IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

EFFICACY OF A CARDIAC REHABILITATION PROGRAMME ON ACTIVITY TOLERANCE, CERTAIN PHYSIOLOGICAL PARAMETERS (HEART RATE (HR), ELECTROCARDIOGRAM (ECG)), AND QUALITY OF LIFE IN HOSPITALISED CABG SURGERY PATIENTS AT DR. PREM HOSPITAL IN PANIPAT

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Abstract

The study's goal was to find out how well the cardiac rehabilitation plan worked on activity tolerance, certain physiological parameters (heart rate (HR) and electrocardiogram (ECG)), and quality of life in Dr. Prem Hospital Panipat patients who had recently undergone CABG surgery. This study's main ideas come from Sister Calista Roy's Adaptation Model, which is made up of four ideas: the person, nursing, health, and surroundings. Methodology: To test a goal, a quantitative research method is used. This study uses a quasi-experimental research design to find out how well a cardiac rehabilitation plan works. It does this by using a quasi-experimental nonequivalent Pretest Post Test control group design. The study took place at Dr. Prem Hospital. For the study, 60 people who had CABG surgery were chosen: 30 were in the experimental group and 30 were in the control group. They were all brought to the cardiothoracic surgery department. The study used a method called "total enumerative sampling." Demographic and clinical variables, the Duke Activity Status Index, heart rate, an ECG, and the SF 36 questionnaire are all used to gather data. Also, written permission was asked for. The method used was total enumerative selection. This cardiac rehabilitation scheme checked in on people who had CABG surgery once a week. On the fifth day after surgery, both the experimental group and the control group took a pre-test in the post-operative room of the cardiothoracic department. Thirty of them were put in the training group and thirty were put in the control group. The intervention group got cardiac rehabilitation for three days in a row through a planned training programme and demonstration. They were told what to do and were urged to do it over the phone. Before 30 and 60 days, changes were measured in both groups' exercise tolerance, physiological parameters (heart rate ECG), and quality of life. The standardised tools were used, and the material was approved by experts. The Cronbach alpha method was used to check the reliability of the tools. Before the samples were used to collect data, the Duke activity status index was used to measure activity tolerance and the SF-36 questionnaire was used to measure quality of life. For heart rate.9, the inter rater method ECG-.75 was used. The control group had an

activity tolerance score of 45.47 + 4.883 on the post-test, which is the mean and standard deviation. The average and range of exercise tolerance levels in the control group during the post-test were 25.23 + 8.169, and the score for the independent 't' test was 12.045 for 58 degrees of freedom. The 'p' number was less than 0.001, which means it was probably real. To compare the experimental group and the control group, the quality of life score after the test was 50.4 + 9.676 for the experimental group and 30.8 + 5.372 for the control group. The independent 't' test score was 9.700 for the degree of freedom 58. At a 'p' value of less than 0.001, it was statistically significant(p value less than 0.001). Based on the study, it can be said that a mix of interventions, such as teaching, showing exercises, giving out pamphlets about cardiac rehabilitation, and phone calls to encourage people to stick with it can increase adherence to cardiac rehabilitation, which in turn improves activity tolerance and quality of life.People who went through a cardiac rehabilitation course will not get sick again or have to go back to the hospital.It makes people more likely to follow through with their therapy treatment.

Keywords: Effectiveness, cardiac rehabilitation programme, activity tolerance, selected physiological parameters, Heart rate, Electro cardiogram and quality of life CABG surgery patients

