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NURSING RULES PULMONARY REHABILITATION FOR COPD PATIENT

1 - Naif Sueid Alotibi,
2- Dareen Essam Ghalman,
3-Ahmed Shabib Al-Maqati,
4-Mansour Ateyan Alharbi,
5-Aisha barakah Albeladi,
6- Jameel Wasl Allah Albeshri,
7-Talal Saeed Alghamdi,
8-Mohammed Saeed Alghamdi,
9-Abdullah Mohammed Bareq Alqarni Alsuhaymi

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Abstract:

Literature search till the beginning of 2022 for all relevant studies publish in English language among different databases such as; PubMed and Embase. Many physical, emotional, and social symptoms may be present in COPD patients, necessitating a comprehensive, targeted intervention in the form of a personalized pulmonary rehabilitation (PR) program. Taking into account the disease's complexity and severity, good PR must incorporate the translation of information and evidence of recognized aspects into a multidimensional, complex intervention. In this manner, PR will increase the patient's individual autonomy and maximize the patient's autonomy and community functioning. PR is defined as a comprehensive strategy designed to sustainably enhance physical, psychological, and social outcomes in individuals with chronic respiratory problems. PR is a personalized, sophisticated health care intervention. Although exercise training has been recognized as the cornerstone of a comprehensive PR program, a profound pathophysiology understanding of the mechanisms governing exercise tolerance, particularly in COPD patients, necessitates the consideration of several training modalities.

Corresponding author:
Naif Sueid Alotibi,

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INTRODUCTION:

Chronic obstructive pulmonary disease (COPD) is a progressive, complex, chronic lung illness that causes airflow restriction. This blockage causes persistent, growing shortness of breath, productive cough, tiredness, and recurrent chest infections [1]. COPD is accompanied with extrapulmonary consequences such as muscle wasting, osteopaenia (a decrease in the protein and mineral content of bone tissue), cardiovascular illness, and depression, and is therefore best viewed as a systemic disease [2,3]. Globally, COPD is a leading cause of mortality. It is estimated that 210 million people live with COPD, and it is anticipated that by 2030, COPD will be the third leading cause of death worldwide [4]. Nowadays, COPD is incurable and is associated with considerable economic expenses due to disease progression and frequent hospital hospitalizations and readmissions [5]. Many risk factors, including genetics, recurrent respiratory illness, low socioeconomic position, exposure to air pollution, poor nutrition, and asthma [5,6], contribute to the development of COPD. The more a person smokes, the more likely they are to get COPD. COPD is a diverse illness whose development varies significantly between individuals. The initial underlying pathology of COPD is confined to the lungs, and a clinical diagnosis is made on the basis of presenting symptoms and confirmation of airflow obstruction with a postbronchodilator spirometry forced expiratory volume in one second/forced vital capacity ratio (FEV1/FVC) 0.70 [7]. Typically, the Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines are used to classify the severity of airflow limitations as mild (FEV1 80% predicted: GOLD 1), moderate (50% FEV1 80% predicted: GOLD 2), severe (30% FEV1 50% predicted: GOLD 3) or very severe (FEV1 30% predicted: GOLD 4) [6,7].

Long ago, the primary focus of COPD treatment was pharmacological alleviation of airway blockage. Yet, over the past two decades, mounting evidence of systemic manifestations in COPD patients and their detrimental impact on the functioning of these patients has hastened the development and implementation of nonpharmacological treatments, such as pulmonary rehabilitation (PR). PR and pharmaceutical therapy are not in competition with one another; rather, they must collaborate closely for a more beneficial outcome. One study has demonstrated that long-acting anticholinergic bronchodilators can improve the result (exercise tolerance) of PR when combined with PR [8]. In addition, PR has been demonstrated to be the most effective nonpharmacological intervention for enhancing the health status of COPD patients and has become the standard of care for COPD patients. Exercise is an important component of pulmonary rehabilitation courses; some programmes also incorporate assessment, teaching, psychological support, and food recommendations. Pulmonary rehabilitation is one of the most recommended treatments for COPD [9, 10].

Randomized studies, reviews, and meta-analyses [10] have conclusively demonstrated the positive effects of PR on exercise capacity, HRQoL, breathlessness, and health care usage (especially bed days) in patients with COPD. PR is currently suggested by a number of influential guidelines [11]. In the majority of nations, COPD rehabilitation is either practically nonexistent or severely underfunded. In addition to the expensive expense, misunderstandings regarding the utility of a PR program have impeded the widespread diffusion of comprehensive PR centers [11].

