

## Pulmonary Rehabilitation in COPD-An Important Non-pharmacological Treatment

**Shrestha KD**

Department of Adult Nursing, Maharajgunj Nursing Campus, Institute of Medicine, Tribhuvan University, Kathmandu, Nepal

**Correspondence to:** Ms. Krishna Devi Shrestha

**Email:** Krishna\_kr06@yahoo.com

### Abstract

Pulmonary rehabilitation (PR) is a non-pharmacological therapy that has emerged as a standard of care for patients with chronic obstructive pulmonary disease. It is an integral part of the clinical management and health maintenance of those patients with chronic respiratory disease who remain symptomatic or continue to have decreased function despite standard medical treatment. It aims to reduce symptoms, decrease disability, increase participation in physical and social activities, and improve the overall quality of life (QOL) for patients with chronic respiratory disease. Currently, the focus of treatment is appropriate bronchodilator therapy but much like bronchodilator therapy, non-pharmacological therapy provides symptomatic improvement and better quality of life. Pulmonary rehabilitation is a comprehensive, multidisciplinary, patient-centered intervention that includes patient assessment, exercise training, self-management education, and psychosocial therapy delivered by an interdisciplinary team of therapists and it last for 6-8 weeks. The benefits of pulmonary rehabilitation as a non pharmacological treatment include decreased dyspnoea, improved health-related quality of life, fewer days of hospitalization, and decreased health-care utilization. This article aims to highlight the pulmonary rehabilitation, its indication, contraindication, benefits, component of PR and health care providers' role in successful PR.

### Introduction

Chronic obstructive pulmonary disease (COPD) is a highly prevalent disease worldwide. It is the fourth leading cause of death in the world.<sup>1</sup> In Nepal, COPD accounts for 43% of the non-communicable disease burden, and 2.56% of hospitalizations.<sup>2,3</sup> Development of COPD is multifactorial and the presence of symptoms, exacerbations and co-morbidities associated with COPD have significant impacts on mortality rate, exacerbation rates, hospital length of stay, quality of life and functional status. Co-morbidities affects more than 80% of older patients with COPD.<sup>4</sup> It is a leading cause of morbidity and mortality resulting economic and social burden that is both substantial and increasing.<sup>5</sup>

Pulmonary rehabilitation is a non-pharmacological therapy that has emerged as a standard of care for patients with COPD. It is recognized as a core component of

the management of individuals with chronic respiratory disease. Pulmonary rehabilitation is defined as an “evidence-based, multidisciplinary, and comprehensive intervention for patients with chronic respiratory diseases who are symptomatic and often have decreased daily life activities designed to reduce symptoms, optimize functional status, increase participation, and reduce health care costs through stabilizing or reversing systemic manifestations of the disease.”<sup>6</sup> American Thoracic Society (ATS) and the European Respiratory Society (ERS) defined the pulmonary rehabilitation as “a comprehensive intervention based on a thorough patient assessment followed by patient-tailored therapies that include, but are not limited to, exercise training, education, and behavior change, designed to improve the physical and psychological condition of people with chronic respiratory disease and to promote the long-term adherence to health-enhancing behaviors.”<sup>7</sup>

It is a program of education and exercise that helps to manage the breathing problem, increase stamina and decrease breathlessness.<sup>8</sup> Dyspnoea and fatigue are hallmark symptoms in most COPD patients. There is a considerable body of evidence that pulmonary rehabilitation improves exertional dyspnoea and dyspnoea associated with daily activities in COPD.<sup>9</sup> British Thoracic Society guideline stated that PR should be offered to patients with COPD with a view of improving exercise, improving dyspnoea, health status and psychological wellbeing by a clinically important amount.<sup>10</sup> The primary aim of pulmonary rehabilitation then is to reduce disability and handicap of persons with chronic lung diseases and support their carers, thereby restoring the patient to the highest possible level of independent functioning.<sup>11</sup> The program consists of an individual assessment followed by exercise training and education. The rehabilitation team includes a physical therapist, occupational therapist, rehabilitation nurse, social worker, respiratory therapist, vocational counselor, and psychologist. A successful team maintains coordination, cooperation, and opens communication.<sup>12</sup>

The goals of pulmonary rehabilitation are to improve adherence to recommended therapies, reduce frequency & severity of symptoms, enhance mood, reduce anxiety & depression, reduce dependency & increase involvement with friends and family, enhance ability to perform activities of daily living, improve strength & quality of life, to have better exercise capacity, endurance & return to work, increase knowledge about respiratory disease and management, enhance participation in therapeutic decisions by building self management capacity, reduce health care burden for patients, families and communities, reduce hospitalization rate, days per admission, cost of health care, improve self-efficacy and extend survival.<sup>13, 14, 15</sup>

