CHAPTER II

REVIEW OF LITERATURE
CHAPTER - II

REVIEW OF LITERATURE

A review of literature in any thesis work includes the current knowledge, with authentic findings and theoretical and methodological contributions about the topic for study. This chapter presents the existing evidence and related research literature to understand the importance of this randomized controlled trial. Various databases, such as Scopus, PubMed-Medline, Science Direct, CINAHL (Cumulative Index to Nursing and Allied Health Literature) and journals were searched to acquire the related information on the research area. Detailed literature review, including systematic reviews and meta-analysis was done.

Systematic reviews provide very clear, replicability and transparency of the data. The major advantage of systematic reviews is the reduction of researcher bias in reporting. Another advantage is that it increases the breadth of searching using broad search strategies and compulsorily force the researcher to search a wider area than strictly restricting to the topic per say. The synthesis can be done in the form of a structured narrative summary with tables or using statistical combination of meta-analysis. This helps in making conclusions and recommendations. Systematic reviews make sure that all attempts are made to search all available relevant data.

Both traditional review of literature and systematic reviews were done for the present study and organized under the following headings

- Anxiety and pain among patients following CABG surgery.
- Fatigue among patients after CABG surgery.
• Self-efficacy among patients after CABG surgery.

• Quality of life among patients after CABG surgery.

• Effect of preoperative education on postoperative outcomes among patients undergoing cardiac surgery: A systematic review and meta-analysis.

• Effectiveness of massage therapy on post-operative outcomes among patients undergoing cardiac surgery: A systematic review.

**Anxiety and pain among patients following CABG surgery**

Nowicka-Sauer et al. (2016) conducted a study to evaluate the anxiety level among patients who underwent cardiac surgery, and to evaluate the associations between depression and anxiety and subjective health status at Medical University Hospital, Poland. The research group consisted of seventy patients. The hospital anxiety and depression scale was utilized to evaluate the level of depression and anxiety. Subjective health status was assessed by the visual analogue scale and a Likert scale. Results showed that 32.9% of the patients had higher level of anxiety. There was a significant association found between level of depression and anxiety (p=.001), suicidal thoughts (p=.023), and lower subjective health status (p=.002). Study concluded that evaluation of anxiety among patients undergoing cardiac surgery is very important.

Nesami, Shorofi, Jafari, Khalilian, and Tabari (2016) conducted a descriptive-analytical study in Iran to assess the factors that contribute to anxiety after CABG surgery. A total of one hundred and eighty six patients filled the STAI and post-surgery stressors questionnaire during the 2nd or 3rd post-operative days after the surgery. Insufficient sleep during hospitalization (p=.010), not explaining the treatment details to the patients,
presence of chest tube, post-operative pain and being away from the family were the main factors that contribute to anxiety in the patients. Study concluded that physical and psychological stress factors are causing anxiety and there is a need for appropriate interventions to alleviate anxiety and stress.

Pereira et al. (2016) conducted a prospective observational study in a tertiary university hospital, Portugal among the patients following cardiac surgery, to evaluate incidence of persistent postoperative pain and its characteristics, related factors and quality of life of the patients. Data was collected from two hundred and eighty eight patients and standardized pain assessment tools were used (McGill Pain Questionnaire, Pain Catastrophizing Scale, and Brief Pain Inventory) and quality of life was evaluated by Duke Health Profile. Study revealed that 43% of the patients had postoperative pain at three months. Fifty percent of the patients with persistent postoperative pain reported significantly lower quality of life. There was a positive association between pain and poor quality of life (p=.001). Study concluded that postoperative pain is strongly connected to the quality of life after cardiac surgery, health care professionals should do timely assessments and provide appropriate interventions for the patients to promote their optimal health.

Bjornnes, Rustoen, Lie, Watson, and Leegaard (2016) conducted a study to describe pain characteristics preoperatively and postoperatively, and to identify the relationship between their pain scores and characteristics (demographic and clinical) at Oslo University Hospital, Norway. Randomized controlled trial enrolled four hundred and sixteen patients undergoing elective cardiac surgery. The Brief Pain Inventory - Short
Form was used to collect the data. Results showed that 38.5% of the patients reported postoperative pain. Female gender, younger age and presence of preoperative pain is strongly associated with worst postoperative pain. Study concluded that patients who were discharged with unrelieved pain from the hospital had a higher risk of postoperative complications.

Yang, Huang, Tsai, and Lou (2015) conducted a repeated descriptive correlational study to examine variations in sleep pattern and emotional correlates among CABG patients in a Medical Centre, Taiwan. A total of eighty seven patients who underwent CABG surgery completed the hospital anxiety and depression scale and the Pittsburgh sleep quality index during the first week and first month follow up. Poor sleep quality was observed in most of the patients during the first week (82.8%) and one month (66.7%) after the surgery. Poor sleep quality was strongly associated with anxiety (p= .001), older age (p=.001), and depression (p=.001). Study recommended that health care professionals should focus on evaluation of emotional status and sleep pattern in patients who had CABG surgery and provide them appropriate interventions to decrease the anxiety and depression for promotion sleep quality.

Korbmacher et al. (2013) conducted a prospective longitudinal study on anxiety and depression among patients undergoing CABG surgery at Dusseldorf University Hospital, Germany. One hundred and thirty five consecutive patients were interviewed week before and six months after surgery using the Hospital Anxiety and Depression Scale. Study findings revealed that anxiety and depression scores were elevated respectively in 39.3% and 20.7 % of the patients before the surgery. Increased preoperative
anxiety and depression scores appeared to correlate with increased postoperative complications. Study concluded that remarkably high anxiety and depression scores postoperatively require psychotherapeutic interventions despite successful CABG surgery.

Sethares, Chin, and Costa (2013) conducted a study to describe pain characteristics and strategies utilized to relieve pain in patients during the post-operative days after CABG surgery at UMass memorial hospital, USA. The Modified Brief Pain Inventory was used to collect baseline data after CABG surgery in the hospital. Weekly telephone interviews were conducted to collect the data from one to twelve weeks after discharge. Results demonstrated that severity of pain level and its impact on daily living activities were extreme during hospital stay and diminished over twelve weeks. Pain interfered the patients sleep pattern and experienced more pain while coughing. The patients experienced pain for longer duration than they expected and expressed their willingness to learn more about pain management activities and strategies.

Feuchtinger et al. (2013) conducted a qualitative study to collect information regarding anxieties and fears of patients while waiting for CABG surgery at Freiburg University Medical Centre, German. The day before CABG surgery, semi-structured interview was conducted among twenty four patients with respect to their emotional status. Results showed that patients while waiting for CABG surgery experiences more fear and anxiety about the outcomes of the surgery. The study concluded that there is a need for specific interventions to reduce fear and anxiety among the patients during the waiting period for the CABG surgery.
Tully et al. (2011) conducted a study to evaluate whether presence of depression, anxiety and stress is correlated with atrial fibrillation after the heart surgery at Flinders Medical Centre, Australia. Two hundred and twenty-two patients after the surgery completed measures of anxiety, depression and stress. Study results revealed that 24.8% of the patients had the incidence of atrial fibrillation, and more duration of hospitalization. Postoperative anxiety was significantly correlated with atrial fibrillation. Study concluded that health care professionals should accurately evaluate anxiety considering the incidence of atrial fibrillation after cardiac surgery and implement appropriate interventions for reducing the anxiety.

**Fatigue among patients after CABG surgery**

Ammouri, Al-Daakak, Isac, Gharaibeh, and Al-Zaru (2016) conducted a descriptive, cross-sectional study to assess symptoms experienced by the patients after CABG surgery from five hospitals in Jordan. A convenience sample of one hundred post-CABG surgery patients were selected and surveyed using the Cardiac Symptom Survey. Results demonstrated that chest incisional pain, leg swelling, fatigue, poor appetite and sleeping problems were the most frequently perceived symptom by the participants. The study concluded that early identification of perceived symptoms among post-CABG patients enables health care providers to focus their assessments in identifying and alleviating them with appropriate interventions.