Introduction

Cardiovascular Disease (CVD) is the leading cause of death worldwide, especially in low- and middle-income nations like India and China.1. Board for Global Health in Developing World 2010 states that cardiovascular disorders are prevalent in towns and developing rapidly in rural areas. India's health policy says chronic illness control is under planned. Thus, cardiovascular problems will rise. The heart receives blood and oxygen from its arteries. It causes coronary artery disease (CAD) when constricted or blocked. This disease is also known as arteriosclerotic heart disease, coronary atherosclerosis, coronary arteriosclerosis, and ischemic heart disease. The excessive deposit of fat or lipid compounds and tissue in the vessel wall affects the arterial wall structure and physiology and lowers blood flow to the myocardium. Lipid metabolism, blood coagulation, and artery wall biochemistry and biophysics likely induce atherosclerotic disease. Blockages preventing blood to the heart cause most acute heart attacks. The most common cause of this condition is fatty deposits on heart artery walls. Coronary artery disease consequences are called acute coronary syndrome. Silent ischemia, chronic stable angina, acute coronary syndrome, unstable angina, ST segment elevation MI, and non-STEMI Myocardial infarction is heart illness.

CABG surgery aims to preserve cardiac blood flow. However, surgery will not prevent fatty deposits from forming in artery walls, constricting blood arteries and lowering blood flow again. Professionals must treat the underlying causes of fatty deposit advancement to reduce disease recurrence. CABG requires physical, psychological, emotional, and social adjustment.

According to the USPHS, cardiac rehabilitation (CR) involves medical assessment, supervised physical exercise, training, and counselling for heart disease patients9.Cardiac rehabilitation is a helpful and safe programme for coronary artery disease patients.

According to the CHD statistics 2012 edition of the University of Oxford, Coronary Heart Disease (CHD) affected 585,900 Australians in 2011, and the exact number for the following year is not specified. In sub-Saharan Africa, high blood pressure remains the major risk factor, with a nationwide occurrence rate of 15-30% among adults. Although smoking rates in African males are high, the occurrence of other risk factors is comparatively low. The burden of Cardiovascular Disease (CVD) in sub-Saharan Africa has been increasing since 1990, and it is estimated that it will double between 1990 and an unspecified year. The mortality rate due to CVD is estimated to increase by 77% in China and 106% in other countries of Asia in 2020, while it is only projected to increase by 15% in high-income nations. People in the northern and northwestern areas of China consume more sodium than those in the southern areas. The prevalence of high blood pressure, increased average serum cholesterol, and high Body Mass Index (BMI) is higher in the north than the south, and in cities.

OBJECTIVES

1. To find out the pretest and posttest activity tolerance, selected physiological parameters (Heart rate(HR), Electrocardiogram (ECG)) and quality of life of patients with CABG surgery in experimental and control group.
2. To find out the effectiveness of cardiac rehabilitation programme in terms of activity tolerance, selected physiological parameters (heart rate, ECG) and quality of life of patients with CABG surgery.
3. To find out the relationship between activity tolerance of the patients with CABG surgery who received cardiac rehabilitation programme and their quality of life.
4. To find out the relationship between physiological parameters (heart rate, ECG) of the patients with CABG surgery who received cardiac rehabilitationprogramme and their quality of life.

Materials and Methods

The current study primarily focuses on evaluating the efficacy of a cardiac rehabilitation programme. The quantitative research approach is utilised to test objective theories by analysing the relationships between variables. Quasi-experimental approach with non-equivalent control groups, measuring before and post intervention outcomes. Location: Dr. Prem Hospital in Panipat. The study utilises a quasi-experimental research approach to assess the efficacy of a cardiac rehabilitation course through a quasi-experimental non-equivalent pretest-posttest control group design.

