CHAPTER - II

REVIEW OF LITERATURE

The review of literature was done extensively and is presented under the following headings.

2.1.0 REVIEW OF RELATED LITERATURE

2.1.1 Studies on anxiety and its impacts on cardio vascular system.

2.1.2 Functional ability and self-efficacy in CAD population.

2.1.3 Effects of educational intervention on various cardiovascular outcomes.

2.1.4 Studies on effectiveness of Video Educational Interventions.

2.1.5 The scientific basis of yoga.

2.1.6 Studies on yoga techniques on normal adults.

2.1.7 Effectiveness of Yoga techniques in CAD population.

2.1.8 Studies on Other Stress Management Strategies.

2.2.0 CONCEPTUAL FRAME WORK.

2.1.1 Studies related to anxiety and its impacts on cardiovascular system

Psychological stress has been implicated in the etiopathogenesis of CAD. Recent researches highlight the importance of anxiety as a risk factor for mortality in cardiac patients. Identification of anxiety in patients and initiating appropriate interventions to mitigate the negative effect of stress and anxiety is an essential responsibility of the nurses.

Findings of Rymszewska and associates (2003) indicated the need for preoperative assessment of anxiety and initiation of appropriate intervention to reduce the anxiety. They assessed the level of anxiety and depression among, 53 patients who
submitted to CABG a few days before and after the operation and 3 months after
CABG. The incidence of anxiety was as high as 55% in the preoperative period
whereas in the post operative period the incidence was little low with 34%. Three
months after CABG 32% of patients still had clinically higher levels of anxiety. 32%
of the patients reported depression before CABG and 28% were depressed shortly
after CABG and 26% had depression at follow up at 3 months after surgery. The
anxiety was assessed using Speilberger’s Anxiety inventory. The Beck depression
scale was used to measure depression.

When patients are not aware of the outcomes of their illness or therapy, they
are eventually forced with lot of psychological stress. Evidence from a study showed
that uncertainty and symptoms of psychologic stress in the patients subjected to
Percutaneous Transluminal Coronary Angioplasty. (PTCA) and CABG were
significantly positively correlated (White & Frusuresmith, 1995). Results showed that
at 1 month and at 3 months after angioplasty patients were more uncertain than bypass
patients (p < .05), and that regardless of procedure, patients reported fewer symptoms
of psychological stress at 3 months than at 1 month (p < .01). Patients with high social
support had less uncertainty and psychological stress than patients with low social
support (p < .05). Analysis of the social support and treatment group interaction
showed that angioplasty patients with low perceived social support had significantly
more psychological stress than angioplasty patients with high social support
(p < .01). Analysis of the correlations between uncertainty and psychological stress in
the angioplasty and bypass grafting procedure groups after control for social support
revealed that social support was a significant mediator of the relationship between
uncertainty and stress only among patients undergoing PTCA. There was little
evidence of a mediating role for social support in the coronary artery bypass grafting
group.

Contradictory results were reported by McCormick, et al (2006). They
examined the relationship between uncertainty, symptom distress, anxiety and
functional status in patients awaiting CABG. The descriptive correlational study was done with 42 patients awaiting CABG. Average uncertainty and anxiety were present at moderate levels and were associated with moderate deterioration of functional status. Reported symptom distress was low; however the presence of symptoms showed a strong relationship with anxiety (P = .0002), and this relationship was confirmed through semi structured interviews. The relationship between uncertainty and anxiety was non significant. But the interviews suggest positive views of uncertainty as an opportunity for getting better may have muted the relationship between uncertainty and anxiety. Similarly it is possible to experience uncertainty as a danger. No statistically significant relationship was found between the study variables and waiting time.

A scientific evidence from a study has shown the relationship between Anxiety and baroreflex control among MI patient (Watkins, Bluementhal & Carney, 2002). Their study evaluated whether depression is associated with impaired baroreflex sensitivity in patients with AMI. Two hundred four hospitalized patients with AMI were evaluated 6 +/- 3 (mean +/- SD) days after AMI. BRS was assessed using cross-spectral analysis to measure baroreceptor-mediated R-R interval oscillations. Depression was determined using the Diagnostic Interview Schedule, and severity of depressive symptoms was measured with the Beck Depression Inventory. In order to adjust for possible differences in anxiety, we also measured state anxiety using the Spielberger State Anxiety Inventory. Depression was not significantly related to BRS. However, anxiety was significantly related to low BRS in multivariate analysis, after the potentially confounding variables of age, blood pressure, and respiratory frequency were controlled for. Comparison of groups with high and low anxiety showed that BRS was reduced by approximately 20% in the patients with the higher anxiety scores (4.7 +/- 3.2 ms/mm Hg vs 5.7 +/- 3.3 ms/mm Hg, P <.05), after adjustment for differences in age, blood pressure, and respiratory frequency.
Empirical evidences from a longitudinal study (Perski, et al 1998) also indicated that the preoperative anxiety predicts the long term post operative cardiac events. In their study Perski and colleagues assessed the psychosocial functioning with 172 patients submitted for CABG completed the psychological status before surgery one year and three years after surgery. All major cardiac events such as cardiac death, definite myocardial infarction, revascularization, and unstable angina verified by angiography or myocardial scintigraphy were recorded for three years after CABG. The patients exhibiting a high degree of distress with anxiety, depression, and tiredness before surgery assessed their status as being much worse both before the operation and at the 1-year follow-up. Emotionally distressed patients before surgery had significantly higher rates of cardiac events (16%) in the 3-year follow-up period compared with non-distressed patients (5%) ($\chi^2 = 5.11$, df = 1, $p < .02$).

Similar results were reported by other two studies also (Panagopoulou, Montgomery & Benos, 2006; Grossi, et al 1998). In a prospective study done (Panagopoulou, et al 2006) with 157 patients submitted for CABG, the preoperative psychological distress was the only predictor of quality of life at one month after CABG ($P < .01$) as well as one year after CABG ($P < .001$). Findings of Grossi and associates (1998) is in conformity with the previous findings. In their study 61 consecutive patients with the mean age of 66 years, were studied before and one year after surgery. Psychological, social, and surgical data were assessed. The roles of State and Trait anxiety, emotional reactions, and different coping modes were evaluated. At baseline the patients were divided into 3 groups according to their level of anxiety as assessed by Spielberger's S-Anxiety Inventory (STAI). The 3 groups did not differ in any of the basic parameters, except for their subjective experience of symptoms of dyspnoea ($p < .01$), and quality of life ($p < .0001$) for the whole patient group one year after surgery. However, patients belonging to the moderate-anxiety
and high-anxiety groups remained more psychologically distressed \((p < .0001)\) and perceived a higher degree of residual angina pectoris \((p < .0001)\) than did patients who did not display anxiety preoperatively. Dividing the patients into groups according to their answers to the other measures of psychological distress or negative coping strategies yielded similar results.

Gallaghar, (2007) reported that anxiety level was fairly low in patients undergoing CABG and reduced when surgery was completed. Despite the generally low anxiety levels, many patients in the sample had clinically higher levels of anxiety before and after surgery, and therefore stress reduction intervention was suggested for individual patients undergoing CABG. Intervening before surgery is especially crucial because patients who were anxious before surgery were more likely to continue to be anxious through out their recovery. In her study Gallaghar had used Hospital Anxiety Depression Scale.

Krannich, et al (2007) have carried out a study to evaluate the presence of anxiety and depression in patients before and after CABG and their association with age. Hundred and forty two consecutive patients who underwent CABG were recruited for the study. They completed the Hospital Anxiety Depression scale two days before and ten days after CABG. Results revealed that 34\% were clinically anxious before CABG and 24.7\% after CABG. Percentage of clinical depression was little less than the anxiety. 25.8\% of the patients were clinically depressed before and 17.5\% after CABG. ANOVA and McNemar tests revealed that anxiety scores and the number of patients high in anxiety declined statistically meaning fully only in the younger age group. Younger patients were more anxious before CABG than older ones and showed a decline in symptoms post operatively while elderly patients hardly show any change.
Other most important factor that influences the level of anxiety was the feeling of having control over situation or events and environment. Garvin, et al (2003) examined the relationship of gender and preference for information and control on anxiety after an acute MI. The convenience sample of 410 was recruited from multi centers 48 hours after an acute MI. 68% of the samples were male and predominantly white (87%). Anxiety was assessed using state-trait anxiety inventory and preference for information and control was measured using the Krantz Health Opinion. Study results indicated that women were more anxious than men (P<.05) but they were similar in their preference for information and control.

Koivula, et al (2006) analyzed the factors associated with fear and anxiety among 207 patients subjected to elective CABG in Finland. The results revealed 42% of them had moderate anxiety with STAI score ranging from 40-59 or low anxiety with scores ranging from 20-39. Only 5% of the subjects had reported the STAI score of above 60. The demographic variable accounting for high anxiety were age, sex, education and employment status. Women and younger patients had high anxiety than male and older patients aged above 65. Patients with high fear had high anxiety.

Tung, et al (2007) examined the relationship between anxiety, coping and quality of life of patients who had undergone CABG. Quality of life has been indicated as an important indicator of success following cardiac surgery. About 100 patients who had undergone CABG were recruited for the study. The mean post CABG duration was 27.1 month for male and 16.4 months for female. The mean S-Anxiety as measured using the Spielberg’s STAI was 42.7 and 44.6 for men and women respectively. The mean Quality of life score measured using SF 36 scale was 45.3 for men and 41.8 for women. Anxiety was negatively correlated to physical dimension (r =-.29, P < .01) and mental dimension of Quality of life (r = -.70, P < .01). It can be noted there was a stronger association between the anxiety and
mental dimension of quality of life. Multiple regression analysis revealed that 37% of variability in quality of life was accounted for by the anxiety (P <.001). Women in their study who took up more gender role function such as the house hold activities and social activities reported low quality of life.