Miller et al. (2014) conducted a study to explore the relationship of exhaustion (fatigue) to pathogens burden (inflammatory markers) at Federal tertiary care centre in USA. Forty two individuals after CABG surgery who fulfilled the eligibility criteria were
interviewed using the Maastricht questionnaire to measure the vital exhaustion. Pathogen burden was measured based on the total number of seropositive exposures. Results revealed that presence of vital exhaustion after the surgery was forty percentage. Exhausted patients showed a frequency of moderate (p=.04) to higher (p=.03) pathogen burdens. This study results showed a primary evidence that higher level of fatigue after CABG surgery may be correlated with high pathogens burden (inflammatory markers). There is need for therapeutic interventions on management of postoperative fatigue (exhaustion).

Miller, Evangelista, Giger, Dracup, and Doering (2013) conducted a descriptive, exploratory study to evaluate correlates of vital exhaustion among patients undergoing CABG surgery at two cardiac centres, California. Forty two patients were assessed for the prevalence of exhaustion for four to eight weeks after discharge from the hospital. Data were collected using self-report form and reviewing their medical record. Study findings showed that approximately 41% of the patients reported exhaustion. Increased left ventricular ejection fraction, haemoglobin and eosinophil counts were significantly associated with increased exhaustion. Study concluded that all the patients should be evaluated for exhaustion after CABG surgery and implement appropriate interventions to reduce its consequences.

Barnason et al. (2008) conducted a prospective, comparative study to evaluate the associations of early recovery outcomes and fatigue among patients after CABG surgery at Nebraska Medical Centre, USA. Patients (N=119) were divided into non-fatigued (n=53) and fatigue (n=66) groups based presence of postoperative fatigue on their third week self-report. Study findings demonstrated that, fatigued patients had significant disturbed
psychosocial functioning (p<.05). Postoperative fatigue was significantly associated with higher level of anxiety (p<.05) and depression (p<.05). Persistent post-operative fatigue may impair early recovery of patients post CABG surgery. Study concluded that specific interventions are required to decrease postoperative fatigue and promote patients health.

Pick, Molloy, Hinds, Pearce, and Salmon (1994) studied the relationship between emotional state and post-operative fatigue to the catecholamine response among seventy four patients following CABG surgery at a medical centre, London. Self-reported questionnaires were utilized to evaluate anxiety, depression and fatigue after the surgery up to thirty days. Levels of circulating catecholamine were measured at specific intervals before and after the surgery. Results demonstrated a positive correlation between fatigue and catecholamine (p=.05). Postoperative fatigue was significantly correlated with anxiety (p=.05) and depression (p=.05) at days post CABG surgery. Study concluded that there is a need for appropriate interventions to relieve post-operative fatigue.

**Self-efficacy among patients after CABG surgery**

Varaei et al. (2017) conducted a randomized-controlled trial to evaluate the effect of educational intervention self-efficacy and readmissions among the patients following CABG surgery at two urban hospitals, Iran. Sixty patients in the experimental group had a peer education on self-efficacy while the regular care of the hospital was received by the control group. Cardiac self-efficacy scale was used to collect the data. Results demonstrated that there was a greater and significant (p=.001) improvement in cardiac self-efficacy among the patients in the experimental group. Very small number of the patients in the experimental group had hospital readmissions compared to the control
group. Study concluded that educational intervention is effective in improving self-efficacy and decreasing hospital readmissions among patients who had CABG.

Tung et al. (2012) conducted a descriptive and correlational survey to assess the influence of adherence on self-care management and self-efficacy among one hundred and sixty six patients following CABG surgery in Taiwan. Self-efficacy scale for managing chronic disease and cardiovascular diabetic adherence scale were used. Results shown the mean score of 6.48 for self-care management in the patients, with 57 (34.3%) of them revealed a non-adherent. It was also identified that self-efficacy plays an important role in self-care management after CABG surgery. The results proves association between adherences, self-management and self-efficacy in patients following CABG. Study concluded that this finding is valuable to the clinicians and related strategies should be able to be developed on its basis.

Katch and Mead (2010) conducted a systematic review on effectiveness of interventions promoting self-efficacy skills among patients with CVD. A comprehensive search was made for published literature in PubMed and Scopus, finally five studies were found to be eligible for the review. Reviewed studies demonstrated that self-efficacy skills and self-management are important components for managing the CVD. Comprehensive interventions should be planned and implemented for the patients to improve their self-management skills. Additional research is required to evaluate the relationship between self-management, self-efficacy and clinical outcomes of the patients.

Krannich et al. (2008) conducted a prospective controlled study to assess the effect of a motivational interventions on lifestyle changes among patients undergoing CABG
surgery at University Hospital, Germany. One hundred and forty patients who undergo elective surgery were included in the study and a trained clinical psychologist provided motivational interventions. The interventions consisted of both group lectures and personalized individual sessions. The six factors intention, self-efficacy, vulnerability, perceived severity, outcome and social expectations were measured by a 30-item questionnaire. Repeated measures ANOVA showed there was a significant improvement in the treatment group in vulnerability (p=.04), social expectation (p=.001), and self-efficacy expectation (p=.001) as a result of motivational interventions.

Dehdari, Heidarnia, Ramezankhani, Sadeghian, and Ghofranipour (2008) conducted a descriptive - analytical study to evaluate and compare anxiety, perceived social support and self-efficacy between the patients who had CABG surgery and percutaneous coronary interventions (PCI). The STAI, perceived social support and self-efficacy scales were used to collect the data. Study results revealed that patients who had PCI experienced more anxiety (p=.02) and lesser perceived social support (p=.01) than the patients who had surgery. The PCI patients had higher self-efficacy (p=.01) than the patients who had CABG surgery. Study recommended that educational interventions are required to relieve the anxiety and improve the self-efficacy among this patients population for the better recovery.

Barnason et al. (2003) conducted a randomized clinical trial to evaluate the effect of an educational intervention on functioning, self-efficacy and CAD risk factor modification among thirty five patients who underwent CABG surgery at Nebraska Medical Centre, USA. Results revealed that, participants who received intervention had significantly higher self-efficacy (p<.05) and functioning (physical, mental, vitality, and
general health) than the control group (p<.05). Improved emotional functioning, exercise adherence and lower stress were observed among the patients who received interventions. Study concluded that HCI is highly recommendable in improving self-efficacy and functioning after CABG surgery.

Quality of life among patients after CABG surgery

Araujo, Silva, and Ramos (2016) conducted a descriptive study to analyze basic self-care conditioning factors and associated with quality of life, relating them to self-care capacity among the patients before CABG surgery at a university teaching hospital, Brazil. The medical outcomes 36 item - short form and self-care assessment scale were used to assess the quality of life and self-care capacity respectively from sixty two patients. Results demonstrated that there was a correlation between self-care capacity and quality of life (p=.001). Study recommended that future research or interventions should be based on actions and interactions with individuals to foster the comprehensive care practices.

Kidd et al. (2016) conducted a study to evaluate the relationship between QOL, health behaviours, depression symptoms, and health-related control beliefs in CABG surgery patients at a hospital clinic, United Kingdom. One hundred and forty nine patients who were following CABG surgery were included. Before and after the surgery, patient’s filled questionnaires measuring QOL, health related personal control, health behaviours and depression symptoms. Results revealed there was a strong association between higher personal health control and improved QOL (p=.001), and decreased depression symptoms (p=.001). Study recommended that tailored interventions directed to increase perceptions of personal health control can increase positive health outcomes after CABG surgery.
Barolia, Ali, and Jaffar (2012) conducted a study to assess the effect of cardiac rehabilitation programme on quality of life before and one month after CABG surgery in a tertiary care university hospital, Pakistan. A prospective single group pre and post study design used the WHO QOL brief version to collect the data. Patient education, exercise and CAD risk factor modification were the major components of rehabilitation programme. The results indicated a significant progress in patients' physical and psychological health (p=.001), satisfaction (p=.001), social relationships (p=.001) and overall health status. The study recommended that these findings can be used to develop interventions to improve health and QOL in patients having CABG surgery.

