Effect of pulmonary rehabilitation on quality of life in patients with chronic pulmonary diseases

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Pulmonary rehabilitation:

- a broad therapeutic concept
- defined by the American Thoracic Society (ATS) and the European Respiratory Society (ERS) as an evidence-based, multidisciplinary and comprehensive intervention for patients with chronic respiratory impairments who are symptomatic and often have decreased daily life activities.
Integrated into the individualized treatment of the patient, pulmonary rehabilitation is designed to:

1. reduce symptoms
2. optimize functional status
3. increase participation
4. reduce health costs by stabilizing or reversing systemic manifestations of the disease.
Physical medicine and Rehabilitation is an integral part of the medical treatment of chronic pulmonary diseases.

For many years the standard of care for pulmonary patients include inactivity and rest.

PR programs encourage the exact opposite and include assessment, medication, patient training, exercise, psychological intervention and follow-up, with prevention incorporated into every aspect of rehabilitation
In accordance with the Guidelines Panel of ACCP (American College of Chest Physicians) and AACVPR (American Association of Cardiovascular and Pulmonary Rehabilitation), it is considered that pulmonary rehabilitation includes individual patient assessment and multimodality treatment.

PR provides multidisciplinary training to improve the patient's ability to manage and cope with progressive dyspnea.
PR services include critical components of:
1. assessment
2. physical reconditioning
3. skills training
4. psychological support
5. additional PR services may include vocational evaluation and counseling.
PR efforts are often focused on patients with chronic obstructive pulmonary disease (chronic bronchitis and/or emphysema).

Other conditions appropriate for this process include:

- asthma, interstitial disease, bronchiectasis,
- cystic fibrosis, chest wall diseases,
- neuromuscular disorders, ventilator dependency, before and after lung surgery for transplantation, volume reduction and cancer.
Chronic obstructive pulmonary disease (COPD):
- is a progressive, disabling pathology that can severely affect a person's quality of life (QOL)

Pulmonary rehabilitation programs have been shown to improve exercise tolerance, decrease dyspnea and enhance QOL.
Previously, pulmonary rehabilitation has been evaluated using mainly physiologic quantitative measures, such as exercise tolerance, oxygen consumption and workload performance.

A consistent finding in pulmonary rehabilitation research has been an improvement in patients’ health-related quality of life (HRQL).

Enhancing quality of life is the central aim of pulmonary rehabilitation programs and is highly valued by patients.
Quality of life - definition

An important consideration in medical care, quality of life refers to the patient's ability to enjoy normal life activities. Some medical treatments can seriously impair quality of life without providing appreciable benefit, while others greatly enhance quality of life.
The addition of QOL questionnaires in the evaluation of pulmonary rehabilitation:

- may broaden the scope of the evaluation
- provide a more comprehensive assessment of the benefits of pulmonary rehabilitation than measures of physiological change such as exercise performance or lung function
The addition of QOL questionnaires in the evaluation of pulmonary rehabilitation

- can indicate how treatment affects psychosocial, spiritual and physical domains of a person's life rather than solely evaluating physical dysfunction such as reduced exercise tolerance
The generic instruments (quality of life questionnaires):
1. BASIS -32
2. Duke Health Profile (DUKE)
3. London Handicap Scale (LHS)
4. Quality of Well-Being Scale (QWB)
5. Primary Care Assessment Survey (PCAS)
6. SF-36 Health Survey (SF-36 Health Survey)
7. SF-12 Health Survey (SF-12 Health Survey)
8. Sickness Impact Profile (SIP)
9. Nottingham Health Profile (NHP)
10. EuroQoL Group
The SF-36 (Medical Outcome Study "short form" 36)

- a widely used and validated generic questionnaire that measures QOL in health-related states and conditions.
- shows acceptable concurrent and content validity for use in individuals with COPD.
The SF-36

- has eight multi-item health concepts or dimensions: physical functioning, role limitations due to physical problems, social functioning, bodily pain, mental health, role limitations due to emotional problems, vitality and general health perceptions.

- the following two summary scores can be extrapolated: a physical component summary and a mental component summary.
The specific instruments (quality of life questionnaires):

1. Basal/transitional Dyspnea Index
2. St George’s Respiratory questionnaire (SGRQ)
3. Chronic Respiratory Questionnaire (CRQ)
4. Adult Asthma Quality of Life Questionnaire (AQLQ)
5. Breathing Problems Questionnaire
The Chronic Respiratory Disease Questionnaire (QRC)

- Is a interviewer-administered, disease-specific questionnaire who has 20 questions covering 4 domains: dyspnea, fatigue, emotional function and mastery.

