# Title

## *Effect of different exercise programs on lung function in people with chronic obstructive pulmonary disease: A network meta-analysis of RCTs*

## Abstract

Background: Chronic obstructive pulmonary disease (COPD) has systemic consequences and causes structural abnormalities throughout the respiratory system. It is associated with a high clinical burden worldwide. Aim: A network meta-analysis was performed to determine the effects of exercise programs on lung function measured by forced expiratory volume in the first second (FEV1), FEV1 as a percentage of the predicted value (FEV1%) and forced vital capacity in people with COPD. Methods: A literature search was performed to March 2023. Randomized controlled trials on the effectiveness of exercise programs on lung function in people with COPD were included. A standard pairwise meta-analysis and a network meta-analysis for direct and indirect comparisons between intervention and control/nonintervention groups were carried out to calculate the standardized mean difference and 95 % CI. The risk of bias was assessed using the Cochrane Risk of Bias tool and the Grading of Recommendations, Assessment, Development, and Evaluation tool was used to assess the quality of the evidence. Results: 35 studies with a total sample of 2909 participants were included in this network meta-analysis. The highest standardized mean difference was for active mind body movement therapy programs versus control for FEV1 and FEV1% (0.71; 95 % CI 0.32 to1.09; and 0.36; 95 % CI 0.15 to 0.58, respectively), and pulmonary rehabilitation+active mind body movements therapies versus control for forced vital capacity (0.45; 95 % CI 0.07 to 0.84). Conclusions: active mind body movement therapy programs were the most effective type of exercise program to improve lung function measured by FEV1 and FEV1%; pulmonary rehabilitation+active mind body

movements therapies had the greatest effects on FVC in people with COPD. Exercise programs in which the abdominal muscles are strengthened could improve lung emptying, helping to overcome airway resistance in people with COPD. 

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## Author Keywords

Active mind-body movements therapies; COPD; FEV1; FVC; Lung function; Meta-analysis; Physical activity; Pulmonary rehabilitation; Systematic review

## Index Keywords

Exercise Therapy; Humans; Lung; Network Meta-Analysis; Pulmonary Disease, Chronic Obstructive; Quality of Life; age; body mass; body movement; chronic obstructive lung disease; endurance; forced expiratory volume; forced vital capacity; human; kinesiotherapy; lung function; medical care; meta analysis; muscle training; physiotherapy; pranayama; pulmonary rehabilitation; qigong; randomized controlled trial (topic); Review; risk assessment; self care; spirometry; yoga; kinesiotherapy; lung; network meta-analysis; quality of life

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