Rantanen et al. (2009) conducted a study to evaluate the variations in QOL and to find related factors among patients undergoing CABG surgery at the university hospital, Finland. Three questionnaires were used to collect the data at one, six and twelve months after CABG surgery from two hundred and thirty six patients and two hundred and twelve family members. Results shown that QOL was lower in the patients and family members one month after the surgery and increased during follow up. The increase in the mean QOL scores significantly differed between the patients and family members (p=.001); the increase of QOL in patients was greater than that in the family members (p=.001). Study recommended that additional research is required to find factors causing the variation in QOL to design and implement suitable interventions to support the patients and their family members.

Tung, Hunter, and Wei (2008) conducted a study to evaluate the association between level of anxiety, ways of coping, and QOL among patients who underwent CABG
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surgery at a medical centre, Taiwan. An integrated research design adopted convenience sampling to recruit one hundred patients. The STAI, ways of coping checklist and short form 36-health survey were the instruments used to collect the data. Results shown that lower level anxiety was strongly associated with improved QOL (p=.001). Study concluded that the nurses need to design and implement appropriate interventions to reduce level of anxiety for promoting optimal QOL among patients following CABG surgery.

Effect of preoperative education on postoperative outcomes among patients undergoing cardiac surgery: a systematic review and meta-analysis

Background

Cardiac surgery is an important event in an individual’s life which impairs their physical functioning thereby affecting the economic, personal, and professional life of the individual. Fear, anxiety, depression and other mental health problems may be experienced by the postoperative patient (Petry, 2000). Anxiety, fear, depression, and pain are common physical and psychological problems in patients undergoing cardiac surgery and has been related to the recovery of patients from major cardiac surgical procedures (Blumenthal et al., 2003). Optimal management of physical and psychological problems during the immediate post-operative phase might improve satisfaction with the surgery experience, decrease complications and duration of hospital stay (Albert et al., 2009).

Anxiety, depression, and negative thoughts are the psychological factors that can possibly relate to the pathophysiological changes (Hemingway & Marmot, 1999). High levels of anxiety and substantial symptoms of depression may be experienced by the patients who are awaiting cardiac surgery due to worries, fear, and uncertainties about the
outcomes of the surgery (Fitzsimons, Parahoo, & Stringer, 2000). Psychological distress can aggravate symptoms of the prevailing cardiovascular disease, harmfully affecting the physiological parameters before and during anaesthesia, and can lead to prolonged recovery (Andrew, Baker, Kneebone, & Knight, 2000).

Postoperative outcomes of major heart surgery such as severe pain, anxiety, psychological distress and sleep disturbance are commonly associated with recovery from cardiac surgery. These factors may compromise the effectiveness of their treatment and quality of life of the patients (Bagheri-Nesami et al., 2014). The aim for those having CABG surgery is to preserve myocardial tissue. However, exposure to high-stress level during the pre and postoperative period of major heart surgery may result in the development of disturbing memories and symptoms of chronic stress or even posttraumatic stress disorder, which can have adverse effects on the recovery (Weis et al., 2006).

Cardiac surgical patients reported apprehension, fear, anxiety, confusion, and hallucinations related to their stay in the intensive care unit. There was a significant relationship between the patients' perceptions of their ICU experiences and their scores for depression, anxiety, avoidance and intrusion (Aslan & Tosun, 2015). Given the high burden of emotional symptoms post-operatively and their impact on long-term recovery, interventions are needed to prevent these poor outcomes. Nurses caring for patients during the post-operative period find it challenging to manage their pain and anxiety. There is a need for clinicians and nurses to identify safe and effective therapeutic interventions to use following a major cardiac surgery (Ramesh et al., 2015).
Preoperative education is defined as helping the patients to understand and prepare mentally for surgical procedure and recovery in the postoperative period. Education and preparation of patients before the surgery has positive benefits on the care of patients after surgery and at the discharge phase (Deyirmenjian, Karam, & Salameh, 2006). Preoperative patient education is the method by which health care workers provide information to the patients to understand about the surgery and minimize their worry and anxiety (Kongstvedt & Plocher, 2001).

Preoperative education offers the patients who are undergoing surgery with relevant information regarding the surgery and the proposed surgical procedure, as well as expected patient experience’s (eg, anxiety, fear); expected sensations; and probable outcomes (Kruzik, 2009). This form of education is also referred to as preoperative psychological preparation for the patient’s waitlisted for elective surgery and it has been revealed advantageous for improving the clinical conditions and outcome variables (O’Brien, Mckeough, & Abbasi, 2013).

A meta-analysis reported that information on the surgical procedure and behavioral instructions to the patients revealed the positive benefits in managing the outcome variables such as duration of hospital stay, behavioral recovery, pain, analgesics, costs, satisfaction, and clinical recovery (Johnston & Vogele, 1993). The most efficient approach to care for the patient with anxiety is to reassure and provide psychological support. The development of effective interventions to reduce adverse psychological and physical outcomes in cardiac surgery is of importance. Education is often the first choice intervention and it has a significant role in the care of patients during the postoperative period.
Many research studies have investigated whether preoperative education interventions were successful in improving postoperative outcomes and in increasing physical and psychological recovery after cardiac surgery. However, the efficacy of preoperative education on postoperative outcomes in patients undergoing cardiac surgery is not understood clearly. This is the first meta-analysis on the effectiveness of preoperative education on postoperative outcomes among patients undergoing cardiac surgery. Therefore, the results of this systematic review are important to both the clinicians and nurses. More importantly, meta-analyses assist us to understand the combined effects of these interventions over time and form the highest level of evidence for practice.

Objective

The objective of this systematic review was to appraise evidence concerning the effect of preoperative education on various postoperative outcomes in patients following cardiac surgery.

Methods

Design

This systematic review was conducted based on the guidelines of Cochrane Handbook for Systematic Reviews of Interventions (Higgins & Green, 2011) and reported using the PRISMA Statement (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) (Moher, Liberati, Tetzlaff, & Altman, 2014). This meta-analysis was carried out by the investigator.
Search Strategy

The search strategy was prepared using search terms related to PICO (patient or population, intervention, control or comparator, and outcomes) to retrieve the relevant studies. Electronic databases searched were PubMed-Medline, CINAHL, Cochrane library, Ovid, ProQuest, Science Direct, Web of Science and Scopus. We explored for original research studies published between 1995 and 2015 that used preoperative education as the intervention in patients following cardiac surgery. The following combinations of search terms were used: patient education, preoperative education, anxiety, fear, pain, discomfort, surgical outcomes, postoperative outcomes, cardiac surgery, cardiac surgical procedures, coronary artery bypass graft surgery. In addition, references from related original studies and reviews retrieved from these databases were explored for further relevant publications. Duplicate studies and records were excluded based on the screening of titles and abstracts. The full text of all the remaining articles was screened to assess the eligibility criteria.

Inclusion Criteria

The below-mentioned selection criteria were followed to include the studies in this review.

Type of study

- Original research studies were published in English between 1995 and 2015
- Randomized controlled trials that included preoperative education among patients undergoing cardiac surgery

Type of intervention

The studies assessed the effectiveness of pre-operative education on postoperative outcomes
Type of participant

The studies involved adult patients undergoing any form of cardiac surgery that includes coronary artery bypass graft (CABG) surgery or valve replacement or repair.

Types of outcomes

The outcomes measured were anxiety, depression, pain and length of hospital stay.

Data extraction and Synthesis

Cochrane data extraction form for systematic review was utilized. Two authors individually extracted data from the included studies and dissimilarities were resolved following a discussion. A data extraction form included the first author, year of publication, nationalities of the researchers, study design, sample size, intervention measures, the outcomes, research instruments, researcher’s evaluations, and study findings.

