PULMONARY REHABILITATION AMONG COPD PATIENTS

Shatrughan Pareek1*, Yashawant Ramawat2, Nitesh Kumawat2, Diwakar Verma3*, Nitesh Kumar3 and Suman Kumawat4

Nursing Superintendent, Indian Railway Health Services, Bikaner (Rajasthan)1 Nursing Officer, Stoma and Wound care, AIIMS, Jodhpur2 Senior Resident, Emergency Medicine, AIIMS Jodhpur3 Senior Resident, Department of Pediatrics, AIIMS Jodhpur4

DOI: http://dx.doi.org/10.24327/ijrsr.2020.1105.5315

INTRODUCTION

Respiratory disorders are conditions that affect lungs and tissues that make gas exchange possible in human beings and affect the condition of the respiratory tract, trachea, bronchi, bronchioles, alveoli, pleura and pleural cavity1. The WHO estimates that 2.74 million people died of COPD worldwide. In 1990, a study by the World Bank and WHO ranked COPD 12th as a burden of disease; by 2020, it is estimated that COPD will be ranked 5th. The passive smoking carries serious risks, especially for children and those chronically exposed. It is estimated that passive smoking is associated with 0 to 43 percent increase in risk of COPD in adults. Although cigarette smoking is the primary cause of COPD, it is estimated that there are 400,000 deaths per year from exposure to biomass fuels2. Chronic obstructive pulmonary disease (COPD) is a type of obstructive disease where the airways become narrow. The main symptom of COPD is dyspnea, which restricts physical activities of the patient. The chronic obstructive pulmonary disease is an umbrella term for diseases that impair lungs functions and breathlessness. Chronic obstructive pulmonary disease is predominantly a disease of men and only 40% of cases in India occur among women. Much more than a smoker’s cough, it will become the 3rd leading cause of death by 20303.

More than 13 million Indians are victims of Chronic Obstructive Pulmonary Disease. The prevalence rate of COPD in Indian males is 5% and in women is 2.7%, male to female ratio being 1:64. In the world, approximately 210 million people are affected from COPD. At global level, COPD was the 4th leading cause of death (5.1%) in 2004 and is projected to occupy the 3rd position (8.6%) in 2030. Pulmonary Rehabilitation (PR) is a multi-disciplinary program design for the patients with chronic respiratory diseases. It is an evidence-based, multidisciplinary, and comprehensive intervention for respiratory disease patients who have poor daily life activities; and is individually tailored and designed to optimize physical and social performance and autonomy. The program is effective for almost all respiratory diseases. The main components of exercise training programs for COPD are tolerance and resistance training; these should add all exercise prescriptions. PR programs can vary from 4 to 12 weeks in duration and include both active and passive exercise, pulmonary education sessions and self care. The aim of pulmonary rehabilitation is to break this vicious cycle and help the COPD patients to participate in daily activities. It is known to improve quality of life and exercise tolerance in COPD. The program is helpful in minimizing the hospital stay among patients with respiratory diseases. Pulmonary rehabilitation is effective in reducing the disease burden of respiratory diseases.

*Corresponding author: Shatrughan Pareek
Nursing Superintendent, Indian Railway Health Services, Bikaner (Rajasthan)
future. COPD accounts for about half million deaths in India, which is more than 4 times the number of people who die due to COPD in USA and Europe. A recently study estimated the prevalence of COPD at 3.49% in India\(^4\).

India is a vast country comprising of people with variety of sociodemographic profiles, cultural practices and ethnicities. Hence the risk factors for COPD are also likely to be different across various Indian states and regions. Together COPD, asthma and other respiratory diseases are the second (10.2%) leading cause of death in the population aged 25–69 years in India, as reported in 2001–2003\(^5\). Chronic obstructive pulmonary disease (COPD) is characterized by airflow limitation leading to declined ventilation capacity and is associated with shortness of breath\(^6\).

Pulmonary Rehabilitation is a multi-disciplinary program design for the patients with chronic respiratory diseases. It is an evidence-based, multidisciplinary, and comprehensive intervention for respiratory disease patients who have poor daily life activities; and is individually tailored and designed to optimize physical and social performance and autonomy.

