The effect of complex interventions on depression and anxiety in chronic obstructive pulmonary disease: systematic review and meta-analysis


CRD summary
This well-conducted review concluded that complex psychological and/or lifestyle interventions that included an exercise component improved symptoms of depression and anxiety in patients with chronic obstructive pulmonary disease over the short term. These conclusions reflect the evidence presented and are likely to be reliable.

Authors' objectives
To assess whether complex interventions that incorporate psychological and/or lifestyle components were effective in reducing symptoms of anxiety and depression in patients with chronic obstructive pulmonary disease.

Searching
MEDLINE, EMBASE, PsycINFO, Cochrane Central Register of Controlled Trials (CENTRAL), Web of Science and Scopus were searched from inception to April 2012 without any language restrictions. Reference lists of included studies were screened for any additional relevant studies.

Study selection
Cluster or individual randomised controlled trials (RCTs) that evaluated single or multiple component interventions that included psychological and/or lifestyle components to change knowledge, attitudes, beliefs, emotions, skills and/or behaviour in patients with chronic obstructive pulmonary disease were eligible for inclusion. Eligible patients had chronic obstructive pulmonary disease confirmed by post-bronchodilator spirometry of forced expiratory volume in one second/forced vial capacity ratio of 70% and a forced expiratory volume in one second of 80%. Any controls (including waiting list, usual care, attention and active control) were eligible. Studies that included patients being treated for depression and/or anxiety with psychotropic medications were excluded. Outcomes of interest were standardised measures of depression and/or anxiety.

The included studies contained considerable variations in content, duration, intensity and delivery of interventions. Most (65%) interventions included both psychological and lifestyle components; others included only psychological components or lifestyle alone. Mean duration of interventions was 11 weeks. Numbers of treatment contacts (including remote contacts) ranged from one to 63 (mean 18). Treatment sessions ranged from 30 to 240 minutes (mean 81.5 hours). Most interventions were delivered face to face by a wide range of professionals or lay trainers to groups or individuals. Most studies recruited patients with moderate or severe symptoms. The median age of included patients was 66.3 years and a median of 59% were men. Only a small proportion of studies recruited patients with identified depression and anxiety.

Four reviewers independently assessed studies for inclusion. Disagreements were resolved by consensus with all reviewers.

Assessment of study quality
The quality of studies was assessed using the Cochrane Collaboration tool for random sequence generation, allocation concealment, blinding of outcome assessments, losses to follow-up (>20%), adequate statistical handing of missing data and intention-to-treat analysis.

Two reviewers independently assessed study quality. Any discrepancies were resolved by discussion with a third reviewer.

Data extraction
Data were extracted on mean and standard deviation to enable calculation of standardised mean differences (SMD) and 95% confidence intervals (CI). Data were extracted and cross-checked by pairs of reviewers. Disagreements were resolved by discussion with another two reviewers.
Methods of synthesis
Random-effects models were used to pool standardised mean differences with 95% CIs. Statistical heterogeneity was assessed using the $\chi^2$ and $I^2$ statistics. Publication bias was assessed using funnel plots and Egger's test. Sensitivity analyses were performed on the basis of risk of bias. Subgroup analyses were performed on the basis of different groups of interventions and different severity status of depression and/or anxiety.

Results of the review
Twenty-nine RCTs (30 independent comparisons, 2,063 patients) were included in the meta-analysis. None of the studies were cluster RCTs. Seventeen studies reported an adequate method of random sequence generation. Only nine studies reported adequate methods of allocation concealment. Treatment allocation concealment was not adequate in one trial and not reported in 19 trials. Ten trials had blinding of outcome assessors. Thirteen trials used an intention-to-treat analysis. Three trials had baseline imbalance in terms of disease severity (patients in the intervention group had milder disease than those in the control group). Mean follow-up at post-treatment was 10.5 weeks (range four to 52 weeks).

Compared with controls, psychological and/or lifestyle interventions were associated with a significant improvement in depression (SMD -0.28, 95% CI -0.41 to -0.14; $I^2=47.5%$; 29 RCTs) and anxiety (SMD -0.24, 95% CI -0.39 to -0.09; $I^2= 56.4%$; 26 RCTs).

Based on the results of subgroup analyses, multicomponent exercise training was the only intervention subgroup associated with a significant improvement in depression (SMD -0.47, 95% CI -0.66 to -0.28; $I^2=43.9%$; 14 RCTs) and in anxiety (SMD -0.45, 95% CI -0.71 to -0.18; $I^2=63.3%$; 11 RCTs). No other intervention subgroups (including cognitive and behavioural therapy) were associated with significant treatment effects. When compared with trials in which severity of depression and anxiety was unknown at baseline, treatment effects did not appear to be larger in trials that included confirmed depressed and/or anxious samples or above threshold samples.

Sensitivity analyses did not significantly alter the results. There was no evidence for publication bias.

Authors' conclusions
Complex psychological and/or lifestyle interventions that included an exercise component improved symptoms of depression and anxiety in patients with chronic obstructive pulmonary disease over the short term.

CRD commentary
The review question was clear and supported by appropriate inclusion criteria. Various relevant databases were searched without language restrictions, which minimised the possibility of missing relevant studies. Sufficient attempts were made to minimise errors and biases during the review process. Appropriate criteria were used to assess the risk of bias and its impact on the overall results was investigated in sensitivity analyses. Statistical heterogeneity was assessed and indicated that the pooled outcomes were associated with moderate heterogeneity overall. Appropriate methods were used to pool the results.

This review was generally well conducted and the authors' conclusions are likely to be reliable.

Implications of the review for practice and research
Practice: The authors stated that the finding that multicomponent exercise training effectively reduced symptoms of anxiety and depression in patients with chronic obstructive pulmonary disease (regardless of severity of depression or anxiety) highlighted the importance of promoting physical activity in this population.

Research: The authors stated that future research should explore the effectiveness of collaborative care models in the management of chronic obstructive pulmonary disease, particularly in evaluation of whether integration of exercise training in such models can be associated with physical and mental health benefits in this population. Future research should investigate the usefulness of mindfulness-based interventions in patients with chronic obstructive pulmonary disease.

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