2.1.2 Studies on self-efficacy and functional capacity

Physical inactivity levels in urban India, where cardiovascular diseases have become the leading cause of death, are now comparable with levels observed in the west (Rastogi, 2004). Rastogi and associates conducted a study to evaluate the relationship between the physical activity and the CAD risk in Indian population. The case control study results indicated that approximately, 48% of all controls were participating in some form of leisure exercise. This included walking, jogging, yoga, gardening, as well as sports and games such as badminton, swimming or those recreational activities that had MET ranging from 3 to 8. On the other hand, cases spent more time in sedentary activities or behaviors such as watching television, listening to music, reading and writing, or other activities with MET of 2. The majority of sedentary time was spent watching television (47%). People who spend more than 3.6 hours per day of sedentary activity such as television viewing had an elevated risk of 1.88 (95% CI: 1.09, 3.20) compared to people who spend lee than 70 minutes per day in television viewing.

Activity level or functional ability is the process oriented patient outcome that depicts the unique pattern of recovery and rehabilitation in CABG population. Literature review yielded evidence based information on this nursing sensitive patient outcome.

Barnoson, et al (2000) conducted a longitudinal study with 51 patients who had undergone CABG. The functional status was measured using Medical Outcome Study Short Form – 36 (MOS SF – 36) and modified 7 days activity tool prior to
surgery, 3 months, 6 months and 12 months after CABG. Results showed significant
difference (P < .0001) overtime for all 8 subscales. Other salient findings were that
subjects who had lower role emotional scores before surgery and at 3 months after
surgery were having problems at work or in other daily activities. Emotional problem
had interfered with one or all the following areas of functioning (i) Less amount of
time to spend on work / activities (ii) accomplished less than desired and (iii) Poor
Quality of work. From the association analysis it could be inferred that age and sex
had no significant influence on the functional ability.

Dimattio, & Tulman (2003) analyzed the functional status and correlates
following coronary artery bypass graft surgery in women. A single longitudinal
design was used for this research. Women were interviewed in person before hospital
discharge and by telephone at 2, 4 and 6 weeks after discharge. Functional status was
assessed by (a) The inventory of Functional status in the Elderly and subscales of the
Sickness impact profile; (b) Comorbid conditions by simple tally; and (c) Fatigue and
surgical pain by the Energy/Fatigue and pain severity subscales of the MOS patient
assessment questionnaire. Women experienced significant gains in the functional
status over 6 weeks, particularly between 2 and 4 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. None of the
women were completely recovered or had regained baseline functional status by six
weeks. 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.

functional status in CAD. The six months prospective study was done with CAD
patients (N=198). The sample consisted of CAD patients managed medically, CABG
patients, angioplasty and atherectomy patients. Self reported functional measure was significantly correlated with self-efficacy ($P < .001$) at baseline and at 6 months. The patients who reported better functioning at 6 months had initially better functioning, less anxiety, and reported more self-efficacy. With respect to maintain function the patients who reported more interference at 6 months follow up were more anxious at base line and reported less self-efficacy to control symptom.

Dehdari & associates (2008) reported a contrary finding. Contrary to the Sullivan et al's finding which supported the hypothesis that self-efficacy and S-Anxiety are inversely related they reported higher self-efficacy in the group with higher anxiety level. They had compared the S-Anxiety, self-efficacy and social support of CABG patients with that of Percutaneous Coronary Intervention (PCI). The Speilberger’s STAI, General self-efficacy scale and perceived social support were used to collect data from the participants. The patients who had under gone PCI were more anxious than the CABG patients. The Mean Anxiety score for CABG group and PCI group was 40.6 and 45.1 respectively. The self-efficacy was higher for the PCI group than the CABG group. Contrary to Bandura’s Postulation that individual with higher self-efficacy would report lower anxiety, the samples from PCI group reported higher anxiety and higher self-efficacy than the CABG group. The authors had attributed the use of general self-Efficacy scale to this contrary result.

Allen, Becker, & Swank, (1990) studied the physical and social and leisure functioning of 125 men before, 1 month after and 6 months after CABG. Relationship between functional status outcomes and selected psychological and physical variables were examined. Baseline measure of psychologic, physical, and social and leisure functioning during the month before surgery were reported during the hospital review. Functional status was also reported 1 and 6 moths after surgery. Self-efficacy was measured using a 5 point rating scale. The mental health questionnaire assessed the
frequency of depression and anxiety. Functional status improved significantly from 1 month before to 6 months after CABG. Slight improvement occurred in ADL at 1 month and significant improvement by 6 months. Social and leisure time activities scores decreased slightly before surgery to 1 month after surgery and significant improvement after 6 months. Self-efficacy independently and significantly explained 20% variance in patients’ subsequent performance of daily household activities. The variables that were not significantly predictive were age, post operative length of stay, number of bypass grafts, preoperative social and leisure functioning. Important finding on regression analysis was that Preoperative mental health was predictive of functional capacity.

Conn, (1998) analyzed the constructs related to exercise and the role of self-efficacy related constructs. The variables included were self-efficacy expectation, outcome expectancy, perceived barriers, age and life long leisure time. Self-efficacy expectation had a strong direct effect on the exercise. Outcome expectation had contributed little to exercise in the model proposed by Conn. Perceived barriers, self-efficacy expectation followed by age exerted the total influence on exercise scores.

Robertson & Keller, (1992) based on their study ascertained the importance of self-efficacy and health belief in improving the compliance to exercise. To analyze the relationship among health beliefs, self-efficacy and exercise they recruited a convenience sample of 51 men and women who had undergone PTCA or CABG in the previous 4 to 8 months. The participants completed the instruments in the following order: the self-efficacy scale, the severity scale, the benefits scale, and the barriers scale. Patients who had undergone CABG had greater adherence to recommended exercise regimen than patients who had PTCA. Individuals who perceived barriers to a recommended exercise regimen had fewer adherences than those patients who did not perceive barriers. In addition, perceived severity and
perceived benefits were negatively correlated with barriers. Participants who had higher perception of self-efficacy for a recommended exercise regimen had more adherence than those with a lower self-efficacy. Perceived barriers, benefits, severity, self-efficacy, and type of surgery explained 31 % of variance in exercise adherence. The relationship between self-efficacy and barriers was also non significant. This study result is limited to those who are capable of performing exercises for at least 25-40 minutes three times a week.

According to Gortner and Jenkins the 12-24 weeks following cardiac surgery is too late for self-efficacy assessment as ceiling effect occurs. But in this study the participants were recruited 4-8 months after PTCA or CABG. This is another major weakness of the study done by Robertson & Keller (1992).

Carroll, (1995) described the changes in the self-efficacy expectations and self care behaviors and investigated the effects of self-efficacy expectation as a mediator between self-care agency and self-care/recovery behavior among the 122 CABG patients aged 65 or more. Their self-efficacy expectation, self reported activities were assessed at discharge, 6 weeks and 12 weeks after surgery. The average subject in the sample was walking 1/2 block before surgery, walking around the inside of the hospital at discharge, walking 5 blocks at 6 weeks, and 6 blocks by 12 weeks after surgery. General activities ranged from brushing teeth to going on an overnight trip. At discharge, only 57% had taken a shower. At 6 weeks after surgery, subjects were performing activities around the home, but venturing no further than the local store. By 12 weeks after surgery, the elderly in this sample were doing their shopping and attending social functions, though only 54% felt that they were back to normal. There were significant main effects for time on self-care agency, all self-efficacy expectations, and for the behaviors of walking, general activities, and role and relationships during recovery (p < .01). For the behavior of climbing stairs, there was
not a significant main effect in this behavior between 6 and 12 weeks (p < .20). Regression analysis at discharge showed a significant influence of self-efficacy expectation as a mediator between self-care agency and general activities at discharge. The regression equations for the data at 6 weeks and 12 weeks after surgery found significant effects of self-efficacy expectation as a mediator between self-care agency and all self-care/recovery behaviors.

Very similar relationship between self-efficacy expectation and behavior performance was elicited by Perkins and Jenkins (2005) among the patients during early recovery following PTCA. Ninety patients who had undergone PTCA from 3 hospitals were recruited for the study. The outcome was measured using Jenkins self-efficacy scale, activity checklists for various activities and profile of mood states inventory. Mean self-efficacy expectation scores were moderately high post procedure for all behaviors except scores for role resumption. The behavior performance score increased significantly (p <.01) by 2 weeks post-discharge. Self-efficacy expectation scores were significantly and positively related to behavior performance for all study behaviors except work at 2 weeks, with r values ranging from 0.26 to 0.85. Mean total mood state scores improved significantly (p <.01) over the 2 week period. Those with higher efficacy expectation scores tended to have higher behavior performance scores and lower levels of mood disturbance. It was noted that the level of mood disturbance was low at both data collection points.

