Effectiveness of combined physical and psychological interventions for anxiety and depression symptoms in adult patients with chronic obstructive pulmonary disease: a systematic review protocol

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ABSTRACT

Objective: The objective of this review is to evaluate the effectiveness of combined physical and psychological interventions for anxiety and depression symptoms in adult patients with chronic obstructive pulmonary disease (COPD).

Introduction: By 2030, COPD is expected to be the third-leading cause of death and the seventh-leading cause of health problems in terms of overall health impact, measured in disability-adjusted life years. As with other comorbidities, anxiety and depressive disorders influence the prognosis. Combined physical and psychological interventions may have better results than isolated interventions for symptoms of anxiety and depression in patients with COPD.

Inclusion criteria: Studies of adult patients with COPD and anxiety and depression symptoms who have undergone combined physical and psychological interventions will be considered for inclusion. This review will primarily include randomized controlled trials.

Methods: Articles will be searched in CINAHL (via EBSCOhost), Cochrane Central Register of Controlled Trials, Academic Search Complete, Psychology and Behavioral Sciences Collection (via EBSCOhost), APA PsycINFO, PubMed, Web of Science Core Collection, and Scopus. Two independent reviewers will select the studies and apply the JBI tools for critical appraisal and data extraction. Studies will be pooled in a meta-analysis whenever possible. The χ^2 test and I^2 statistics will be the standard tools for assessing heterogeneity. Statistical analyses will be carried out using the random-effects model. The fixed-effects model will be applied if there is low heterogeneity between included studies ($I^2 < 50$, or $P \geq 0.5$). The Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) approach will be used to grade the certainty of the evidence, and a Summary of Findings will be presented.

Review registration: PROSPERO CRD42024550523

Keywords: anxiety; chronic obstructive pulmonary disease; depression; non-pharmacological interventions; systematic review

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Introduction

Chronic obstructive pulmonary disease (COPD) is the seventh-leading cause of health problems worldwide (measured in disability-adjusted life years) and is expected to be the third-leading cause of death by 2030.[1] Its global prevalence is estimated at 10.3%,[2] it is significantly more prevalent in current and former smokers, and it increases with age.[1] The definition of COPD has evolved, and it was last defined by the Global Initiative for Chronic Obstructive Lung Disease (GOLD) in 2022 as a common, preventable, and treatable disease characterized by

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persistent respiratory symptoms.[3] Spirometry is necessary for diagnosis and staging. Still, patients who exhibit dyspnea, persistent cough, sputum production, a history of recurrent lower respiratory tract infections, or exposure to risk factors should be evaluated for this disease.[3] As COPD is a heterogeneous disease, GOLD proposed a multidimensional approach based on a treatable traits model to assess patients with COPD.[3] This model includes 3 domains: pulmonary, extrapulmonary, and lifestyle/behavioral factors.[3,4] As recommended by the GOLD guidelines, this approach involves assessing patients' traits using the modified Medical Research Council (mMRC) dyspnea scale to determine the level of dyspnea; the Hospital Anxiety and Depression Scale to measure symptoms of anxiety and depression; the spirometry (percentage of forced expiratory volume in 1 second, known as FEV_1 % of predicted); and history of exacerbations.

Dyspnea, as a symptom of COPD, is the major cause of disability and anxiety associated with the disease.[3] In COPD, the prognosis is significantly influenced by comorbidities, most commonly cardiovascular, endocrinological, and metabolic diseases; skeletal muscle dysfunction; osteoporosis; and anxiety and depressive disorders.[3] Anxiety and depressive disorders have a prevalence of 30–40% for people with COPD.[5,6] Patients with COPD are 85% more likely to develop anxiety disorders than their healthy age-sex-matched controls and patients with other physical illnesses.[7] These comorbidities can impact health outcomes such as physical functioning, social interaction, fatigue, dyspnea, quality of life, and COPD exacerbation, as well as patients' ability to effectively manage their COPD, hospitalizations, morbidity, and mortality.[3,8] Access to an early multidimensional approach for patients with COPD, including pharmacological treatments and non-pharmacological interventions (NPIs), minimizes the likelihood of a poor prognosis,[3] which is affected by mental illness. Enhancing mental health positively affects how the disease develops.[3] Furthermore, NPIs that target mental symptoms lead to a reduction in dyspnea and the overall impact of COPD on patients' health.[9]