The Cochrane risk of bias tool was used to evaluate the methodological quality of each included trial (Higgins & Green, 2011). The GRADE approach and guidelines (Guyatt et al., 2013) were followed to provide the quality of the evidence and outcome measures are summarized in the 'Summary of findings’ tables (Appendix-F). The magnitude of the effect was graded in following categories large (effect size of 0.8 or higher), medium (effect size around 0.5) and small (effect sizes around 0.2).

Statistical Analysis

Outcome measures were compared between participants who were treated with preoperative education intervention and the control group within each study. Meta-analysis was performed to pool the results of randomized controlled trials included in the review.
Effect sizes for preoperative education were calculated pooling the mean difference and standardized mean difference for the continuous outcome with 95% confidence intervals. The heterogeneity among trials was evaluated using I², and a fixed effects model was used to compare homogeneous trials (I² < 50%), otherwise a random-effects model was used. We did the analysis for every intervention and outcome variable as matched with the control group. Intervention effects were estimated using a random-effects model to compute standardized mean differences and weighted mean differences with confidence intervals of 95%. All the data were pooled and analyzed using RevMan v5.3.

Results

Study selection

Eight hundred and thirty-one studies were identified by the search strategy through databases. Twenty duplicate articles were removed. After assessment of titles and abstract, seven hundred and ninety-five studies were excluded as they did not fulfil the inclusion criteria. Another eight articles were excluded after assessing the full-text as they did not meet the review criteria. The reasons for the exclusion of studies were, the studies did not involve the patients undergoing cardiac surgery, irrelevant outcomes, non-RCTs and the study intervention did not include preoperative education. Fourteen studies were included in the narrative synthesis. Finally, ten studies were included in the quantitative synthesis (meta-analysis). Flow diagram of study selection process is shown in Figure 2.
Figure 2. Flow diagram of study selection (Preoperative education).
Sample Characteristics

The reviewed studies included a total of 2,071 patients. In these studies, the number of samples ranged from 40 to 406. The mean age of the entire study population was 61 ranged from 52 to 65 in years. In all the studies both the genders were included. Majority of the study samples in the selected studies were male (n=1691, 81%). In all the included studies, the participants were following elective cardiac surgery. The types of surgery included were coronary artery bypass graft, valve replacement, and valve repair. Most of the studies included the patients undergoing CABG surgery (n=1621, 74%). In all of the reviewed studies, preoperative education was administered to only the experimental group and the control group received usual care. Sample characteristics of the reviewed studies are mentioned in Table 1.

Figure 3. Assessment of risk of bias in selected studies
Risk of bias

The risk of bias of included studies was assessed by Cochrane collaboration tool for risk of bias assessment (Higgins & Green, 2011). None of the studies demonstrated selection bias and 10% of the studies shown the unclear risk of bias in allocation concealment. Fifty percent of the studies demonstrated the unclear risk of bias in blinding of personnel and participants and 60% in blinding of outcome assessment. None of the studies demonstrated attrition and reporting bias. Details regarding the risk of bias assessment is shown in Figure 3.

Effect of preoperative education on outcome measures

The post-operative outcomes of preoperative education that we assessed were anxiety, pain, depression and length of hospital stay. The investigator estimated differences in the effects of preoperative education between the pre-test and the post-test (one-time measurement before and after the intervention). Details of outcomes, quality of evidence and magnitude of the effect are presented in summary of findings table (Appendix F).

Anxiety

Six studies involving 829 patients reported the effect of preoperative education on anxiety after the preoperative education (Guo, East, & Arthur, 2012; Hoseini, Soltani, Babaee Beygi, & Zarifsanaee, 2013; Kalogianni et al., 2015; Shahmansouri et al., 2014; Sorlie, Busund, Sexton, Sexton, & Sorlie, 2007; Zhang et al., 2012). Analysis with a random effects model revealed that preoperative education significantly reduced anxiety scores (standardized mean difference = -0.96, 95% confidence interval [CI]: -1.37, -0.54) in patients undergoing cardiac surgery and there were statistically significant between groups differences ($Z = 4.52, P<0.0001$) (Figure 4).
Figure 4. Effect of preoperative education on anxiety

Pain

Four studies involving 704 patients reported effect of preoperative education on pain level (Guo et al., 2012; Martorella, Cote, Racine, & Choiniere, 2012; Utiriyapasit, Moore, & Chaiser, 2010; Watt-Watson et al., 2004). Analysis with a random effects model revealed no significant statistical difference (standardized mean difference = -0.00, 95% confidence interval [CI]: -0.15, -0.15; Z = 0.00, P=1.00) between patients receiving educational intervention or control group in pain level (Figure 5).
Validity and Reliability

The validity and reliability of data collection tools used to measure outcome measures in the reviewed studies were found to be adequate. Name of the data collection tools and their reliability values are mentioned in Table 1.

Publication Bias

The potential for publication bias was not assessed as only a few studies were included in the meta-analysis.

Discussion

The increase in the prevalence of cardiovascular diseases has led to an increase in the incidence of cardiac surgeries. Preoperative education is given to the patients to improve their coping skills, increase knowledge on self-care activities and render psychological support before the surgery. In general, there is evidence available that preoperative education interventions can result in positive postoperative outcomes but less is known about their effect in cardiac surgical patients. This study used meta-analysis to investigate the effects of preoperative education as a nursing intervention for patients following cardiac surgery.

In this systematic review, the purpose was to appraise whether preoperative education intervention could minimize symptoms of depression, anxiety, reduce pain, and decrease the length of hospital stay. A comprehensive and systematic review of research studies published between 1995 - 2015 were carried out to analyze the present evidence regarding the effects of preoperative education on postoperative outcomes in cardiac surgery patients. The trials included in this meta-analyses were conducted in both developed and developing countries.
A total of fourteen original research studies were identified and analyzed. Ten of the randomized controlled trials were included in meta-analysis (Guo et al., 2012; Hoseini et al., 2013; Kalogianni et al., 2015; Shahmansouri et al., 2014; Shuldham et al., 2002; Sorlie et al., 2007; Utriyaprasit et al., 2010; Watt-Watson et al., 2004; Zhang et al., 2012) and the remaining studies were involved in narrative synthesis (Arthur, Daniels, McKelvie, Hirsh, & Rush, 2000; McHugh et al., 2001; Varaei et al., 2014; Shelley & Pakenham, 2007). This systematic review produced mixed results. Meta-analysis revealed that preoperative education significantly reduced anxiety scores in patients undergoing cardiac surgery. Evidence on other outcomes still remains inconclusive that includes pain, depression, and length of stay. In narrative synthesis out of 14 studies, 11(79%) studies concluded that preoperative education improves postoperative outcome while three (21%) studies reported no positive results. In this review, the investigator did not assess any harm related to preoperative education since none of the included studies reported harm effects of the intervention.

This meta-analysis shows there is an evidence that preoperative education reduces anxiety in patients undergoing cardiac surgery. This review finding provides preliminary support for nurses and other healthcare professionals to integrate the practice of preoperative education in the management of patients undergoing cardiac surgery. Summary of all the studies, interventions, outcome measures, and findings are described in Table 1.

These findings regarding the effect of preoperative education on postoperative outcomes were in agreement with findings of a systematic review (Guo, 2015), which concluded evidence of the effect of preoperative education in patients undergoing cardiac
surgery remains inadequate. Additional research is required to assess the efficacy of preoperative education interventions for generating more evidence in the developing countries. Another systematic review reported that education of a patient is a combined process of learning influencing the behavior, increase in the knowledge, skills, and attitudes required to preserve and advance health status and clinical outcomes (Commodore-Mensah & Dennison Himmelfarb, 2012).

Most of the reviewed studies were conducted in the Western countries, hence data from these studies cannot be directly applied to countries such as India, and other Asian countries without further research as social, cultural and economic factors may affect patient’s reaction to preoperative educational interventions. There is a necessity for higher quality randomized trials to develop a strong evidence of preoperative education interventions in improving postoperative outcomes among patients undergoing cardiac surgery in Asian countries like India and China etc.