### Indications and contraindications of pulmonary rehabilitation

Patient with mild, moderate, or severe COPD, dyspnoea interfering with daily activities, pulmonary hypertension, interstitial lung disease, asthma, chest wall disease, cystic fibrosis, bronchiectasis, lung cancer, selected neuromuscular diseases, and peri-operative conditions (thoracic or abdominal surgery, lung transplantation, lung volume reduction surgery) are indicated.<sup>12</sup> Contraindications includes unstable angina or conditions that substantially interfere with the

rehabilitative process,<sup>16</sup> recent Myocardial infraction,<sup>12</sup> Patients who have co-morbidities, cognitive disorder limiting ability to participate.<sup>6</sup>

### Benefits of Pulmonary rehabilitation:

As per Pulmonary rehabilitation factsheet, the benefits of PR include increased physical fitness & functioning, increased participation in everyday activities, reduced breathlessness, improved quality of life, improved knowledge and ability to manage of lung condition, reduced hospital re-admissions post exacerbation, reduced length of stay in hospital, reduced anxiety and depression associated with COPD, improved mood, motivation and psychological wellbeing, reduced mortality.<sup>17, 18, 19</sup>

Regarding duration of PR, it last for at least 6-8 weeks with 2 exercise sessions per week, and an education component attached such as breathing techniques, using medicines, increasing physical function, energy conservation and reassessment will be done at the end.<sup>6,17</sup> Each session usually lasts between one-and-a-half and two hours. Patient will be part of a group, commonly between eight and 16 people.<sup>6</sup>

### Components of Comprehensive Pulmonary Rehabilitation

Comprehensive pulmonary rehabilitation programs generally have the 4 major components i.e. Exercise training, Education, Psychosocial/behavioral intervention and Outcome assessment.

#### *Exercise training*

Exercise training includes aerobic training of upper and lower limbs, trunk muscles, flexibility and muscle strength, guiding efficient energy expenditure, and teaching breathing control during exertion.<sup>11</sup> It is an essential component of pulmonary rehabilitation.<sup>16</sup>

Exercise prescription emphasizes endurance training targeted at 60% of maximal workload for about 20-30 minutes, repeated 2-5 times a week. Regular walking schedules as well as cycling are an important component of PR. Walking distance is increased progressively, and oxygen supplementation often is used in a patient who desaturates with exercise.<sup>12</sup> Effect of pulmonary rehabilitation on outcomes in stable COPD shows PR including at least 4 weeks of exercise training leads to clinically and statistically significant improvements in health related quality of life (HRQOL) in patients with

COPD. Similarly, it shows significant improvement in functional exercise capacity.<sup>20</sup>

### **Education**

Education is an integral part of comprehensive pulmonary rehabilitation programs. It improves the patient's knowledge about breathing and the various treatments to control breathlessness,<sup>11</sup> encourages active participation in health care, which leads to a better understanding of the physical and psychological changes that occur with chronic illness. With education, patients can become more skilled at collaborative self-management and have improved compliance.<sup>12</sup> Self-management education has been shown to be highly effective in improving health status and reducing health care utilization.<sup>16</sup> In small groups or on an individual basis, the topics such as energy conservation and work simplification : include paced breathing, optimization of body mechanics, advanced planning, prioritization of activities, and use of assisted devices are generally covered. Similarly, education about disease process, medications (action, adverse effects, dose, and proper use of all oral and inhaled medication, instructions in metered-dose inhaler technique and spacer devices) and other therapies (appropriate use of oxygen including end-of-life education)<sup>12</sup> as well as breathing techniques, posture technique, managing breathlessness, sputum clearance, benefits of physical exercise, nutrition/healthy eating, stress management, coping with chronic lung disease and management of depression, anxiety and panic attacks are usually emphasized.<sup>17</sup>

### **Psychosocial and behavioral intervention**

Depression, anxiety and panic are frequent complications of chronic disabling breathlessness, with dependency and social isolation being common consequences<sup>11</sup> contributing to the burden of advanced respiratory disease.<sup>16</sup> Psychosocial and behavioral interventions in the form of regular patient education sessions or support groups focusing on specific problems are very helpful. Instructions in progressive muscle relaxation, stress reduction, and panic control may help to reduce dyspnoea and anxiety.<sup>12</sup> Patients' family members and friends are also encouraged to participate in these support groups.