The investigation was conducted at Dr. Prem Hospital. The hospital has a capacity of 120 beds and offers a range of specialised medical services. The investigation was conducted in a cardiothoracic surgery postoperative unit. The post-operative facility has 20 beds. Every week, 2 CABG operations are conducted, with a majority being males and a minority being girls. They remain hospitalised for up to 12 days post-surgery. The outpatient section of cardiothoracic surgery is utilised for academic purposes as well. Postoperatively, individuals who have undergone CABG surgery commonly experience issues including as wound infections, neurological difficulties, arrhythmias, and pulmonary complications. Patients at Dr. Prem Hospital who had undergone CABG surgery and met the inclusion criteria between 12-05-2022 and 12-06-2022 were chosen for the study. One patient experienced a neurological issue during the data collecting time, and another person was transferred to the Thoracic Department. Sample size of at least 30 is necessary in each group. 60 patients who underwent CABG surgery were recruited for the trial, including 30 in the experimental group and 30 in the control group at the cardio thoracic surgery department. The study utilised total enumerative sampling approach. It is a type of non-probability sampling method. This sampling strategy involves selecting all subjects who meet the predetermined inclusion and exclusion criteria. Samples are not at risk of contamination. Surgical patients will not return to the cardiothoracic postoperative department. Initially, 50 samples were collected for the experimental group, followed by another 50 samples for the control group.
In this present study, the following tools are used by the researcher based onthe objectives of the study.

Part I: Demographic & clinical variables

Part II: Duke Activity Status Index

Part III: Heart ratePart IV: ECG

Part V: Sf 36 questionnaire

The researcher acquired official authorization from the ethical committee of Ved Nursing College and Dr. Prem Hospital before commencing the study. Data gathering lasted for one month. The study was conducted at Dr. Prem Hospital in Panipat during the first week of December 2022, explaining its significance to the Head of the Cardio Thoracic Department. Data were gathered from patients in the cardiothoracic department five days after undergoing CABG surgery. During the data collection period at Dr. Prem hospital, patients who underwent CABG surgery and met the inclusion criteria were chosen for the study. The researcher acquainted herself with each participant and elucidated the study's objective. Written consent was acquired as well. Enumerative sampling approach was employed. Each week, six patients who underwent CABG surgery participated in this cardiac rehabilitation course. A pretest was conducted in the postoperative ward of the cardiothoracic department on the 5th postoperative day for both the experimental and control groups.

The data were analysed for the study's aims using descriptive and inferential statistics. The data analysis plan is outlined as follows:

- Data organization in master sheet
- Demographic data were assessed using frequency and percentage, whereas Pre-test and Post-test scores for activity tolerance, heart rate, electrocardiogram, and quality of life were analysed using mean and standard deviation.
- Paired t-test was utilized to determine the mean score difference before and after a cardiac rehabilitation program in both the experimental and control groups.

Data Analysis and Interpretation

Table – I

Frequency and Percentage Distribution of Subjects According to Demographic Variables in Experimental and Control Group

(N = 60)

S, No	Demographic Variables		Experimental Group		Control Group	
			f	%	f	%
1	Age (Years)	< than 50 years	5	16.7	9	30.0
		51 – 60 years	17	56.7	14	46.7
		> than 61 years	8	26.7	7	23.3
2	Gender	Male	19	63.3	12	40.0
		Female	11	36.7	18	60.0
3	Religion	Hindu	21	70.0	22	73.3
		Muslim	4	13.3	2	6.7
		Christian	3	10.0	4	13.3
		Sikhs	2	6.7	2	6.7
4	Educational Status	Illiterate	0	0	5	16.7
		Primary	11	36.7	9	30.0
		Secondary	16	53.3	11	36.7
		Senior Secondary	3	10.0	5	16.7

5	**Dietary Pattern**	Vegetarian	16	53.3	10	33.3
		Non - Vegetarian	11	36.7	13	43.3
		Eggetarian	3	10.0	7	23.3

Table – I show the frequency and percentage distribution of subjects according to demographic variables in experimental and control group.

With regard to age of the subjects in experimental group majority 17 (56.7 %) were in 51 – 60 years and in the control group majority 14 (46.7 %) were in age 51 – 60 years.

Gender of the subjects were distributed as follows. Among subjects in experimental group majority 19 (63.3 %) were males and in case of subjects in the control group majority 18 (60 %) are females.

Subjects were distributed as follows with regard to religion, in both the group majority of the subjects were Hindus 21 (70 %) in experimental group and 22 (73.3 %) in control group.

