IJTI | INTERNATIONAL JOURNAL OF THERAPEUTIC INNOVATION

Research article

The effect of cardiac rehabilitation on exercise tolerance and quality of life in patients with coronary artery bypass grafting (Cabg) in outpatient phase

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Received - 25-06-2024**, Revised** - 10-09-2024, **Accepted** - 13-10-2024 **(DD-MM-YYYY)**

Refer this article

Rupam Sarkar, Taniya Vaidya, Nisha Shinde. The effect of cardiac rehabilitation on exercise tolerance and quality of life in patients with coronary artery bypass grafting (Cabg) in outpatient phase. January-February 2025, V3 – I1, Pages - 0306 – 0309. Doi: https://doi.org/10.55522/ijti.v3i1.0088.

ABSTRACT

CABG is most common type of heart surgery. Cardiac Rehabilitation following CABG surgery aims to minimize post-operative pulmonary complications. Quality of life (QOL) and exercise tolerance are important factor in the prognosis of CABG as well as to evaluate effects of different interventions in cardiovascular diseases. 30 samples of both male and female between ages 50 to 80 years who fulfil inclusion criteria were selected randomly for this study. All subjects were undergone Pre and Post 6MWT & evaluated with Pre and Post QOL SF-12 Patient Questionnaire to evaluate the effect of CR Post CABG on Exercise tolerance and QOL. The data was evaluated by statistical analysis which showed there is a significant improvement in exercise tolerance as well as QOL in Patient with CABG after Applying Cardiac rehabilitation exercises.

Keywords: Cardiac Rehabilitation (CR), Quality of life (QOL), Coronary artery bypass grafting (CABG), 6 Minutes' walk test (6MWT).

INTRODUCTION

Cardiovascular disease is the largest cause of mortality in the Indian population, with disease sequelae sometimes requiring surgical process. Undergoing cardiac surgery CABG has a significant impact on patients' physical and emotional health status.

This surgical process is a process for patients with coronary artery obstruction, under which category fall thousands of people annually. Coronary artery bypass grafting is a common surgical intervention for the treatment of myocardial ischemia. The surgeon takes blood vessel (usually chest, leg or arm) and attaching it to the coronary above and below the narrowed area or blockage [1].

In order to strengthen their ability for activity, CABG patients should be encouraged to participate in cardiac rehabilitation after being discharged from the hospital. For patients participating in rehabilitation programs, self-efficacy is a significant predictor of behavioral changes.

Following coronary artery bypass graft surgery, physical therapy treatment seeks to reduce post-operative pulmonary complications (PPCs), which include respiratory infections and atelectasis and are the main causes of morbidity and mortality following CABG surgery [2].

Cardiac rehabilitation has been defined as the sum of the protocols required to make sure the best possible physical, psychological and social aspects so that patients with CABG, by their own efforts, preserve and resume a place in the life in the community. Cardiac rehabilitation can have a significant positive effect on health and Health Related quality of life [3].

Quality of life is an important factor in the etiology and prognosis of CABG as well as to evaluate effects of different interventions in cardiovascular diseases. Improvement in quality of life (QOL) is an important goal for patients participating in cardiac rehabilitation (CR) [4].

MATERIAL AND METHODOLOGY

Introduction of Herbs

Study design

Experimental

A total of 30 subjects who fulfilled the inclusion criteria after the CABG outpatient phase were taken and included in the study through purposive sampling. The study was conducted between August 2021 and August 2022.

A consent form was filled after explaining the reason and procedure of study to patient [5].

After doing a proper cardiac assessment followed by Pre 6MWT and Pre SF-12 Questionnaire were recorded, then again after 6 weeks after giving CR program again Post 6MWT & Post SF-12 Questionnaire were recorded. An explanation in simple language and a demo of test procedure were given [6].

Exercise Protocol

(Outpatient phase 6-weeks):

1st & 2nd Week

Frequency- 5 days a week Duration- 30 mins Mode- Aerobic Initial Target HR- 55-70% [7].

Stretches

Neck stretch

Shoulder stretch

Triceps stretch

Forearm stretch

Quadriceps stretch

Calf muscle stretch

10 repetitions with 10-15 Seconds hold each [8].

