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EFFECTS OF PRE OPERATIVE PROGRAMME ON PULMONARY FUNCTION TESTS AND 6 MIN WALK DISTANCE IN POST SURGICAL MITRAL VALVE DISEASE INDIVIDUALS

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Abstract: *Back ground:* Rheumatic heart disease has been a major public health problem in India, numerous studies have documented on it is estimated that 15.6-19.6 million people suffer from rheumatic heart disease worldwide with approximately 282,000 new cases and 2, 33,000-2, 94,000 related death each year .surgical treatment of MVD patients involves replacement of damaged heart valve with mechanical or bio prosthetic mitral valve. Mechanical ventilation and thoracotomy substantially influence lung function. This has an increased risk of post-operative pulmonary complications which leads to increased post-operative morbidity and mortality, increased use of medical resources, longer hospital stay, and increased health care costs. Physical therapy was usually given after the operation, where as the preferred strategy is to identify, on the basis of known risk factors, and treat patients who might benefit the most from physical therapy before surgery. *Methodology:* 30 samples are taken by simple random sampling in the SVIMS, CT surgery ward and samples are divided into experimental and control group. The experimental group underwent 3 days pre-operative exercise programme +post-operative cardiac rehabilitation and control group underwent pre-operative general care along with cardiac rehabilitation programme. The outcome was measured by PFT, 6 MWD 3 days prior to surgery and the 7th post-operative day. *Results:* P-value is < 0.05 which indicates that FEV1/FVC and 6MWD reduced at 7th post-operative day in both experimental and control groups, difference in experimental group compared to control group. *Conclusion:* hence the study shows concludes that pre-operative exercise programme has beneficial effect over the post-surgical mitral valve disease individuals.

Keywords: 6 minute walk test, pulmonary function test, Mitral valve disease individuals, Rheumatic heart disease, Mitral stenosis, Mitral regurgitation.



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INTRODUCTION

Rheumatic heart disease has been a major public health problem in India. India contributes to nearly 25% to 50% of the global burden of RHD¹. WHO reported that 1.33 lakh deaths occur from RF/RHD annually in the south East Asia. it is estimated that 15.6-19.6 million people suffer from rheumatic heart disease worldwide with approximately 282,000 new cases and 2,33,000-2,94,000 related death each year².

Mitral valve located between left chambers of heart, it allow blood to pass from left atrium to left ventricle, Types of mitral valve diseases: were Mitral valve stenosis, Mitral valve prolapsed, Mitral valve regurgitation. Surgical treatment of RHD patients involves replacement of damaged heart valve with mechanical or bioprosthetic mitral valve. During cardiac surgery the use of general anesthesia, muscle paralysis, mechanical ventilation and thoracotomy substantially influence lung function. This causes changes in lung volume diaphragmatic dysfunction, respiratory muscle strength, pattern of ventilation, gas exchange on the response to carbon dioxide and oxygen concentrations^{3,4,5}. Have an increased risk of post-operative pulmonary complications (ppcs) which leads to increased post-operative morbidity mortality, increased use of medical resources, longer hospital stay, and increased health care costs^{6,7,8}. Physical therapy was usually given after the operation, where as the preferred strategy is to identify , on the basis of known risk factors ,and treat patients who might benefit the most from physical therapy before surgery⁹. Pre-operative physical therapy in cardiac surgery has damages over post-operative care alone¹⁰.

Need of study: is Patient who had undergone mitral valve replacement have an increased risk of post-operative morbidity and mortality. Commonly used for prevention and treatment of post-operative pulmonary complications. Previously few studies have done on the effects of pre-operative physical therapy programme in post-surgical disease individual. Aim: To evaluate the effects of pre-operative exercise programme on pulmonary function test (FEV1/FVC) and six minute walk distance in post-surgical mitral valve diseased individual. Objectives: To determine the effects of pre-operative exercise programme on pulmonary function tests (FEV1/FVC) using spirometry in post-surgical mitral valve disease. To determine the effects of pre-operative exercise programme on six minute walk distance using six minute walk test in post-surgical mitral valve disease.

INCLUSION & EXCLUSION CRITERIA:

INCLUSION CRITERIA:

Patients who were planned for elective Mitral Valve Replacement age group between 30-60 years including both genders (male or female), Co-operative and motivate , No history of musculoskeletal and neurological disorder.

EXCLUSION CRITERIA:

Emergency surgery, Left ventricular ejection fraction (LVEF) < 35% multiple valve replacement surgery.

METHODS:

Study design: the design adopted for the study was a randomized controlled trail conducted in college of physiotherapy in SVIMS, Randomization procedure: patients were randomly allocated to either experimental or control group through concerned allocated using lottery method, study duration: 3 days (pre-operative exercise programme), sample size: 30 thirty patients both males and females were included in the study on the basis of inclusion and exclusion criteria.

