



A STUDY TO ASSESS THE EFFECTIVENESS OF ACAPELLA BREATHING EXERCISE ON PULMONARY FUNCTION AMONG POST CABG PATIENTS ADMITTED IN SREE MOOKAMBIKA INSTITUTE OF MEDICAL SCIENCE AT KULASEKHARAM

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ABSTRACT

Coronary Artery Disease is a chronic process that begins during adolescence and slowly progresses throughout life. The increasing number of individuals is now undergoing CABG surgery. The patients have a higher risk of respiratory complications after CABG surgery. The removal of Respiratory secretion is an important concern during the rehabilitation phase after cardiac surgery. The Acapella is a handheld device causing a positive expiratory pressure within the airways has been proposed as an alternative to more conventional airway clearance techniques. The study was quasi experimental study with quantitative approach. Data collection period was one month. The study was conducted in Sree Mookambika Institute of Medical sciences Kulasekharam. 40 samples were selected by using purposive sampling technique. The tools used for the data collection were demographic variables, disease specific variables, clinical variables and spirometry assessment scale. The study findings during pre-test in experimental group, majority 11(55%) were having moderate discomfort and 6(30%) were having severer discomfort and in control group majority 11(55%) were having moderate discomfort and 6(30%) were having severe discomfort. During post-test in experimental group, majority 9(45%) of them were having mild discomfort and no discomfort and 2(10%) were having moderate discomfort and in control group majority 12(60%) of them were having moderate discomfort and 6(30%) were having mild discomfort. In experimental group mean value were 3.2 in pre-test and 1.7 in post-test respectively. The paired 't' value is 13.07* which is significant at $p < 0.001$. It showed that the Acapella breathing exercise was effective in improving the level of pulmonary function among post CABG patients. There is significant association between the level of pulmonary function with the selected demographic variables, disease specific variables and clinical variable like age group, gender, education, occupation, marital status, type of family, heart rate, respiration rate.

Key words: Assess Effectiveness, Acapella, Breathing Exercise, Pulmonary function, Post CABG Patients.

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INTRODUCTION

Health is common theme in all cultures; in fact all communities have their own concepts of health as a part of their culture. From the ancient man has been interested in trying to be healthy and to have control over disease[1].

Coronary artery disease (CAD) is the most common type of heart disease[2]. Coronary Artery Disease is a chronic

process that begins during adolescence and slowly progresses throughout life. It is the leading cause of death in the United States in both men and women. CAD happens when the arteries that supply blood to heart muscle become hardened and narrowed. This is due to the build-up of cholesterol and other material, called plaque, on their inner walls[3]. This build-up is called



atherosclerosis. As it grows, less blood can flow through the arteries. As a result, the heart muscle can't get the blood or oxygen it needs[4].

Cardiovascular disease (CVD) is the leading cause of global death, accounting for 17.3 million deaths per year, a number that is expected to grow to more than 23.6million by 2030. In 2008, cardiovascular deaths represented 30 % of all global deaths, with 80 % of those deaths taking place in low- and middle-income countries [5].

According to World Health Organization (WHO) 2017 CVDs are the number one cause of death globally, more people die annually from CVDs than from any other cause. An estimated 17.9 million people died from CVDs in 2015, representing 31% of all global deaths. 85% are due to heart attack and stroke. Of these deaths, an estimated 7.4 million were due to coronary heart disease and 6.7 million were due to stroke[6]. Over three quarters of CVD deaths take place in low- and middle-income countries. Out of the 17 million premature deaths (under the age of 70) due to non-communicable diseases in 2015, 82% are in low- and middle-income countries, and 37% are caused by CVDs. It occurs almost equally in men and women. Every year 3,09,000 people die due to coronary attack in an emergency department or without being hospitalized[7].

Globally eight percentage world population has access to coronary artery bypass grafting surgery. 6.5 lakhs surgeries are done in a year 2007. Out of 6.5 lakhs in that 4.5 lakhs are performed in United State alone only two lakhs are performed- in the rest of world. [8]

In India, an estimated 2.27 million people died due to cardio vascular disease during 1990 and the projection of death due to increase of heart disease from 1.17million to 1.59 million in 2000 and 2.30 million by 2010. The prevalence of coronary valve disease is reported to be 2 to 3 times higher in urban population than in rural population and it is estimated as 96.7 percentage in 1000 adult population in urban and 27.1 percentage in rural population. The American heart association reported a statistics in the basis of 2007 mortality rate which shows that, there were more than 2200 deaths occurring due to CVD in America in each day.[9]

The mortality rate increases in patients with age more than 70 years; already who had poor health before the time of surgery; disease in the left main coronary artery; patient with Diabetes; chronic lung problems; smokers; excessively over weight; women usually had heart attack at an older age than men, the average being 70 years. [10]

The researcher felt that there is a need of the hour to find out the effectiveness of certain non-pharmacological measure which may be useful in improving the pulmonary function. With this concept the researcher is intended to find the effectiveness of selected discomfort relieving technique which is taken from the concept of breathing technique.[11]

Methodology:

Research approach: In this study, quantitative research approach was adopted.

