-focused) and tailored (self-management recovery) intervention to assist females in recovering from CABG surgery to improve symptom management, thereby enhancing physical functioning and physical activity outcomes.

Sørlie, Busund, & Sexton (2007) tested the efficacy of an information intervention upon emotional recovery following CABG surgery. Video information combined with individualized information sessions were carried out by nurses at admission and at discharge from the hospital to the experimental group. Patients were helped to express their questions, worries. The congruent information and support were provided accordingly. Control group patients received standardized information and no video. Recordings were made at baseline, discharge from hospital and during a two years follow-up period. The results showed that intervention patients reported less anxiety, less depression and better subjective health during two years following
discharge. The effects of the intervention probably relate to the combined use of the video and patient centered information sessions.

Ali, Gorji, Abasi, Didehdar, Ardebil, & Charati (2014), determined the effectiveness of education on self-care among patients who underwent CABG surgery. The control group received only usual care. The experimental group received the discharge plan administered including: five educational sessions-provided manual at discharge time and follow up with ten times phone contact with patients after discharge. The results showed that there was a significant difference in self-care behavior between experimental and control group after the discharge plan intervention. The study concluded that, administration of discharge plan is an effective method for enhancement of self-care behaviors in patients after coronary bypass surgery which suggests that it is a potentially critical program to be administered.

Cebeci, & Celik (2008), determined the effect of discharge training and counseling on self-care ability and on the problems encountered after discharge among CABG surgery patients. The intervention group received discharge training and counseling on the day of hospitalization. The patients were provided according to their individual knowledge needs and they were given a booklet developed for training purposes. The results found that the intervention group had a higher mean self-care score and experienced fewer problems than the control group following discharge.
Krannich, Weyers, Lueger, Schimmer, Faller, & Elert (2008) evaluated the effectiveness of a motivation programme on lifestyle change among patients subjected to CABG surgery. Each patient was evaluated regarding his or her motivation for lifestyle change two days before and ten days after CABG surgery. The results indicated the motivational factors for lifestyle change among patients who received motivation programme were the vulnerability, intention, social expectation, outcome expectation and self-efficacy expectation. It was concluded that motivation programme performed in a cardiac surgery hospital after CABG may increase the motivation for a positive lifestyle change.

2.1.7 Preoperative education on functional status

Hussain, Mutwalli, Stephen, Fallows, Ammar, & Arnous (2012), conducted a randomized study to assess the effectiveness of home-based cardiac rehabilitation (HBCR) program on quality of life and walking distance among post-CABG patients. Pre-CABG session included one-hour education talk on CAD, risk factors and CABG. The post-CABG program included a further education session on second post operative day regarding lifestyle modification, home management scenarios and the benefits of a 30-minute daily walk. Each participant was contacted after hospital discharge for six months by telephone calls to follow their walking program. In the control
group, 21 patients participated and received standard hospital care. The results revealed that the intervention group showed greater improvement in health-related quality of life and walking distance compared to the control group. It was concluded that, cardiac rehabilitation caused positive impact on the various aspects of health-related quality of life.

2.2 CONCEPTUAL FRAME WORK

INTRODUCTION

Conceptual framework provides an abstract prospective regarding the phenomena of interest. The conceptual framework identified for this study is the revised Health Promotion Model [HPM] by Nola Pender (1996), to assess the effectiveness of comprehensive nursing strategies on state anxiety, quality of life and functional status among the patients subjected to CABG surgery at Sri Ramachandra Medical Centre.

Health promotion is the process of enabling patients to increase the level of wellbeing and increase the control over their health (WHO, 2005). Pender defined health as not only the absence of disease, but a positive dynamic state of well being. The HPM was proposed by Pender in 1982 and revised in 1996. Pender (1996) reports three concepts that are central to this model: individual characteristics & experiences, behavior specific cognitions &
affect and behavioral outcomes. It identifies factors that enhance or decrease health promotion activities.

The 1996 revision of the model adds three new variables that serve to influence the individual to engage in health promoting behaviors: activity-related affect, commitment to plan of action, immediate competing demand and preferences.

The concepts of this model were modified and utilized for the current study. The underlying assumptions of this study were integrated into the application of this model. It is conceptualized that implementation of Comprehensive Nursing Strategies (CNS) improves individual’s perception of self-capabilities, promotes participation and adherence to health promoting behaviors after CABG. The components of the model in the present study are discussed below;

a. INDIVIDUAL CHARACTERISTICS AND EXPERIENCES

Individual characteristics and experiences include personal factors (biological, psychological and sociocultural) that influence health behavior. The personal factors of the study participants include the background variables that comprises of demographic, clinical and outcome variables.