Anxiety disorders involve excessive feelings of fear, tension, and worry; changes in behavior, such as avoidance or panic attacks; and physical manifestations, such as tachycardia and hyperhidrosis.[10] Depressive disorders include emotions such as depressed mood or sadness, loss of energy, anhedonia, and feelings of hopelessness. They can cause cognitive and somatic symptoms, such as an increase or loss of appetite, insomnia or hypersomnia, agitation, slowness, decreased ability to concentrate, and recurring thoughts of death.[10] Panic disorders, social anxiety disorder, and generalized anxiety disorder are among the most common anxiety disorders among patients with COPD; major depressive disorder and persistent depressive disorder are the 2 most common types of depressive disorders.[11]

Typically, the treatment of anxiety and depressive disorders can be pharmacological or non-pharmacological.[3,12-14] NPIs are non-invasive and science-based approaches aimed at preventing, reducing, or treating health problems; require relational, communicational, and ethical skills (eg, respect for patient autonomy, beneficence, non-maleficence, confidentiality); and cover a range of methods and programs.[15] These are considered by the National Institute for Health and Care Excellence and GOLD as complementary interventions to pharmacological treatment.[3,12-14] When comparing pharmacological treatment with NPI, the latter typically offers fewer side effects but has long-term benefits.[3,8,12-14] However, NPI often takes longer to produce effects, demands more time and commitment from patients, and may be less accessible than medications, which tend to provide quicker symptom relief but carry the risk of side effects and dependency.[3,8,12-14] NPIs can be categorized as i) psychological health interventions, ii) physical health interventions, iii) nutritional health interventions, iv) digital health interventions, and v) other types of interventions (eg, phytotherapy, wave therapy).[15]

When examining NPIs to treat anxiety and depression as a condition stemming exclusively from psychological changes, these strategies tend to focus on psychological causes.[12,13] However, when addressing anxiety and depressive disorders associated with physical causes, these interventions should target the symptoms of anxiety and depression resulting from the conditions associated with the physical disease, emphasizing the interconnection between mental and physical health.[3,12-14] Some of the traits associated with physical illness that can be addressed by NPIs are impaired exercise tolerance, low level of disease knowledge, negative attitudes toward the disease, self-management ability, living alone, low socioeconomic status, obesity or cachexia, smoking, long-term oxygen therapy, dyspnea, and a predicted FEV_1 % of less than 50%.[14]

Reviews of effectiveness typically focus on psychological or physical NPIs, making the results insufficient to address the full range of traits associated with physical illness and restricting the capacity of a multidimensional approach to treat symptoms of anxiety and depression effectively.[16-21] A randomized controlled trial (RCT) of psychological (including cognitive behavioral therapy, counseling, and self-help approaches) and physical interventions (such as pulmonary rehabilitation) administered consistently to patients with COPD proved to be neither clinically effective nor cost-effective.[22] However, the intervention group showed a reduction in anxiety and depression symptoms, although this was not statistically significant.[22] Conversely, a subsequent RCT involving a cognitive intervention, combined with the active cycle of breathing technique in patients with moderate to severe COPD, demonstrated a significant reduction in anxiety and depression symptoms within the intervention group ($P<0.05$).[23] Another RCT that included art therapy interventions focused on self-awareness, self-relaxation, problem release, stress relief, speech focusing on the topic of a bright future, and dance movements showed a significant improvement in anxiety and depression symptoms in the intervention group when compared with the group that received usual care ($P<0.0001$ and $P<0.001$, respectively).[9]