Research design:

In this study, Quasi experimental pre-test and post-test design was adopted.

Setting of the study:

The study was conducted at Sree Mookambika Institute of Medical Science Kulasekharam which is a 750 bedded multispecialty hospital[12]. The researcher select the settings because our hospital have separate cardiac wing .In this there are facilities such as cardiac outpatient department, cathlab, cardiac operation theatre, CTICU, ICCU, pre and post-operative cardiac ward, cardiac ward for both males and females. Daily two patient underwent CABG surgery. Approximately 40 patients undergone CABG surgery per month[13].

Population In the present study, target population comprised of Post CABG patients in selected hospitals.

Sample size

The sample size for this study was 40 between the age group of 35-70years. Among 40, 20 patients allotted to the experimental group and 20 allotted to the control group based on the inclusion and exclusion criteria[14].

Sampling technique In this study, Purposive sampling technique was used to select the samples.

Criteria for sample selection

Inclusion criteria

- CABG patients who are conscious and well oriented.
- CABG patients who were between the age group of 35-70 years.
- CABG patients who are willing to participate in the study
- CABG patients with both males and females.

Exclusion criteria

- CABG patients those who are seriously ill
- CABG Patients who are not willing to participate in the study.
- CABG patients undergone other than the cardiac surgeries.

Research Approach:

Research approach used for this study was Quantitative approach.

Description of the tools:

The tool used for the study was demographic variables, Disease specific variables, clinical variables andSpirometer based on the objectives of the study and



with the guidance of experts in the field of medical experts[15].

Section: A

It consists of demographic variables such as age, gender, educational status, occupation, family income, marital status, place of residence type of family[16]. Disease specific variables such as family history of CAD, history of smoking, chest pain, breathing difficulty, palpitation, duration of illness, previous hospitalization, hypertension, diabetes mellitus, type of diet, meat, frequency of consuming non-veg in a week, type of oil used, comorbid conditions[17].

Section: B

This section deals with Inspiratory and Expiratory capacity using spirometer which is measured the functional capacity of the lungs among CABG patients. Total score is 4.

Scoring:

- No Discomfort -1 (3 ball rise)
- Mild Discomfort - 2 (2 ball rise)
- Moderate Discomfort - 3 (1 ball rise)
- Severe Discomfort - 4 (no ball rise)

Data collection procedure:

Data collection was done in in Sree Mookambika institute of medical science, for a period of 4 weeks[18]. The investigator has obtained written permission from the hospital management and oral consent was obtained from

the samples prior to the study[19]. The purpose of the study was explained to the subjects. The samples that fulfilled the inclusion criteria were selected. The purposive sampling technique was used to select 40 post CABG Patients for both experimental group and control group. The investigator collected the data related to demographic variables, disease specific and clinical variables and conducted the pre-test to assess the level of pulmonary functions by using spirometer in both experimental and control group[20]. Acapella Breathing exercise was administered, Subjects were asked to seat in a comfortable position leaning forward with elbows supported on a table and neck slightly extended in order to open up the airway. The acapella was held horizontally and tilted slightly upwards in order to get maximal oscillatory effect and was place in the mouth[21]. Inspiration was done through the nose. A slow breath in, only slightly deeper than normal with a breath hold of 2-3 seconds followed by breath out through the acapella at a slightly faster than normal. An acapella session consists of 10 to 15 breaths followed by huffing, with session lasting about 20-30 minutes in the morning for 10 consecutive days for the experimental group, where as in control group, the existing hospital routine was practiced. On the 10th day after the completion of sessions post-test was done to assess the pulmonary functions measured by using spirometer in both experimental and control group[22]. The data collected was analysed by using descriptive and inferential statistics[23].