Overall, there was low-quality evidence for outcomes because of unclear risks of bias, inconsistency and imprecision of effect estimates. No outcomes were supported by high-quality evidence (Appendix F: Summary of findings table).

Very few published studies evaluate the effectiveness of preoperative education on post-operative outcomes in cardiac surgery patients. Therefore, rigorous research is needed to prove the efficacy of preoperative education and, higher methodological qualities of randomized controlled trials are necessary for the area of preoperative patient education in cardiac surgery to determine its effectiveness and to develop most effective educational strategies in the hospital setting. Forthcoming research must emphasize on the scientific
rationale of preoperative education interventions in the area of cardiac surgery, as these mechanisms are not yet understood clearly.

For most people, the idea of surgery often creates a sense of stress and anxiety. There is an opportunity for clinicians and nurses to identify novel therapeutic interventions that are safe, effective and practical for patients after major cardiac surgery. The use of preoperative education in a surgical setting could be a favorable intervention that minimizes anxiety, promotes relaxation and reduces the length of stay in the hospital. Although preoperative education alone may be inadequate to increase health status, we consider that this systematic review and meta-analysis is a substantial contribution to the area of research on preoperative education in cardiac surgical patients and recommends the necessity for patient education strategies that increase clinical, behavioral and utilization of health care.

This meta-analysis has some limitations that should be mentioned. In this review, only research articles published in English were included, which may have produced a language bias regarding the conclusion as some research studies were published in other languages. Another concern is publication bias was not assessed as only a few studies were included in the meta-analysis. Other concerns included moderate quality of research studies because of unclear risk of selection, performance and detection bias and notable heterogeneity.

The results of this systematic review and meta-analysis show there is an evidence that preoperative education can effectively decrease anxiety. There is a growing attention in knowing the significance of preoperative education after cardiac surgery. Given the
mixed results from published studies involved in this review, there is a need for higher methodological qualities of research studies to create a strong evidence base for preoperative education. In addition high-quality, large-scale randomized controlled trials are warranted to confirm these beneficial effects

Publication

This systematic review and meta-analysis article was published online on April 13, 2017 in the *Journal of PeriAnesthesia Nursing*, Official Journal of the *American Society of PeriAnesthesia Nurses*
<table>
<thead>
<tr>
<th>Author, Year, Design &amp; Location</th>
<th>Sample Size /Group /Gender</th>
<th>Type of surgery</th>
<th>Age in years</th>
<th>Intervention</th>
<th>Outcomes measures</th>
<th>Instruments</th>
<th>Reliability</th>
<th>Study findings</th>
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<tbody>
<tr>
<td><strong>Arthur., et al 2000, RCT, Canada</strong></td>
<td>249</td>
<td>CABG</td>
<td>NR</td>
<td>63</td>
<td>Individualized pre-operative education by nurses</td>
<td>One session before the surgery</td>
<td>Anxiety, Length of stay</td>
<td>NR</td>
</tr>
<tr>
<td><strong>Guo et al., 2012, RCT, China</strong></td>
<td>153</td>
<td>CABG or/ and valve replacement</td>
<td>18</td>
<td>52</td>
<td>An informational booklet and 15-20 minutes of verbal advice by the nurse</td>
<td>One session two or three days before surgery</td>
<td>Anxiety, depression, Length of stay, Pain</td>
<td>HADS – A, HADS – D, BPI</td>
</tr>
<tr>
<td><strong>Hosein et al., 2013, RCT, Iran</strong></td>
<td>70</td>
<td>CABG</td>
<td>Below</td>
<td>59</td>
<td>Preoperative audiotape education and information about postoperative care</td>
<td>One session after the surgery</td>
<td>Anxiety, Depression</td>
<td>HADS – A, HADS – D</td>
</tr>
<tr>
<td><strong>Kalogianni et al., 2015, RCT, Greece</strong></td>
<td>395</td>
<td>CABG or/ and valve replacement</td>
<td>NR</td>
<td>65</td>
<td>A booklet and teaching by the nurse</td>
<td>One session on the day of admission</td>
<td>Anxiety, Length of stay</td>
<td>STAI</td>
</tr>
<tr>
<td><strong>Martorella et al., 2012</strong></td>
<td>52</td>
<td>CABG or/ and valve replacement</td>
<td>18 years old</td>
<td>64</td>
<td>A booklet and teaching through video and face to</td>
<td>3 sessions, one before the surgery</td>
<td>Pain</td>
<td>NRS</td>
</tr>
</tbody>
</table>
### Review of Literature

<table>
<thead>
<tr>
<th>Author, Year, Design &amp; Location</th>
<th>Sample Size /Group /Gender</th>
<th>Type of surgery</th>
<th>Age in years</th>
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<th>Outcomes measures</th>
<th>Instruments</th>
<th>Study findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCT Canada</td>
<td>M: 41, F: 11</td>
<td>CABG</td>
<td>above</td>
<td>face by the nurse and 2 after surgery</td>
<td>Anxiety, Depression</td>
<td>HADS – A, HADS – D</td>
<td>more costs</td>
</tr>
<tr>
<td>McHugh. et al., 2001, RCT, UK</td>
<td>98, EG: 49, CG: 49</td>
<td>CABG</td>
<td>NR 62</td>
<td>Preoperative health education and discussion by the nurse</td>
<td>One session before the surgery</td>
<td>Anxiety, Depression</td>
<td>Decreased anxiety and depression</td>
</tr>
<tr>
<td>Shahmansouri et al., 2014, RCT, Iran</td>
<td>60, EG: 29, CG: 31, M: 43, F: 17</td>
<td>CABG</td>
<td>Less than 70 years</td>
<td>Preoperative group psycho education on the day of admission by the psychotherapist</td>
<td>One session before the surgery</td>
<td>Anxiety, Fear</td>
<td>Lower fear score no difference in anxiety scores.</td>
</tr>
<tr>
<td>Shuldham et al., 2002, RCT, UK</td>
<td>329, EG: 173, CG: 156, M: 288, F: 41</td>
<td>CABG</td>
<td>18 years old &amp; above</td>
<td>A booklet, video and discussion by the nurses, physiotherapist and doctor</td>
<td>One session before the surgery</td>
<td>Anxiety, Depression, wellbeing</td>
<td>No significant differences</td>
</tr>
<tr>
<td>Sorlie et al., 2007, RCT, Norway</td>
<td>109, EG: 55, CG: 54, M: 89, F: 20</td>
<td>CABG</td>
<td>Less than 68 years</td>
<td>Video and individualized information sessions carried out by the nurses</td>
<td>Two sessions before the surgery and at discharge</td>
<td>Anxiety, Depression, Subjective health</td>
<td>Less anxiety depression and better subjective health</td>
</tr>
<tr>
<td>Utriyaprasit et al, 2010,</td>
<td>120, EG: 60, CG: 60</td>
<td>CABG</td>
<td>18 years old or 62</td>
<td>Audiotape information and strategies</td>
<td>Two sessions</td>
<td>Psychological distress, Recovery</td>
<td>Better recovery in the experimental</td>
</tr>
<tr>
<td>Author, Year, Design &amp; Location</td>
<td>Sample Size/Group/Gender</td>
<td>Type of surgery</td>
<td>Age in years</td>
<td>Intervention</td>
<td>Outcomes measures</td>
<td>Instruments</td>
<td>Study findings</td>
</tr>
<tr>
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</tr>
<tr>
<td>RCT, Thailand</td>
<td>M: 84; F: 36</td>
<td>CABG</td>
<td>above</td>
<td>Three sessions before the surgery</td>
<td>Self-efficacy, Readmission</td>
<td>CSE; Cronbach’s alpha - 0.87</td>
<td>Increased self-efficacy and decreased readmission</td>
</tr>
<tr>
<td>Varaei et al., 2014, RCT, Iran</td>
<td>60; EG:30; CG:30; M:46; F:14</td>
<td>CABG</td>
<td>40 - 70</td>
<td>Preoperative education of lecture, discussion, and interactive session</td>
<td>Self-efficacy, Readmission</td>
<td>CSE</td>
<td>No significant improvement in pain</td>
</tr>
<tr>
<td>Watt-Watson et al., 2004, RCT, Canada</td>
<td>406; EG:202; CG:204; M: 336; F: 60</td>
<td>CABG</td>
<td>NR</td>
<td>A booklet and a video education by the nurse</td>
<td>Pain</td>
<td>BPI; Internal consistency – 0.82</td>
<td>No significant improvement in pain</td>
</tr>
<tr>
<td>Zhang et al., 2012, RCT, China</td>
<td>40; EG:20; CG:20; M: 12; F: 28</td>
<td>CABG</td>
<td>NR</td>
<td>Structured preoperative education given by specialist nurse educator</td>
<td>Anxiety, Postoperative complications</td>
<td>ZSAS; NR</td>
<td>Lower anxiety score and complications</td>
</tr>
<tr>
<td>Shelley et al., 2007, RCT, Australia</td>
<td>80; EG:40; CG:40; M:52; F: 28</td>
<td>CABG</td>
<td>&gt;18</td>
<td>Psychoeducational and cognitive-behavioral intervention</td>
<td>Pain, psychological distress</td>
<td>VAS; NR</td>
<td>Lower psychological distress and higher self-efficacy</td>
</tr>
</tbody>
</table>