SOURCE OF DATA:

The source of data are collected from the SVIMS educational institution Tirupati .Ethical clearance was obtained from the head of the institution and prior permission for the study was taken from the institution.

PROCEDURE: A the 30 subjects are those who come under inclusion criteria, they are divided into two groups, experimental group and control group. During their hospital stay subjects in the experimental group received a physical therapist Wenger protocol¹¹ (Stabilization protocol).

WENGER STABILIZATION PROTOCOL:

Step 1	1-2days	Stabilisation phase	Incentive spiromerty in the form deep breathing exercises, active assistive to active range of motion. Postural awareness and care with monitoring.
Step2	3-5 days		In sitting-repeat exercises form step1 and increase repetitions to5-10 Mobilisation of upper limb, monitored ambulation of 100 feet as tolerated.
Step3	6-8 days		In standing-step1+2 active upper limb, trunk exercises, ankle exercise 5-10 repetations twice daily

			Out of intensive care unit, pre discharge plan, monitored ambulation 200 feet twice daily or as tolerated.
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INTERVENTION:

Pre-operative exercise programme:

The both experimental group and control groups subject meet routine like chest physiotherapy, active breathing exercise and mobility exercise to upper limb and lower limb, positioning, spirometry and bed mobility exercise.

Post-operative cardiac rehabilitation programme:

Experimental group: Pre-operative exercise programme along with post-operative cardiac rehabilitation programme: Light activities with moderate resistance; unlimited sitting; seated activities of daily living (ADL). Increased resistance; walking to bathroom; standing ADL; up to 1 hour group meetings. Walking up to 100 feet; standing warm up exercises. Increased walking; walk down stairs (not up); continued education, Increased exercise programme, review energy conservation, and pacing techniques. Increase exercise with light weights and ambulation; begin education on home exercise program, Increase duration of above activities. Walk down two flights of stairs; continue to increase resistance in exercises. Continue activities, education, and home exercise program teaching. Walk up and down flights of stairs; complete instruction in home exercise program and in energy conservation and pacing techniques.

Control group: Pre-operative general care such as vital signs (HR, BP, CVP) And cardiac output were monitored along with post-operative cardiac rehabilitation programme.

OUTCOME MEASURES:

Pulmonary function test (FEV1/FEC) Six minute walk distance, The pulmonary function test and six minute walk distance are measure 3 days prior to the surgery and at the 7th post op day.

STATISTICAL ANALYSIS:

The analysis has been carried out using SPSS 20.0 version. The data collection and variable measurement are done on two time periods i.e., pre and post. Paired sample t-test was used to analyse the variables within the group. Independent sample t- test was used to test significance between the control and experimental groups.

RESULTS:

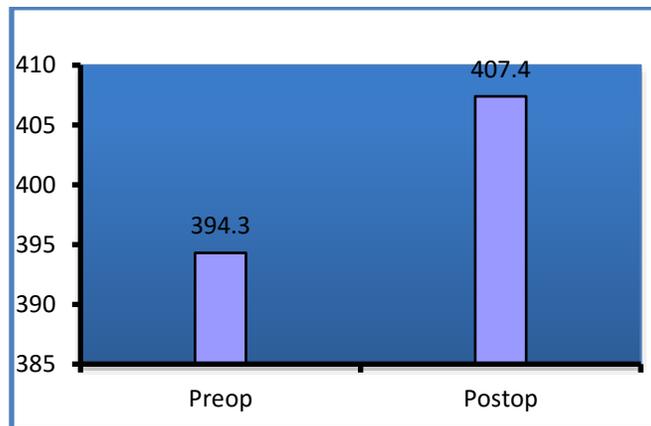
The p-value is < 0.05 indicates that the FEV1/FVC and 6MWD reduced at 7th post operative day in both experimental and control groups, difference in experimental group compared to control group.

Table 1-MEAN 6MWD IN EXPERIMENTAL GROUP:

Parameter		Mean ± SD	t-value	p-value
6 MWD	Pre op	394.3±36.16	2.144	0.00
	Post op	407.4±36.166		

Interpretations of results-The table reveals that 6MWD in pre-operative is 394.3 and post-operative is 407.4.

Graph: 1Experimental group (6 min walk distance)



Comparison of mean difference of 6 MWD between pre-operative and post-operative in experimental groups.

