

Original Article

EFFECT OF PULMONARY REHABILITATION IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE PATIENTS TO IMPROVE QUALITY OF LIFE

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ABSTRACT

Introduction: Chronic obstructive pulmonary disease (COPD) is characterized by airflow limitation leading to reduced ventilatory capacity and is associated with shortness of breath. COPD have become increasingly important cause of morbidity and mortality in modern world.

Objectives: Objective of the study is to assess the effect of PR on exercise tolerance and health related quality of life in COPD patients.

Methodology: The study is carried with 30 subjects and they were randomly selected based on inclusion and exclusion criteria. They are divided into two groups. Experimental group and control group. The experimental group is under went two months pulmonary rehabilitation program in addition to medication and control group patients using medications only.

Results: Results showed the Experimental group showed significant improvement in the exercise tolerance and quality of life.

Conclusion: Early Pulmonary rehabilitation after discharge from hospital leads to additional notable improvements in exercise capacity and health status at two months compared with usual care.

KEYWORDS: Chronic obstructive pulmonary disease (COPD), Pulmonary Rehabilitation (PR), Ventilatory Capacity, Shortness of breath, Exercise tolerance.

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INTRODUCTION

COPD have become increasingly important cause of morbidity and mortality in modern world. The term COPD was adopted by the international classification of disease study in 1979 to describe individuals usually smokers or non ex smokers with slowly progressive and largely irreversible air way obstruction.

COPD is currently the fourth leading cause of death in world. The prevalence of COPD in 2002 was estimated to be 11.6/1000 in men and 8.77/1000 in women. The prevalence of COPD is highest in countries where cigarette smoking has

been or still very common.

Chronic obstructive pulmonary disease (COPD) is characterized by airflow limitation leading to reduced ventilatory capacity and is associated with shortness of breath.

Patients with severe airflow limitation and those who experience repeated acute exacerbations usually suffer from impaired quality of life, reduced exercise capacity, and increased risk of re-admission.

Interventions designed to hasten recovery and improve symptoms after admission to hospital may lead to reduced use of healthcare in future

and real improvement in quality of life and functional ability in breathless and vulnerable patients with COPD.^{1,2}

Several publications have reviewed results of pulmonary rehabilitation and concluded that there is substantial evidence that pulmonary rehabilitation improves exercise capacity and shortness of breath.³

In patients with COPD, HRQL may be particularly valuable in PR assessment. Few studies have compared the effectiveness of rehabilitation programs with accompanying lectures and different teaching methods for patients with pulmonary disease.

The effects of PR on HRQL have used disease-specific questionnaires designed for patients with COPD⁴. These tools make it difficult to compare outcomes in studies of patients with COPD to those with other non pulmonary disorders and some require administration by a trained interviewer. Also, the effects of early PR of outpatients in the acute recovery phase after hospital admission for acute exacerbations of COPD have poorly been studied.

This study was designed to study the feasibility and safety of scheduled early (two months post-discharge from acute exacerbation) pulmonary rehabilitation with outpatient supervision every day including exercise training and lecture series on exercise capacity and quality of life in patients with COPD. In this study Short Form-36 (SF-36), a questionnaire used to assess generic quality of life² and also use 6mwd test to assess exercise tolerance.⁵

Pulmonary rehabilitation is accepted therapy for patients with chronic obstructive pulmonary disease improving both exercise capacity and quality of life.

There is much research material is available regarding quality of life after pulmonary rehabilitation in COPD cases but this evidence is lacked in Indian scenario. Hence this study aims to know the effect of pulmonary rehabilitation in quality of life in COPD patients.

MATIERLS AND METHODS

For this study we used the Treatment table, Sand bags, Static cycle, Pulse oxymeter

STUDYDESIGN: Experimental controlled trail.

STUDY SETUP: Study has carried out on 30 individuals with fallowing inclusive criteria: 1. Age in between 40-50 years, 2. they should reside locally, has a ability of complete questionnaire within one session 4. and with Acute exacerbation of COPD. Whereas illiterates, individual with loco motor problems and Heart diseases were excluded from the study. Study has conducted at the SIMS College of physiotherapy out patient clinic; life hospital Guntur, Andhra Pradesh, India for two months schedule (8 weeks).