With regard to educational status of the subjects in experimental group majority 16 (53.3 %) were with secondary education, were as in the control group majority of the subjects 11 (36.7 %) were with secondary education.

Dietary pattern of the subjects in experimental group shows that majority 16 (53.3 %) are vegetarian and among the subjects in control group majority 13 43.3 %) are non – vegetarian.

Table – III: Frequency and Percentage Distribution of Subjects According to Activity Tolerance Among Subjects in Experimental Group

(n = 30)

	Levels		**Pre - Test**		**Post - Test**	
			f	**%**	**f**	**%**
	Activity Tolerance	Low	2	6.7	0	0
		Fair	14	46.7	0	0
		Average	13	43.3	4	13.3
		Good	1	3.3	6	20.0
		High	0	0	5	16.7
		Athletic	0	0	15	50.0

Table – III illustrates the Frequency and Percentage Distribution of Subjects According to Activity Tolerance Among Subjects in Experimental Group

During pre – test among the subjects in experimental group majority 14 (46.7 %0 had fair level of activity tolerance and those who were with average level of activity tolerance were 13 (43.3 %).

At the time of post – test one half of the total subjects 15 (50 %) were athletic and 6 (20 %) of the subjects in the study were having good activity level.

Table – IV: Frequency and Percentage Distribution of Subjects According to Activity Tolerance Among Subjects in Control Group

(n = 30)

	Levels		Pre - Test		Post - Test	
			f	**%**	**f**	**%**
	Activity Tolerance	Low	4	13.3	6	20.0
		Fair	15	50.0	18	60.0
		Average	9	30.0	6	20.0
		Good	2	6.7	0	0
		High	0	0	0	0
		Athletic	0	0	0	0

Table – IV illustrates the Frequency and Percentage Distribution of Subjects According to Activity Tolerance Among Subjects in Control Group

During pre – test among the subjects in control group majority 15 (50 %0 had fair level of activity tolerance and those who were with average level of activity tolerance were 9 (30 %).

At the time of post – test majority of the subjects 18 (60 %) were fair in activity and 6 (20 %) of the subjects in the study were having low activity level.

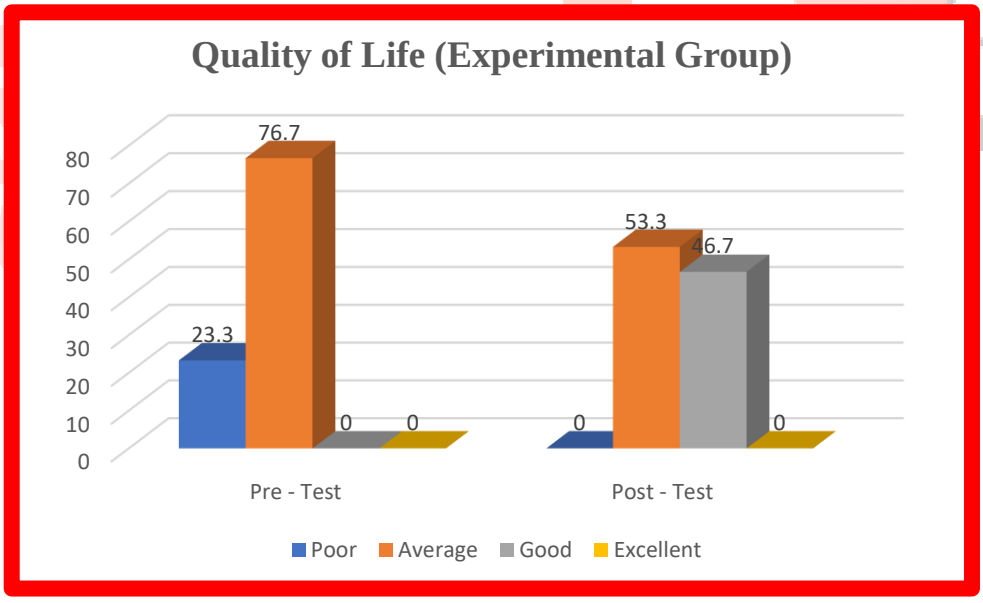

Figure – 1: Percentage Distribution of Subjects According to Quality of Life in Experimental Group

