Systematic reviews of a number of randomised trials have demonstrated small-to-moderate improvements in functional exercise capacity and health-related quality of life (HRQoL) in patients with chronic obstructive pulmonary disease (COPD) who receive pulmonary rehabilitation (PR) [1–4]. PR may also impact positively on health expenditure, mainly by reducing the number of hospitalisations [1]. Inpatient (and outpatient) hospital-based PR programmes for COPD patients are expensive. Moreover, the scientific evidence to support such programmes is limited. Therefore, the economic implications of each approach must be carefully considered. If the evidence is equivocal, the cost-effectiveness analysis should be based on the perspective of the public health service. However, no studies have evaluated the cost-effectiveness of community-based PR programmes for COPD patients. Therefore, a cost-effectiveness analysis should be undertaken to support the prescription of community-based PR programmes for COPD patients.
Home-based rehabilitation

Educational questions
1. What are the possible limitations of home-based PR programmes?
   a) The lack of a multidisciplinary support team
   b) Training intensity
   c) Disease severity
   d) All of the above.
2. What are the PR components of PR programmes?
   a) Education, physiotherapy and muscular training.
   b) Education.
   c) Respiratory muscle training.
   d) Psychosocial support.
3. What is the best structure for a home-based PR programme?
   a) Give instructions at the hospital, design the programme according to the disease and offer some degree of supervision.
   b) Explain the components of the programme and give some instructions to patients.
   c) Prescribe a high-intensity muscular training programme alone.
   d) Give instructions about respiratory muscle training.

Home-based PR programmes
> Home-based PR programmes are as beneficial as hospital-based ones and may even be more so in the long run.
> The benefits are independent of disease severity.
> Education, physiotherapy and training of upper and lower extremities should be considered.
> Both high- and low-intensity training are beneficial.
> An initial evaluation in the hospital and periodic supervision are important.

Programme intensity
The first potential limitation is programme intensity. While the lack of adequate supervision and proper equipment may seem to preclude a high-intensity home-based exercise programme, several studies have evaluated such programmes and made positive findings. In a randomised clinical trial, STRIJBOS et al. [5] compared the effects of a hospital-based outpatient PR programme with those of a home-care rehabilitation programme. The authors observed improvements in exercise capacity, dyspnoea and wellbeing for both groups; notably, these benefits were maintained significantly longer in the home PR group. In a study assessing a home-based PR programme for severe COPD patients, WIKSTRA et al. [6] found a significant improvement in exercise tolerance and HRQoL. Both of the aforementioned studies included intensive home programmes in combination with conventional physiotherapy, inspiratory muscle training, and high-intensity exercise training on a home trainer. Other studies [7-10] of home-based programmes have evaluated low-intensity training, such as walking, and have found similar benefits in exercise capacity and HRQoL. In fact, the American College of Chest Physicians/American Association of Cardiovascular and Pulmonary Rehabilitation Guidelines [1] conclude that exercise training produces clinical benefits for COPD patients regardless of intensity (grade of evidence, 1A).

Patient support
The second potential limitation of home-based rehabilitation may be (as the American Thoracic Society/European Respiratory Society statement [2] on PR suggests) the lack of support from a multidisciplinary team. Many of the studies that have shown significant improvements in exercise capacity and HRQoL [5-8] provided home supervision and emotional support through a physiotherapist or physician. However, other studies of programmes that provided either no supervision or only minimal support have also shown significant benefits [9, 10]. In a recent multicentre study in Spain, the current author and coworkers compared a simple nonsupervised home-based PR programme with a hospital-based programme [9]. Patients in both groups received two educational and four chest physiotherapy sessions. Patients in the hospital group then followed a supervised exercise programme at the hospital, while the home group performed a low-intensity exercise training programme at home without supervision. Our results showed that the two PR programmes result in a similar improvement in functional exercise capacity, although the hospital group showed a greater improvement in HRQoL, particularly in emotional function. We believe that the difference between the findings from our study and those of other previous studies of home-based PR results from the fact that we provided no supervision to the home-based PR group.

Disease severity
A third potential limitation of home-based PR programmes may be related to the severity of disease. In a randomised controlled study of COPD patients stratified for dyspnoea according to the Medical Research Council (MRC) scale, WEIDICHA et al. [13], found no improvement in HRQoL in severely dyspnoeic COPD patients (MRC 5) who participated in a home-based PR programme in which they were treated by physiotherapists. The
authors suggest that the lack of benefits may have been due to disease severity, the relatively short duration of the programme and the low intensity of exercise. In a prospective randomised study of a home-based PR programme in severe COPD patients (Global Initiative for Chronic Obstructive Lung Disease stage III–IV, MRC 3–5) [14], the current author and coworkers observed improvements in exercise tolerance and HRQoL. These were maintained at 6 months.

Recently, Neder et al. [15] have shown improvements in muscle strength, muscle endurance, and breathlessness in patients with severe COPD and incapacitating dyspnoea after a neuromuscular electrical stimulation programme at home.

Conclusion

In conclusion, if we accept that home-based and hospital-based PR programmes are equally beneficial and that home-based programmes may even provide longer-lasting benefits, as Strubos et al. [5] have shown, it follows that such programmes can be prescribed with confidence. However, they must be well-structured and adhere to the following guidelines:

1) Initial instructions should be given at the hospital, based on the severity of the disease; moreover, the intensity and type of programme, comorbidities and the need (or otherwise) for supplemental oxygen should all be considered carefully.

2) Some degree of supervision, either at home or in the hospital, should be included in the programme.

Although the contents of each particular PR programme may differ, they should all contain the following basic components: education, physiotherapy, and exercise training of the upper and lower extremities. Respiratory muscle training should be included only for patients with proven respiratory muscle weakness, because the evidence does not support the routine use of such training in PR (recommendation grade 1B) [1, 2].

References