The main components of exercise training programs for COPD are tolerance and resistance training; these should add all exercise prescriptions. The exercise guidelines stated that tolerance training at least 3 to 5 times/week with ultimate targets more than 60% of maximal peak exercise should be used in all exercise programs for COPD patients. If patient is able to work out without any problem, provide exercise of at least 20 minutes in duration. The whole duration of the program should be 4-12 weeks\(^7,8\).

Goals of pulmonary rehabilitation

- Pulmonary rehabilitation 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.
- These goals are achieved through patient and family education, exercise training, psychosocial & behavioral intervention, and outcome assessment.
- The rehabilitation intervention is geared toward the unique problems and needs of each patient and is implemented by a multidisciplinary team of health care professionals\(^6,7\).

A study was conducted at SIMS College of physiotherapy outpatient clinic; life hospital Guntur, Andhra Pradesh, India on 30 individuals with random sampling method. A two months program was prepared for the COPD patients. SF-36 Quality of life scale was used to obtain data. The study reported that the Experimental group showed significant improvement in the exercise tolerance and quality of life. The study communicated that pulmonary rehabilitation program can shorten hospital stay duration which can indirectly decrease treatment costs but there is no effect on overall survival\(^9\).

A research study was conducted in medical ICU of Labafi Nejad hospital, Tehran, Iran during 2012-2013. The sample size was 173 ICU patients. Pulmonary rehabilitation programme showed no effect on patients’ outcome in 2012, 94 patients were discharged from hospital and 61 patients were died. In 2013, 98 patients were discharged from hospital but 64 patients were died. The study communicated that pulmonary rehabilitation program can shorten hospital stay duration which can indirectly decrease treatment costs but there is no effect on overall survival\(^9\).

A case study was conducted on pulmonary rehabilitation in COPD patients. A 70 years old male patient, active smoker was selected for the present study. The patient was on bronchodilators. The patient was gone under pulmonary rehabilitation programme for 3 months. The program was consisted of educational session, psychological session and various exercises. The study revealed that after going through PR, patient’s vital capacity was increased and dyspnea was at lower level. The PR was helpful in increasing the exercise response of the patient. The PR was effective in improving the functional capacity and quality of the patient\(^9\).

Pulmonary Rehabilitation Program

PR is an individualized and comprehensive intervention. PR programs can vary from 4 to 12 weeks in duration and include both active and passive exercise, pulmonary education sessions and self care. A supervised exercise typically takes place 2-3 hours/session; there are 3-5 times/week. Because skeletal muscle dysfunction is prevalent in patients with COPD and other lung diseases, a combination of strength and tolerance training is used to reverse the conditions. Baseline exercise testing with a walk test (e.g., 6 minute walk test or incremental maximal exercise tests), is used to both evaluate the patient’s ability to exercise as well as to serve as basis for compare the outcome of Pulmonary Rehabilitation\(^10,11\).

Types of pulmonary rehabilitation programs: There are three basic types of pulmonary rehabilitation\(^12,13\).

1. Out-patient
2. In-patient
3. Home-based programs

Conditions in which Pulmonary Rehabilitation can be implemented\(^14\)

<table>
<thead>
<tr>
<th>Chronic obstructive pulmonary disease (COPD)</th>
<th>Parkinson’s disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ventilator dependency</td>
<td>Pre and post lung volume-reduction surgery</td>
</tr>
<tr>
<td>Bronchiectasis</td>
<td>Primary pulmonary hypertension</td>
</tr>
<tr>
<td>Interstitial lung disease</td>
<td>Pre and post lung transplant</td>
</tr>
<tr>
<td>Obesity-related respiratory disease</td>
<td>Lung cancer</td>
</tr>
<tr>
<td>Bronchiolitis obliterans</td>
<td>Lung cancer</td>
</tr>
<tr>
<td>Chronic/persistent asthma</td>
<td>Lung cancer</td>
</tr>
</tbody>
</table>

Components of Pulmonary Rehabilitation Program\(^16\)

1. Anatomy and physiology of Respiratory system
2. Pathophysiology of chronic lung disease
3. Description of medical tests
4. General nutrition guidelines and Smoking cessation
5. Rehabilitation in exacerbations (signs and symptoms of a respiratory infection, call to health care provider, self-management strategies)
6. Energy conservation

\(^1\) P a g e
Pulmonary Rehabilitation Among COPD Patients

Shatrughan Paterek, et al.