The demographic variables are age, gender, marital status, educational status, occupation, monthly income and dietary pattern. The clinical variables
are type of CABG, co-morbidities, physical activity, smoking history, BMI and indication for CABG. The outcome variables are state anxiety, quality of life and functional status.

b. BEHAVIOR- SPECIFIC COGNITIONS AND AFFECT

According to health promotion model, Individual characteristics and experiences exert their influence through the cognitive-perceptual mechanisms that directly affect health promotion behavior. The following are cognitive-perceptual factors, defined as “primary motivational mechanisms” for the activities related to health promotion behavior.

(i) Perceived benefits to action – perceptions of the positive or reinforcing consequences of undertaking a health behavior.

In this study the awareness of the life style modification (LSM) after CABG surgery and relaxation exercise are believed to influence the need to undertake a health behavior.

(ii) Perceived barriers to action – perceptions of the blocks, hurdles and personal costs of undertaking a health behavior.

The barriers included are anxiety, functional status and the quality of life prior to CABG. The other barriers which include lack of time, energy, social support, inadequate knowledge on LSM and poor confidence in carrying out the CNS.
(iii) Perceived self-efficacy – judgment of personal capability to organize and execute a particular health behavior; self-confidence in performing the health behavior successfully.

The individual’s perceived self capabilities to implement the CNS that include knowledge and practice on LSM and relaxation exercise are included. The motivational factors in performing the health behavior include the vulnerability, and outcome expectation.

(iv) Activity-related affect – subjective feeling states that occur prior to, during and following a specific health behavior.

The factors that could influence the behavior of the study participants are the comprehensive nursing strategies that include the following;

Lap top assisted one to one interactive teaching for the subjects in the study group on LSM (diet, physical activity, walking program and medication) and relaxation exercise practice with pulseoxymetry feedback (REPPF) for 30 minutes using booklet on healthy living after CABG surgery and demonstration of REPPF and gentle stretching exercise (GSE) for 30 minutes on admission and 2\textsuperscript{nd} preoperative day Supervision of practice of REPPF and GSE by the researcher from 3\textsuperscript{rd} to 7\textsuperscript{th} postoperative day. Review of daily log followed by reinforcement on the 8\textsuperscript{th}, 15\textsuperscript{th}, 30\textsuperscript{th} and 90\textsuperscript{th} postoperative day and telephonic reinforcement on the 60\textsuperscript{th} and 85\textsuperscript{th} POD regarding adherence to CNS.
(v) **Interpersonal influences** (family, peers and providers): norms, social support and role models – perceptions concerning the behaviors, beliefs or attitudes of relevant others with regard to engaging in a specific health behavior.

In this study the interpersonal influences are teaching, cum discussion on LSM, demonstration on REPPF and interaction between the investigator and the study participants, clarification of the doubts and reinforcements by the researcher are considered.

(vi) **Situational influences** – the simple, aesthetic and ease of the environment that influence the subjects engaging in a specific health behavior.

Active participation in this study, issuing of booklet and reinforcements, CNS daily log, self motivation, intention, social expectation are thought to be influential in the patient’s behavior.

c. **Commitment to a plan of action** -- intention to carry out a particular health behavior including the identification of specific strategies to do so successfully

In the present study this refers to the study participant’s level of adherence to the LSM and RE as per CNS and also the reinforcements in person by the investigator can serve as an intention/ motivation to carry out the health behavior. Apart from that, the other factors that may or may not be present include mass media, newspaper, magazines, peer influences and medical consultation.
d. Immediate competing demands and preferences – alternative behaviors that intrude into consciousness as possible courses of action just prior to the intended occurrence of a planned health behavior.

The immediate competing demands in this study includes inadequate adherence to comprehensive nursing strategies. The reasons are being too busy with visitors, some type of negative physical reaction for exercise (e.g., sickness, chest pains) that occurs after CABG and lack of time.

Competing preferences are alternative behavior over which individuals exert a relatively high control. The competing preferences are self-monitoring of CNS daily log, walking schedule, self motivation and adherence to CNS. The telephonic reinforcement by the researcher is also an influencing factor to keep the study group on track to adhere to comprehensive nursing strategies.

All the above discussed factors are planned to assess as a baseline measurement during pretest which includes assessment of state anxiety, quality of life and functional status. Following the implementation of CNS to the study group the posttests are planned on the 8th, 30th and 90th postoperative day.

e. Expected outcome - Health Promoting Behavior

Outcome is expected following an intervention. Here it refers to the health-promoting behavior directed toward attaining positive health outcome. Substantiation of the health-promoting behavior should be in terms of
improvement or no change in quality of life and functional status and a decrease or no change in the state anxiety.