### **Outcome Assessment**

Outcome assessment is an important component of a comprehensive pulmonary rehabilitation program, being used to determine individual patient responses

and to evaluate the overall effectiveness of the program. Measurement of outcomes should be incorporated into every comprehensive PR program. For measuring outcome, assessment of the patient's recovery before and after rehabilitation i.e dyspnoea, exercise ability, health status and activity levels are necessary.<sup>12</sup> Although improvements may be seen after 1month, longer periods of exercise training may be required to reach peak efficacy.<sup>21</sup> Effect of pulmonary rehabilitation on outcomes following an Acute Exacerbation of COPD Shows PR (within 1 month of hospital discharge) after acute exacerbation significantly reduces hospital readmissions and leads to a statistically and clinically significant improvement in HRQOL.<sup>20</sup> Successful pulmonary rehabilitation reconditions patients, improves ventilatory efficiency<sup>22</sup> and decreases hyperinflation.<sup>23</sup>

### **Health Care Providers' Role**

Chronic obstructive pulmonary disease is a growing public health problem that imposes a considerable burden in terms of morbidity, mortality and healthcare costs. It is a progressive, debilitating and incurable disease causing a negative effect on aspects of daily living and patients' quality of life.<sup>24</sup> Health professionals involved in PR should have a high level of understanding about COPD, other chronic respiratory diseases, and the relevance of disability & handicap. They should have commitment to quality of care and continuous improvement. They should understand clinical indicators that reflect risk factors, and outcome measurements that reflect changes in impairment, disability and cost-effectiveness. They need to be timely, clear and relevant when communication with each patient's health care providers.<sup>11</sup> Nurses are in a key position to assume a leading role in the management of COPD since they frequently represent the first point of contact for patients and are involved in all stages of care from prevention to provision of end-of-life care within a variety of settings.<sup>9</sup>

Pulmonary rehabilitation enhances the promotion of health and self-management, along with the attainment of patients' goals. Nurses can help to improve the optimal level of functioning as they have a core function in assessing activities of daily living and assisting patients to meet their needs. It is important to assess how patients are coping with all activities of living. In PR, nurses can make an important contribution to the assessment of patients' nutritional intake and sleep patterns, which are

important components of the PR assessment. During the programme, nurses give dietary advice and, if required, offer help to modify diets. Equally, reasons for altered sleep patterns can be explored. Medication review such as observing and providing advice on inhaler technique; assessing patient understanding of medications; reported use of medication are all important elements of the nurse's role. Similarly, education on conserving energy is essential to find ways of modifying the patient's life to make the day easier for them. It includes teaching them positioning, how to use aids or helping them with relaxation techniques. Providing maximum support and advance care planning for the end of life when the patient is not able to participate in treatment decisions are also vital role of nurses.<sup>24</sup>

Health care professionals have a responsibility to ensure best practice in the treatment and management of patient conditions. In promoting patient advocacy, health care professionals need to take an active role in referring patients to pulmonary rehabilitation programs when such programs are available. Once a COPD patient has been diagnosed, treated, and becomes stabilized on medical therapy, providing a prescription for pulmonary rehabilitation should become part of best practice across all care settings. If there are no pulmonary rehabilitation programs readily available then utilizing strategies to incorporate the components of PR, including education, exercise, and support, should be sought as minimal requirements for best practice in COPD care.<sup>6</sup>

## Conclusion

Non-pharmacological therapy, such as pulmonary rehabilitation, reduces the burden of COPD symptoms, improves QoL, and increases physical and emotional involvement in everyday activities. PR is recognized as a cornerstone in the management of individuals with stable COPD and with chronic respiratory disease. It is an important component of any COPD management strategy which requires active participation of the patient as well as the physician. It is a highly effective and safe intervention to reduce hospital admissions, mortality and to improve health-related quality of life in COPD patients and who have recently suffered an exacerbation of COPD. Pulmonary rehabilitation programs generally have the 4 major components i.e. exercise training, education, psychosocial/behavioral intervention and outcome assessment. As a minimum, efficacy of PR programmes, need to be regularly assessed by demonstrating clinically important

improvements in exercise capacity, dyspnoea and health status. Positive outcomes from PR include increased exercise tolerance, reduced dyspnoea and anxiety, increased self-efficacy, and improvement in health-related quality of life. Hospital admissions after exacerbations of COPD are also reduced with this intervention. Hence, the health care professionals have a responsibility to ensure best practice in the treatment and management of patient's conditions and where PR programs are not available to incorporate the components of PR while providing care for patients with COPD.