Note: RCT = Randomized Controlled Trial; EG = Experimental group; CG = Control Group; M=Male; F= Female; CABG=Coronary artery bypass graft; NR=Not reported; HADS–A =Hospital Anxiety Depression Scale – Anxiety; HADS–D=Hospital Anxiety Depression Scale – Depression; CSSI=Cardiac Surgery Symptom Inventory; STAI=State Trait Anxiety Inventory; BPI=Brief Pain Inventory; POD=Post-Operative Day; BAI=Beck Anxiety Inventory; ZSDS=Zung Self-Rating Depression Scale; CSE=Cardiac Self-efficacy Scale; ZSAS=Zung Self-Rating Anxiety Scale
Effectiveness of massage therapy on postoperative outcomes among patients undergoing cardiac surgery: A systematic review

Background

The incidence and prevalence of cardiovascular diseases (CVD) is increasing rapidly, predominantly in the developing countries and it has also become the major health burden worldwide (Gupta, Mohan, & Indu, 2016). Most of the patients with CVD who do not respond to medical management may have to undergo cardiac surgery. The number of cardiac surgeries is increasing steadily every year in India and other developing countries due to a high prevalence of CVD (Kasliwal, Kulshreshtha, Agrawal, Bansal, & Trehan, 2006). Postoperative outcomes such as pain, anxiety, psychological distress mostly are associated with the recovery of the patients from cardiac surgery. Severe pain, anxiety, stress and sleep disturbances are faced by patients commonly after a major cardiac surgery. All of these factors may compromise their treatment and quality of life in patients undergoing major heart surgery (Bagheri-Nesami et al., 2014).

Undergoing major cardiac surgery is a highly stressful experience for the patients and will result in increased levels of anxiety. Fear and anxiety are the major factors that strongly influence the patient’s ability to cope with pain or discomfort. Pain can prolong patients stay in the hospital postoperatively and also affects his/her satisfaction level (Gonzales et al., 2010). There is a necessity for the clinicians and nurses to identify therapeutic interventions that could be very safe and effective in the patients after a major cardiac surgery in the postoperative phase (Gunnarsdottir & Jonsdottir, 2007).

There has been a focus on complementary therapies to manage or alleviate pain and anxiety in the recent years. These therapies have many non-invasive techniques that are
cost effective and simple with fewer side effects when compared to drugs (Wentworth et al., 2009). Complementary therapies are used as adjuvant therapy alongside the conventional medical management to enhance the overall health and wellbeing of the patients. Massage therapy is one of the important kinds of complementary therapies in recent years. Massage therapy is promptly recognized as an essential part of health and wellbeing (Babajani, Darzi, Ebadi, Mahmoudi, & Nasiri, 2014).

Massage therapy is defined as the systematic and manual manipulation of the body’s soft tissue for therapeutic purposes of enhancing overall health and well-being (Dion et al., 2011). Massage therapy is effective, easy, low cost, and safe for patients who are undergoing surgery (Petpichetchian & Chongchareon, 2013). It helps to relieve muscle tension, reduce stress, decrease anxiety and evoke a feeling of calm. It is one of the therapeutic and non-invasive therapy that has been experimented in different populations and found to have marked effect in decreasing the level of pain and anxiety. It is helpful in promoting relaxation and enhancing the patient’s satisfaction. Massage therapy can act as a useful complementary and adjuvant therapy to the patients during the postoperative period to promote faster recovery (Braun et al., 2014).

Nurses caring for the patient’s postoperative period face major challenges and find it a task to manage the patient’s pain and anxiety. Although analgesic drugs are helpful in reducing the pain, they have adverse effects which leads to further discomfort for the patients. There is a necessity for the nurses to have scientifically tested, simple and effective interventions to manage the pain and anxiety. There is a steady emerging of evidence that massage therapy is a vital element of the healing experience among the
patients undergoing general surgery, but less is known about their efficiency in cardiac surgical patients.

**Objective**

The objective of this review was to evaluate the efficacy of massage therapy on postoperative outcomes among patients undergoing cardiac surgery.

**Methods**

**Design**

This review was conducted according to the guidelines prescribed in the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA). The PRISMA statement consists of a checklist and a four-phase flow diagram. The checklist includes items deemed essential for transparent reporting of a systematic review. PRISMA focuses on ways in which authors can ensure the transparent and complete reporting of systematic reviews and meta-analyses (Moher, Liberati, Tetzlaff, & Altman, 2014).

**Search strategy**

We searched each database, scanned titles and abstracts, and retrieved studies that satisfied the inclusion criteria. Details of studies retrieved from each database is shown in Table 2. References from retrieved studies were searched for additional relevant studies, but none was identified.

**Inclusion Criteria**

Studies were included in this review if they fulfilled the below-mentioned selection criteria:

**Type of study:**
- Original research studies were published in English between 2000 and 2015
- Randomized controlled trials, nonrandomized controlled trials, Before - after intervention trial and Quasi-experimental studies that included any form of massage therapy for cardiac surgery patients
- The studies compared with any form of massage therapies to usual care

**Type of interventions**

The studies evaluated the effect of any form of massage therapy on one or more postoperative outcomes

**Type of participants**

The studies involved adult patients (older than 18 years) undergoing any cardiac surgery that includes coronary artery bypass graft, valve replacement or repair and open heart surgery.
Types of Outcome

Primary and secondary outcomes of effectiveness were assessed.

Primary outcomes: Anxiety and pain

Secondary outcomes

Secondary outcomes were muscular tension, relaxation, depression, sleep, satisfaction, heart rate, blood pressure, respiration rate, length of hospital stay, and use of sedative drugs.

Data extraction

Cochrane data extraction form for systematic review was utilized (Higgins & Green, 2011). Two authors individually extracted data from the included studies and dissimilarities were resolved following a discussion.

Data Synthesis

Data was synthesized in terms of assessment of methodological qualities, characteristics of the intervention, outcomes and qualitative evaluation of the interventions were reported.

Results

Two hundred and ninety-seven studies were identified by the search strategy through electronic databases. Seven duplicate articles were removed. After assessment of titles and abstract, two hundred and seventy-six studies were excluded as they did not fulfil the inclusion criteria. Another six studies were excluded after assessing the full text as they were not meeting the review criteria. The reasons for the exclusion of studies were
qualitative designs, the studies did not involve patients undergoing cardiac surgery, and the study intervention did not involve massage therapy.