Active Exercises

Elbow Extension to the side- 10 reps

Patient is asked to bent elbow, arms out to sides. Then asked to touch hands to the shoulders.

Straighten elbows and reach out to sides.

Then asked to Bend elbows and bring hands into shoulder again Relax and repeat [9].

Straight Arm Raises- 10 reps

Patient is asked to stand with feet about shoulder width apart and arms straight down at sides. Keeping elbows straight out front and up as far as he can slowly bring arms back down to his sided [10].

Relax and repeat.

Marching in a place 10-20 reps

Patient is asked to stand with elbow slightly bent.

Lift one leg, bending at the knee and then the other, like marching. Then asked to move her arms as you march for balance [11].

Waist bends- 5 reps

Patient is asked to stand his feet about shoulder width apart. Bend elbows and rest hips. Then asked to keep his legs and backbone straight bend at waist to his right. Return to the centre and then bend at waist toward left [12].

Waist twist- 10 reps

Patient is asked with her feet at shoulder width, bend elbow and rest hands on your waist. Turn your upper body to the right and then back to the centre while you move your body in a left-to-right motion [13].

Aerobic

Walking or treadmill – 5 mins

Stair climbing-2 flights

Stationary cycling- 5 mins

3rd & 4th Week

Frequency

5 days a week Initial Target HR- 55-70% Duration- 45mins Mode- Aerobic [14].

Strength and Resistance exercises

Biceps curl with 0.5kg dumbbells

Arm raise with 0.5kg dumbbells

Triceps extension with 0.5kg dumbbell

Knee extension with 1kg shin pads

Side leg raise in standing with 1kg shin pad

Hamstrings curl in standing with 1kg shin pad Repetitions- 10-20 repetitions each [15].

Aerobic

Walking or treadmill – 10 mins

Stationary cycling- 10 mins

Stair Climb- 3-4 flights

5th & 6th Week

Frequency

5 days a week Initial Target, HR- 55-70% [16].

Duration- 60 mins Mode- Aerobic

Strength and Resistance exercises

Biceps curl with 1kg dumbbells

Arm raise with 1kg dumbbells

Triceps extension with 1kg dumbbell

Knee extension with 1.5-2kg shin pads

Side leg raise in standing with 1.5-2kg shin pad

Hamstring curl in standing with 1.5-2kg shin pad Repetitions- 10-20 repetitions each [17, 18].

Aerobic

Walking or treadmill – 15-20 mins

Stationary cycling- 15 mins

Stair Climb- 4-6 flights

All the exercises were done with breathing coordination.

Statistical Analysis

In this study patients of post CABG Pre 6MWT & Pre QOL SF-12 & after CR intervention Post 6MWT & Post QOL SF-12 were taken and evaluated. The response of frequencies was calculated and analysed using raw data of the subjects [19].

Table 1: Showing results of Pre and Post 6MWT

Variable	Pre-Test	Post Test	Pairedt test	d.f	p-value	Result
6MWTDistance	400.23±52.39	524.24±54.704	16.702	29	0.001	Significant