## Conflict of interest: None declared.

## References

1. Safka KA and McIvor RA. Non-Pharmacological Management of Chronic Obstructive Pulmonary Disease, *Ulster Medical Journal*. 2015 Jan; 84(1): 13–21.
2. Bhandari GP, Angdembe MR, Dhimal M, Neupane S, Bhusal C. State of non-communicable diseases in Nepal, *BMC Public Health*.2014;14:23, DOI: 10.1186/1471-2458-14-23,
3. Nepal Health Research Council. Prevalence of Non Communicable Disease in Nepal: Hospital Based Study. Kathmandu, Nepal: Nepal Health Research Council. 2010.
4. Smith MC, Wroble JP. Epidemiology and clinical impact of major co-morbidities in patients with COPD. *International Journal of COPD*. 2014;9(1), 871-88;
5. Global Initiative for Chronic Obstructive Lung Disease. *Global Strategy for the Diagnosis, Management and Prevention of Chronic Obstructive Pulmonary Disease*; 2014..
6. Sanders D. Pulmonary Rehabilitation in COPD: A Second Wind. *Today's Geriatric Medicine*. 2014; 7 (1): 22
7. Spruit MA, Singh SJ, Garvey C, ZuWallack R, Nici L, Rochester C and et al. American Thoracic Society Documents, An Official American Thoracic Society/ European Respiratory Society Statement: Key Concepts and Advances in Pulmonary Rehabilitation, Executive Summary. *American Journal of Respiratory and Critical Care Medicine*. 2013;188,
8. American thoracic society Patient Education, Pulmonary Rehabilitation *American Journal of Respiratory and Critical Care Medicine*. 2013; 188:5-6. [www.thoracic.org](http://www.thoracic.org).

9. Fletcher MJ, Dahl BH. Expanding nursing practice in COPD: key to providing high-quality, effective, and safe patient care? *Primary Care Respiratory Journal*. 2013; 22(x): xx-xx <http://dx.doi.org/10.4104/pcrj.2013.00044>
10. British Thoracic Society guideline on pulmonary rehabilitation in adults: accredited by NICE, *Thorax* 2013; 68:ii1-ii30
11. Frith P. A manual for pulmonary Rehabilitation in Australia, Evidence base and standards. 2008. retrieved from
12. Sharma S. Pulmonary Rehabilitation 4th Oct, 2016.
13. British Thoracic Society Standards of Care Subcommittee on Pulmonary Rehabilitation. Pulmonary rehabilitation. *Thorax* 2001; 56:827-834)
14. Talag AA, Road J. Non-pharmacological management of chronic obstructive pulmonary disease. *British Columbia Medical Journal*. 2008; 50 (2): 90-96
15. Singh S, Singh V. Pulmonary Rehabilitation in COPD, Supplement to JAPI, 2012; 60
16. Nici L, Lareau S, Zuwallack R. Pulmonary Rehabilitation in the Treatment of Chronic Obstructive Pulmonary Disease. *American Family Physician*. 2010 Sep 15; 82(6):655-660.
17. Pulmonary rehabilitation fact sheet. 2015 retrieved from <http://lungfoundation.com.au/wp-content/uploads/2015/09/Pulmonary-Rehabilitation-Advocacy-Fact-Sheet.pdf> on 1st Jan, 2017.
18. Puhan MA, Gimeno-Santos E, Scharplatz M, Troosters T, Walters EH, Steurer J. Pulmonary rehabilitation following exacerbations of chronic obstructive pulmonary disease. *Cochrane Database of Systemic Review*. 2011. Oct 5; (10):CD005305.
19. Celli BR. Pulmonary rehabilitation in COPD on 4th Oct, 2016
20. COPD Working Group. Pulmonary Rehabilitation for Patients With Chronic Pulmonary Disease (COPD). An Evidence-Based Analysis, Ontario Health Technology Assessment Series. 2012; 12(6): 1–75.
21. Green RH, Singh SJ, Williams J, Morgan MD. A randomised controlled trial of four weeks versus seven weeks of pulmonary rehabilitation in chronic obstructive pulmonary disease. *Thorax* 2001; 56: 143–5
22. Casaburi R, Porszasz J, Burns MR, Carithers ER, Chang RS and Cooper CB. Physiologic benefits of exercise training in rehabilitation of patients with severe chronic obstructive pulmonary disease. *American Journal of Respiratory Critical Care Medicine* 1997; 155: 1541–51.
23. Porszasz J, Emtner M, Goto S, Somfay A, Whipp BJ, Casaburi R. Exercise training decreases ventilatory requirements and exercise-induced hyperinflation at submaximal intensities in patients with COPD. *Chest* 2005; 128: 2025–34.
24. Vincent E, Sewell L. The role of the nurse in pulmonary rehabilitation. *Nursing Times*. . 2014. Dec 10-16; 110(50):16-8.