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Chapter

Long-Term Adherence and Maintenance of Benefits in Pulmonary Rehabilitation

Hulya Sahin

Abstract

Pulmonary rehabilitation (PR) is a comprehensive intervention in chronic lung diseases, including personalized special therapies, exercise training, education and behavioral changes to improve the physical and psychological status of the patients, and aims to promote behavior that helps improve health status in the long term. A personalized PR program administered by a multidisciplinary team is recently considered a standard and complementary treatment method in chronic lung diseases. After the PR program, dyspnea of COPD patients decreases and their exercise capacities increase. Their daily life activities and physical activities increase. Their functional dependence decreases and quality of life increases. It presents a perfect opportunity to provide self-management and independence for the patients and improve their quality of life. Studies have shown that, unless there is a structured maintenance program, after an average of 6–12 months following PR programs, the gains that are realized start to decrease. Decrease of gains due to causes like a decrease in compliance to exercises, disease progress, attacks and co-morbidities. Causes such as decreased compliance to exercise, progression of the disease, attacks and comorbidities play a role in reducing gains. Especially in advanced age and in the presence of severe disease, the gain in exercise tolerance is lost more rapidly. The methods used and the results obtained to ensure the continuation of the gains differ.

Keywords: pulmonary rehabilitation, maintenance, adherence, chronic respiratory disease, COPD

1. Introduction

Based on hard evidence, pulmonary rehabilitation (PR) increases exercise capacity, decreases perception of dyspnea and improves the quality of life [1, 2]. Therefore, it has become a standard treatment in the management of patients suffering from chronic respiratory disease [1]. The basic component of this comprehensive program is exercise training and it is intended to break the vicious circle of dyspnea and deconditioning [3, 4]. Maintenance of the benefits in patients who participated a PR program depends on increasing the physical activity and changing the lifestyle. A successful PR program requires the patients to make a series of complicated changes in their behaviors such as regularly exercising, adaptation to treatment, learning the methods of breathing and changing lifestyle [5].

In terms of maintaining the benefits, patient's failure to do physical activities and change the lifestyle after PR constitutes the major problem [6]. According to In a study which assessed the COPD patients 3 times within 1 year after PR, it was found that the daily step count, time spent for sedentary activities and daily physical activities did not change [4]. Likewise, when COPD patients administered PR were assessed 3 and 6 months after the program, it was seen that the time allocated for walking had not changed. In COPD patients, increased physical activity after PR depends on two factors: frequency of supervised exercise and the duration of the program [6]. While offering education three times weekly ensures an increase in the physical activity, providing education for two times is insufficient [7]. While a 3-month exercise program had no effect, 6-month supervised exercise program increased physical activity [8].

2. Maintenance of benefits in pulmonary rehabilitation

The benefits start to diminish over 6–12 months in the absence of structured maintenance programs after the program [6, 9]. Reasons such as decreased adherence to exercise, progression of the disease and attacks are responsible for this decrease [9]. The benefit in exercise tolerance diminishes more rapidly especially in old age and in the presence of severe disease [3]. To maintain the benefits, repeating the program once a year or in cases where there is a decrease in exercise capacity, worsening in quality of life or increase in symptoms may be used a method [1]. A part of the COPD patients who accomplished the PR program were administered repeat PR program and the walk distance was observed to increase similar to the first program. It was determined that the maximum decrease in walk distance occurred when there is a 25-month period between two programs, and therefore, it was stated that the repeat program should be started before 25 months [1]. In COPD patients attended to PR program for two consecutive years were observed to lose the benefits in exercise tolerance and perception of dyspnea 1 year later, however they maintained the improvement in quality of life. In the meantime, annual number of bed-days and attacks decreased more. This study indicated that the repeated PR ensures maintaining the quality of life as well as decrease in number of attacks and hospitalization although the benefits in exercise capacity and perception of dyspnea were not maintained [10]. In COPD patients who attended a PR program for three consecutive years, the decrease in FEV1 was observed to be less compared to those who did not attend the program, and therefore, it was concluded that the repeat programs increased physical performance and slowed down the progression of the disease [11]. Two-third of COPD patients administered repeat PR program achieved significant improvement in exercise capacity. It seems offering repeat PR programs to COPD patients when necessary is beneficial even after a long time between interventions [12]. In severe COPD patients who attended PR programs for three times with 6-month intervals, dyspnea, fatigue and quality of life scores improved, and bed-days decreased after 1 year. No favorable changes were observed in patients who administered PR for once [13]. There were clinically significant improvements in exercise tolerance and quality of life in patients who repeated the PR program within 1–3 years; however, the increase in walk distance was less compared to the increase achieved after the first program. Thus, early intervention and a longer program are recommended [14].