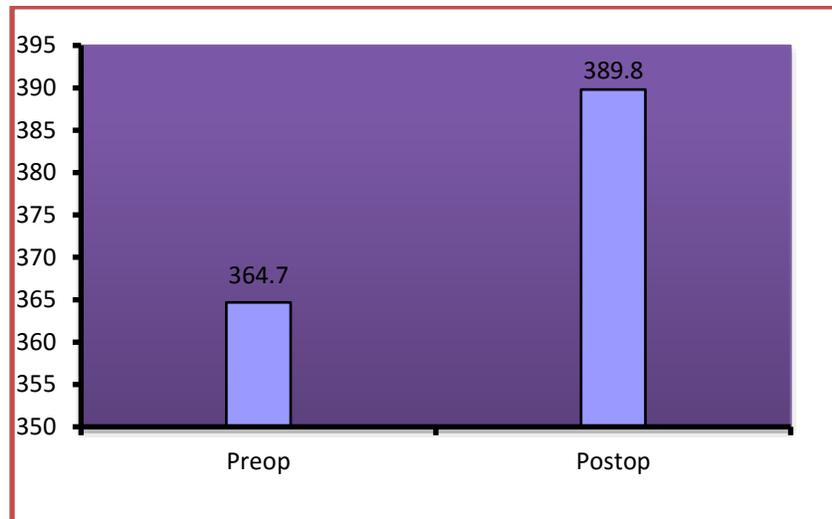
Table 2: MEAN 6 MWD IN CONTROL GROUP:

Parameter		Mean ± SD	t-value	p-value
	Pre op	364.7±12.4		

6MWD	Post op	389.8±14.7	2.14	0.00
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Interpretation of results: The table reveals that 6 MWD in pre operative is 364.7 and post operative is 389.8.

Graph: 2 control group (6 min walk distance)



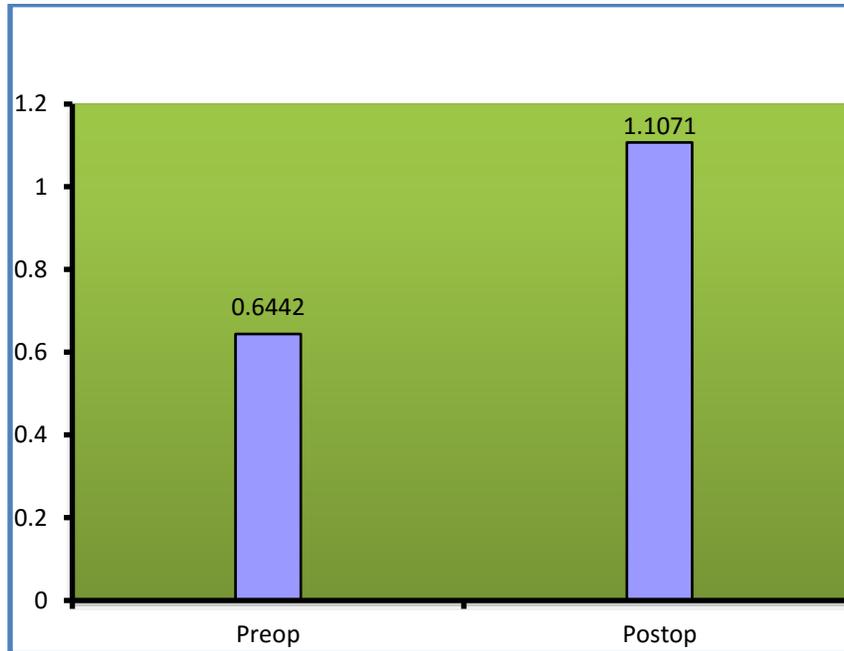
Comparison of the means values of 6 MWD between pre-operative and post-operative in control group.

TABLE: 3 MEAN FEV1/FVC IN EXPERIMENTAL GROUP:

parameter	Mean ± SD	t-value	p-value
Pre op	0.644±0.054	2.16	0.00
Post op	1.107±0.048		

Interpretations of results: The table reveals that FEV1/FVC has been observed at pre-operative is 0.644 and post-operative is 1.107.

Graph: 3 Experimental (FEV1/FVC)



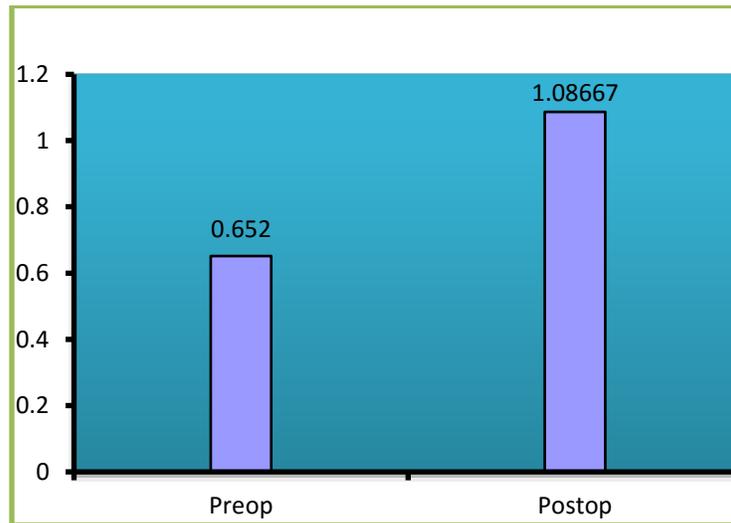
Comparison of the means values of FEV1/FVC between pre-operative and post-operative.