The study results indicate that self-efficacy varies according to the gender and based on the diagnosis (Gardner, et al, 2003). In the study under taken by Gardner and colleagues, the self-efficacy of men and women following CABG has improved significantly (P <.05). Additionally the men had greater self-efficacy for climbing, walking and lifting than women (P <.05). The caloric expenditure was a positive predictor of self-efficacy and quality of life. The caloric expenditure which indicates
the functional ability also varied between men and women following CABG at base line but at the end of the 12 weeks cardiac rehabilitation women also showed a similar parallel improvement as men.

Self-efficacy has been identified as a primary determinant in behavior change (Bandura, 1977). Based on the self-efficacy theory of Bandura a study had been conducted instituting self-efficacy interventions to older patients recovering from MI and CABG (Hiltunen, et al., 2005). Advanced practice nurses provided the nursing intervention to 110 participants for the first 12 weeks after discharge to home. After an initial introductory meeting in the acute care setting, participants were contacted by the advanced practice nurses in their home setting and over phone at 2, 6, and 10 weeks after initial contact. Results described the number of participants receiving the interventions at all contacts and the intensity of intervention. Verbal encouragement and mastery were the efficacy enhancing interventions used with greatest frequency. Based on the finding Hiltunen, and associates concluded that nurses can integrate specific efficacy enhancing intervention such as verbal persuasion, exercise promotion, mastery, energy management, active listening, disease process education in the rehabilitation process.

Parent, & Fortin, (2000) investigated the effect of vicarious experience on anxiety, self-efficacy expectation and self-reported activity for male first time cardiac surgery patients. A randomized control trial was used. Fifty six first time male patients undergoing CABG with a mean age of 56.5 were randomly assigned to an experimental or control group. Anxiety was measured using STAI at 48 hours, 24 hours before surgery again 5 days and 4 weeks after surgery. The intervention consisted of three supportive visits by a volunteer former patient. One to one support provided the vicarious experience which varied according to patients. The supportive acts include listening, affirmation, feedback and social support. Self-efficacy for three categories of activities namely activities of daily living, walking and climbing stairs was assessed using Jenkins Self-efficacy scale and self-reported activity was
determined using Jenkins Activity checklist which was a three point scale. The total activity score can range from 0-100. For anxiety significant group and time factors were observed. The S-Anxiety was 46.6 and 39.8 for the experimental and control group respectively. The multiple comparisons showed a significant reduction in anxiety during hospitalization for experimental group where as the anxiety levels of control group remained same. Findings revealed a significant difference between the groups in anxiety (p < .01) on the day before surgery. There was a significant difference between the groups in self-efficacy for general activities and self-reported activity (p < .002). The experimental group had higher self-efficacy for walking and actual walking performances (P <.001). There was a significant difference between the groups in self-efficacy for climbing stairs and the actual stair climbing performances (P <.01). The results support the effectiveness of vicarious experiences in reducing anxiety and enhancing the Self-efficacy for general activities, walking and stair climbing and the performance of activities.

King, et al (2000) examined the relations between demographic factors and, self-efficacy, self-motivation, social support and cardiac rehabilitation attendance. Consecutive consenting patients discharged following acute myocardial infarction and / or CABG were recruited for the repeated measure cohort study (N=304). The Jenkins Self-efficacy expectation scales and activity checklist of behavior performance for maintaining health and role resumption, modified version of the self motivation inventory, and the shortened social support scale were. Those who had higher role resumption behavior performance scores at two weeks after discharge were significantly less likely to attend cardiac rehabilitation programs. At six months after discharge, those who attend cardiac rehabilitation demonstrated higher health maintenance self-efficacy expectation and behavior performance scores. Health maintenance self-efficacy expectation and behavior performance improved over time. Changes in self-efficacy scores were unrelated to cardiac rehabilitation attendance but
changes in health maintenance behavior performance scores were strongly associated with cardiac rehabilitation attendance.

2. 1. 3 Studies related to Educational intervention

Providing valid discharge information is the most important nursing responsibility. Literature showed varied information intervention being designed and tested. There are ample of evidences available in support of sensory and procedural information provided was effective in terms of improving functional status and psychological outcomes (Suls & Wan.1989).

Ku, Ku., Ma, (2002) assessed the effects of phase I cardiac rehabilitation on anxiety of patients hospitalized for coronary artery bypass graft in Taiwan. In the prospective quasi experiment 70 patient who had CABG were recruited. The intervention was individualized instruction on progressive exercises and activity using the Chinese manual. The comparison group received routine treatment. The anxiety was assessed using the STAI on admission to hospital before surgery, on the day before surgery, and on the day of discharge. The mean anxiety for all subjects before undergoing CABG surgery was 42.6. The mean anxiety on the day before undergoing CABG surgery was 33.7 in the experimental group and 49.8 in the control group. There were statistically significant differences between the experimental and control group (P < .05).

Moore (1996) conducted a quasi – experimental study to test the effects of a discharge information intervention on physical and psychological outcomes 1 month following CABG. Recovery outcomes were compared between two groups of patients. An audiotape of information focusing on expected physical symptoms and their management was the experimental intervention. Using tandem method first 49 patients were assigned to control group and next 46 were assigned to experimental group. The mean age of the sample was 64 years. The outcome measures included
were psychological distress, measured by the Profile of Mood States, and physical functioning measured by the Sickness impact profile. The audiotape intervention produced positive effects on physical functioning (F(180) = 6.37, p < .01). The effects were maintained when age and post operative length of stay were statistically controlled. No differences in psychological distress were found because the data pertaining to psychological distress was taken 1 month after discharge by which time the patients would have had substantial recovery. Moreover both the study groups had low scores on the Profile of Mood States than normative groups. Findings suggest that audio tapes containing discharge information about expected recovery experiences are a feasible and effective approach to enhancing the physical recovery of CABG patients.

Rankin, Moore along with Dolansky (2001) tested the effectiveness of the same intervention using a Randomized, unblinded, controlled trial with follow up after 1 month. 193 patients who had their first CABG surgery were recruited for the study. Among them 98 patients were allocated to the Cardiac Home Information Program (CHIP) plus usual discharge care. CHIP was a 15 minute audio taped message describing the typical recovery experiences of CABG patients with emphasis on physical symptoms and their management. Patients were given the audiotape and a tape recorder on the 4th or 5th postoperative day and encouraged to listen to it as many times as necessary. They could take the tape and recorder home with them. Rest 95 patients were allocated to usual discharge care. Main outcome measures were the Psychological distress, physical functioning and symptom frequency. The results revealed that, patients in the CHIP group had better physical functioning (p = .05) and vigour (p = .01) than patients in the usual care group at one month. The CHIP and usual care group did not differ for psychological distress or frequency of symptoms other than vigor. Women in the CHIP group had better physical functioning than women in the control group (p = .03), but did not differ for psychological distress or
symptom frequency. Men in the CHIP group had lower levels of psychological distress (p = .04) and fatigue (p = .01) and higher levels of vigor (p=0.00), but did not differ for physical functioning or symptom frequency.

A quantitative review of literature (Devine, 1991) was conducted with 191 studies on the effects of psycho educational care on recovery, post surgical pain and psychological distress of adult surgical patients. Results showed statistically reliable small to moderate size beneficial effects on recovery, post operative pain and psychological distress. The psycho educational interventions included in this research were healthcare relevant information, skill training and psycho-social support. Most experimental treatments were delivered to each person individually. In some instances, patients were taught in groups or provided with booklets or other audio visual materials. The most frequent timing of treatment administration was the night before surgery. The overall efficacy of psycho educational care provided to adult surgical patients has been reconfirmed with this large sample of studies.

Linden, Stossel, & Maurice (1996) performed a Meta analysis of 23 randomized control trials to confirm whether the addition of psychosocial intervention improves the outcome of a standard rehabilitation regimen for patients with CAD. The 2024 patients who received psychosocial interventions were compared with 1156 control subjects. The psychosocial interventions typically shared a cognitive behavioral orientation and have been globally classified as stress management intervention. The psychologically treated patients showed greater reduction in psychological distress, systolic and diastolic BP, heart rate and cholesterol level with effect size of 0.34,-0.24,-0.38, and -1.54 respectively. Those who did not receive psychosocial interventions showed greater mortality and cardiac recurrences. All studies included in the Meta analysis, had used a combinations of more than one intervention. Linden, et al (1996) stated that the paucity of single component trials
was not surprising as the minimal interventions were known to lack efficacy, further it would be unethical to assign patients to interventions that were known to show little benefit when better alternatives were available. The finding urged the need for identifying the most effective and specific interventions via a controlled research.

Dusseldrop, et al (1999) undertook a Meta analysis of 37 studies to determine the effect of psycho educational program for coronary artery disease patients. They took up studies that had tested health education and stress management programs either on MI patients or on the CABG patients. Dusseldrop asserts that the psycho educational interventions affect rehabilitation outcomes in two ways. First, they can facilitate psychosocial recovery including the patients return to everyday activities. Second, they can play an important role in secondary prevention by encouraging compliance with medical advice and behavior change related to risk factor modification. Ten studies measured the anxiety. All studies used validated questionnaire except one. Contrary to Linden, et al (1996) Dusseldrop and associates reported no favorable effects on Anxiety. Inclusion of two trials that employed large samples have attributed for the inconsistency in the results. The principal effects of health education and Stress management programs for CAD patients identified in this Meta analysis include a 34% reduction in cardiac mortality and 29% reduction in recurrence of MI at 2-10 years follow up and a significant positive effect on the risk factors and related behaviors at 6 weeks – 2 years follow up.