These results highlight the need to review the effectiveness of combined physical and psychological interventions in the treatment of depressive and anxiety symptoms in patients with COPD. A preliminary search was carried out in PROSPERO, PubMed, Cochrane Database of Systematic Reviews, and *JBI Evidence Synthesis*, and no current or in-progress systematic reviews on the topic were identified. Currently, the identified reviews[19-21,24,25] focus on evaluating the effectiveness of isolated or specific interventions in the subcategory of NPIs (eg, physical, psychological, or digital), revealing inconsistent results for the treatment of anxiety and depression symptoms in patients with COPD. As the literature and GOLD[3] guidelines emphasize the need for a multidimensional approach, the innovation of this review lies in assessing combined interventions from 2 categories of NPIs (physical and psychological), as this combination appears to yield better outcomes in treating these patients. Therefore, this review aims to evaluate the effectiveness of combined physical and psychological interventions for anxiety and depression symptoms in adult patients with COPD.

Review questions

i) What is the effectiveness of combined physical and psychological interventions for anxiety symptoms in adult patients with COPD?
ii) What is the effectiveness of combined physical and psychological interventions for depression symptoms in adult patients with COPD?

Inclusion criteria

Participants

This review will consider studies that include adult patients (≥18 years) with a diagnosis of COPD, as defined by the GOLD standard,[3] and concomitant symptoms of anxiety and/or depression. In the absence of spirometry confirming COPD, studies that provided sufficient clinical documentation for COPD will also be considered, regardless of the stage.[3] Participants must present symptoms of anxiety and/or depression as identified according to the diagnostic criteria of any edition of the Diagnostic and Statistical Manual of Mental Disorders. There will be no restrictions regarding gender, ethnicity, education, or socioeconomic status.

Intervention

This review will consider studies that evaluate the effectiveness of combined physical and psychological interventions for symptoms of anxiety and/or depression, regardless of the aim of the intervention, the type and timing of application, frequency, duration, or format. These interventions can be categorized into psychological interventions (eg, cognitive-behavioral therapeutic strategies, anxiety and depression education, psychotherapy, acceptance and commitment therapy, art therapy, Jacobson relaxation technique, meditation, coaching, mindfulness) or physical interventions (eg, physiotherapy, physical activity, spa therapy, manual therapy).[15]

Comparator

The current review will consider usual care, placebo, or isolated interventions as the comparator. Usual care will be defined as the routine care received by patients with COPD; placebo interventions will be defined as specifically designed control interventions; and isolated interventions will be defined as NPIs only from 1 category (eg, physical, psychological, digital, nutritional).

Outcomes

The primary outcomes of this review are symptoms of depression and anxiety. These outcomes will be measured using any validated assessment tool, such as the Hospital Anxiety and Depression Scale. This assessment tool prevents the overlap of psychological and physical symptoms, specifically excluding insomnia, loss of appetite, and fatigue.[3] Secondary outcomes will be dyspnea measured by any validated assessment tool, such as the mMRC scale. The global impact of COPD on health status will be measured by any validated assessment tool, such as the COPD Assessment Test.

Types of studies

This review will primarily include RCTs. If such designs are unavailable, experimental and quasi-experimental studies, non-randomized controlled trials, before-and-after studies, interrupted time series, cohort studies, and case-control studies will also be included.

Methods

The proposed systematic review will be conducted in accordance with the JBI methodology for systematic reviews of effectiveness[26] and reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline.[27] The protocol has been registered in PROSPERO (CRD42024550523). Any deviations from the protocol will be reported and justified in the completed systematic review.

