ORIGINAL RESEARCH PAPER
Volume - 13 | Issue - 04 | April - 2024 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

EFFECTIVENESS OF CARDIAC REHABILITATION ON DEPRESSION, APPETITE AND ACTIVITIES OF DAILY LIVING IN POST- OPERATIVE VALVE REPLACEMENT INDIVIDUALS

Physiotherapy

Dr D. Hyndavi	MPT (Cardio), College of Physiotherapy, SVIMS, Tirupati.
Dr N. Kavitha*	MPT (Cardio), Faculty, College of Physiotherapy, SVIMS, Tirupati. *Corresponding Author
Dr K. Madhavi	MPT (Cardio), PhD, Professor & Principal, College of Physiotherapy, SVIMS, Tirupati.
Dr M. Suresh Kumar	MPT (Cardio), Faculty, College of Physiotherapy, SVIMS, Tiruapti.

ABSTRACT

Background: Heart valve disease is a significant and increasing global problem in the developing world. Valve surgery plays a central role in the management of acquired valvular heart disease. The optimal diagnostic evaluation, surgical treatment and post-operative care of these patients are only possible through a cooperative effort of the primary care physician, the cardiologist and the cardiac surgeon. The aim of this study is to evaluate the effectiveness of cardiac rehabilitation on depression, appetite and activities of daily living in post-operative valve replacement individuals. (21) **Objectives:** This study evaluated the depression levels, appetite levels and activities of daily living levels to see the effect of cardiac rehabilitation in post-operative valve replacement individuals. **Methodology:** An Experimental study of 30 participants of both genders, male and female adults between the age group 25-45 years were included in the study. The study was done by direct markings with the help of 3 questionnaires respectively. Depression is assessed by using Hamilton Depression Rating Questionnaire (HDRQ), Appetite by using Simplified Nutritional Appetite Appearance Questionnaire (SNAQ) and Activities of daily living is assessed by using Functional Independence Measure Questionnaire (FIM) on the post-operative Day-3 and at the Time of discharge respectively. **Result:** The Individuals showed a significant beneficial effect regarding depression, appetite and activities of daily living that is shown by the HDRQ, SNAQ & FIM Questionnaires. **Conclusion:** Early cardiac rehabilitation appears to be an effective approach to improve the activities of daily living, mental health and appetite levels in post-operative valve replacement individuals.

KEYWORDS

Cardiac rehabilitation, Valve replacement, Depression, Appetite, Activities of daily living.

INTRODUCTION

In India, cardiovascular diseases are currently the main cause of death[1]. Excessive fat intake, poor diet, cigarette use, sedentary lifestyle and other primary risk factors are strongly positively correlated with an increase in cardiovascular diseases.[2]

Globally recognized for it's exceptional cardiovascular benefits, quality of life and mortality rates, heart valve surgery is a well-established operation.[3]

The most significant cardiovascular conditions is valve heart disease, which varies in prevalence depending on age, gender and social class. Due to the rise in rheumatic heart disease frequency, valve heart disease is still prevalent in emerging nations.[4]

Aortic, mitral, tricuspid or pulmonary heart valve damage or defects are the causes of ventricular heart disease.[5]

Replacement of the heart valve is by either mechanical or biological prostheses, of which there are two types: Xenografts and Allografts, can be used to replace heart valves. The primary benefit of artificial valves is their mechanical lifespan, which typically outlasts the patient's expectations, because they do not experience degenerative changes.[6]

However, due to the complexity of the surgical procedure, patients undergoing heart valve surgery frequently experience complications in the post-operative period. Those are post-pulmonary complications. These complications can include low cardiac output syndrome, post-operative bleeding, infection[3], changes in systemic vascular resistance, increased inflammation, altered tissue perfusion and oxygenation[1].