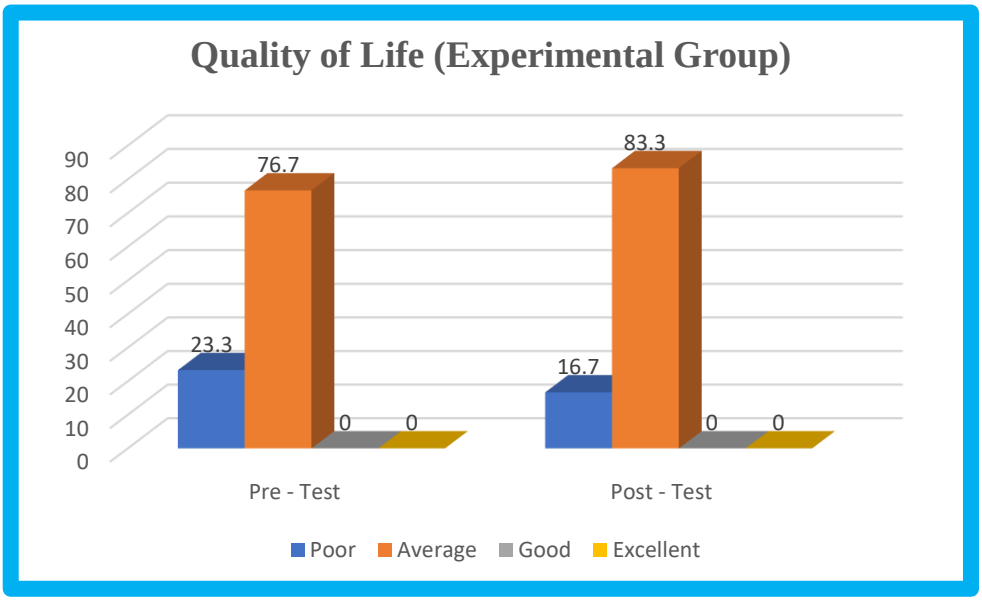

Figure – 2: Percentage Distribution of Subjects According to Quality of Life in Control Group

Table – III: Comparison of pre-test and post – test Activity tolerance level of subjects in experimental and control group using Independent 't' test

(n = 30)

Post -Test	**Mean**	**Mean Difference**	**Standard Deviation**	**Independent 't' test**	**'p' value**
Experimental group	45.47	20.24	4.883	12.045 (df = 58)	0.001* Significant
Control group	25.23		8.169		

Table – III: depicts the Comparison of pre-test and post – test Activity tolerance level of subjects in experimental and control group using Independent 't' test

In experimental group the post - test mean and standard deviation activity tolerance score was 45.47 $\pm$ 4.883. and in control group during post – test the mean and standard deviation of activity tolerance level was 25.23 $\pm$ 8.169 and the independent 't' test score was 12.045 for the degree of freedom 58. It was statistically significant at the 'p' value < than 0.001.

Table – IV: Comparison of pre-test and post – test Quality of Life among subjects in experimental and control group using Independent 't' test

(n = 30)

Post -Test	**Mean**	**Mean Difference**	**Standard Deviation**	**Independent 't' test**	**'p' value**
Experimental group	50.4	19.6	9.676	9.700 (df = 58)	0.000* Significant
Control group	30.8		5.372		

Table – IV depicts the Comparison of pre-test and post – test quality of life in experimental and control group subjects using Independent 't' test

In experimental group the post - test mean and standard deviation quality of life score was 50.4 ± 9.676. and in control group during post – test the mean and standard deviation of quality of life was 30.8 ± 5.372 and the independent 't' test score was 9.700 for the degree of freedom 58. It was statistically significant at the 'p' value < than 0.001significant at the 'p' value < than 0.001.