Graph 1: Shows the differences in pre & Post 6MWT

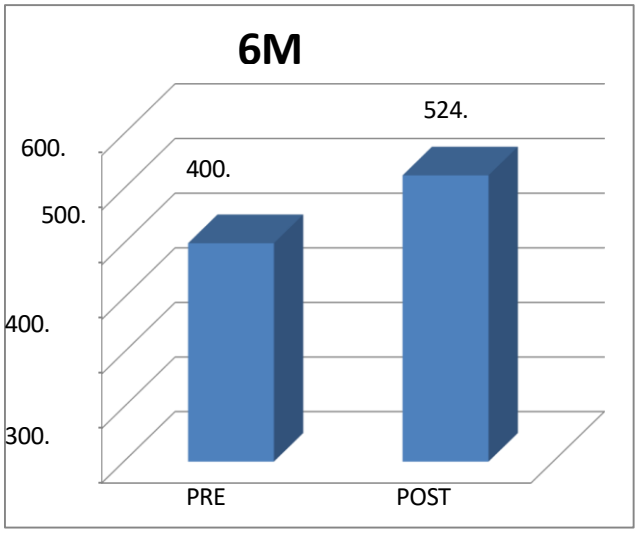
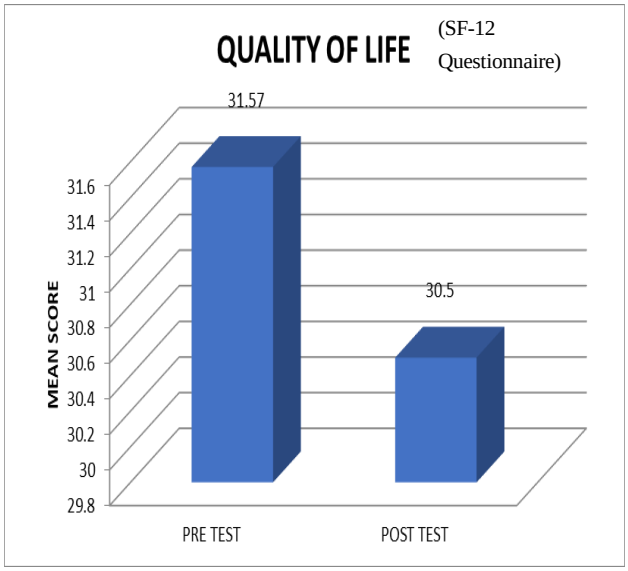


Table 2: Showing results of Pre & Post recorded SF-12 Questionnaire

Variable	Pre-Test	Post Test	Paired t Test	d.f	p-value	Result
Quality of life SF-12 Questionnaire	31.57±1.924	30.50±1.253	2.536	29	0.017	Significant

Graph 2: Shows the difference in Pre & Post SF-12 QOL Questionnaire



DISCUSSSION

The study assessed on Post CABG at outpatient phase and the effect of Cardiac Rehabilitation on Exercise tolerance and quality of life is observed. The finding of the study showed that there is significant improvement exercise tolerance and quality of life in patient with CABG.

The effect of cardiac rehabilitation exercise protocol on exercise tolerance is may be due to the continuous adaptation to a comprehensive rehabilitation regime as its helps to increase blood circulation which will improve oxygenation throughout the body. Strength training in this rehabilitation process will help to regain the strength of weaken muscles thus it also has positive and significant effect on Quality of life because it's making the Activities of daily life easier as exercise itself have positive impact on overall health and wellbeing including emotional and social as well.

The study done by (Ramin Shabani et al 2010) supports results of my study that ones who for CR have improve levels of lungs compliance and also improvement in exercise tolerance and oxygen supply to cardiac muscles after coronary heart disease which is further leading to increase in exercise capacity.

The study is also supported by (Asghar Khalife-Zadeh et al 2015) they stated that cardiac rehabilitation could improve patients' QOL. They conducted study on 100 cardiac patients and the result showed significant improvement in all domains of SF-36 questionnaire.

In the study aim was to improve the adaptation to the heart condition and to increase activity and also increase in fun activities, quality of sleep and greater pleasure while eating. Therefore, it may be possible that a comprehensive CR protocol could help to improve mental stress associated with underlying cardiac disorder and it could improve overall QOL.

Studies have proved the beneficial effects of exercise helps to lowers levels of anxiety or depression which continue for up to a year after the cardiac an event. Hence those intervention can directly assist patient outcome by improving quality of life.

The study also supported by (Abebaw M Yohannes et al 2010) found that CRled to clinically significant in quality-of- life good progress in physical status, anxiety and depression level in patients with coronary disorder.

In the study by (Herbert F. Jelinek 2013) Cardiac rehabilitation had a positive impact on the exercise tolerance.

This study also supports that a short-week Cardiac rehabilitation program as recommended by the Australian guidelines is enough to improve exercise tolerance and cardio respiratory functioning CABG.

List of Abbreviations

CABG: Coronary artery bypass graft

PPCs: post- operative pulmonary complications CR: Cardiac Rehabilitation

MI: Myocardial Infraction

6MWT: 6 Minutes' Walk test

ADLs: Activities of daily living

QOL: Quality of life

Conflict of Interest: None

Source of Funding: None

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