

# Role of Pulmonary Rehabilitation In Cases of COPD

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## ABSTRACT

### INTRODUCTION

Pulmonary rehabilitation is a comprehensive intervention for patients with chronic respiratory diseases who are symptomatic and often decreased life activities. Pulmonary rehabilitation reduces hospitalization among patients who have repeated exacerbation. This study is used to assess the role of pulmonary rehabilitation in COPD patients.

### MATERIALS AND METHOD

This is a hospital-based randomized case-control study, conducted in 66 clinically diagnosed COPD patients in Sarojini Naidu medical college, Agra to assess the role of pulmonary rehabilitation in COPD patients is assessed by 6minute walk test, St George Respiratory Questionnaire[SGRQ] and Modified Borg Scale[RPE scale]

### RESULT

The change in decline in [PRE 6MWT] observed between the case and control group was significant [p=0] ] The change in decline in [POST 6MWT] observed between the case and control group was significant [p=0]. The SGRQ was noticed to be decreased in both groups. The change in decline in SGRQ observed between the case and control group was significant [p=0].

### CONCLUSION

In conclusion, pulmonary rehabilitation is new hope for the patient with COPD. It is a treatment that reduces dyspnea and increases activities of daily living, exercise tolerance, exercise capacity and better quality of life.

**KEYWORDS** : COPD Chronic Obstructive Pulmonary Disease, PR Pulmonary Rehabilitation, 6MWT 6 Minute Walk Test, SGRQ St George Respiratory Questionnaire

### INTRODUCTION

American Thoracic Society (ATS) and European Respiratory Society adopted the following definition of Pulmonary rehabilitation. It is an evidence-based, multidisciplinary, and comprehensive intervention

for patients with chronic respiratory diseases who are symptomatic and often decreased life activities. Integrated into the individualized treatment of the patient, pulmonary rehabilitation is designed to reduce symptoms, optimize functional status and reduce health care costs through stabilizing or reversing systemic manifestation of the disease. Pulmonary rehabilitation may be initiated at any stages of the disease, during periods of clinical stability or directly after an exacerbation.<sup>1</sup> The goals of pulmonary rehabilitation include minimizing symptoms burden, maximizing exercise performance, promoting autonomy, increasing participation in everyday activities, enhancing the quality of life, and effecting long term health-enhancing behaviour change. The COPD includes chronic bronchitis and emphysema.

Chronic obstructive pulmonary disease is a common, preventable and treatable disease that is characterized by persistent respiratory symptoms and airflow limitation that is due to airway and alveolar abnormalities usually caused by significant exposure to noxious particles or gases influenced by host factors including abnormal lung development, [GOLD 2020].<sup>2</sup> Pulmonary rehabilitation improves dyspnea, health status and exercise tolerance in stable patients of COPD. Pulmonary rehabilitation reduces hospitalization among patient who has repeated exacerbation. It reduces symptoms of anxiety and depression. This study is used to assess the role of pulmonary rehabilitation in COPD patients.

### MATERIALS AND METHODS

This is a hospital-based randomized case-control study, conducted in 66 clinically diagnosed COPD patients attending the department of tuberculosis and chest diseases, Sarojini Naidu Medical College, Agra, Uttar Pradesh, India to assess the role of pulmonary rehabilitation in COPD patients between July 2019 to January 2020.

### INCLUSION CRITERIA

- Patients meeting the definition of COPD by GOLD Guidelines
- Stable follow up COPD patients



- Patients above 18 years of age
- Patients who can give informed consent

**EXCLUSION CRITERIA**

- Patients who are not able to give informed consent
- Other medical illness[thyroid disorders, diabetes, hypertension, asthma]

The study group was randomly divided into cases and control. Thus, there were 33 patients in either case and control group, 1 patient in the case group and 5 patients in the control group did not come for follow up. Thus finally, there were 32 patient in the case group and 28 patients in the control group. The pulmonary rehabilitation was given to cases of COPD. The pulmonary rehabilitation components consist of health education about the disease, breathing retraining techniques, exercise for bronchial hygiene and exercise like brisk walking. The role of pulmonary rehabilitation in COPD patients is assessed by 6minute walk test, St George Respiratory Questionnaire[SGRP] and Modified Borg Scale[RPE scale]

**TABLE1:  
DISTRIBUTION OF CASES AND CONTROL IN STUDY**

	NO. OF COPD PATIENTS
CASES	32
CONTROL	28
TOTAL	60

**TABLE 2 :  
DISTRIBUTION based on AGE**

	NO	MEAN	T VALUE	VALUE
CASES	32	47.41	1.6558	0.1034
CONTROL	28	42.04		

**TABLE 3 :  
DISTRIBUTION based on SEX**

	NO	MALES	FEMALES	PVALUE
CASES	32	19	13	0.8
CONTROL	28	21	7	

**TABLE 4:  
MODIFIED BORG SCALE RATING [PRE 6 MWT]**

GROUP	The difference in mean [Borg scale Pre 6MWT]	t value	P-value
CASES [n=32]	-2.00	-11.51	0
CONTROL [n=28]	-0.39		

**TABLE 5 :  
6 MINUTE WALK TEST**

GROUP	Difference in mean [ 6MWT]	t value	P-value
CASES [n=32]	109.62	10.93	0.01
CONTROL [n=28]	55.90		

**TABLE 6 :  
MODIFIED BORG SCALE RATING [POST 6 MWT]**

GROUP	The difference in mean [Borg scale Post 6MWT]	t value	P-value
CASES [n=32]	-2.35	-17.698	0
CONTROL [n=28]	-0.50		

