CRD summary

This review assessed the impact of home-based physiotherapy interventions on breathlessness during activities of daily living in severe chronic obstructive pulmonary disease and concluded that inspiratory muscle training and exercise seemed to be beneficial. Clinical variation and methodological weaknesses in the included studies mean that caution is required when judging the reliability of the authors’ conclusions.

Authors’ objectives

To assess the impact of home-based physiotherapy interventions on breathlessness during activities of daily living in patients with severe chronic obstructive pulmonary disease (COPD).

Searching

MEDLINE, AMED, CINAHL, Cochrane Central Register of Controlled Trials (CENTRAL), EMBASE and PEDro were searched from inception to May 2008 for articles published in English. Search terms were reported. Reference lists of retrieved papers were reviewed; these included relevant systematic reviews and the latest official statements of relevant Thoracic Societies.

Study selection

Randomised controlled trials (RCTs) of individuals aged over 18 years with severe chronic obstructive pulmonary disease (COPD) defined as forced expiratory volume in one second (FEV1) ≤50% predicted by Global Initiative for Obstructive Lung Disease (GOLD) without cardiovascular comorbidities were eligible for inclusion if they assessed home-based physiotherapy interventions and reported breathlessness during activities of daily living. Eligible studies had to explicitly document baseline FEV1≤50% (to ensure that only severe COPD patients were captured) and utilise any form of outcome measure specific to breathlessness during activities of daily living, provided the measurement tool could demonstrate reliability and validity.

The included trials were conducted in different settings and countries and were of various durations and frequencies of training. The level of supervision of interventions varied. Trials fell broadly into two intervention groups: respiratory muscle training and generalised pulmonary rehabilitation. Participants were mostly males with mean FEV1 26% to 47%. The mean age of participants was 61.1 to 67.6 years (where reported). For the five trials that assessed respiratory muscle training, participants were trained with a handheld incentive flow meter device that offered resistance to breathing and were required to progressively work up to a maximum of 60% of their peak inspiratory capacity or peak expiratory maximum over the duration of the intervention.

The authors did not state how many reviewers selected the studies.

Assessment of study quality

Quality of the included trials was assessed using PEDro criteria (scores 0 to 10), with 10 being the highest achievable score. Individual quality domains and how each component was assessed was reported.

Two reviewers assessed quality of the included studies and resolved disagreements by consensus.

Data extraction

Summary statistics in the form of mean differences (MD) in breathlessness score between treatment groups were extracted directly where possible or calculated.

Two reviewers extracted data. The authors did not state how any disagreements were resolved.

Methods of synthesis
For most of the interventions, differences between groups in improvement after treatment were summarised in a narrative synthesis.

Change in breathlessness scores were pooled in a meta-analysis using random-effects model. Heterogeneity between trials was assessed by $I^2$.

**Results of the review**

Seven RCTs (194 patients, range eight to 21) met the inclusion criteria. Three trials scored 7, three trials scored 5 and one trial scored 4 on the PEDro scale. Only one trial reported power calculation. One trial concealed treatment allocation. Five trials blinded outcome assessors, but not therapists or participants. Three trials used intention-to-treat (ITT) analysis.

From the narrative synthesis, breathlessness in patients with chronic obstructive pulmonary disease (COPD) during activities of daily living improved significantly for all the interventions except expiratory muscle training (which did not achieve statistical or clinical significance in two studies).

From the meta-analysis, inspiratory muscle training achieved a significantly better breathlessness score compared with control groups (MD 2.36, 95% CI 0.76 to 3.96; three RCTs; $I^2=43.4$%).

**Authors' conclusions**

Inspiratory muscle training and exercise are home-based physiotherapy interventions that may improve breathlessness during activities of daily living in severe COPD. Administration can only be advocated tentatively in outpatient services and primary care until further higher quality, more homogeneous research with larger sample sizes is conducted to substantiate the findings.

**CRD commentary**

This review addressed a well-defined question in terms of participants, interventions, outcomes and study design. The search included appropriate databases. The restriction to published articles in English meant that relevant data may have been missed and language bias could not be ruled out. Two reviewers extracted and assessed trial quality; it was unclear how many reviewers selected studies, so errors and bias could not be ruled out.

Trial quality was assessed with appropriate criteria. The characteristics of the individual trials were presented and potential sources of heterogeneity were explored. There was clinical heterogeneity between the included trials and summarising most data in a narrative synthesis was appropriate.

The review process was robust, but methodological weaknesses in the included trials and potential for language and study selection biases mean that caution is required when judging the reliability of the authors' conclusions.

**Implications of the review for practice and research**

**Practice**: The authors stated that available evidence indicated that certain home-based physiotherapy interventions (in particular inspiratory muscle training and walking exercises) appeared to have beneficial impact on breathlessness during activities of daily living among severe COPD patients.

**Research**: The authors stated that weaknesses identified in the review should be addressed in large well-designed RCTs before a recommendation could be made to change practice and introduce home-based physiotherapy interventions for COPD patients.

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**Bibliographic details**


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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.