Outcome measures used for this study includes: 1. SF-36 Quality of life scale in short form 2. 6 min walk distance (6 mwd) test 3. Stop watch.

METHODOLOGY

Patients were randomly selected based on inclusion and exclusion criteria, they were divided into two groups controlled group (Group – A) and Experimental group (Group –B).

Experimental group under went for two months pulmonary rehabilitation program in that respiratory muscle training E.g. diaphragmatic and purse lip breathing exercises, endurance training E.g. walking, cycling. Chest mobilization exercises, six to ten upper and lower body strength exercises were used based on weakness and fatigue of each individual subject. In addition to this group has allowed to take the prescribed medications. Where as in control group provided with prescribed medications only.

DATA ANALYSIS AND RESULTS

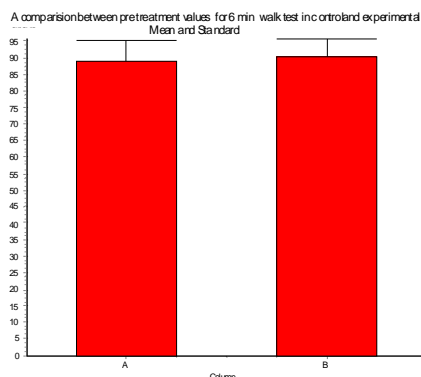
Table 1: A comparison between pre treatment values for 6 min walk test in control and experimental group:

	Control group	Experimental group
Mean	89.26666667	90.33333333
Standard deviation (SD)	5.861	5.094
Sample size (N)	15	15

Table 2: A comparison between Post treatment values for 6 Min walk test in control and experimental groups

	Control group	Experimental group
Mean	89.66666667	159.7333333
Standard deviation (SD)	5.066	16.525
Sample size (N)	15	15

Graph 1 : Statistical Test: Unpaired 't' test
P value: The two-tailed P value is 0.5989, considered not significant.
 t = 0.5320 with 28 degrees of freedom.



Graph 2: The two-tailed P value is < 0.0001, considered extremely significant.

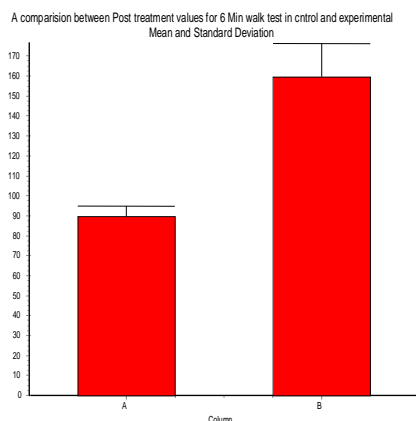


Table 3: A comparison between pre and post treatment values in 6min walk distance test in control group.

	Pre Treatment	Post Treatment
Mean	89.266	89.66
Standard deviation (SD)	5.861	5.066
Sample size (N)	15	15

Statistical Test : Unpaired 't' test
P value
 The two-tailed P value is 0.8453, considered not significant.
 t = 0.1970 with 28 degrees of freedom.

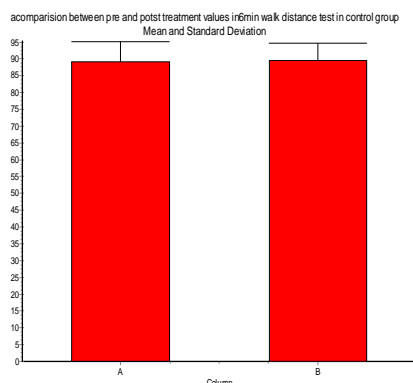


Table 4: A comparison between pre and post treatment scores in 6 min walk distance test for experimental group.