Empirical evidence from scientific studies on effects of sensory and procedural information on coping with stressful medical procedures and pain indicated that combined sensory procedural information yielded the strongest and most consistent benefits in terms of reducing negative affect, pain reports and related distress (Suls & Wan, 1989). Meta analysis of 21 studies that provided either procedural or sensory or both information was under taken by them. The findings
reported that purely sensory information had some positive, albeit inconsistent effect. It was effective in reducing self rated pain. Purely procedural information alone yielded insignificant value.

The concept of self care education in management of CAD has gained popularity and plays a key role in the post operative management. The study findings of Marshall, Penckofer & Llewellyn (1986) demonstrated that pre operative education was very useful in improving the knowledge and post operative walking behavior. A nonequivalent control group, quasi experimental design was used. Data were collected on the control group first and then the experimental group. The groups were equal in number with 30 in each. A teaching guide was developed for nurses to educate the patient and his family about normal postoperative recovery after cardiac surgery. The guide includes information on six basic areas: the structure and function of heart, risk factors for heart disease, common postoperative problems, and activity, diet, and medications after surgery. A significant difference in knowledge was found (p < .05) between groups. The group which received structure teaching show increased knowledge. The patients who receive structured teaching had better compliance than those who received regular instructed teaching.

Gortner, & Jenkins, (1990) conducted a study to determine whether inpatient education and outpatient monitoring enhance the self-efficacy and self-reported activity for recovery at 4 weeks, 8 weeks, 12 and 24 weeks after cardiac surgery. One hundred and fifty six patients who had either CABG or Valve replacement for the first time or redo surgery were recruited. The experimental group patients had viewed a slide program on family coping and conflict resolution followed by a brief individual counseling. Weekly telephone follow up was done to coach on life style modification and provide reassurance to patient and their spouse. The participants self-efficacy for walking, lifting, climbing and general activity along with actual
performance of the same set of activities were measured preoperatively, at discharge, 4 weeks, 8 weeks and 12 weeks after surgery. Mood states were assessed using Profile of Mood States scale. The results revealed a significant difference between the group which received the verbal persuasion and inpatient education and the control group. The telephone coaching and inpatient education which were a low intensity verbal persuasion was effective in improving the self-efficacy expectation and self-reported activity. The regression analysis showed that self-efficacy was an important predictor of activities at various points of time whereas the mood states were not an independent predictor of the activity level.

There are ample of research reports available regarding the learning needs and the effectiveness of the selected educational intervention. But there are handful of research that addresses the relationship between the knowledge and anxiety. Beckie (1989) conducted a study to evaluate the effect of supportive educative telephone program on the knowledge level and anxiety and to correlate the knowledge with anxiety. Post test only design was employed to test the hypotheses. Seventy four CABG patients were randomly assigned to telephone program or to control condition. The cardiac rehabilitation nurse specialist gave the telephone intervention during the first 6 weeks after CABG. The knowledge level and S-Anxiety were assessed at the end of six weeks. Results indicated that there was a significant difference between the telephone intervention group and the controls. Further the correlation analysis revealed a significant negative correlation between the S-Anxiety and the knowledge \( r = -0.71, P < .05 \). The study results indicated the need for effectively controlling anxiety and further the knowledge of patients on essential self care aspects in the immediate post operative period. If the patients were clarified about the post operative care, symptoms etc their anxiety level would have reduced.
During the immediate post operative period following CABG patients feel vulnerable. During this period they experience post operative pain, fatigue and emotional upsets. Provision of information and support through the telephone by nurses is another strategic method tested by Hartford, and colleagues (2002). In the randomized control trial 131 patients who have undergone elective CABG and their partners were enrolled. Intervention began at discharge six telephone calls were made to patients and partners over 7 weeks. Primary outcome was anxiety which was measured using Beck Anxiety Inventory at baseline in hospital, at home on day 3, week 4, and week 8. Patients' anxiety was moderate to severe the day before discharge. It was significantly lower in the treatment group than in the control group by day 2 at home. Partners always had lower anxiety than patients. A more sustained decrease in anxiety in the partner treatment group was found at both day 2 and week 4.

Klopper, Hanekom & Faure, (2006) studied the effect of a structured exercise program implemented within 24 hrs after CABG on self-efficacy and functional capacity. A double-blinded, randomized controlled trail was performed. Thirty-eight subjects were randomized into an experimental group (n = 17) or a control group (n = 21). Subjects in the experimental group performed a structured exercise program implemented within 24 hours after extubation, whereas subjects in the control group performed the routine unstructured mobilization program. Functional capacity and self-efficacy was tested by means of the 6-minute walk test (6MWT) and Jenkins self-Efficacy Expectation Scales respectively. Testing was done on discharge and on follow up 10–14 days later. Functional capacity of subjects in the experimental group was significantly higher than that of those in the control group on discharge (p = .01), however no significant difference was found between the two groups' self-efficacy. On subjects' first follow up visit, there was no significant difference between the groups in functional capacity or self-efficacy, as the experimental group increased to a
lesser degree relative to the control group. While subjects in both groups benefited from doing exercises, subjects in the experimental group initially benefited to a greater extent.

Barnason, et al (2006) study examined the effect of a home communication intervention (HCI) to augment home health care (HHC) on functioning and recovery outcomes of elderly patients undergoing coronary artery bypass graft. A randomized, experimental two-group (N = 50) repeated-measures design was used. Both HCI and control subjects received HHC, and the HCI group also received the 12-week HCI delivered by a tele-health device, the Health Buddy (Health Hero Network). The Medical Outcome Study Short Form-36 measured physiologic and psychosocial functioning at baseline, 6 weeks, and 3 months after surgery. Follow-up subject interviews ascertained self-report of postoperative problems and health care use. Repeated-measures analyses of covariance, covariating for the total number of HHC visits, HCI subjects, compared with the HHC group only, had a significantly higher adjusted mean general health functioning score (P < .01). There were significant time effects on physical, role-physical, and mental health functioning, indicating that both groups improved over time. The groups reported similar postoperative problems; however, the control group had more emergency department visits than the HCI group.

Evidence from a study supports the usefulness of comprehensive discharge planning for hospitalized elderly (Naylor, 1990). The comprehensive discharge planning was effective in terms of reduced rehospitalization during the study period. The findings suggest the need for future studies that address the cost implication associated with rehospitalization and the cost of specialist involved in comprehensive discharge planning.
2.1.4 Studies related to Video Educational intervention

Use of video tapes for patient education has become a common feature. Gangliano, (1998) has given three reasons for the dramatic increase in the use of video. First it is practical. Second it provides a standard level of education and thirdly video can reach a larger audience and perhaps even produce greater individual impact through visual representation than through the lecture oriented methods of patient education.

Evidence from an empirical study demonstrated the usefulness of video education for those patients submit themselves for CABG in enhancing their self-efficacy beliefs and recovery from CABG (Mahler & Kulik, 1998). The relative effects of three experimental vide tapes that involved different approaches for preparing CABG patients for surgery and the in hospital recovery period was elicited in this study. One of the tapes conveyed information via a health care expert only. The other two featured the same health care expert and also included clips of interviews with patient models. These latter two tapes differed in the extent to which they portrayed the recovery period as a steady, forward progression or as consisting of "ups and downs". Two hundred fifty-eight male CABG patients were randomly assigned to view one of the three videotapes on the evening prior to surgery or to a control condition. Overall, patients who viewed any of the videotapes felt significantly better prepared for the recovery period, reported higher self-efficacy for using the incentive spirometer and for speeding their recovery, performed more repetitions with their incentive spirometer each time they used it postoperatively, had shorter intensive care unit stays, and were released from the hospital more quickly than patients in the control condition. There was also evidence that patients' self-efficacy beliefs for speeding recovery directly mediated the effects of the videotapes on length of stay both in the intensive care unit and in the hospital.
The study done by Mahler, Kulik & Tarazi, (1999) evaluated the relative effects of two experimental videotapes on compliance with the recommended lifestyle changes during the post hospital recovery period. The mastery tapes and coping tapes as explained in the previous study had been tested on a different set of outcome variables namely the diet and exercise compliance. Two hundred and sixteen male and female CABG patients were assigned randomly either to view one of the two videotapes before discharge from the hospital or to receive only the standard discharge preparation provided by the hospital. All patients completed measures of anxiety and self-efficacy at discharge, 1 month and 3 months after discharge from the hospital. Patients also completed measures of dietary fat consumption and activity level 1 and 3 months after discharge. Relative to controls, patients who viewed either of the videotapes before hospital release reported higher self-efficacy for adhering to the recommended low-fat diet both at discharge and 1 month after surgery. Viewing either of the videotapes also resulted in significantly less dietary fat intake 1 month after hospital release compared with controls (p <.05) Patients who viewed the tape that portrayed the recovery period as consisting of ups and downs also reported significantly more frequent moderate exercise at 1 month. Neither tape affected patients' anxiety levels nor exercise self-efficacy beliefs at any time point. The results demonstrated a significant, positive relationship of patients' dietary self-efficacy beliefs at discharge with 1-month dietary intake scores ([beta] = 6.75, P < .001),

The same authors Mahler & Kulik, (2002) tested whether the videotaped information intervention targeted at the spouses of postoperative CABG patients would influence spouse feelings of preparedness, spouse distress levels, and, ultimately, patient recovery over a 6-month post discharge period. Participants were 226 men and 70 women who underwent CABG surgery for the first-time without associated procedures such as heart valve repair. Couples were not eligible if one of the pair had undergone previous CABG surgery or any procedure involving
thoracotomy, had other serious medical conditions, did not speak English, or were taking antidepressant medication. The sample was predominantly White. Among the participants who viewed the coping tape 79.4% of patients and 80.1% of spouses were more likely than those who viewed the mastery tape to expect ups and downs during the recovery period, conflicts with the patient regarding the patient’s diet and the patient trying to do “too much” (P < .05). Although control spouses’ expectations fell between those in the coping and mastery conditions on all of these measures, the expectations differed significantly only from mastery spouses in terms of their greater expectations for ups and downs and for conflict regarding the patient doing too much.