Finally, seven studies were included in the data extraction. In these studies, patient demographics, types of massage therapies used, duration of massage, research designs, and outcome measures were varied considerably. Therefore, it was decided not to conduct the meta-analysis, but synthesize them descriptively. Flow diagram of study selection process is shown in Figure 6.

**Sample Characteristics**

The reviewed studies involved a total of 764 patients. In these studies, the number of patients ranged from 40 to 252. The patients included in the studies were of the age group of 18 to 85 years. The mean age of the samples ranged from 52 to 67 years, and the mean age was not mentioned in one study (Babaee, Shafiei, Sadeghi, Nik, & Valiani, 2012). The majority of the study samples in the selected studies were males. In all the included studies, the patients were undergoing elective cardiac surgery. The types of surgery included were coronary artery bypass graft, valve replacement and valve repair. Some studies included combinations of coronary artery bypass graft surgery and valve replacement or repair (Bauer et al., 2010; Braun et al., 2012; Albert et al., 2009). In all of the reviewed studies, massage therapy was administered to only the experimental group and the control group received usual care. Sample characteristics of the reviewed studies are summarized in Table 2.
Figure 6. Flow diagram of study selection (Massage Therapy).
Risk of bias

The risk of bias of each study was assessed by the Cochrane collaboration tool (Higgins & Green, 2011). The overall quality of reviewed studies was moderate. All the studies included in the review had no bias in random sequence generation. Three of the studies had no risk of bias in the concealment of allocation (Bauer et al., 2010; Albert et al., 2009; Asadizaker, Fathizadeh, Haidari, & Goharpai, 2011) and all the remaining studies had not mentioned anything clearly about it (Braun et al., 2012; Najafi et al., 2014; Babaee, Shafiei, Sadeghi, Nik, & Valiani, 2012; Nerbass, Feltrim, Souza, Ykeda, & Lorenzi-Filho, 2010). Five of the studies had given less information to judge the risk of bias in blinding of participants and personnel (Albert et al., 2009; Najafi et al., 2014; Babaee, Shafiei, Sadeghi, Nik, & Valiani, 2012; Nerbass, Feltrim, Souza, Ykeda, & Lorenzi-Filho, 2010; Asadizaker, Fathizadeh, Haidari, & Goharpai, 2011). Bias of incomplete outcome addressed and free of selective reporting were not able to assess all the studies as it was not mentioned clearly.

Primary outcomes

Anxiety

A total of four studies evaluated the efficacy of massage therapy for anxiety among patients undergoing cardiac surgery (Bauer et al., 2010; Braun et al., 2012; Albert et al., 2009; Babaee, Shafiei, Sadeghi, Nik, & Valiani, 2012). In three of the four studies, massage therapy significantly reduced the anxiety level among patients undergoing cardiac surgery (Bauer et al., 2010; Braun et al., 2012; Babaee, Shafiei, Sadeghi, Nik, & Valiani, 2012). Only one study reported that massage therapy does not yield any therapeutic benefits, but it is a feasible intervention for patients undergoing cardiac surgery, and further research is indicated to prove this intervention (Albert et al., 2009).
Pain

A total of six studies assessed the effectiveness of massage therapy for pain among patients undergoing cardiac surgery (Bauer et al., 2010; Braun et al., 2012; Albert et al., 2009; Najafi et al., 2014; Nerbass, Feltrim, Souza, Ykeda, & Lorenzi-Filho, 2010; Asadizaker, Fathizadeh, Haidari, & Goharpai, 2011). Visual Analogue Scale (VAS) was used to measure the level of pain in all six studies. Five of the six studies reported that massage therapy significantly reduced the pain level among patients in the postoperative period after cardiac surgery. One study reported that massage intervention does not yield any therapeutic benefits, but it is a feasible intervention for patients undergoing cardiac surgery and further research is warranted (Albert et al., 2009).

Secondary Outcomes

Efficacy of massage intervention was evaluated in three of the reviewed studies, and all the three concluded that massage therapy significantly improves the patient’s satisfaction in the postoperative period after cardiac surgery (Bauer et al., 2010; Braun et al., 2012; Najafi et al., 2014). Two of the reviewed studies concluded that massage intervention is very useful and significantly reduces the tension after cardiac surgery (Bauer et al., 2010; Braun et al., 2012). One study reported that massage therapy is a useful intervention in relieving fatigue and for improving sleep, recovery among patients following CABG surgery (Nerbass, Feltrim, Souza, Ykeda, & Lorenzi-Filho, 2010). A randomized controlled trial on the efficacy of massage therapy reported that there was a significant difference statistically on an amount of sedative drug used between the two groups (Asadizaker, Fathizadeh, Haidari, & Goharpai, 2011).
Validity and Reliability

All of the reviewed studies have used standardized research instruments to collect data from the participants in the study. Validity and reliability of data collection tools used to measure the outcome variables in the reviewed studies was found to be adequate.

Discussion

There is evidence that massage therapy for patients following general surgeries can result in positive postoperative outcomes, but less is known about their efficiency among patients following cardiac surgery. A comprehensive, systematic review of originally published research studies between 2000 and 2015 was conducted to evaluate the efficacy of massage interventions on postoperative outcomes among patients following cardiac surgery. A total of seven original research studies was retrieved and analyzed. The studies analyzed in this systematic review have produced conflicting results regarding the efficacy of massage therapy for patients following cardiac surgery.

Six studies have concluded that massage therapy improves the postoperative outcomes for patients following cardiac surgery, while one study concluded that massage does not yield positive results (Albert et al., 2009). The methodological quality of the reviewed studies varied considerably. Evidence of the effectiveness of massage therapy for patients following cardiac surgery patients is inconclusive. However, most of the studies included in the reviews have produced positive results. Therefore, there is some evidence that massage therapies can result in improving postoperative outcomes among patients undergoing cardiac surgery. Scientific evidence of the effect of massage therapies among patients following cardiac surgery is considerable and remains inconclusive. Results are
limited by the modest quality of research studies, heterogeneity, and small study sample sizes. Therefore, larger number of patients should be included in future studies. Additional research is warranted to strengthen the evidence of massage therapy in cardiac surgical patients.

Complementary therapies are believed to minimize anxiety and pain by arousing the relaxation response through stimulation of mechanism of the parasympathetic nervous system. In addition to minimizing pain and tension during recovery from cardiac surgery, complementary therapies are also intensively engaging the patient in the faster healing process (Kshettry, Carole, Henly, Sendelbach, & Kummer, 2006). A qualitative descriptive study on feasibility and acceptability of hand massage among patients following cardiac surgery concluded that increasing staff acceptance, decreasing the rest period, including families, and repeating the treatment are paths to consider. Developing the evidence for non-pharmacological pain management in the postoperative period is compulsory (Martorella, Boitor, Michaud, & Gélinas, 2014).

Massage therapy is an ancient system of treatment that is now gaining more recognition as part of the alternative and complementary medicine. A meta-analysis was performed to assess the effect of massage therapies in 37 studies that utilized random assignment of samples. Massage therapy decreased the level of anxiety, pain, depression and heart rate and blood pressure among the patients. Thirty-seven studies produced statistically significant results and the Meta-analysis concluded that massage therapy is effective (Moyer, Rounds, & Hannum, 2004).
In the evaluation of massage therapies, long-term follow-ups are desirable along with the evaluation of cost-effectiveness and addition of more outcome variables. Most of the reviewed studies were experimented in Iran and Western countries. Evidence generated from these reviewed studies cannot be directly applied to countries such as China, India, and other Asian countries without further research investigations as sociocultural factors may influence the patient’s responses to massage interventions.

There are very few studies published to evaluate the effectiveness of massage therapies on post-operative outcomes among patients following cardiac surgery. The scientific consensus on the clinical effectiveness of massage therapies is not well documented. Rigorous research is necessary to prove the mechanism with measurement of relative biomarkers. Additionally, higher methodological qualities of randomized controlled studies are needed to prove the efficiency of massage therapies for this patient population. Additional research studies on the efficacy of massage therapies is necessary to strengthen the further evidence for patients undergoing cardiac surgery.