The degree of these difficulties is mostly determined by three factors: the patient's overall health, any surgical trauma and the anesthetic's effects[1]. Problems during the heart valve treatment during post-operative phase result in more sedation and bed rest, which prolongs the period of inactivity and weakens the muscles[3]. Other factors that may lead to these issues include diabetes and smoking. [1]

The harmful effects of physical inactivity involve - reduced muscle protein synthesis, increased proteolysis, loss and leaning of muscle strength, muscle mass respectively. Additionally, physical exercise is associated with reduced respiratory complications and decline in hospital readmission rates in patients with coronary heart disease.[3]

It is believed that exercise-based cardiac rehabilitation and physical activity, improve cardiorespiratory fitness and lower short-term and long-term hospital stays in individuals with coronary heart disease. In order to enhance physical capability and enhance clinical results following heart valve surgery, exercise-based cardiac rehabilitation is advised.[5]

Depression and anxiety may have an impact on how severe a patient's symptoms are, which may lower the patient's quality of life.[7]

By definition, appetite is the system that governs food intake or energy intake, and related motivational states like hunger. Appetite has both biological and behavioural components, since it serves as a link between the internal and external environments. As a result, both physiological and behavioural end-points must be included in measurements.[8]

Within two weeks following surgery, up to 55% of patients experience a partial or complete loss of appetite. Malnutrition resulting from post-operative appetite loss has a negative effect on survival, complications and quality of life of the patient.[9] It is common knowledge that, hunger causes a deterioration in cognitive and motor abilities.[10]

Unintentional loss of appetite is a complex issue in surgical practice, that presents a range of challenges due to it's difficulty in measuring and treating. As such, the evaluation of appetite is very subjective, much like that of pain.[9]

Need Of The Study

In most of the cases of post cardiac surgeries, pulmonary complications are the leading cause of morbidity in patients. In addition to that mental state of the individual & their appetite levels and activities of daily living will also get altered.

Therefore, exercise-based cardiac rehabilitation is recommended after cardiac surgery, to increase physical capacity and improve clinical outcomes.

Phase 1 cardiac rehabilitation has a major role to play in post cardiac individuals, also it is very beneficial among them.

The main purpose of the study is to focus on the Effectiveness of Phase – 1 Cardiac Rehabilitation on Depression, Appetite and Activities of daily living in Post-operative Valve Replacement Individuals, there by helping in assessing & reducing the hospital stay.

There are many studies that are conducted based on the functional activities & ability of the patients, but there very few studies based on the Depression, Appetite and Activities of daily living in post valve replacements individuals. Hence, it is being focused in the study.

Aim Of The Study

To study the Effects of Cardiac Rehabilitation on Depression, Appetite & Activities of daily living in Post-operative Valve Replacement Individuals.

Objectives Of The Study

- To evaluate the effects of Cardiac rehabilitation on Depression, in Post-operative Valve Replacement Individuals by using the Hamilton Depression Rating Questionnaire (HDRQ).
- To evaluate the effects of Cardiac rehabilitation on Appetite, in Post-operative Valve Replacement Individuals by using the Simplified Nutritional Appetite Appearance Questionnaire (SNAQ).
- To evaluate the effects of Cardiac rehabilitation on Activities of daily living, in Post-operative Valve Replacement Individuals by using the Functional Independence Measure Questionnaire (FIM).

Hypothesis Of The Study

Alternate Hypothesis :

The Cardiac Rehabilitation will have an influence on the levels of Depression, Appetite and Activities of daily living in Post-operative Valve Replacement individuals.

Null Hypothesis :

The Cardiac Rehabilitation will not have an influence on the levels of Depression, Appetite and Activities of daily living in Post-operative Valve Replacement individuals.

Materials Used

- Flow-oriented Incentive Spirometry
- Hamilton Depression Rating Questionnaire.
- Simplified Nutritional Appetite Appearance Questionnaire.
- Functional Independence Measure Questionnaire.
- Weight calculated by using Weighing machine.
- Height calculated by using Measuring tape.

Methodology

- Study design – Experimental study
- Study Setup – SVIMS Hospital, Tirupati.
- Study duration – 3 Months
- Sampling Method – Purposive sampling
- Study Sample Size – 30 Subjects

Inclusion Criteria:

- Condition – Post-operative Valve Replacement Individuals
- Age Group – 25 to 45 years were included.
- Gender – Both males & females were included.