In addition, ANOVA that was performed on the spouse emotional difficulties index revealed that the spouses’ problems decreased significantly over time. An effect of gender also indicated that female spouses reported more emotional difficulties overall than did male spouses.

Rath, et al (2002) developed and evaluated the effects of a preparatory videotape on endocrine stress responses of patients prior to cardiac surgery. 101 male patients prior to elective cardiac surgery were enrolled into the study. On the day before surgery, patients were assigned to one of the following groups: group 1 (n = 51) saw a video with realistic information about the upcoming pre operative procedure, and group 2 (n = 50) saw a video of the same length without surgery-related information. Venous blood was sampled before and 15 min after the video presentation. On the second postoperative day, patients filled in a questionnaire concerning their experiences of having preoperatively watched the video. After viewing the video, blood levels of cortisol, Adreno Cortico Tropic Hormone (ACTH), beta-endorphin, prolactin, epinephrine and nor epinephrine in patients of group 1 were not significantly different compared to values measured before the video presentation. In patients of group 2, blood levels of cortisol, ACTH, prolactin and nor epinephrine were significantly lower after video presentation compared to values obtained before
the video. Patients of group 1 compared to group 2 were significantly more often of the opinion that the video had helped in the preparation for surgery, and that they would like to repeat this adjunct preoperative video preparation in another similar situation. This study finding suggests that giving surgery related information has not induced any stress response among the patients who awaits a CABG.

Similar results were obtained by Sorlie, et al (2007). In their study they recruited 109 Patients who were subjected to CABG. The randomly allocated experimental group viewed the video before surgery. The individualized patient education was given to them along with video. The control group had usual care. The emotional well being parameters were Anxiety, Depression, and subjective health. At discharge intervention patients reported less anxiety \( (p = .046) \) and better subjective health \( (p = .005) \). They reported better subjective health during the whole follow-up period \( (0.040 \geq p \geq .000) \), less anxiety up to 1 year \( (.042 \geq p \geq .004) \), and less depression from 6 months to 2 years following discharge \( (.023 \geq p \geq .004) \).

Gangliano, (1988) ascertained the efficacy of video for patient education by systematically analyzing 25 methodologically sound studies. Several studies showed that a video program can increase patients’ knowledge. The review suggested that video education is no better or no worse than other methods in promoting long term retention. An impressive finding was demonstrated by Uzark and other colleagues that modeling plus information not only improved emotional response, but also potentiate learning. Several strong studies have shown that when applied to well defined self-limiting stressful situation, video modeling decreased anxiety, pain and sympathetic arousal while increasing knowledge, co-operation and overall ability.
2.1.5 Scientific basis of yoga

Yoga has its origin in India which is about 8000 Years old. Yoga is derived from the Sanskrit verb Yuj which means merging individual consciousness with universal consciousness. Patanjali defines yoga as “Mastery over the modification of mind” (Nagendra, 2004).

Yoga consists of not only physical postures but also practices like pranayama and meditation. The yoga Astangayoga or eight limbs of yoga are

1. Yama – The dos – moral restraints such as non-violence, non-stealing, non-acceptance of gifts and not telling lies.

2. Niyama – Do’s moral commitments – cleanliness, cheerfulness, celibacy, penance, self-study and surrender to God.

3. Asana – Physical postures.

4. Pranayama – Slowing down the breath.

5. Pratyahara – Withdrawal of senses from sensual pleasure.


7. Dhyana – Meditation.

8. Samadhi – Deepest meditation with absorption with the object of meditation.

The ancient Indian classic on the practice of yoga, Gherananda – Samihita, notes that there are 840,000 asanas, though only one ten thousandth of them, or 84, are used in contemporary common practice (Jayasinghe, 2004). Of these, only 32 are recommended by this ancient text. The classic texts advise each asana to be maintained for the period of 5-20 breaths (Jayasinghe, 2004).
Concept of Health and Illness according to Yoga - According to the science of yoga, the human body consists of 5 layers called kosas (Nagendra, 2004).

- **Annamayakosa** – Physical body, the first and grossest layer.
- **Manomayakosa** – The psychic body or mental sheath.
- **Pranamayakosa** – The sheath of life force.
- **Vignanamaya kosa** – Sense of discrimination and real knowledge sheath.
- **Anandamaya kosa** – Layer of immortal bliss.

As per yoga, man is in perfect health and homeostasis at his subtle level of existence. All diseases are classified as stress born and non-stress born. The root cause of stress induced ailments is amplified likes and dislikes at the manomaya kosa which results in distressful emotional surges. The lifestyle gets disturbed because of the long standing and uncontrolled intense emotions like irrational desire, anger, fear, jealousy etc. These agitations cause violent fluctuations in the flow of prana or life energy. These disturbances in the manomaya kosa percolate into physical body as disturbed autonomic endocrine and immune responses. Hence, the management of these stress induced ailments should correct imbalances at all these levels. Yoga techniques are offered to correct through set of physical postures or asanas, relaxation techniques, breathing techniques, meditation and following the moral norms of do’s and don’t’s.

Innes & Vincent, (2007) hypothesized two major path ways by which Yoga brings about changes in the risk of DM and the CVD. First by reducing the activation of sympatho adrenal system and hypothalamic pituitary adrenal axis and promoting feeling of wellbeing, yoga may alleviate the effects of stress and foster multiple positive downstream effects on neuro endocrine status, metabolic function and related systemic inflammatory responses. Second by directly stimulating the Vagus nerve,
Yoga may enhance parasympathetic activity and lead to positive change in the cardio vagal function, in mood and energy state and in related neuro endocrine, metabolic and inflammatory responses. In addition Yoga may both indirectly and directly lead to weight loss and reduced visceral adiposity. Weight loss itself lowers the risk for diabetes and cardiovascular complications.

Practice of yogic postures has been shown to restore the baroreflex (Jayasinghe, 2004). This particular effect of restoring baroreflex helps in reducing blood pressure in essential hypertension. Yoga is shown to have the ability to control the sympathetic overdrive thus mimicking beta blockade. Yogic practitioners exposed to acute hypoxia under experimental conditions could maintain better oxygen saturation than controls, despite lack of decrease in minute ventilation. Their sympathetic activation is blunted during such hypoxia. Control of excess sympathetic activation has become the corner stone in the management of CAD. Hence the application of yoga in management of CAD is scientific and beneficial.

The Hypothesis path way by which yoga relaxation techniques can reduced risk and promote the psychological and physiological will being is depicted in the following figure 1.
Fig. 1 Mechanism by which Yoga relaxation benefits patients with CAD
2.1.6 Effect of Yoga on various Physiological outcomes among normal adults

There are numerous studies available done with normal adults. Lung function has been found be improving with the practice of yoga. (Yadav & Doss, 2001) in their study 60 healthy young female volunteers were enrolled as subjects. The yoga schedule consisted of a prayer, asanas, pranayam and meditation. The exercise regimen included different yogic asanas viz: Padmasana, Yoga Mudra, Matsyasana, Kukkudasan, Uthana Padhasana, Pavanmuktasana, Paschimotasana, Dhanurasana, Supta Vajrasana, Gomukhasana, Viparita Karani, Sarvangasana, Halasan, Karna Peedasana, Bhujangasana, Bakasana, Mandukasana, Parvathasana, Nauli and Shavasana. All the subjects had to do pranayam practice for 10 to 15 minutes which included abdominal breathing and alternate nostril breathing. Pulmonary Function Tests (PFT) were recorded by MEDSPIOR - made in India (Chandigarh) - a computerized dry type spirometer. The parameters of PFT included in the study were - FVC (Forced vital capacity), FEV1 (Forced expiratory volume in 1st second) and PEFR (Peak expiratory flow rate). Recordings were done on day-1, after 6 weeks and after 12 weeks of yogic practice. FVC and FEV-1 were significantly higher at weeks-6 and weeks-12 from day-1 (P<0.001). However, PEFR was not statistically significant at weeks 6 in comparison to day 1. At weeks 12 PEFR was significantly higher than day 1 (P<0.05). Lung inflation near to total lung capacity is a major physiological stimulus for the release of lung surfactant and prostaglandins into alveolar spaces, which increase lung compliance and decreases bronchial smooth muscle tone respectively. (Hildebran, J. et al., 1981 as cited in Yadav and Das, 2001).

Bharshankar, et al (2003) conducted a case control study to determine the effect of yoga on pulse rate, systolic and diastolic pressure and valsalva ratio in 100 normal adults above the age of 40 years belonging to both sex. The control group consisted of 50 subjects who were not doing any yoga or other forms of physical
exercise on regular basis. The study subjects were performing asanas, pranayama and savasana or relaxations, for 5 years under the guidance of instructor. There was no significant difference between controls and study subjects with respect to height, weight and BMI. The results revealed statistically significant difference in the mean systolic and diastolic blood pressure between the study and controlled group (P< .01 and P < .001 respectively). Valsalva ratio in study group was statistically less than the controls (P <.001).