Search strategy

A 3-step search strategy will be used to locate published and unpublished studies. First, an initial limited search of PubMed and CINAHL (EBSCOhost) was undertaken to identify articles on the topic. The text words in the titles and abstracts of relevant articles and the index terms used to describe these articles were used to develop a complete search strategy for PubMed (Appendix I). The search strategy, including all identified keywords and index terms, will be adapted for each included database. The reference lists of all studies selected for critical appraisal will be screened for additional studies. The databases to be searched include PubMed, CINAHL (EBSCOhost), Psychology and Behavioral Sciences Collection, Academic Search Complete, APA PsycINFO, Cochrane Central Register of Controlled Trials, Web of Science Core Collection, and Scopus. Sources of unpublished studies and gray literature will be searched through MedNar. Trial registries to be searched will include ClinicalTrials.gov.

The search will not be limited by language, in order to minimize the risk of missing relevant sources. Languages other than English, Portuguese, or Spanish will be translated by colleagues fluent in the respective language or qualified translators. Digital tools such as DeepL (DeepL, Cologne, Germany) will be used if those resources cannot be accessed. No time restrictions will be applied to the search, ensuring a comprehensive scope; however, in compliance with the PRISMA guidelines, the date of the last search performed in each database will be documented in the final report.

Study selection

After the search, all citations will be uploaded into the Rayyan Intelligent Systematic Review tool (Qatar Computing Research Institute, Doha, Qatar) and duplicates removed. Two independent reviewers will screen titles and abstracts against the eligibility criteria. Studies that could potentially be relevant will be retrieved in full, and their citation details will be imported into the JBI System for the Unified Management, Assessment and Review of Information (JBI SUMARI; JBI, Adelaide, Australia).[28] The full text of selected citations will be assessed against the inclusion criteria by 2 independent reviewers and in accordance with the PRISMA guidelines. The systematic review will record and report reasons for exclusion of full-text studies that do not meet the inclusion criteria. Any disagreements between reviewers during the study selection process will be resolved through discussion or with a third reviewer. The search results, study selection, and inclusion process will be fully reported in the final systematic review and presented in a PRISMA flow diagram.[27]

Assessment of methodological quality

Eligible studies will be critically assessed for methodological quality in this review. This assessment will be conducted by 2 independent reviewers using the JBI critical assessment appraisal tools for each study methodology[26] (eg, the checklist for quasi-experimental studies or RCTs). Authors of papers will be contacted to request missing or additional data for clarification, where required.

Any disagreements will be resolved through discussion or with a third reviewer. All studies, regardless of their methodological quality, will undergo data extraction and synthesis. The critical appraisal will be reported in a table accompanied by a narrative.

Data extraction

Data extraction from studies included in the review will be performed by 2 independent reviewers using the standardized JBI data extraction form. The extracted data will consist of specific details about i) participants, ii) study methods, iii) control groups, iv) interventions, v) timing of intervention delivery, vi) frequency and duration of the intervention, and vii) before, during, and after intervention outcomes relevant to the review question. In cases of disagreement between reviewers, resolution will be achieved through discussion or by consulting a third reviewer. Additionally, authors of the papers will be contacted to request any missing or additional data, as needed.

Data synthesis

This systematic review will pool eligible studies through statistical meta-analysis using JBI SUMARI. Effect sizes will be expressed as weighted (or standardized) final post-intervention mean differences between groups (for continuous data), and their 95% CI will be calculated for analysis. Heterogeneity will be assessed using the standard χ^2 and I^2 tests. Statistical analyses will be performed using the random-effects model in moderate to high heterogeneity ($I^2 > 50\%$). The fixed-effects model will be used if there is low heterogeneity between included studies ($I^2 < 50$, or $P \geq 0.5$).[29]

Subgroup analyses will be performed using RevMan v.5.3 (Copenhagen: The Nordic Cochrane Centre, Cochrane), and will be conducted when adequate data are available to explore factors such as study design, timing, frequency, and duration of the intervention. A sensitivity analysis will determine the impact of methodological quality (ie, including or excluding poor-quality studies from the meta-analysis) and sample size (ie, including or excluding studies with large or small sample sizes). A funnel plot will be generated using RevMan to assess publication bias if 10 or more studies are included in this meta-analysis. Where appropriate, statistical tests for publication bias, including the Egger test, Begg test, or Harbord test, will be performed to assess funnel plot asymmetry. Where meta-analysis is not possible, the findings will be presented according to the synthesis without meta-analysis method (ie, the findings will be presented in narrative format, including tables and figures).[30]