4. Breathing strategies (pursed-lip breathing, paced breathing techniques, energy conservation)
5. Medications (bronchodilators, steroids, oxygen), inhaler technique, spacer/chamber, cleaning equipment, proper use of antibiotics, expectorants and cough suppressants
6. Oxygen delivery systems (concentrators, liquid, compressed gas, pulse devices), oxygen-conserving devices
7. Patient education
8. Exercise and maintaining physical activities

Figure 1 Benefits of Pulmonary rehabilitation (Courtesy Researchgate)

DISCUSSION
Pulmonary rehabilitation plays a key role in the management of chronic obstructive pulmonary disease. Pulmonary rehabilitation is a multidimensional process of services, directed to persons with pulmonary disorders and their families usually by an interdisciplinary team of specialists, with the goal of achieving and maintaining the maximum level of individual’s independence and functioning. Cochrane meta-analysis examined the effect of 23 randomized trials regarding pulmonary rehabilitation. It reported that pulmonary rehabilitation for COPD improves dyspnea and disease specific quality of life. Functional exercise capacity was also increased from 6-minute walk distance to 49 minutes. The benefits of the program were more in severe COPD as compared to mild and moderate disease. The aim of pulmonary rehabilitation is to break this vicious cycle and help the COPD patients to participate in daily activities. It is known to improve quality of life and exercise tolerance in COPD. A case study on a COPD patient was conducted to find out the outcomes of PR. The researcher implemented a pulmonary rehabilitation program which significantly improves the functional capacity and quality of life of the patient. Pulmonary rehabilitation programs are more effective after an exacerbation of COPD. It reduces the readmission rate to health care centers and improves physical functions. The rehabilitation programme is implemented on almost all respiratory disease patients. The outcomes of the program are not only effective for medical but also for surgical patients. It is also effective in cutting the cost of treatment for COPD patients. Pulmonary rehabilitation (PR) is a multidisciplinary approach which needed active involvement of not only the patient but also of health care providers. PR is cost-effective therapeutic intervention that enhances the shortness of breath, quality of life and physically performance abilities. PR is effective to improve exercise capacity, dyspnea and quality of life in COPD patients. So it is important to make the people aware about the pulmonary rehabilitation and, risk factor prevention and management of the COPD. The nurse, as health team members has the responsibility of educating the patient about disease process, avoiding triggers, performing breathing exercise, use of inhaler therapy, dietary management, medications and other home care management with COPD. Then only we can effectively control and manage COPD. Pulmonary rehabilitation is effective in reducing the disease burden of respiratory diseases.

CONCLUSION
COPD is a common disease among respiratory disorder patients. Pulmonary rehabilitation is needed for the respiratory disease patients. It is an effective way to improve their functional and breathing capacity. Pulmonary rehabilitation programs are more effective after an exacerbation of COPD. Health care professional have to emphasis on the program to minimize the morbidity and mortality among COPD patients.

Relevance to Clinical Practice: Climate is changing drastically at global level and it’s also affecting the respiratory status of population. COPD has a major contribution in respiratory diseases. Pulmonary rehabilitation program for COPD patients is a good initiative to improve the patient’s condition. It is a comprehensive program which may be implemented in hospital, clinic and home settings. Doctors or Nurses both can initiate and implement this program among COPD patients. This program helps the health care professionals in minimizing the disease burden of COPD and associated disorders.

References
1. Pulmonary rehabilitation. Lewis’s Medical Surgical Nursing. Lewis; Heitkemper; Bucher; O’Brien; Dirksen Missouri: ELSEVIER publication.2011.
2. World Health Organization/News/Factsheets/COPD/1 December 2017


How to cite this article:

******