Kavirajaudupa, et al’s (2003) examined whether pranayam training has any effect on ventricular performance as measured by systolic time intervals and cardiac autonomic function tests. 24 school children were divided randomly into two groups of 12 each. The pranayama group was given training in Nadishudhi, mukh-bhastrika, pranav and savitri pranayama and practiced the same for 20 minutes daily for the duration of 3 months. Control group subjects were not given any pranayama training. The result showed that three months of pranayama training modulates ventricular performance by increasing parasympathetic activity. Further studies on a larger sample size may illustrate the underlying mechanism involved in this alteration.

Yet another study has tested the effect of yoga training on respiratory pressure and handgrip endurance. Twenty school children in the age group of 12 to 15 years were given yoga training (asanas and pranayams) for 6 months. Twenty age and gender - matched students formed the control group. Hand grip strength, hand grip endurance, maximum inspiratory pressure, forced expiratory volume (FEV) and forced expiratory volume in the first second (FEV₁) and peak expiratory flow rate were assessed. Yoga training produced statistically significant (P<0.05) increase in all the above parameters. This finding further substantial the usefulness of yoga in preventive and promotive aspects of health.
Madanmohan et al’s study (2004) on effects of yoga training on cardiovascular response to exercise and the time force of recovery after exercise revealed a better exercise tolerance after 2 months of yoga training among 21 normal subjects. The duration of exercise was about 45 minutes every day. Yoga practice for 2 months resulted significant decrease in basal heart rate, systolic and diastolic blood pressure. The calculated Rate, Pressure Product which indicates myocardial oxygen consumption decreased significantly (P <.001).

Madanmohan, et al (2004) investigated the effect of 6 weeks Shavashan-yoga relaxation technique, on short term heart rate variability among young healthy volunteers. 26 healthy subjects consisting of 13 boys and 13 girls with a mean age of 16.1 were recruited to the shavashan group. 17 age and gender matched healthy subjects with mean age of 15.8 were assigned to control group. The ECG was continuously acquired at a rate of 100 samples per second for 5 minutes blood pressure was measured by an automated non-invasive blood pressure monitor. Recordings were obtained in the polygraph laboratory. Shavashan group was taught by a trained yoga teacher and they practiced the same for 15 minutes a day 4 days a week for a total duration of 6 weeks. The control group did not receive any shavashan training. There was significant difference in Heart rate P = .01 systolic pressure P=.05, diastolic pressure P = .03 and rate pressure product P = 0.012 following shavashan training. The control group subjects did not show any significant difference after 6 weeks period.

2.1.7 Studies on Yoga Techniques among CAD population

Many researchers had applied various Yoga techniques among CAD population and recorded evidences in support of the Yoga techniques. The outcome variables are quite varied. Most of the published literature which tested yoga was long term studies with risk reduction, biochemical parameters such as the lipid profile.
Some studies had blood pressure and other physiological parameters as the criterion variable.

Ornish, et al study (1998) explored the feasibility of patients to sustain intensive lifestyle changes for a total of 5 years and the effects of these lifestyle changes without lipid-lowering drugs on coronary heart disease. Randomized controlled trial conducted from 1986 to 1992 using a randomized design. Forty-eight patients from two tertiary care university medical centers with moderate to severe coronary heart disease were randomized to an intensive lifestyle change group or to a usual-care control group, and 35 completed the 5-year follow-up quantitative coronary arteriography. Intensive lifestyle changes which included 10% fat whole foods vegetarian diet, aerobic exercise, stress management training, smoking cessation and group psychosocial support. Main outcome measures were adherence to intensive lifestyle changes, changes in coronary artery stenosis in diameter, and cardiac events. Among 28 experimental patients who completed 5-years follow-up 20(71%) maintained comprehensive lifestyle changes for 5 years, whereas control group patients 15 (75%) of 20 patients completed 5-year follow-up, made moderate changes. There was a significant difference between the groups in the percentage of stenosis (P = .001). Twenty-five cardiac events occurred in the experimental group patients whereas 45 events occurred in control group patients during the 5-year follow-up. The risk ratio for any event for the control group was 2.47 (95% confidence interval, 1.48-4.20). More regression of coronary atherosclerosis occurred after 5 years than after 1 year in the experimental group. In contrast, in the control group, coronary atherosclerosis continued to progress and more than twice as many cardiac events occurred.

The preventive and therapeutic effect of Yoga was established by many researchers. The regular practice of yoga for 14 weeks had shown beneficial effect of
reducing the lipid parameters. The effect of yogic lifestyle on the lipid status was studied in angina patients and normal subjects with risk factors of CAD (Mahajan, 1999). The parameters included were the Body weight, Serum cholesterol, Triglycerides, HDL, LDL and the cholesterol - HDL ratio. A baseline evaluation was done and then the angina patients and subjects with risk factors were randomly assigned to control (n = 41) and yoga intervention group (n = 52). Lifestyle advice was given to both the groups. An integrated course of yoga training was given for four days followed by practice at home. Serial evaluation of both the groups was done at four, 10 and 14 weeks. Dyslipidemia was a constant feature in all cases. An inconsistent pattern of change was observed. The subjects practising yoga showed a regular decrease in all lipid parameters except HDL.

Manchanda, et al (2000) evaluated possible role of lifestyle modification incorporating yoga, on retardation of coronary atherosclerotic disease. In this prospective, randomized, controlled trial, 42 men with angiographically proven CAD were randomized to control (n = 21) and yoga intervention group (n = 21) and were followed for one year. The active group was treated with a user-friendly program consisting of yoga, control of risk factors, diet control and moderate aerobic exercise. The control group was managed by conventional methods i.e. risk factor control and American Heart Association step I diet. At one year, the yoga groups showed significant reduction in number of anginal episodes per week, improved exercise capacity and decrease in body weight. Serum total cholesterol, LDL cholesterol and triglyceride levels also showed greater reductions as compared with control group. Revascularisation procedures (coronary angioplasty or bypass surgery) were less frequently required in the yoga group (one versus eight patients; relative risk = 5.45; P = 0.01). Coronary angiography repeated at one year showed that significantly more lesions regressed (20% Vs 2%) and less lesions progressed (5% Vs 37%) in the yoga group (χ² = 24.9; P < .0001). The compliance to the total program was excellent and
no side effects were observed. Yoga lifestyle intervention retards progression and increases regression of coronary atherosclerosis in patients with severe coronary artery disease. It also improves symptomatic status, functional class and risk factor profile.

Maraghatham, (1995) conducted a study in which she had applied the shavashana and Nishbhavabandha on pain intensity and analgesic intake in cardiac surgery patients. Shavashana and Nishbhavabandha are the relaxation techniques aimed at reducing pain intensity. In the quasi experimental study a small sample of 15 in experimental group and 15 in control group were recruited. Pain intensity was assessed from post operative day 2, 3 immediately after the coughing, deep breathing exercises and changing the position among patients who had underwent cardiac surgery. Results of the pilot study indicated the group which had yoga relaxation reported a significant reduction in the pain intensity (P < .05) and the analgesic intake than the group which did not have yoga relaxation.

Neera, Vyas, Agarwal & Dubey (2004) tested the effect of stress management strategies in post coronary artery bypass patients. The interventions tested are alternate nostril breathing and alpha feedback relaxation. Seventy six patients subjected to CABG participated in the study. Among them 24 patients were assigned to conventional treatment, 28 were assigned to experimental group I which received conventional treatment along with pranayama, rest of the 24 subjects were assigned to experimental group II which received cardiac feedback and alpha feedback therapy along with conventional treatment. The alpha feedback and cardiac feedback procedures are self regulated relaxation practices. The outcome variables were anxiety, depression, blood pressure, pulse rate, blood serotonin levels and number of alpha frequency in EEG. Post test measures were taken after three months and six months. The analysis showed there was a significant reduction in systolic and
diastolic blood pressure in pranayama group at \( p < .01 \) and \( p < .001 \) respectively. The
cardiac and alpha feedback group reported much higher reduction in both systolic and
diastolic blood pressure (\( p < .001 \)). The anxiety scores measured using Sinha anxiety
scale showed significant reduction in alpha feedback and pranayama group (\( p < .001 \)).
In this study the assignment to the group was not done on random basis and the back
ground variables were not reported by the investigator. The cardiac feedback and
alpha feedback needed complicated gadgets such as cardiac feedback apparatus and
alpha feedback electronic apparatus and also EEG, ECG monitors which were not
available in home settings. Anyway pranayama technique the alternate nostril
breathing can be easily learnt and practiced at home settings.

modification based on Yoga techniques, stress management and dietary modifications
in retardation of coronary artery disease. This prospective, controlled, open trial
included angiographically proven CAD patients. Seventy one patients were assigned
to the study group and 42 patients were assigned to control group. They were assessed
clinically. The biochemical parameters, stress myocardial perfusion, function studies,
coronary angiography and psychological parameters were also assessed. The study
group patients were given a family based Yoga Program which included, control of
risk factors, dietary modifications and stress management for a period of one year.
The patients were assessed at baseline, at frequent intervals and at the end of one year.
At the end of one year of yoga training, statistically significant changes (\( P < .05 \)) were
found in serum total cholesterol, serum LDL cholesterol, regression of disease arrest
of progression and progression of diseases (29.6% of study group Vs 60.0% of
controls on angiography). At the end of the study improvement in anxiety scores was
concordant with the improvement seen in the Myocardial perfusions. No untoward
effects of the therapy were observed. Yoga based lifestyle modifications help in
regression of coronary lesions and in improving myocardial perfusion. This had been reflected in the symptomatic improvement.