Assessing certainty in the findings

The Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) approach for grading the certainty of evidence will be followed regardless of the synthesis approach employed (eg, whether meta-analysis or narrative synthesis).[26,31] The GRADE framework will assess the strength of evidence from RCTs and non-randomized studies. Data from each study type will be analyzed separately, allowing informed judgments about the quality of evidence and the level of confidence in the outcomes for each study type.

Outcomes will be presented in a Summary of Findings (SoF) created using GRADEpro GDT (McMaster University, ON, Canada). The SoF will show the following information where appropriate: absolute risks for the treatment and control; estimates of relative risk; and a ranking of the quality of the evidence based on the risk of bias, directness, heterogeneity, precision, and risk of publication bias of the review results. The outcomes reported in the SoF will be symptoms of anxiety and depression, dyspnea, and the global impact of COPD.

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Author contributions

Conceptualization: SR; methodology: SR, RS, MG, FS; writing (original draft, review, and editing), visualization: SR, AG, AR, RS, MG, FS; supervision: MG, FS.

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Appendix I: Search strategy

PubMed

Search conducted: September 21, 2024

Search	Query	Records retrieved
#1	"Patients"[MeSH Terms] OR "Adult"[MeSH Terms] OR "Aged"[MeSH Terms] OR "patient*"[Title/Abstract] OR "adult*"[Title/Abstract] OR "Aged"[Title/Abstract]	13,512,806
#2	"lung diseases"[Title/Abstract] OR "pulmonary disease, chronic obstructive"[MeSH Terms] OR "pulmonary disease chronic obstructive"[Title/Abstract] OR "COPD"[Title/Abstract] OR "COAD"[Title/Abstract] OR "pulmonary emphysema"[MeSH Terms] OR "pulmonary emphysema"[Title/Abstract] OR "bronchitis, chronic"[MeSH Terms] OR "chronic bronchitis"[Title/Abstract] OR "chronic airflow obstruction"[Title/Abstract] OR "chronic obstructive"[Title/Abstract] OR "airflow limitation"[Title/Abstract]	146,069
#3	"depressive disorder"[MeSH Terms] OR "depression"[MeSH Terms] OR "anxiety disorders"[MeSH Terms] OR "Anxiety"[MeSH Terms] OR "anxi*"[Title/Abstract] OR "depress*"[Title/Abstract] OR "HADS"[Title/Abstract]	860,789
#4	"mind body"[Title/Abstract] OR "psychosocial intervention"[MeSH Terms] OR "psychosoc*"[Title/Abstract] OR "non pharmacologic"[Title/Abstract] OR "support*"[Title/Abstract] OR "practice*"[Title/Abstract] OR "strateg*"[Title/Abstract] OR "physica*"[Title/Abstract] OR "cognitive behavioral therapy"[MeSH Terms] OR "CBT"[Title/Abstract] OR "cognitiv*"[Title/Abstract] OR "behav*"[Title/Abstract] OR "therap*"[Title/Abstract] OR "psychotherapy"[MeSH Terms] OR "psychotherap*"[Title/Abstract] OR "health education"[MeSH Terms] OR "educat*"[Title/Abstract] OR "care"[Title/Abstract] OR "treat*"[Title/Abstract] OR "self-management"[MeSH Terms] OR "self-management"[Title/Abstract] OR "psychotherapy, group"[MeSH Terms] OR "Mindfulness"[MeSH Terms] OR "Mindfulness"[Title/Abstract] OR "mind body therapies"[MeSH Terms] OR "relaxation"[MeSH Terms] OR "relaxat*"[Title/Abstract] OR "counseling"[MeSH Terms] OR "counsel*"[Title/Abstract] OR "coach*"[Title/Abstract] OR "biofeedback, psychology"[MeSH Terms] OR "Biofeedback"[Title/Abstract] OR "hypnosis"[MeSH Terms] OR "hypnos*"[Title/Abstract]	15,010,145