RESULT AND DISCUSSION

Section – A

Table 4.1: Frequency and percentage distribution of demographic variables of Post CABG Patients in experimental group and control group. N=40

Sl No	Demographic Profiles	Experimental group		Control group	
		f	%	f	%
1	Age group				
	a) 35-45 years	2	10	2	10
	b) 46-55 years	10	50	12	60
	c) 56-65 years	8	40	6	30
	d) 66-75 years	0	0	0	0
2	Gender				
	a) Male	10	50	11	55
	b) Female	10	50	9	45
3	Education				
	a) Primary	10	50	8	40
	b) Secondary	4	20	4	20
	c) Degree	1	5	2	10
	d) Illiterate	5	25	6	30
4	Occupation				
	a) Unemployed	6	30	4	20
	b) Agriculture	11	55	12	60
	c) Private	0	0	1	5



	d) Government	3	15	3	15
5	Family income				
	a) <Rs.5,000	6	30	12	60
	b) Rs.5,000-7,000	2	10	4	20
	c) Rs.7,000-10,000	9	45	1	5
	d) Rs.10,000-20,000	3	15	3	15
6	Marital status				
	a) Married	16	80	16	80
	b) Unmarried	0	0	0	0
	c) Widow	4	20	4	20
	d) Divorced	0	0	0	0
7	Residence				
	a) Rural	7	35	7	35
	b) Semi urban	8	40	11	55
	c) Urban	5	25	2	10
8	Family type				
	a) Nuclear	11	55	9	45
	b) Joint	8	40	9	45
	c) Extended	1	5	2	10

Section – B

Table 4.4: Frequency and percentage distribution of post CABG patients according to the level of pulmonary function in experimental group. n=20

Variables	Levels	Experimental group			
		Pre test		Post test	
		f	%	f	%
Pulmonary Function	Severe discomfort (No ball rising)	6	30	0	0
	Moderate discomfort(1 ball)	11	55	2	10
	Mild discomfort (2 balls)	3	15	9	45
	No discomfort (3 balls)	0	0	9	45

Table 4.4: During pre-test in experimental group, majority 11(55%) were having moderate discomfort and 6(30%) were having severe discomfort. In post test, majority 9(45%) of them were having mild discomfort and no discomfort and 2(10%) were having moderate discomfort.

Recommendations

- The study can be conducted for a larger group in different setting for better generalization of the findings
- A comparative study can be conducted with other complementary therapies.
- All cardiac thoracic cases with chest drain to be included in this study.
- It can be conducted in different settings like hospice care and rehabilitation centers.

Nursing implications

Coronary Artery Bypass Graft (CABG) is one of the most commonly performed surgical procedures to restore the blood flow to the heart, when a blockage occurs in two or three arteries. CABG patients have to take some precautions and modifications in their life style to improve the quality of life and to prevent further recurrence of the problem[24]. It is mainly used to treat

the patient whose coronary artery are severely blocked. Acapella combines the benefits of both PEP therapies and airway vibrations to mobilize pulmonary secretions and can be used in virtually any position allowing patients to move freely and sit, stand or recline. Coughing and deep breathing are techniques used to help clear the respiratory system of secretions. The goal of coughing and deep breathing is to increase lung capacity and expand the airways after a period of inactivity or anesthesia. The research has derived the following implications from the study results, which are of vital concern to the field of nursing practice, nursing education, nursing administration and nursing research[25].

Nursing practice

- Acapella breathing exercise is a safe and better modality which brings a higher level of satisfaction for patients.
- Acapella breathing exercise is one of the cost effective nursing intervention to improve the pulmonary parameters.
- It can be used in this study can be applied in the practice set up; there by increasing the nursing practice based on evidence.



NURSING EDUCATION

- Nurse educator can train and encourage the student nurses to implement education and exercises as a non-pharmacological measure to improving pulmonary parameters among post CABG patients.
- The nursing curriculum can include evidence based research studies related to post-operative outcomes for patients undergoing cardiac surgeries.
- Nurses must be reinforced in-service education regarding CABG, its follow-up care, early identification and prevention of complications.

Nursing administration

- The result of the study encourages the nurse administrator to conduct in service education program on various types of breathing exercises in improving pulmonary parameters among post CABG patients.
- Nurse managers can strengthen interdisciplinary and multidisciplinary collaboration with researchers.
- The nurse should prepare, case presentation, clinical presentation, nursing rounds, clinical demonstration, on importance of post-operative exercises with the preparation of pamphlet for the benefit of patients.

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Nursing research

- Nurse researcher can do various studies related to other beneficial effects of Acapella breathing exercise to improve pulmonary parameters.
- Nurse researchers can collaborate with the other health team members in developing evidence based nursing practice.
- The study plan can be further replication in various other settings and larger population

CONCLUSION

The study was done to assess the effectiveness of Acapella breathing exercise on pulmonary function among post CABG patients. Based on statistical findings, in experimental group mean value were 3.2 in pre-test and 1.7 in post-test respectively. The paired 't' value is 13.07 * which is significant at $p < 0.001$. It shows that the Acapella breathing exercise was effective in improving the level of pulmonary function among post CABG patients. Hence the research hypothesis (H1) is accepted. Acapella breathing exercise found to be an effective nursing intervention in improving the level of pulmonary function among post CABG patients.



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