Bijilani, et al (2005) assessed the short-term impact of a brief lifestyle intervention based on yoga on the biochemical indicators of risk for cardiovascular disease namely serum lipid profile and fasting blood glucose. Design for the study was a single group pre-post design. The subjects were a heterogeneous group of patients with hypertension, coronary artery disease, diabetes mellitus, and a variety of other illnesses with 67 male, 31 female, aged 20-74 years. The intervention consisted of asanas (postures), pranayama (breathing exercises), relaxation techniques, group support, individualized advice, lectures and films on the philosophy of yoga and the place of yoga in daily life, meditation, stress management, nutrition, and knowledge about the illness. The outcome measures were fasting plasma glucose and serum lipoprotein profile which were determined in fasting blood samples, taken on the first and last day of the course. Fasting plasma glucose, serum total cholesterol, Low Density Lipoprotein (LDL) cholesterol, Very Low-Density Lipoprotein (VLDL) cholesterol, the ratio of total cholesterol to High Density Lipoprotein (HDL) cholesterol, and total triglycerides were significantly lower. The HDL was significantly higher on the last day of the course compared to the first day of the course. The changes were more marked in subjects with hyperglycemia or hypercholesterolemia. The observations suggest that a short lifestyle modification and stress management education program leads to favorable metabolic effects within a period of 9 days.

Effect of Yoga and meditation on hemodynamic and laboratory parameters as well as endothelial functions have been evaluated in a six weeks pilot study. Sivasankaran, et al (2006) Yoga and meditation session lasting for about 90 minutes were given to coherant consisting of 10 participants with CAD and 23 without CAD.
Yoga sessions included Yoga postures for 40 minutes, Pranyama for 15 minutes, 15 minutes meditation and 20 minutes of yoga relaxation. The hemodynamic lab parameters were assessed at baseline and after the session for 6 weeks. The results revealed that with regular practice of Yoga and meditation had reduced the Blood pressure both systolic and diastolic by 5 mm of Hg (P <.01). The pulse had decreased by 9 beats / minute. The BMI also had decreased by from 29 to 28. Brachial artery reactivity had improved significantly among the CAD cohort. Empirical evidences strongly support the usefulness of Yoga in the CAD patients.

Gupta, et al (2006) carried out a study to assess the effect of yoga based lifestyle intervention on state and trait anxiety. The subjects were a mixed group with history of hypertension, coronary artery disease, diabetes mellitus, obesity, psychiatric disorders such as depression, anxiety, gastrointestinal problems which included non ulcer dyspepsia, duodenal ulcers, irritable bowel disease, Crohn’s disease, chronic constipation and thyroid disorders. The intervention consisted of asanas, pranayama, relaxation techniques, group support, individualized advice, and lectures and films on philosophy of yoga, the place of yoga in daily life, meditation, stress management, nutrition, and knowledge about the illness. The outcome measures were anxiety scores, taken on the first and last day of the course. Anxiety scores, both state and trait anxiety, were significantly reduced. Among the diseased subjects significant improvement was seen in the anxiety levels of patients of hypertension, coronary artery disease, obesity, cervical spondylitis and those with psychiatric disorders. The observations suggest that a short educational program for lifestyle modification and stress management leads to remarkable reduction in the anxiety scores within a period of 10 days. The most important weakness found in the study is that results lack internal and external validity as the samples were highly heterogeneous.
Jayasinghe, (2004) undertook a mete analysis to assess the efficacy of yoga in prevention of CAD, treatment of coronary risk factors and the management of CAD. All the randomized controlled trails, well designed experimental studies and well designed open trails were selected and reviewed. In total 22 papers were selected out of which 21 were in English and one in Russian. Of the 13 studies reviewed in this article six were randomized controlled trails, six were open trails and one was an experimental study. Practice of yoga for a short duration of 11 weeks had reduced the blood pressure. The mechanism of Yoga induced blood pressure reduction may be attributed to its beneficial effect on the autonomic neurological function. Impaired baroreflex sensitivity has been increasingly postulated to be one of the major causative factors of essential hypertension. Yoga has found to be particularly helpful in the management of obesity. A randomized control trial revealed that practicing yoga for a year helped significant improvements in ideal body weight and lipid profile. Based on the evidences Jayasinghe concluded that yoga can be beneficial in the primary and secondary prevention of cardiovascular disease and that it can play a primary or a complementary role in this regard.

Yang, (2007) reviewed the available data base using yoga as a key word. Of the 32 articles reviewed 12 were experimental studies 18 were quasi experimental and 2 were observational studies. According to a retrospective observational study of 15550 adults aged 53 to 57 years, regular yoga practice for 4 or more years with significantly associated with weight loss by overweight participants. Another study in which 4 days residential yoga practice followed by 14 weeks of 1 hour daily home practice reported significant loss of mean body weight from 72.26 to 70.48 kg among subjects with risk factor.
2. 1. 8 Studies on Other Methods of Stress Management

Guided imagery is now considered a complementary means to reduce anxiety, pain, and length of stay among our cardiac surgery patients. Halpin, et al (2002) implemented guided imagery in their hospital and found it to be beneficial for CABG patients. Cardiac surgical outcomes between two groups of patients with and without guided imagery were compared. Data from the hospital financial cost/accounting database and patient satisfaction data were collected and matched to the two groups of patients. A questionnaire was developed to assess the benefits of the guided imagery program to those who elected to participate in it. Patients who completed the guided imagery program had a shorter average length of stay, a decrease in average direct pharmacy costs, and a decrease in average direct pain medication costs while maintaining high overall patient satisfaction with the care and treatment provided.

Michalsen, et al (2005) analyzed the effect of a comprehensive stress reduction and lifestyle program on psychological and Quality of life (QOL) outcomes. Relaxation techniques were taught to the experimental group. Hundred one patients (59.4 ± 8.6 years, 23 female) with CAD were randomized to a 1-year lifestyle/stress management program (n = 48) or written advice (n = 53). QOL and psychological outcomes were assessed with the SF-36, Beck Depression, Spielberger State/Trait Anxiety, Spielberger State/Trait Anger and Perceived Stress Inventories. Group repeated-measures analyses of variance were performed for all measures. Adherence to the program was excellent (daily relaxation practice 39 ± 5 Vs. 5 ± 8 min, respectively; p < .001). Both groups improved comparably in most dimensions of QOL, and significantly greater improvements for the lifestyle group were found for physical function and physical sum score (p = .046 and p = .045). Depression, anxiety, anger and perceived stress were reduced similarly in both groups. However, intervention × gender interaction effects revealed greater benefits among women in the lifestyle intervention Vs. advice group for depression and anger (p = .025 and
p = .040), but no effects for men. A comprehensive lifestyle modification and stress management program did not improve psychological outcomes in medically stable CAD patients. The program did appear to confer psychological benefits for women but not men. Further trials should investigate gender-related differences in coronary patient responses to behavioral interventions.

Turner, et al (1995) evaluated the effectiveness of stress management for patients who had MI or CABG. In the randomized control trial 45 patients were assigned to receive either exercise rehabilitation or to receive stress management program along with routine exercise for 8 weeks. Hostility, subjective distress, resting electrocardiogram, resting blood pressure and blood pressure reactivity to a psychologic stressor, and blood lipid, cortisol, and catecholamine levels were the outcome variable. The analysis revealed that the stress management group showed reduction in triglyceride level and reduced subjective distress. The exercise only group showed no changes in triglyceride level and had a reduction in the High density lipoprotein also.

McHugh, et al (2001) evaluated the effect of Nurse led shared care for patients awaiting CABG on risk reduction, General Health, Anxiety and depression using a randomized controlled trial. Ninety eight consecutive patients with 75 males and 23 females were recruited to the study within one month of joining the waiting list for elective CABG at Glasgow Royal Infirmary University NHS Trust. Patients were randomly assigned to usual care (control; n = 49) or a nurse led intervention programme (n = 49). A shared care programme consisting of health education and motivational interviews, according to individual need, was carried out monthly. Care was provided in the patients' own homes by the community based cardiac liaison nurse alternating with the general practice nurse at the practice clinic. Smoking status, obesity, physical activity, anxiety and depression, general health status, and
proportion of patients exceeding target values for blood pressure, plasma cholesterol, and alcohol intake were measured before and after the intervention.

Compared with patients who received usual care, those participating in the nurse led programs were more likely to stop smoking (25% Vs 2%, p = .001) and to reduce obesity (16.3% Vs 8.1%, p = .01). Levels of anxiety and depression improved (p < .000) and there was improvement in time spent being physically active (p < .000). Target systolic blood pressure improved by 19.8% compared with a 10.7% in the control group (p = .001) and target diastolic blood pressure improved by 21.5% compared with 10.2% in the control group (p = .000). However, there was no significant difference between groups in the proportion of patients with cholesterol concentrations exceeding target values. There was a significant improvement in general health status scores across all eight domains of the 36 item short form health survey with changes in difference in mean scores between the groups ranging from 8.1 (p = .005) to 36.1 (p < .000).