  The mastery domain refers to a sense of control over the disease process. Fatigue refers to tiredness or lack of energy.
The Chronic Respiratory Disease Questionnaire

According to Guyatt et al, the developers of the questionnaire, scores from the dyspnea and fatigue domains can then be combined to form the physical function component. The emotional function and mastery domains can also be combined to make the emotional function component.
The St George's Respiratory Questionnaire (SGRQ)

- is a standardized self-completed questionnaire for measuring impaired health and perceived well-being ('quality of life') in airways disease.
- it has been designed to allow comparative measurements of health between patient and general populations and quantify changes in health following therapy.
Selection of appropriate HRQL instrument depends on the purpose

- generic measures:
  - to study range of disability in general population
  - to compare various chronic diseases

- specific measures:
  - to discriminate between patients with the same disease
  - to evaluate changes over time/treatment
**HRQL measures: limitations**

- A subjective measure (intra- and interindividual variability)
- Results may be affected by feelings or situations unrelated to disease
- Provide complementary information but do not replace physiological measures
- Not reproducible, unlike objective measures
Compared to the generic questionnaires, the disease-specific questionnaires are more likely to be responsive to changes after pulmonary rehabilitation and more sensitive to specific respiratory issues. However, the disease-specific questionnaires are also limited by their specificity.

Compared to the disease-specific questionnaires, the generic questionnaires provides a more global view of the respiratory patient’s quality of life, include a wider range of scales and can be readily compared with other illness groups. However, the generic questionnaires do have lower responsiveness and sensitivity.
Benzo R., Flume PA and colab. from the Medical University of South Carolina looked at the Medical Outcomes Survey Short Form 36-item questionnaire (SF-36), a generic QOL measure, to detect changes in QOL in COPD patients after completion of PR.

Quality of life was assessed by the SF-36; it was calculated its eight dimensions as well as mental (MCS) and physical (PCS) component summary scores.
Quality of life improved in nearly all dimensions and in both summary scores; PCS improved from 26.1 +/- 8.0 before PR to 30.5 +/- 9.0 after PR (P = 0.008) and MCS improved from 27.9 +/- 7.0 before PR to 34.1 +/- 5.0 after PR (P = 0.0002).

In conclusion, the SF-36 and its summary scores are sensitive instruments to detect improvement in QOL in COPD patients after PR.
In an updated meta-analysis of randomized-controlled trials of pulmonary rehabilitation in COPD, Lacasse *et al.* reaffirm that rehabilitation led to clinically significant improvements in patients' dyspnea, fatigue, mastery of their condition and overall SGRQ score. Unfortunately, the benefits provided by rehabilitation may wane over time.
In addition, improvement in HRQOL and functional parameters may be partially dependent on the severity of the disease.

Patients who are chair-bound or who have severe dyspnea are less likely to benefit from this intervention.
In investigating the association of HRQL measures and healthcare resource utilization among COPD patients, Desikan et al. found the SF-36 to be a better predictor than the CRQ or the SGRQ.

It is not so surprising that a generic instrument may perform better than a disease-specific measure in this regard since patients with severe COPD are also more likely to have other comorbidities.
One possible use of HRQOL measures is for prognostication.

Previous studies show a correlation between measures for quality of life and mortality independent of disease severity. Anxiety, nutritional status and psychosocial factors such as marital support have been implicated as predictors of mortality.
CONCLUSIONS

a) Pulmonary rehabilitation does not attempt to change or improve lung function.

   Improvements in exercise tolerance, quality of life and breathlessness are achieved through mechanisms other than change in pulmonary function: by increasing muscle strength, achieving desensitization to breathlessness and improving aerobic fitness.
b) The pulmonary rehabilitation program should involve an interdisciplinary team.

Because of the diversity of impairments (the physiologic deficits), disabilities (the performance deficits of the whole person) and handicap (the societal disadvantages) in the respiratory patients, rehabilitation medicine draws on the service of physician and other specialists in the allied health sciences and the biological, social and behavioural sciences.
c) The questionnaires of QOL confirmed that physical health and emotional health are affected by pulmonary rehabilitation, obtaining knowledge, increasing activity and controlling dyspnea combined to enhance QOL.
d) In 1994, National Institutes of Health called for future research to identify the respective contributions of the components of pulmonary rehabilitation, in order to determine which aspects of rehabilitation are beneficial.

However, research that attempts to assess the individual interventions, such as education or behavioral modifications, has shown little effect on various outcomes.
Nevertheless, The American College of Chest Physicians recommended that all pulmonary rehabilitation programs continue to offer exercise, educational and psychosocial interventions.

Components of pulmonary rehabilitation may be interactive and synergistic in their benefit.

Clinical trials in which there is an attempt to analyze unique contributions of each of the various interventions alone may fail to find benefits because of the lack of synergistic effects.