#4	"exercis*"[Title/Abstract] OR "exercise"[MeSH Terms] OR "rehabilitation"[MeSH Terms] OR "rehabilitat*"[Title/Abstract] OR "telerehabilitation"[Title/Abstract] OR "dance therapy"[MeSH Terms] OR "danc*"[Title/Abstract] OR "walk*"[Title/Abstract] OR "fitness"[Title/Abstract] OR "Aerobic"[Title/Abstract]	1,219,455
#5	("mind body"[Title/Abstract] OR "psychosocial intervention"[MeSH Terms] OR "psychosoc*"[Title/Abstract] OR "non pharmacologic"[Title/Abstract] OR "support*"[Title/Abstract] OR "practice*"[Title/Abstract] OR "strateg*"[Title/Abstract] OR "physica*"[Title/Abstract] OR "cognitive behavioral therapy"[MeSH Terms] OR "CBT"[Title/Abstract] OR "cognitiv*"[Title/Abstract] OR "behav*"[Title/Abstract] OR "therap*"[Title/Abstract] OR "psychotherapy"[MeSH Terms] OR "psychotherap*"[Title/Abstract] OR "health education"[MeSH Terms] OR "educat*"[Title/Abstract] OR "care"[Title/Abstract] OR "treat*"[Title/Abstract] OR "self-management"[MeSH Terms] OR "self-management"[Title/Abstract] OR "psychotherapy, group"[MeSH Terms] OR "Mindfulness"[MeSH Terms] OR "Mindfulness"[Title/Abstract] OR "mind body therapies"[MeSH Terms] OR "relaxation"[MeSH Terms] OR "relaxat*"[Title/Abstract] OR "counseling"[MeSH Terms] OR "counsel*"[Title/Abstract] OR "coach*"[Title/Abstract] OR "biofeedback, psychology"[MeSH Terms] OR "Biofeedback"[Title/Abstract] OR "hypnosis"[MeSH Terms] OR "hypnos*"[Title/Abstract]) AND ("exercis*"[Title/Abstract] OR "exercise"[MeSH Terms] OR "rehabilitation"[MeSH Terms] OR "rehabilitat*"[Title/Abstract] OR "telerehabilitation"[Title/Abstract] OR "dance therapy"[MeSH Terms] OR "danc*"[Title/Abstract] OR "walk*"[Title/Abstract] OR "fitness"[Title/Abstract] OR "Aerobic"[Title/Abstract]) AND ("Patients"[MeSH Terms] OR "Adult"[MeSH Terms] OR "Aged"[MeSH Terms] OR "patient*"[Title/Abstract] OR "adult*"[Title/Abstract] OR "Aged"[Title/Abstract]) AND ("lung diseases"[Title/Abstract] OR "pulmonary disease, chronic obstructive"[MeSH Terms] OR "pulmonary disease chronic obstructive"[Title/Abstract] OR "COPD"[Title/Abstract] OR "COAD"[Title/Abstract] OR "pulmonary emphysema"[MeSH Terms] OR "pulmonary emphysema"[Title/Abstract] OR "bronchitis, chronic"[MeSH Terms] OR "chronic bronchitis"[Title/Abstract] OR "chronic airflow obstruction"[Title/Abstract] OR "chronic obstructive"[Title/Abstract] OR "airflow limitation"[Title/Abstract]) AND ("depressive disorder"[MeSH Terms] OR "depression"[MeSH Terms] OR "anxiety disorders"[MeSH Terms] OR "Anxiety"[MeSH Terms] OR "anxi*"[Title/Abstract] OR "depress*"[Title/Abstract] OR "HADS"[Title/Abstract])	1097