Exclusion Criteria:

- Age Group – Less than 25 years & greater than 45 years of age were excluded.
- Individuals with any Musculo-skeletal disorders were excluded.
- Individuals with any Neurological disorders were excluded.
- Individuals who cannot follow the instructions were excluded.
- Individuals who are not willing to participate in the study were excluded.

Procedure For Intervention

- The individuals who fulfilled the inclusion criteria and are willing to participate in the study were included after they sign an informed consent.
- Regular Height, Weight, BMI measurements was evaluated for all the individuals.
- 30 individuals of elective Valve Replacement surgery within the age group of 25 - 45 years of both genders were included in the study.
- The individuals were assessed on the Post-operative 3rd day and then at the Time of discharge, with respective Hamilton Depression Rating Questionnaire, Simplified Nutritional Appetite Appearance Questionnaire & Functional Independence Measure Questionnaire.
- Psychological interventions like patient education, emotional support are ensured by the Therapist and Patient attenders.

Exercise Protocol :

- Includes phase-1 cardiac rehabilitation (i.e, from POD 3rd to the Discharge).[(1)]
- Range of motion exercises, Thoracic mobility exercises are instructed to be performed - 5 Repetitions, 3 sets, 4 times / day.
- Supported and Unsupported room ambulation were encouraged.

Table 1: Intervention protocol

Days	Exercise Protocol Includes
Day 1	Flow-oriented Incentive Spirometry Range of motion exercises for all four limbs Long sitting in bed encouraged.
Day 2	Repeat previous steps Edge of the bed sitting encouraged Thoracic mobility exercises encouraged.
Day 3	Repeat previous steps Splinted coughing encouraged.
Day 4	Repeat previous steps Supported room ambulation.
Day 5	Repeat previous steps Unsupported ward ambulation
Day 6	Repeat previous steps.
Day 7	Repeat previous steps.

Statistical Analysis

- Participant data was analysed by intension to treat. All continuous data was assessed for normality.
- Continuous data were described using Mean, Standard Deviation if normally distributed & Median by using Inter Quartile Range when the distribution is skewed.
- Differences in the outcomes was compared with in the groups.
- A **P** value of < 0.05 was considered as Statistically significant.

RESULTS

The demographic details of - Age, Gender, Depression, Appetite and Functional Independence Measure were analysed using a paired-t test and concluded that there was no statistically significant difference in demographic characteristics of subjects with heart valve replacements.

TABLE 2: Demographic Data - Baseline Descriptive Statistics

Variables	Mean	Std. Deviation
	Statistic	Statistic
Age	37.57	6.41
Basal Mass Index	22.94	2.52
Depression	19.73	3.02
Appetite	5.30	1.09
Functional Independence Measure	24.63	2.28

According to the **Table 2**, The **mean value std** of Age is 37.57 6.41; BMI is 22.94 2.52; Depression is 19.73 3.02; Appetite is 5.30 1.09; Functional Independence Measure is 24.63 2.28 respectively.

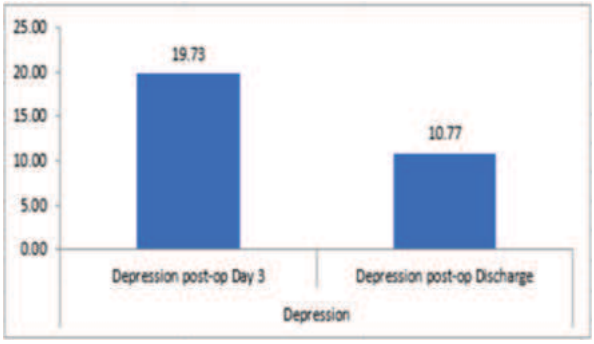
TABLE 3: Analysis of Mean & Standard Deviation Of Outcome Measures

VARIABLES	ASSESSMENT	Mean	N	Std. Deviation
Depression	Depression post-op Day 3	19.73	30	3.02
	Depression post-op Discharge	10.77	30	2.10
Appetite	Appetite post-op Day 3	5.30	30	1.09
	Appetite post-op Discharge	11.63	30	2.17