DISCUSSION:

In addition, COPD patients typically suffer from concurrent chronic conditions [2–4]. Physical inactivity is a well-known negative lifestyle factor, leading to a downward cycle that predisposes patients to a worse health status, higher hospitalization rates, and mortality [5,6]. Hence, there is a clear therapeutic reason for further, comprehensive therapies, such as PR, that take the individual's features and comorbidities into consideration [1]. Already in the first authoritative statement, PR was described as an art of medical practice in which an individually tailored, multidisciplinary program is developed through accurate diagnosis, therapy, emotional support, and education in order to stabilize or reverse both physiopathological and psychopathological manifestations of pulmonary diseases. [7] Such a program must aim to restore the patient to the maximum functional capability permitted given the severity of lung function impairment and the patient's overall life condition. Recently, PR has been defined as a comprehensive intervention based on a "thorough" patient assessment followed by patient-tailored therapies designed to improve the physical and psychological condition of patients with chronic respiratory disease and to promote long-term adherence to health enhancing behaviors [8]. Providing a patient-tailored, individualized, comprehensive intervention targeting complex requirements to improve physiological, psychological, and social outcomes and promote long-term adherence to health-promoting behaviors must be the foundation of any rehabilitation program [8,10]. PR programs are designed with the patient's needs and characteristics in mind. The multiple expression of COPD and the

unique patient features make PR a complex, patient-tailored health care intervention [11].

Evaluation of cardiopulmonary exercise and selection of training methods Exercise intolerance is a hallmark of COPD [12] individuals. Patients with comparable resting ventilatory deficits have diverse underlying causes [13]. There is a growing realization that co morbidities alter the pathophysiological effects of COPD. Certainly, cardiovascular illnesses are particularly widespread in COPD, have an impact on the level of disability and quality of life of patients, and contribute to their shortened lifespan [15,16,17]. A precise estimation of functional capacity by cardiopulmonary exercise testing can offer information regarding the effects of the cardiovascular, respiratory, musculoskeletal, and hematologic systems [18]. Such an evaluation of the integrated cardiopulmonary response to exercise is underutilized in the customized assessment and therapy of COPD patients with exercise limitation and dyspnea. Specifically in public relations, field tests are utilized to provide an overall measurement of exercise ability. Among metrics of ventilatory inefficiency, it has been observed that increases in the ventilation intercept in the V E/V CO2 plot more accurately reflect the gradual deterioration of exercise ventilatory inefficiency along the continuum of COPD severity [19]. In addition, this measure is associated with increased mechanical restrictions, deteriorating pulmonary gas exchange, higher dyspnea scores, and decreased exercise capacity [19]. This ventilatory inefficiency has already been identified in individuals with modest airflow restriction, indicating that ventilation-perfusion problems coexist [19].

Fundamentals of physical training Muscle deconditioning occurs spontaneously as a result of inactivity. Muscle mass and the expression of genes involved in muscle growth decrease immediately (within two weeks) with muscular immobilization [20]. Nevertheless, these changes are rapidly reversed during the course of 6 weeks of exercise rehabilitation, with changes in gene expression visible as early as 24 hours following the onset of activity. 6 Considering the origin of muscle deconditioning in otherwise healthy individuals is identical to that of COPD, it is logical to think that physical exercise can reverse this condition in these patients. Muscle deconditioning and peripheral muscle dysfunction caused by physical inactivity (due to chronic breathlessness and fatigue) and the systemic effects of chronic respiratory disease (**Fig. 1**) [21] can result in impairments (reductions in functional performance and QoL) that necessitate physical training to prevent. Some known contributors to peripheral muscle weakness include poor diet and the side effects of specific medications (e.g. systemic corticosteroids). It is crucial to emphasize that a direct association between changes in exercise performance and health status has not yet been proven [22].