Another method to reinforce and prolong the benefits of a successful rehabilitation program may be the maintenance programs after the program. However, optimal strategies have not yet been described to meet this goal [6]. There are different approaches about the exercise type, level of supervision, physiotherapy

strategies, duration and frequency of administration in the maintenance program. Therefore, the effectiveness of maintenance program is debated for the moment [15]. Following the 8-week PR program administered to moderate and severe COPD patients, patients were provided with a similar home-based program for 3 years (15 min of chest physiotherapy, 30 min of arm exercise, and 30 min of leg exercise) and they were called by physiotherapists every 15 days. In patients assessed on years 1, 2 and 3, it was seen that the significant change in BODE index and walk distance disappeared after year 2 [15]. Similarly, in patients with moderate and severe COPD who took supervised daily exercise for 3 months and weekly supervised breathing exercises for 6 months following 3-month PR, it was determined that the positive improvements in dyspnea, fatigue, walk distance and quality of life substantially diminished after year 2 [16]. It was observed that the exercise tolerance increased in patients with chronic pulmonary disease who were called every week for 12 months and who took supervised reinforcement sessions once a month, they had an improved medical condition and that the duration of their stay in the hospital decreased, however those positive effects disappeared at the end of year 2. Besides, no changes were found in respiratory functions, perception of dyspnea, self-efficacy, quality of life and use of healthcare resources and the improvement provided by the maintenance treatment after PR was reported as mild [5]. According to a study where mild COPD patients with exercise intolerance were visited by physiotherapists for 20 months following a 4-month PR program, dyspnea, exercise capacity and quality of life changed favorably and that those benefits were maintained for 2 years [17]. In several other studies, it was suggested that maintenance treatment was useless in maintaining the benefits [18, 19]. COPD patients prescribed exercise to do at home after PR program attended an exercise support group once a month and contacted via telephone calls once a month. At the end of the first year, no significant improvements were achieved in the exercise capacity and quality of life of the patients [18]. In COPD patients provided with 1-h patient-tailored exercise training and 1-h education every 3 months, no positive changes were recorded at the end of 1 year and thus, it was indicated that maintenance program had no effect on maintaining the benefits and that other methods were required to achieve that [19].

Some studies went beyond the traditional methods and investigated the effectiveness of several technological devices [7]. Moderate and severe COPD patients were given auditory stimuli after PR and asked to walk for 30–45 min 2–5 times per week, and there had been a decrease in perception of dyspnea and a significant increase in walk distance at the end of week 8. Based on this result, it was indicated that giving auditory stimuli was both a simple and a cost effective method to increase the efficiency of maintenance treatment after PR. Use of motion-sensitive devices during and after the program had been a research subject [20, 21]. No difference was detected between COPD patients using pedometer during and for 6 months after 8-week PR program and the patients who did not use the device in terms of physical activity [20]. When accelerometers were used in severe and very severe COPD patients attended to PR program, although there were no changes in unsupervised exercises, it was observed that physical activity in supervised exercises increased. Therefore, it is important to use an accelerometer to measure the walking habit and daily activity of COPD patients with severe dyspnea [21]. To see the changes in physical activity, a sensitive, valid and reliable accelerometer pedometer should be preferred [7].

In brief, it is not enough to increase the exercise capacity, decrease the perception of dyspnea and to improve the quality of live in patients after PR. In order to maintain these benefits, it is required to increase the physical activities of the patients and change the lifestyle of the patients at the end of the program. In most

of the studies on this matter, it was found that the improvement in quality of life continued and the diseases progression slowed through repeat programs although the decrease in perception of dyspnea and increase in exercise capacity were not maintained. While it was shown that the benefits were maintained for 2 years with maintenance programs, the type of exercise, frequency of supervision and the length of program are not clear yet; therefore, there is are no recommended maintenance programs. A very small number of studies related to the use of technological devices suggested that giving auditory stimuli or using accelerometer during and after the program had an impact on increasing the physical activity.

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