Functional Independence Measure	Functional Independence post-op Day 3	24.63	30	2.28
	Functional Independence post-op Discharge	66.37	30	4.45

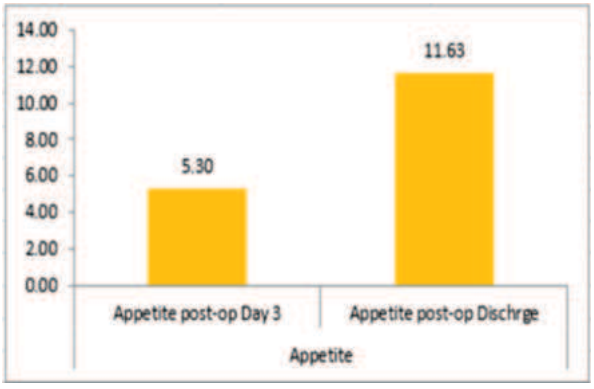
According to the **table 3**, the **mean Post-operative Day 3 values** of Depression is 19.73, Appetite is 5.30 and Activities of daily living is 24.63 respectively. The **mean Post-operative Discharge values** of Depression is 10.77, Appetite is 11.63 and Activities of daily living is 66.37 respectively.

According to the **table 3**, the **standard deviation Post-operative Day 3 values** of Depression is 3.02, Appetite is 1.09 and Activities of daily living is 2.28 respectively. The **standard deviation Post-operative Discharge values** of Depression is 2.10, Appetite is 2.17 and Activities of daily living is 4.45 respectively.



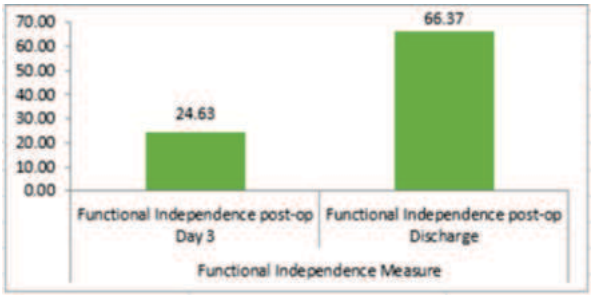
Graph 1: Percentage Of Depression Levels In Post-operative Day 3 & Post-op Discharge

Based on the total study population of 30, the **Graph 1 -** describes the Depression Levels In Post-operative Day 3 & Post-op Discharge. It shows that individuals with Depression on post-op Day 3 are 19.73% & Depression on post-op Discharge is 10.77% respectively. The Depression levels had got reduced when compared to post-op Day 3.



Graph 2: Percentage Of Appetite Levels In Post-operative Day 3 & Post-op Discharge

Based on the total study population of 30, the **Graph 2 -** describes the Appetite Levels In Post-operative Day 3 & Post-op Discharge. It shows that individuals with Appetite levels on post-op Day 3 are 5.30% & Appetite levels on post-op Discharge is 11.63% respectively. The Appetite levels had got increased when compared to post-op Day 3.



Graph 3: Percentage Of Functional Independence (Activities of daily living) Levels In Post-operative Day 3 & Post-op Discharge

Based on the total study population of 30, the **Graph 3 -** describes the Functional Independence Levels In Post-operative Day 3 & Post-op Discharge. It shows that individuals Activities of daily living levels on post-op Day 3 are 24.63% & Activities of daily living levels on post-op Discharge is 66.37% respectively. The Activities of daily living levels had got increased when compared to post-op Day 3.

TABLE 4: Variables Of The Outcome Measures

	Paired Differences				T value	df	P value
VARIABLES	Mean	Std. Deviation	95% Confidence Interval of the Difference				
			Upper Bound	Lower Bound			
Depression	8.967	2.297	8.109	9.824	21.384	29	0.001
Appetite	-6.333	1.971	-7.069	-5.597	-17.599	29	0.001
Functional Independence Measure	-41.733	4.034	-43.240	-40.227	-56.667	29	0.001

According to Table 4, the Mean (std) HDRQ, SNAQ and FIM Scores were as follows: 8.967 2.297, -6.333 1.971, -41.733 4.034 respectively.

