

effects of pre operative education and ventilatory exercise training in reducing anxiety and improvement in recovery among cardiac patients

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ABSTRACT

OBJECTIVE:

To evaluate the effects of pre operative education and ventilatory exercise training in reducing anxiety and improvement in recovery among cardiac patients.

BACKGROUND:

Patients awaiting cardiac surgery typically experience physical and psychological stress. Although there is evidence that preoperative education can improve postoperative outcomes among general surgical patients, less is known about preoperative education for patients undergoing cardiac surgery. Physiotherapists play an important role in the preparation and rehabilitation of patients who had undergone surgical procedures. In the present study, the effects of pre operative education and ventilatory exercise training were observed to know the effectiveness in reducing anxiety and improvement in recovery among patients undergoing cardiac surgery.

METHODOLOGY:

This study includes 100 subjects both male and female undergoing elective cardiac surgery of age 18-60 years who were eligible as per the inclusion criteria. Pre- participation questionnaire along with the consent form was given to the subjects to fulfill criteria for selection. Subjects were allocated physiotherapy instructions and ventilatory exercise training pre operatively. The primary outcome was change in anxiety which was measured by BAI (Beck Anxiety Inventory) pre operatively before and after education and training and 4 days post operatively. Secondary outcomes were pain and SPO₂ which were measured by VAS (Visual Analogue Scale) and pulse oxymetry respectively.

RESULTS:

Results showed that anxiety score after pre operative instructions and ventilatory exercise training exercise was significantly higher ($p<0.01$) in males as compared to females. There was a significant decrease in score of anxiety pre and post operatively after physiotherapy instructions and ventilatory exercise training ($p<0.01$) and there was also a significant reduction in VAS score ($p<0.01$) whereas SPO₂ was increased significantly ($p<0.01$). Thus it showed that pre operative education and ventilatory exercise training is effective in reducing anxiety and improves recovery among patients undergoing cardiac surgery.

CONCLUSION:

This study provides empirical support for the hypothesis that a pre operative education intervention involving counseling, verbal explanation and ventilatory training are effective in reducing anxiety and pain among patients undergoing cardiac surgery. This study not only have important implications for effective strategies to control patient's elevated anxiety in anticipation of cardiac surgery, but also help make recommendations for quality improvement of pre

operative education in practice.

KEY WORDS: Pre operative education, cardiac surgery, anxiety, ventilatory training.

INTRODUCTION

Coronary artery disease is the leading cause of morbidity and mortality worldwide. For more than 15 years, WHO has been sounding an alarm on the rapidly rising burden of cardiovascular disorders. The reported prevalence of coronary artery disease (CAD) in adult surveys has risen 4-fold over the last 40 years to a present level of around 10%.⁸

The burden of CVD is projected to be the highest in India by the year 2020, as compared to other countries.⁹ In the WHO-PREMISE study, the proportion of CHD among patients less than 50 years of age, was highest in India (22.6% in males and 3% in females).¹⁰ In the Million Death Study(2009), the authors determined that CVD are the leading cause of death (20.3% in males and 16.9% in females) among Indian adults (age 25-69 years).¹¹

Cardiovascular diseases, especially coronary heart disease (CHD), are epidemic in India. The Registrar General of India reported that CHD led to 17% of total deaths and 26% of adult deaths in 2001-2003, which increased to 23% of total and 32% of adult deaths in 2010-2013.⁸

Cardiovascular disease is the leading global cause of death, accounting for more than 17.3 million deaths per year, a number that is expected to grow to more than 23.6 million by 2030.¹²

In 2013, cardiovascular deaths represented 31 percent of all global deaths, with 80 percent of those deaths taking place in lower and middle income countries. Nearly 801,000 people in the U.S. died from heart disease, and other cardiovascular diseases in 2013. That's about one of every three deaths in America. About 2,200 Americans die each day from these diseases, one every 40 seconds.¹²

Cardiac surgery is a procedure performed in patients with cardiovascular disease. After cardiac surgery, various complications that will require specific care, especially in the respiratory system, can be observed. These complications can lengthen the hospital stay of patients, causing increased hospital costs and becoming an important cause of morbidity and mortality.¹⁴

The coronary artery bypass grafting presents satisfactory results, however, is has the pain caused by the nociceptive stimulus from sternotomy as an important cause of mortality and morbidity in the postoperative period, which leads less effectiveness of cough, by adopting a rapid and superficial breathing, and can cause pulmonary complications such as atelectasis.¹⁵

Nevertheless, patients who had undergone heart surgery may suffer psychological disorders such as anxiety, which is hardly noticeable in the pre-operative, and it may go unnoticed by the medical team, since often such disorder is related to physical illnesses.¹⁶ These can exacerbate symptoms of existing cardiovascular disease, adversely affect physiological parameters before

and during anaesthesia, and can result in prolonged recovery .^{25,26}

Cardiac patients with a high level of anxiety can experience physical symptoms including headache, dizziness, nausea, muscle weakness, fatigue, sweating, and difficulty falling asleep, or even more intense symptoms such as chest pain, palpitations, shortness of breath. Chest pain is a common symptom of anxiety and may take form of a sharp pain or a feeling of visceral tightness.²⁹

Decreases in essential parameters of vital capacity, functional residual capacity, and forced expiratory volume may directly contribute to atelectasis, which can contribute to postoperative pulmonary complications. Pulmonary function is further compromised by hypoventilation, decreased mucous clearance, decreased respiratory muscle function, increased work of breathing, and hypoxia—all ramifications of the surgical procedure.³⁶ Additionally, walking ability is limited after CABG surgery.³⁷