TABLE: 4 MEAN FEV1/FVC IN CONTROL GROUP:

parameter	Mean ± SD	t-value	p-value
Pre op	0.65±0.66	2.14	0.00
Post op	1.08±0.04		

Interpretations of results: The table reveals that FEV1/FVC has been observed at pre-operative is 0.65 and post-operative is 1.08.

Graph: 4 control (FEV1/FVC)



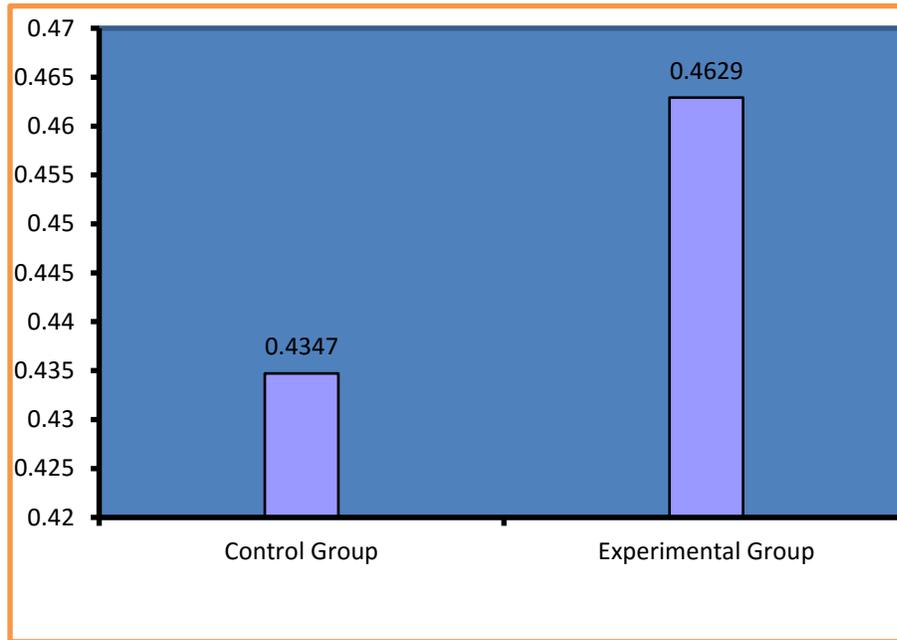
Comparison of the means values of FEV1/FVC between pre-operative and post-operative.

TABLE: 5 MEAN DIFFERENCE OF 6 MWD BETWEEN EXPERIMENTAL AND CONTROL GROUPS:

parameter	Group	Mean ± SD	t- value	p- value
6 MWT	Experimental Group	25.06±7.5	-5.4	0.00
6 MWT	Control Group	13.06±14.1	-5.4	0.00

Interpretations of results: The table reveals that 6 MWD has been observed at experimental group: 25.06±7.5 and control group: 13.06±14.1.

Graph: 5 MEAN DIFFERENCE OF FEV1/FVC BETWEEN CONTROL AND EXPERIMENTAL GROUPS:



Interpretations of results: The graph reveals that FEV1/FVC between Experimental and control groups, control group: 0.4347 and experimental group: 0.4629.

DISCUSSION:

The present study was designed to know the effects of pre-operative exercise programme on pulmonary function test (FEV1/FVC) and six minute walk distance in post-surgical mitral valve disease individual's .Preoperative exercise programme was given to experimental group for 3 days and general care to control group. The present study showed that there was significant differences in the six minute walk distance and pulmonary function test (FEV1/FVC) in both groups. The experimental group is found to be statistically significant compared to control group in terms of six minute walk distance and pulmonary function test (FEV1/FVC).The reduction of pulmonary volumes was observed in both experimental and control group from preoperative to 7th post-operative day. A similar result was reported by Meyers et al the pulmonary volumes (FEV1/FVC) reduced in the 1st post-operative day running close to the postoperative levels by the 6th postoperative day. The factors, such as pain, alterations in the ventilator mechanics due to the sternotomy affects on pulmonary function.

CONCLUSION:

The preoperative exercise programme should be included as a part of the treatment. Protocol in the rehabilitation of post-surgical mitral valve disease individuals.

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