The T-value, Mean std (lower bound, upper bound), df value, p-value of the 3 outcomes are as follows :

- Depression : 21.384, 8.967 2.297, (8.109, 9.824), 29, 0.001
- Appetite : -17.599, -6.333 1.971, (-7.069, -5.597), 29, 0.001
- Functional Independence Measure : -56.667, -41.733 4.034, (-43.240, -40.227), 29, 0.001 respectively.

P* = < 0.05
P** = < 0.001

DISCUSSION

The study aimed at evaluating the Effectiveness of Cardiac Rehabilitation on Depression, Appetite & Activities of daily living in Post-operative Valve Replacement Individuals.

To the best of our knowledge, this study is to determine the effects of cardiac rehabilitation on depression, appetite and activities of daily living in individuals following an valve replacement surgery.

All eligible individuals had Heart Valve Replacements, but primarily had Mitral valve stenosis (21) & Aortic valve stenosis (5) respectively.

None of the patients doesn't had any serious adverse events, while measuring the outcomes. There were no dropouts in the study.

In the study, cardiac rehabilitation is distributed and analysed among the Elective Valve Replacement Individuals. The results depicted that, cardiac rehabilitation showed a positive correlation on the depression, appetite and activities of daily living over 7 days.

All the individuals included in the study were given a set of exercises, that are instructed to be performed in the respective intervals. Their care takers were briefed about these exercises, that are to be performed by the individuals.

A marked reduction in the appetite levels, activities of daily living & increased levels of depression was noted in the post-operative Day 3 of valve replacement individuals. After the Intervention, there was a marginal decrease seen in the levels of Depression, an increase in the levels of Appetite and Improvement of the Activities of daily living was noted at the Time of discharge.

Overall, there was a significant increase in the values of Appetite and Activities of daily living & decrease in the Depression levels, when compared to the post-operative Day 3 to the Time of discharge.

The present study results suggest that cardiac rehabilitation is an effective approach for improving clinical outcomes in individuals with heart valve surgery.

A study done by Xue W Xinlan, Xiayan et al supports the present study. They studied the effectiveness of cardiac rehabilitation in patients with heart valve surgery. They concluded that Early Cardiac Rehabilitation

appears to be an effective approach to improve the physical function and survival of patients with heart valve surgery.[3]

Several studies have shown that, patients who had underwent heart surgery and participate in an exercise training program, experience a noticeably higher level of improvement in their self-efficacy than those who receive a usual care.[3]

In the present study, the mental health of individuals had got improved from post-op 3rd day to the discharge, by the cardiac rehabilitation and the use of psychological interventions. Study done by Xue W Xinlan, Xiayan et al supports the present study. They showed that psychological therapies seem to be helpful in treating the psychological signs and symptoms of coronary heart disease, with modest improvements seen in anxiety and depression.[3]

In the present study Cardiac Rehabilitation showed a positive significance on the activities of daily living, as there is marked increase seen when compared to the post-op 3rd Day to the Time of Discharge. Prior research has demonstrated a noteworthy rise in the degree of physical activity among heart valve surgery patients who engaged in cardiac rehabilitation.[3]

The present study results showed that, Cardiac Rehabilitation had shown positive significance of Appetite levels, when compared to the post-op 3rd Day to the Time of Discharge.

Therefore, further studies should explore the relationships among pre-operative psychological conditions and length of hospital stay after operations, as well as changes in anxiety and depression symptoms in post-operative phase.[7]

CONCLUSION

According to the present results, the study concluded that the Cardiac rehabilitation influence the effect on depression, appetite and activities of daily living in post-operative valve replacement individuals. The study shows the statistical significance among all 3 groups, i.e., Depression, Appetite & Activities of daily living respectively. Hence the Alternate Hypothesis is accepted & the Null Hypothesis is rejected.

Limitations

- The study had a smaller sample size.
- The duration of the study was short term.
- No further long term follow-up was conducted.
- Only the subjective measures were taken as outcome's.

Recommendations

- Future studies should have a larger sample size.
- Further long term follow-up should be conducted.
- The duration of the study should be increased in future studies.
- In future studies, the objectives measures should be taken as outcome's.

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