**TABLE 7 :  
SGRQ Score**

GROUP	Difference in mean SGRQ	t value	P-value
CASES [n=32]	-1.21	-6.844	0
CONTROL [n=28]	-0.12		

## RESULT

There were a total of 32 patients in the case group and 28 patients in the control group. In the case group, the mean age of the patients was 47.41 years, and in the control group, the mean age of patients was 42.04 years. Hence the two groups were comparable with respect to age as suggested by the p-value which was 0.1034, the difference was not significant [TABLE 1 AND 2]

In the case group, 19 patients [59.38%] were male, while 13 patients [40.62%] were female. In the control group, 21 patients [75%] were male, and 7 patients [25%] were female. Hence the two groups were comparable with respect to sex as suggested by the p-value which was 0.8 the difference was not significant [TABLE 3]

In the case group, the mean value of [PRE 6MWT] Modified Borg scale before rehabilitation was found to be 5.25 while after a rehabilitation period of 10 weeks it was found to be 3.25. In the control group, the mean value of PRE 6MWT distance [m] at the start of the study was found to be 5.39 while after 10 weeks, it was found to be 5. The [PRE 6MWT] distance [m] was noticed to be decreased in both the group; however, the change in the case group was double the time of the control group. The change in decline in [PRE 6MWT] observed between the case and control group was significant [p=0] [TABLE 4]

In the case group, the mean value of 6MWT distance before rehabilitation was found to be 369.63 m while after rehabilitation period of 10 weeks it was found to be 479.25m, In the control group, the mean value of 6MWT distance [m] at the start of the study was found to be 360m while after 10 weeks, it was found to be 416m The 6MWT distance [m] was noticed to be increased in both the group, however, the change in the case group was 29.66% double the time of control group. The change in mean 6MWT distance observed between the case and control group was significant [p=0.01] [TABLE 5]

In the case group, the mean value of [POST 6MWT] Modified Borg scale before rehabilitation was found to be 5.91 while after a rehabilitation period of 10 weeks it was found to be 3.56. In the control group, the mean value of POST 6MWT distance [m] at the start of the study was found to be 6.25 while after 10 weeks, it was found to be 5.75. The [PRE 6MWT] distance [m] was noticed to be decreased in both the group; however, the change in the case group was more than the control group. The change in decline in [POST 6MWT] observed between the case and control group was significant [p=0]. [TABLE 6]

In the case group, the mean value of SGRQ before rehabilitation was found to be 15.51 while after a rehabilitation period of 10 weeks, it was found to be

14.3. In the control group, the mean value of SGRQ at the start of the study was found to be 16.61 while after 10 weeks, it was found to be 16.49. The SGRQ was noticed to be decreased in both the group; however, the change in the case group was more than the control group. The change in decline in SGRQ observed between the case and control group was significant [p=0]. [TABLE 7]

## DISCUSSION

Pulmonary rehabilitation plays a vital role in the management of COPD. It has been used in alleviating symptoms. In a study conducted by Vishal Banal<sup>3</sup> et al about the role of pulmonary rehabilitation in COPD patients concluded that pulmonary rehabilitation decreases the exacerbation episodes and reduction in functional exercise capacity.

In a study done by Osamu Nishiyama<sup>4</sup> et al, the effect of pulmonary rehabilitation in IPF were evaluated. After rehabilitation program 6MWD, dyspnea rating with the baseline dyspnea index and health-related quality of life score on the St George Questionnaire were evaluated at baseline and after the program. It was concluded that Pulmonary rehabilitation improves both exercise capacity and health-related quality of life in a patient with IPF.

In a study conducted by Esther Cecilia<sup>5</sup> et al. on pulmonary rehabilitation among tuberculosis, patient concluded that pulmonary rehabilitation improves patient functionality in tuberculosis patient.

In our study significant improvement was found to be provided by pulmonary rehabilitation over standard medical treatment in terms of exercise tolerance, a similar result was found by Francesca Gibellino<sup>6</sup> et al in her study on the role of COPD where she found significant improvement in exercise tolerance, Almost similar result was reported by Osamu Nishiyama et al. in his study on the role of PR in patients of IPF where he found significant improvement in exercise tolerance. Similarly, B.M.O.Neill<sup>7</sup> found significant improvement in exercise tolerance provided by Pr in chronic lung diseases.

In our study on COPD patient, when the 6MWT distance was compared between the case and control group pre and post-rehabilitation, significant improvement was found by PR in the case group over the control group. The percentage of change in the 6MWT distance in the case group was almost double that observed in the control group. A similar result was found by Mara Popescu Hugen<sup>8</sup> et al and Renta Claudia Zanchet<sup>9</sup>.

In our study on the patient of COPD, at last, when the quality of life was compared between the case and control groups pre and post-rehabilitation, again dramatic and significant improvement was provided

by PR in the case group over control group as indicated by the SGRQ, the percentage change in the mean value of SGRQ score in the case group was - 7.8% which was almost 10 time of that observed in the control group. Osamu Nishiyama et al. made a similar observation. And Nizar Rifaat<sup>10</sup> et al. in their respective studies on the role of PR in IPF. They found significant improvement in the quality of life. Mara Popescu Hagen et al. reported a similar finding in COPD. Salhi B et al. found a similar result in restrictive lung disease

### CONCLUSION

In conclusion, pulmonary rehabilitation is a new hope for a patient with COPD. It is a treatment that reduces dyspnea and increases activities of daily living, exercise tolerance, exercise capacity and better quality of life. As per the result of the pilot study and considering the sample size of the patient enrolled in the study, pulmonary rehabilitation seems to be a better adjunct therapy in patients of COPD along with standard medical treatment for the overall management of these patients having poor quality of life and exercise tolerance.

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