The thought of surgery may create a sense of stress or anxiety for most people. There is a necessity for the clinicians and nurses to identify therapeutic interventions that could be very safe, effective and practically implemented by them to the patients after major cardiac surgery. Patients and family members as health care consumers are looking to seek care in the holistic approach by making use of alternative and complementary therapies to promote the optimum level of their health and sense of well-being. Use of massage therapy in the surgical setting will be a favourable intervention to minimize anxiety, promote relaxation, and reduce the duration of stay in the hospital.
In this review, research articles published only in English were included. This may have produced certain bias (i.e., a Language bias) regarding the conclusion as some research studies were published in other languages. Another potential bias of this review is that some research studies not published due to non-significant results (i.e., a Publication bias). Some other concerns included modest quality of research studies, heterogeneity and small study sample sizes.

There is a growing attention to understand the significance of massage therapy among patients undergoing cardiac surgery. Given the conflicting results from the existing research studies were included in the review and the inappropriateness of direct application of the current evidence in Asian countries. There is a definite need for experimenting higher methodological qualities of research studies to create a strong evidence base of massage therapies. Additional research studies is required to prove massage therapies effective in improving post-operative outcomes and recovery among patients undergoing cardiac surgery, particularly in the Asian countries such as China, India, and other countries.

Publication

This systematic review was published in *International Journal of Nursing sciences*, an official journal of *Chinese Nursing Association* in August 2015.
<table>
<thead>
<tr>
<th>Author</th>
<th>Design &amp; Group</th>
<th>Sample size</th>
<th>Mean age</th>
<th>Type of surgery</th>
<th>Type of massage</th>
<th>Duration &amp; frequency</th>
<th>Outcomes measures</th>
<th>Study findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bauer et al., 2010 USA</td>
<td>RCT, EG:62, CG:51</td>
<td>113</td>
<td>65</td>
<td>CABG/Valve repair/ Replacement or Both</td>
<td>Integrative massage on shoulders, neck, back, hands, legs, feet</td>
<td>20 minutes 2 sessions, 2&lt;sup&gt;nd&lt;/sup&gt; and 4&lt;sup&gt;th&lt;/sup&gt; POD</td>
<td>Pain, anxiety, satisfaction, tension,</td>
<td>Patients receiving massage therapy had significantly less pain (P &lt; .001), anxiety (P &lt; .001), and tension (P &lt; .001) than those who didn’t receive the intervention.</td>
</tr>
<tr>
<td>Braun et al., 2012 Australia</td>
<td>RCT, EG:76, CG:76</td>
<td>152</td>
<td>67</td>
<td>CABG Valve Surgery/ Open heart surgery</td>
<td>Swedish massage on shoulders, neck, back, hands, legs, feet</td>
<td>20 minutes 2 sessions, 3&lt;sup&gt;rd&lt;/sup&gt; or 4&lt;sup&gt;th&lt;/sup&gt; and 5&lt;sup&gt;th&lt;/sup&gt; or 6&lt;sup&gt;th&lt;/sup&gt; POD</td>
<td>Pain, Anxiety, Muscular tension, Relaxation, Satisfaction</td>
<td>There was significant reduction in anxiety (P&lt;.0001), pain (P = .001) and muscular tension (P&lt;.0001) and increases in satisfaction (P = .016) and relaxation (P&lt;.0001).</td>
</tr>
<tr>
<td>Alber et al., 2009 USA</td>
<td>RCT, EG:126, CG:126</td>
<td>252</td>
<td>65</td>
<td>CABG Heart Valve Surgery/ Open heart surgery</td>
<td>Massage on leg, arm and back</td>
<td>30 minutes 2 sessions, 2&lt;sup&gt;nd&lt;/sup&gt; or 3&lt;sup&gt;rd&lt;/sup&gt; and 4&lt;sup&gt;th&lt;/sup&gt; or 5&lt;sup&gt;th&lt;/sup&gt; POD</td>
<td>Anxiety, Pain, Depression, Heart rate, Hospital stay, Respiration</td>
<td>There is no any significant differences between groups for any measures (P=.11 to .93), Massage does not yield any positive benefits.</td>
</tr>
<tr>
<td>Najafi et al., 2014 Iran</td>
<td>RCT, EG:37, CG:37</td>
<td>70</td>
<td>60</td>
<td>CABG</td>
<td>Thai massage on neck, shoulders, arms, fore arms, legs, feet</td>
<td>30 minutes One session, 3&lt;sup&gt;rd&lt;/sup&gt; post op day</td>
<td>Pain, Satisfaction</td>
<td>There was significant reduction of pain (P=0.001), Massage therapy was an effective intervention for management of pain</td>
</tr>
<tr>
<td>Babaee et al., 2012 Iran</td>
<td>RCT, EG:36, CG:36</td>
<td>72</td>
<td>NM</td>
<td>CABG</td>
<td>Swedish massage on legs, hands, back, shoulders</td>
<td>20 minutes 4 sessions, 3&lt;sup&gt;rd&lt;/sup&gt; to 6&lt;sup&gt;th&lt;/sup&gt; POD</td>
<td>Anxiety, Mood</td>
<td>Massage therapy is an efficient intervention in reducing anxiety(P&lt;0.001) and improving the mood (P&lt;0.001) among patients in post-operative period</td>
</tr>
</tbody>
</table>
### Chapter II

#### Review of Literature

<table>
<thead>
<tr>
<th>Author</th>
<th>Design &amp; Group</th>
<th>Sample size</th>
<th>Mean age</th>
<th>Type of surgery</th>
<th>Type of massage</th>
<th>Duration &amp; frequency</th>
<th>Outcomes measures</th>
<th>Study findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nerbass et al., 2011 Brazil</td>
<td>RCT, EG:20, CG:20</td>
<td>40</td>
<td>62</td>
<td>CABG</td>
<td>Massage on neck, shoulder and back</td>
<td>20 minutes Three sessions 1st to 3rd POD</td>
<td>Pain, Fatigue, Sleep</td>
<td>Massage therapy is a useful intervention and there was significant reduction in pain (P&lt;0.001), fatigue (p=0.028) and for improving sleep (p=0.536), recovery among patients</td>
</tr>
<tr>
<td>Asadizaker et al., 2011 Iran</td>
<td>RCT, EG: 32, CG: 33</td>
<td>65</td>
<td>52</td>
<td>Cardiac Surgery</td>
<td>Foot and hand massage</td>
<td>20 minutes Single session 1st POD</td>
<td>Pain, Use of sedative drug</td>
<td>There was statistically significant difference on the pain intensity and type, and amount of sedative drug used(p=0.000) between the two groups</td>
</tr>
</tbody>
</table>

Note: RCT = Randomized controlled trial; EG = Experimental Group; CG = Control Group; NM = Not Mentioned; CABG = Coronary artery bypass graft; POD = Post-Operative Day.
Research Gap

The existing literature gave the insights on impact and burden of anxiety, pain, fatigue on recovery and quality of life among patients who underwent CABG surgery. Two systematic reviews revealed that there were many trials worldwide on effectiveness of preoperative education and massage therapy among patients undergoing cardiac surgery but researcher could not retrieve even one trial from Indian settings. Also many research studies tested the effectiveness of only one component of intervention either massage therapy or preoperative education. No literature was available on combined effects of intervention on this study population. There is a scope for comprehensive nursing interventions having more than one component and check their effectiveness in patients undergoing CABG surgery. This shows the importance of present study.

Summary

This chapter dealt with the review of various research studies related to the study area. Aspects of reviewed literature were anxiety, pain, fatigue, self-efficacy and quality of life among patients undergoing CABG surgery. There were only a few studies available on self-efficacy and fatigue in this patient population. The process of analysing various scientific literatures gave new insights to the researcher with regard to the conduct of the present study. The review also helped in understanding the problem, selecting appropriate research instruments, and designing and conducting the study and also in the data analysis.