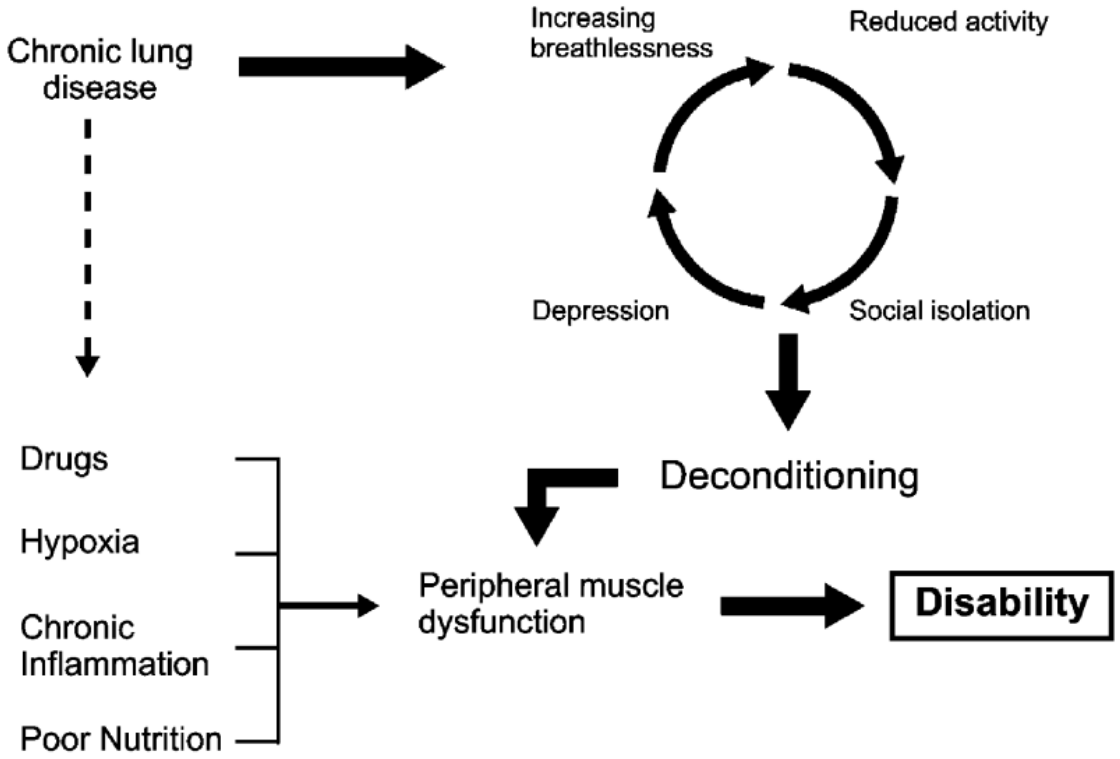

Fig 1: The relationship between chronic lung disease, muscle deconditioning and disability

A new Cochrane systematic review [23] updated the impact of PR following an acute exacerbation of COPD. Puhan and colleagues included randomized controlled trials comparing PR with standard therapy after AECOPD and included 11 additional papers to a prior version of the systematic review for a total of 20 trials (1,477 participants). PR, which could be administered in an inpatient or outpatient environment, was required to begin either immediately or within three weeks following the commencement of exacerbation treatment. Overall, PR after an AECOPD did not appear to be associated with an increased risk of mortality. Evidence of intermediate quality supported a reduction in hospital readmission rates with PR (pooled OR 0.44, 95% CI 0.21 to 0.85, P=0.03), albeit diverse results. The authors hypothesized that the heterogeneity was partially explained by the "extensiveness" of the rehabilitation intervention (using guidelines from international societies, the authors graded interventions according to the total number, frequency, supervision, and content of exercise training sessions, and whether the intervention included a self-management/education program) and the methodological quality of the included trials. There was high-quality data supporting the improvement of health-related quality of life and exercise capacity with PR, however recent research appeared to provide less pronounced advantages or perhaps no benefit [24,25].

This was best illustrated by the trial conducted by Greening and colleagues [26], which contributed the most patients to the most recent Cochrane review. 389 hospitalized patients with COPD were randomized to receive either standard care or a 6-week rehabilitation intervention consisting of an inpatient component beginning within 48 hours of hospitalization, followed by a home-based supported self-management program facilitated by a manual introduced using motivational interviewing [26]. The daily inpatient programme utilized a variety of non-volitional (neuromuscular electrical stimulation) and voluntary (walking, sit-to-stand, inner range contraction against gravity, progressive upper and lower limb muscle resistance training) modalities to achieve the highest individual tolerable intensity of exercise training. The majority of the home-based assisted self-management program's exercise component consisted of progressive walking via goal setting. Greening et al. found no difference in readmission risk [hazard ratio (HR) 1.10, 95% confidence interval (CI) 0.86 to 1.44, P=0.44] or recovery of physical function and health status between intervention and control groups [26].

CONCLUSION:

Acute exacerbations necessitating hospitalization are a significant event in the lives of COPD patients and have severe effects on their levels of physical activity, skeletal muscle function, and exercise tolerance. Pulmonary rehabilitation offers moderate to substantial improvements in health-related quality of life and exercise capacity after AECOPD, with the greatest outcomes occurring with more intensive, supervised therapies. Individualized pulmonary rehabilitation programs should be explored for all stages of COPD patients with respiratory symptoms and/or intolerance to physical activity despite appropriate pharmacotherapy. PR has been shown to have positive impacts on dyspnea, muscle strength and endurance, psychological state, hospital admissions, and life quality in COPD patients, along with a steady increase in daily physical activity and autonomy. Thus, successful PR needs behavioral modifications. To achieve this, patients' skill and adherence may be improved if they are involved in lengthier, comprehensive programs involving contacts with a multidisciplinary team that provides support, guidance, encouragement, and coaching. These modifications are based on exercise training, emotional support, dietary intervention, self-management, education, and pacing and energy conservation measures for motivated COPD patients. Therefore, PR represents a very important and safe therapeutic option that aims to reverse the systemic manifestations of COPD and that, in conjunction with pharmacological therapy, can be used to achieve optimal patient management, resulting in an improvement in the quality of life of our COPD patients.

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