Discussion

The results of the study were consistent with those of a study conducted by K P Jyotishana, Kamlesh Kumari Sharma, and Millind P H in 2022. A randomised controlled trial was conducted on fifty patients undergoing CABG at tertiary care facilities between June 2016 and January 2017. The investigation was conducted on 50 patients who had undergone elective coronary artery bypass grafting (CABG). Two participants in each group were lost to follow-up, resulting in 23 patients included in the study for each group. The average age in the experimental group was 60 years with a standard deviation of 8.3, while in the control group, it was 57.8 years with a standard deviation of 9.0. Most participants in both groups were male. The majority of participants in the experimental group were from rural areas (64%), while the control group consisted of individuals from metropolitan areas (52%). Most members in both groups were illiterate. Both groups were similar in demographic characteristics such as age, gender, location, education level, daily job hours, dietary habits, religion, monthly income, smoking habits, hypertension, and diabetes mellitus, except for alcohol use.
The findings are comparable to investigations conducted by other researchers at various points in time. Kim, C., Youn, J. E., & Choi, H. E. (2011) conducted a study to examine the impact of self-exercise in cardiac rehabilitation on cardiopulmonary exercise capacity in specific individuals with coronary artery disease. The supervised exercise group demonstrated notable improvements in maximum oxygen consumption, maximal heart rate, resting heart rate, and submaximal rate pressure product after 6 months. The self-exercise group demonstrated notable enhancements in maximum oxygen consumption and submaximal rate pressure product. The supervised exercise group showed a considerably higher rate of change in maximum oxygen consumption compared to the self-exercise group.

During the pre-test, the majority of subjects in the experimental group, 23 individuals (76.7%), had an average quality of life. 7 individuals, representing 23.3%, had a low quality of life. After the post-test, most subjects in the experimental group reported an average quality of life, with 53.3% falling into this category, while 46.7% had an excellent quality of life. During the pre-test, the majority of subjects in the control group, 23 individuals (76.7%), had an average quality of life. 7 individuals, representing 23.3%, had a low quality of life. After the post-test, the majority of subjects in the control group, 25 individuals (83.3%), had an average quality of life, whereas 5 subjects (16.7%) had bad quality of life.

KhalifeA clinical trial was conducted by Zadeh, A., Dorri, S., & Shafiee, S. in 2015 on 50 patients with acute coronary syndrome who were admitted to the coronary care units of Shohada Hospital in Isfahan during 2013-2014. The participants were randomly divided into control (n = 25) and study (n = 25) groups. After the intervention, there was a substantial rise in the mean scores of all quality of life domains within the study group ($P < 0.05$). In the control group, there was no significant difference in the mean quality of life scores before and after the intervention ($P < 0.05$). A notable disparity was observed between the study and control groups in all aspects of quality of life, except for general health and social function ($P < 0.05$), with the study group showing better results.

Conclusion

Adults who have heart conditions or are at risk for developing them are the focus of cardiac rehabilitation nurses' work. Nurses that focus on cardiovascular health encourage their patients to make positive changes to their lifestyles (such as reducing stress, eating healthier, being more physically active, and giving up smoking) in order to lower their risk of cardiovascular disease and its complications and to diminish the long-term impact of previous cardiac events. When it comes to making healthy lifestyle choices, knowledge is power. Determining the health condition and treatment is much easier with its support. Some of these adjustments include eating a heart-healthier diet, getting more exercise, and dealing with stress better. Findings suggest that a mix of treatments including education, exercise demonstration, the distribution of a pamphlet about cardiac rehabilitation, and phone reinforcement can improve exercise tolerance and quality of life by

increasing adherence to the programme.Participation in a cardiac rehabilitation programme reduces the risk of future illness and hospital readmission.As a result, patients are more likely to follow their treatment plans.

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