	Pre Treatment	Post Treatment
Mean	90.3	159.7
Standard deviation (SD)	5.094	16.525
Sample size (N)	15	15

Statistical Test : Unpaired 't' test
P value
 The two-tailed P value is < 0.0001, considered extremely significant.
 t = 15.544 with 28 degrees of freedom.

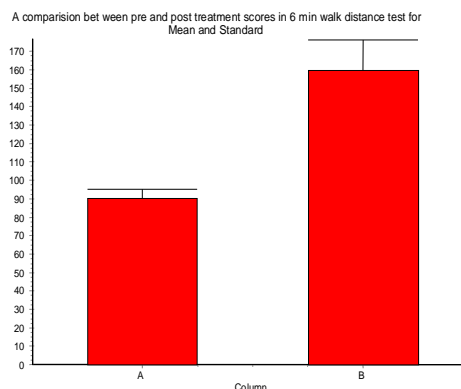


Table 5: A comparison between pre treatment scores in sf-36 for control and experimental group.

	Control Group	Experimental
Mean	892.6666667	916.6666667
Standard deviation (SD)	76.014	49.917
Sample size (N)	15	15

Statistical Test : Unpaired 't' test
P value
 The two-tailed P value is 0.3155, considered not significant.
 t= 1.022 with 28 degrees of freedom.

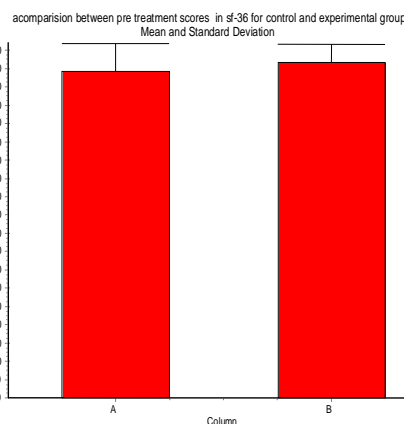


Table 6: A comparison between post treatment scores for control and experimental group in sf-36.

	Control Group	Experimental
Mean	1177	2729.333333
Standard deviation (SD)	96.562	138.06
Sample size (N)	15	15

Statistical Test : Unpaired 't' test

P value

The two-tailed P value is < 0.0001, considered extremely significant.

t = 35.685 with 28 degrees of freedom.

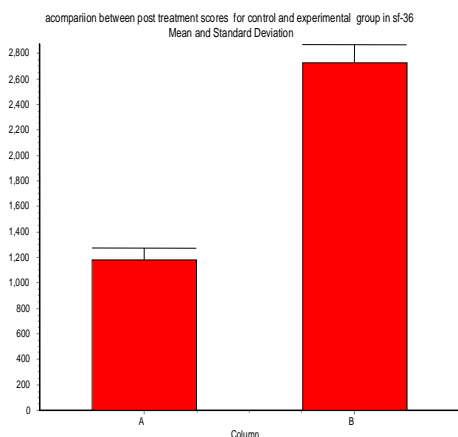


Table 8: A comparison between pre and post treatment scores for sf-36 in experimental group.

	Pre Treatment	Post Treatment
Mean	916.66	2729.33
Standard deviation (SD)	49.917	138.06
Sample size (N)	15	15

Statistical Test : Unpaired 't' test

P value

The two-tailed P value is < 0.0001, considered extremely significant.

t = 47.821 with 28 degrees of freedom.

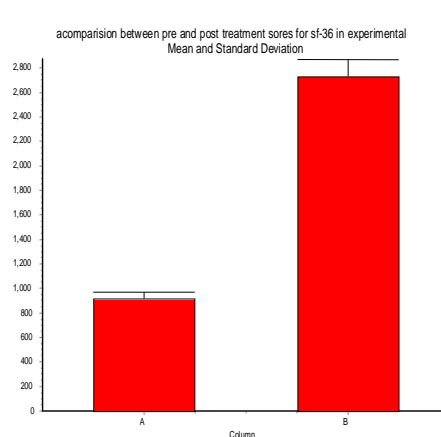


Table 7: A comparison between pre and post treatment scores for sf 36 in control group.

