

Details of the pulmonary rehabilitation program components

The home-based PR was offered by a private company (*FormAction Santé*, Pérenchies, France) based in the North of France. The mobile rehabilitation team was composed of eight healthcare professionals (1 pulmonologist, 2 nurses, 1 physiotherapist, 2 adapted physical activity instructors, 1 nutritionist, and 1 sociomedical beautician). Each healthcare professional had a certain geographical sector that they cover, and they all have received the same standardized therapeutic education training from a licensed instructor.

The PR program consisted in a weekly supervised 90-min home session, during 8 weeks. Physical activity training, educational, motivational and self-management plans were designed and implemented through a collaborative process between the PR team, the patient and his/her caregiver. The patient was primarily followed by the same healthcare professional. But, if the patient had a specific need during the programme, for example, nutritional needs, then the healthcare professional with the specific skills would visit him. Apart from the weekly visit of the team member who supervised the sessions, participants were expected to perform, on their own, personalized physical training (at least 4 sessions/week) and self-management plan the rest of the week and during the long-term follow-up period.

Physical training

Each participant received a cycle ergometer (Domyos VM 200, Decathlon, Villeneuve-d'Ascq, France) and/or a stepper (Go Sport, Grenoble, France) (according to the patient's preference and/or the space available at his home), and dumbbells and elastic bands for the 8-week intervention to perform physical training. Cardiorespiratory training was initially performed by 10-min sequences (or shorter when participants were unable to exercise for 10 min), with the goal of achieving a total of 30-45 minutes of daily exercise, at least 5 days per week. Exercise intensity was progressively adjusted to reach a dyspnea score between 3 and 4 on the Borg 0-10 scale. Upper and lower limbs muscle strengthening exercises using dumbbells, elastic bands and/or body weight were also performed on the same daily basis than cardiorespiratory training. Three upper and three lower limbs muscle strengthening exercises were at least performed, starting with three series of 8 to 10 repetitions. The intensity of the resistance and/or the number of series and repetitions were re-assessed at least every two weeks. For the most deconditioned participants, for whom the initial 6-minute stepper test score was <150 strokes and who could not tolerate cardiorespiratory training, the program started with two 30-min daily sessions of self-administrated quadriceps electrostimulation, five times a week [1]. Each exercise of the training program was first demonstrated by the PR team member, and then adjusted during the weekly visit. All the participants were also encouraged to increase the amount of time spend in daily life physical activities such as gardening, housekeeping, groceries. The patient's caregiver was also encouraged to let the patient participate more in daily life activities. Finally, among the program, PR team members emphasized the need for long-term continuation of endurance training and physical activities integrated into daily living chosen by the patient according to his/ her preferences and the local possibilities.

Education and self-management

Education and self-management interventions were patient-centric, thus, adapted to respond to individual's needs, barriers and personal goals. The education topics covered included pathophysiology of lung disease and comorbidities, medication and its use (bronchodilator, oxygen), breathing and airway clearance strategies, prevention and recognition of exacerbations, physical exercise, stress management and emotional responses related to the disease, nutrition and weight control, smoking cessation, end-of-life planning. Sessions were individually performed during the weekly visit of PR team member (or could include the caregiver) using interactive presentations, questions and answers, card games, and the use of an illustrated folder.

Specific attention was paid to the different stages of motivation and stages of acceptance of the disease. Motivational interviews were designed for increasing the patient's intrinsic motivation, and for finding solutions to implement favorable health behavior changes in their daily life especially concerning treatment adherence (drugs and devices), physical exercise, smoking and alcohol cessation, balanced diet, self-esteem, self-image, and stress management [2]. Furthermore, emotional responses to dyspnea was managed by behavioral therapy [3] including specific techniques such as cognitive behavioral therapy, counseling, motivational approach, cardiac coherence, mindfulness meditation, and hypnosis, depending on individual's preferences and training of the PR team member.

1. Vivodtzev I, Pepin JL, Vottero G, *et al.* Improvement in quadriceps strength and dyspnea in daily tasks after 1 month of electrical stimulation in severely deconditioned and malnourished COPD. *Chest* 2006; 129(6): 1540-1548.
2. Miller W, Rollnik S. *Motivational Interviewing: Preparing People for Change* (2nd ed). The Guilford Press 2002.
3. Yohannes AM, Junkes-Cunha M, Smith J, *et al.* Management of Dyspnea and Anxiety in Chronic Obstructive Pulmonary Disease: A Critical Review. *J Am Med Dir Assoc* 2017; 18(12): 1096 e1091-1096 e1017.