Breathing exercises and ventilatory training are fundamental interventions for the prevention and management of post operative complications (PPC'S). Breathing exercises and ventilatory training includes diaphragmatic breathing, segmental breathing, inspiratory resistance training, glossopharyngeal breathing, breathing techniques for the relief of dyspnea during exertion.³⁹

Chest mobilization exercises combine active movements of the trunk or extremities with deep breathing. They are designed to maintain or improve mobility of the chest wall, trunk and shoulder girdles when it affects ventilation or postural alignment.³⁹

Airway clearance is an important part of management of patients. An effective cough is necessary to eliminate respiratory obstructions and keep the lungs clear. ACBT (active cycle of breathing technique) can be used to stimulate a stronger cough, improving clearance of secretions. Postural drainage, another intervention for airway clearance, is a means of mobilizing secretions in one or more lung segments to the central airways and cleared by coughing or endotracheal suctioning.^{39,40}

Incentive spirometry is a form of ventilatory training that emphasizes sustained maximum inspirations.³⁹

Pre-operative education is defined as providing the patient with health related information, psychosocial support and the opportunity to learn specific skills in preparation for surgery. Pre-operative program might include a number of components and inclusion of family members, teaching of specific skills.⁴

Physiotherapists play an important role in the preparation and rehabilitation of patients who had undergone surgical procedures. In addition to having a large arsenal of techniques, the, physiotherapist has been one of the professionals that more time is next to the patients. As such, it is suggested that time spent is better spent, by favoring professionals to clarify the doubts of

the patients and guide them to the new situations that they will have to face.⁵

Early mobilization, positioning, breathing exercises and techniques for bronchial hygiene are the usual techniques utilized.¹

METHODOLOGY:

A total 100 number of both males and females were selected for this study undergoing cardiac surgery was taken from CTVS ICU Geetanjali Medical College and Hospital (GMCH). Based on assessment, interview and questionnaire subjects were excluded of Acute and Chronic Asthma, Previous Cardiac Surgical history, Unstable vitals, Cardiac pacemaker, Shortness of breath more than grade 3 or 4, Pregnancy, Unstable angina pectoris, Psychosomatic disorders. Information and demonstrations of ventilatory exercises were performed to the patients individually, for the improvement of pulmonary ventilation and bronchial hygiene. Explanation to the patients was given regarding sternotomy and the importance of maintaining an appropriate pulmonary ventilation and cough, so avoiding possible pulmonary complications. Each patient received written, physiotherapeutic guidelines on ventilatory exercise and ventilatory exercise training that could be performed after surgery. After guidance, anxiety was evaluated pre and post operatively by Beck Anxiety Inventory. When it was necessary, the ventilatory exercises were reminded to patients. The primary outcome was change in anxiety which was measured by BAI (Beck Anxiety Inventory) pre operatively before and after education and training and 4 days post operatively. Secondary outcomes were pain and SPO₂ which were measured by VAS (Visual Analogue Scale) and pulse oxymetry respectively.

RESULTS:-

Pair	Variables	Mean	SD	SEm	T	Df	P
1	Pre operative ly BAI at the time of admission and BAI after physiotherapy instructions	19.887	2.753	0.350	56.887	61	0.000

2	Pre operative ly BAI after physiotherapy instructions and BAI post operative ly	12.387	2.836	0.360	34.389	61	0.000
3	Pre operative VAS and post operative VAS	3.790	0.813	0.103	36.730	61	0.000
4	Pre operative SPO ₂ and post operative SPO ₂	-5.597	2.854	0.362	-5.440	61	0.000

DISCUSSION:-

According to the results of the study, preoperative education reduced the anxiety of patients undergoing cardiac surgery and had an effect on postoperative complications. This finding is consistent with that reached by Guo Ping, who found a significant reduction in post operative

anxiety after pre operative education of patients who underwent CABG. Only one study by Deyirmenjian M showed that pre operative education increased the post operative anxiety of patients. This is probably due to the difference in the timing and the manner of education delivery. . Heather et al. applied a protocol of preoperative intervention in patients undergoing coronary artery bypass grafting by a multidisciplinary team of cardiologists, surgeons and physiotherapists. There was a reduction of one week in hospital stay in the group receiving the intervention, as well as improvement in quality of life of these patients, which lasted for 6 months. However, mortality rates and levels of anxiety both preoperatively and postoperatively did not differ between groups.

Physiotherapists play an important role in the preparation and rehabilitation of patients who had undergone surgical procedures. In addition to having a large arsenal of techniques, the physiotherapist, notoriously, has been one of the professionals that more time is next to the patients. As such, it is suggested that time spent is better spent, by favoring professionals to clarify the doubts of the patients and guide them to the new situations that they will have to face. Some symptoms reported by anxious patients, such as tachycardia, tachypnea, and high systemic blood pressure, may be mistaken as part of the presentation developed by coronary artery disease. Conceição et al. reported that the measurement of blood pressure and heart rate are not good parameters to measure the patient's anxiety level, requiring the assessment of the disorder by means of validated scales such as the Beck anxiety Inventory. According Trame et al. , the Inventory is widely used because of its cost-effectiveness, ease of application and interpretation.

In our study, results showed that except anxiety score after counseling which was significantly higher in males as compared to females ($p < 0.01$) , there was no difference for rest of the parameters. Score of anxiety and pain has been reduced after pre operative education and ventilatory training significantly ($p < 0.01$). Score of SPO_2 increased significantly. The correlation was significantly positive for anxiety and pain pre and post operatively.

CONCLUSION:-

This study provides empirical support for the hypothesis that a pre operative education intervention involving counseling, verbal explanation and ventilatory training are effective in reducing anxiety and pain among patients undergoing cardiac surgery. This study not only have important implications for effective strategies to control patient's elevated anxiety in anticipation of cardiac surgery, but also help make recommendations for quality improvement of pre operative education in practice.

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