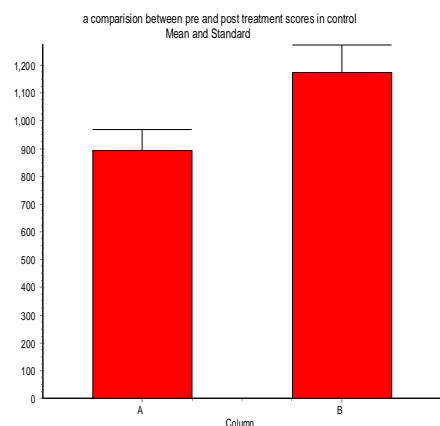
	Pre Treatment	Post Treatment
Mean	892.66	1177
Standard deviation (SD)	76.014	96.562
Sample size (N)	15	15

Statistical Test : Unpaired 't' test

P value

The two-tailed P value is < 0.0001, considered extremely significant.

t = 8.961 with 28 degrees of freedom.



DISCUSSION

The study has been done with 30 subjects divided into 2 groups control and Experimental group respectively. The control group under went optimal medical treatment and Experimental group under went immediate pulmonary rehabilitation program after the discharge from hospital for 8 weeks after an acute exarerbation of COPD ^{1,9}.

Man et.al studied the effects of 3 months pulmonary rehabilitation program on an out patient basis besides there are few other studies which investigated the benefits of exercise training after acute exacerbation of COPD in improving health related quality of life². Early pulmonary rehabilitation compared with usual care lead to significant improvement in median st george respiratory questionnaire, chronic respiratory questionnaire and sf-36 questionnaire.¹⁴

Behnke et.al looked at the effects of initial 10 days inpatient training program, followed by 6 months of supervised home training compar-

-ed with usual care in-patients admitted for an acute exacerbation of COPD. they showed an improvement in 6min walk test and sum scores in the questionnaires of chronic respiratory disease.¹⁵

Pulmonary rehabilitation, which consists of different exercises that is diaphragmatic and pursed lip breathing exercises, endurance exercises like walking, cycling, upper and lower body strengthening exercises 20 to 30mins. these exercises help to retraining the muscles of respiration, increasing work of breathing, improves gaseous exchange and leads to effective ventilation. On the other hand, improved bronchial hygiene, which also aids and augments ventilation, is achieved by implanting a pulmonary rehabilitation program in COPD patients (Michael G. Levitzky). All these changes have a direct impact over the exercise tolerance of the patients by alleviating dyspnea as a result of decreased work of breathing and improving gaseous exchange. This improved exercise tolerance shifts the patient to a highly compatible functional ability and thereby experience improved quality of life which is scientifically assessed by SF-36 questionnaire.

Summary of the present study:

This study was done on 30 COPD patients which were divided into two groups: 15 patients in the controlled group and 15 patients in the experimental group.

The experimental group underwent for 2 months pulmonary rehabilitation program with outpatient supervision everyday along with medication and the controlled group using medications only.

6 min walk distance test and short form -36 (SF-36) were used twice at beginning and at the end of the study.

The experimental group showed significant improvement in 6min walk distance test and health related quality of life scores at two months compared with the usual care patients.

LIMITATIONS

1. This study was small because only patients literate enough to complete the questionnaires by themselves were included.
2. It did not measure the effect of this program

on frequency of exacerbations, rate of readmission to the hospital or long term effect.

3. The pre-treatment SF-36 scores of the experimental group are bit higher compared to control group but they are statistically not significant.

RECOMMENDATION

1. This study can be done on a larger sample for a longer duration of time.
2. This study can be done by measuring the frequency of exacerbations, rate of re-admission to the hospital or long term effects.

CONCLUSION

Early pulmonary rehabilitation immediately after discharge from hospital leads to additional notable improvements in exercise tolerance and quality of life at two months compared with usual care.

ABBREVIATIONS:

PR - Pulmonary Rehabilitation
COPD- Chronic Obstructive Pulmonary Disease
HRQL- Health Related Quality of Life

Conflicts of interest: None

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