Psychosocial factors are associated with increased morbidity and mortality in healthy and clinical populations. Behavioral interventions are needed to train the large number of people in the community setting who are affected by stressors to use coping skills that will reduce these risk factors. Kirby and associates (2006) evaluated the efficacy of three forms of delivery of a standardized, behavioral intervention the Williams life Skills program-designed to reduce levels of psychosocial risk factors in non clinical populations. One hundred ninety-six participants screening positive for elevated psychosocial distress were randomized to either a waitlist control group or one of three intervention groups: the Life Skills Workshop, the Life Skills Video, or the Life Skills Video and Workshop combined. Psychosocial risk factors were evaluated at baseline and at 10 days, 2 months, and 6 months after the training/wait period. At 10 days follow up, the workshop + video and video-only groups showed
significant improvements over control subjects in trait anxiety and perceived stress. Moreover, the workshop + video group maintained benefit over control subjects throughout 6 months follow up in both of these measures, whereas the video-only group maintained benefit in trait anxiety.

The recurrent coronary prevention project undertaken by Friedman, et al study (as cited in Buselli & Steuwart, 1999) a behavioral modification program for Type A Personality evaluated the effect of behavioral counseling and cardiac counseling on recurrence of cardiac symptoms in posts MI patients. The behavioral counseling group received relaxation training, cognitive therapy, and dietary, exercise, and cardiac disease advice, the cardiac counseling group received information about diet, exercise, and cardiac disease; and control group received standard treatment with no additional counseling. The results demonstrated that lower rates of reinfarction and cardiovascular death were seen in those who received behavioral counseling versus those in cardiac counseling group and standard treatment group after 1 year. Four and one-half years into the study, the experimental group (behavioral counseling) had significantly lower cardiac recurrence rates (12.2%) than either the cardiac counseling group (12.9%) or the standard treatment group (28.2%). Additionally, those in behavioral and cardiac counseling group had a marked reduction in Type A behavior compared with the standard therapy group.

Rajendran, and colleagues (2004) have reported results in support of the comprehensive cardiac rehabilitation which included the psychosocial interventions such as relaxation, attitude change, motivation along with exercise. Independent exercise was encouraged. Functional capacity as measured by the treadmill, serum glyceridelevel, Cholestrol, blood glucoselevel, waist hip ratio was the outcome variables. Results revealed that there was a significant improvement in the functional
capacity, resting rate pressure double product, BMI, fasting blood sugar, triglyceride and cholesterol level. Study did not employ a comparative group.

2.2.0 CONCEPTUAL FRAME WORK

Conceptual Framework for this study was based on self-efficacy theory proposed by Bandura, (1977) and the Roy’s Adaptation Model (RAM). Roy’s model focuses on the concept of adaptation of the person whereas the self-efficacy theory focuses on self perception of efficacy. In the RAM the four Meta paradigms namely the person, nursing health and environment revolves around the central concept of adaptation of person. According to Roy (as cited in Tomey, 2002) person is a living open system. The person continuously receives stimuli from the environment. The adaptation level is determined by the combined effect of focal, contextual and residual stimuli. Adaptation occurs when the person respond to the environmental changes positively.

In the human being there are two primary subsystems namely the regulator and cognator. There are four secondary sub systems called effectors. The effector sub system consists of physiological function, self concept, role function and interdependence. The regulator sub system function upon the physiological adaptive mode automatically through neural, chemical and endocrine coping process. The cognator sub system acts upon the self concept role function and inter dependence modes through information processing, learning, judgment and emotion.

In the present study the person who is the patient subjected to CABG receives the focal stimulus-surgical trauma of CABG and the contextual stimuli perception of stressful event, environmental changes activity limitation and pain. Patient also receives residual stimuli the negative attitude to pain, co-morbidity and the changes in the lifestyle impose by the disease and CABG. The self concept is threatened because
of the stress associated with CABG. Patient feel incapacitated because of CAD and the CABG which lead to changes in role function and inter dependence.

The stress reduction strategies act upon the regulator sub system through neural, chemical medication, to elicit parasympathetic response. Hence the coping is expected to be better. Video assisted information and the Yoga relaxation techniques improve information processing, learning, judgment and reduce emotional arousal. The impact of the stress reduction interventions are expected to be evident in the four effector subsystems. In the physiological subsystem the hemodynamic parameters are expected to be stable with reduction in Blood Pressure and Pulse rate. The self concept is expected to be boosted up, with resultant improvement in the performance of ADL, physical exercise social and leisure activities.

The Self-efficacy Theory proposed by Bandura (1977) is based on the principle assumption that psychological procedures whatever may be the form serves as the means of creating and strengthening expectations of personal efficacy. Bandura defines self-efficacy expectation as the conviction that one can successfully execute the behaviour required to produce the out comes. The perceived self-efficacy has directive influence on the choice of activities. The stronger the perceived self-efficacy, the more active the efforts be. People tend to avoid situations they believe exceed their coping skills where as they get involved in the activities and behave assuredly when they judge themselves capable of handling situations that would otherwise be intimidating.

Bandura (1977) postulated four major sources or modes off self-efficacy enhancing modes. They are 1. Performance accomplishment or enactive mode, 2. Vicarious experience or vicarious mode, 3. Verbal persuasion or cognitive mode, and 4. Physiological state or emotive mode. Participative modeling, performance desensitization are the modes of induction for performance accomplishment. When an
individual participates actually in activities that were previously felt stressful and accomplish the activities in a graduated fashion successfully the self-efficacy gets boosted up. It is the strongest of all modes of self-efficacy enhancing modes. Based on the preliminary experiments on enactive experiences Bandura (1982) asserts that people register notable increase in their self-efficacy when their experiences disconfirm their false belief related to their fear and when they were able to acquire new skills to tackle the threatening situation.

People obtain efficacy information from the experiences of others also. When an individual see others overcoming and accomplishing a task without much adverse effects the observer also improve his or her confidence to accomplish or persistently do an activity. Live modeling and symbolic modeling are the modes of induction for vicarious experiences.

People are led through suggestion into the belief that they can cope up with what has overwhelmed them. Verbal persuasion or cognitive mode induct self-efficacy through the suggestion, exhortation, self instruction, interpretative treatment. This form of efficacy source produces weaker effect than enactive mode because the strong experiential source provides strong beliefs.

People gain mastery in a specified task by seeing others perform threatening activities or overcome threatening activities without adverse sequelae. They persuade themselves that if other can do it they should be able to achieve similar skill. Verbal persuasion attempts to influence human behaviour through suggestion and there by helping individuals to believe that they can cope successfully.

Stressful and taxing situation elicit emotional arousal. Emotional arousal can affect perceived self-efficacy in coping with threatening situations. Behavioral control through application of relaxation skill not only allows one to manage the aversive
aspects of environment but also modifies how the environment is likely to be perceived. Potentially stressful situation such as CABG can be construed less stressful when the patient learns the relaxation skill. Attributions, Relaxation, bio feedback, symbolic desensitization are the modes of induction for emotional arousal.

Cardiac rehabilitation provides wide scope for application of self-efficacy theory. In the present study the cognitive vicarious and emotive modes of efficacy enhancement measures have been applied. The experimental interventions applied in this study were the video assisted information and Yoga relaxation techniques. The video uses the principle of verbal persuasion, video modeling and vicarious experience. The former patients interview and sharing their recovery experiences were the vicarious mode of efficacy enhancement strategy. The emotive modes were manipulated through the practice of Yoga relaxation techniques.

Based on empirical evidences Bandura (1982) posited that self-efficacy influence the thought patterns, action, and emotional arousal. The higher the level of induced self-efficacy the higher will be level of performance accomplishments with fewer the emotional arousals. Perceived self-efficacy helps to account for such diverse phenomenon as changes in coping behavior, levels of physiological stress reaction, self regulation of refractory behavior and despondency.

Based on the self-efficacy theory of Bandura theory and the Roys Adoption Model the CABG patients who viewed the video and practiced the Yoga relaxation are expected to show less emotional arousal, improved self-efficacy for activities and engage in more activities. They are expected to show lesser degree of autonomic arousal as reflected by lesser pulse rate, systolic and diastolic BP.

Nursing has a unique goal to facilitate the CABG patient’s adaptation effort by applying the stress reduction strategies. The yoga relaxation techniques act upon the
regulator sub system and help the patient to reduce anxiety and to maintain stable vital
signs. The video developed following the principles of verbal persuasion and
vicarious experience facilitate perceptional of self concept. The cognator sub system
is activated to improve self-efficacy expectation and in turn patient gain mastery in
self care activities social and spiritual activities. Patients are there by helped to adapt
to the stressful situation of undergoing CABG and exhibit better coping skills in the
post operative convalescent stage.
**Figure 2**: Conceptual Framework based on the Roy’s Adaptation Model and Bandura’s Self Efficacy Theory

- **Input**
  - Pain & Anxiety
  - Video & Yoga Relaxation
  - CABG
  - Co-Morbidity

- **Human System**
  - Self Concept
  - Role Function
  - Physical
  - Interdependence

- **Regulator**
  - Video Modeling
  - Vicarious Experience
  - Verbal persuasion
  - Yoga Relaxation

- **Self-Efficacy Enhancing Modes**
  - Improved Self-Efficacy
  - Stable Vital Signs
  - Improved Activities
  - Reduced S Anxiety

- **Outcome**
  - Adaptive Response
  - Mal adaptive Response

- **Feedback**