

# BMJ Open Effect of remote mindfulness-based interventions on symptoms of anxiety and depression in patients with chronic obstructive pulmonary disease: a protocol for systematic review and meta-analysis

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## ABSTRACT

**Background** The incidence of chronic obstructive pulmonary disease (COPD) is high worldwide, and patients with COPD commonly suffer from mood disorders, such as symptoms of anxiety and depression. However, it is difficult to communicate with patients face to face to solve these psychological problems in the case of the fluctuations in symptoms of COPD and COVID-19 prevalence, which may lead to the fact that patients with COPD are more likely to suffer exacerbations, frequent readmissions and worse survival. Mindfulness-based interventions are a stress-reducing therapy with mindfulness at its core. Remote mindfulness-based interventions combine the advantages of high availability, accessibility, low cost and anonymity and can solve the barriers to access that many patients face when attending face-to-face programmes. Therefore, remote mindfulness-based interventions may be an effective way to improve the mental health of patients with COPD.

**Methods and analysis** We will search PubMed, Embase, Cochrane Library, CNKI, PsycNET, MEDLINE, Psychology & Behavioral Sciences Collection and Web of Science to select eligible studies that were published. The eligible studies will be screened, extracted and then the methodological quality will be evaluated independently by two reviewers. Review manager software V.5.3 software and Stata V.14.0 software will be used for meta-analysis.

**Ethics and dissemination** Ethical approval is not required for a systematic review protocol. Findings of the proposed systematic review will be disseminated through conference presentations and publication in a peer-reviewed journal.

**PROSPERO registration number** CRD42021265286.

## INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is an irreversible lung disease characterised by dyspnoea, chronic cough and sputum production,<sup>1 2</sup> and it is projected to become the third leading cause of death worldwide by 2030.<sup>3</sup> Although it has been

## Strengths and limitations of this study

- The proposed systematic review will be the first to evaluate the quality of existing evidence from randomised controlled trials on the effectiveness of remote mindfulness-based interventions on patients with chronic obstructive pulmonary disease (COPD).
- Evidence synthesised in the proposed systematic review will provide insight into whether remote mindfulness-based interventions could offer a potentially useful avenue for alleviating symptoms of depression and anxiety in patients with COPD.
- Findings of the proposed systematic review may be limited by publication bias, study heterogeneity, the instruments that have been used to measure symptoms of depression and anxiety, and the methodological quality of existing research.

traditionally considered as a disease primarily affecting the lungs, COPD is often accompanied by many comorbidities, with symptoms of anxiety and depression being particularly common.<sup>4</sup> Epidemiological studies have shown that the incidence of anxiety symptoms in patients with COPD is about 50%, and the prevalence of depressive symptoms in COPD in the international aggregate is estimated at 8%–88%.<sup>5 6</sup> However, symptoms of anxiety and depression are often undiagnosed or undertreated because of a tendency to prioritise control of the symptoms of the primary illness.<sup>6</sup> This may lead to poor adherence to medication, poor quality of life, higher mortality, higher rates of hospitalisation and readmission, longer hospital stays and high healthcare costs in patients with COPD.<sup>7 8</sup> Therefore, there is a need to find an effective solution.

Previous studies have shown that mindfulness-based interventions are widely used to treat and relieve anxiety, depression, compulsion and other emotional and psychological problems.<sup>9–11</sup> The key aspects of mindfulness-based interventions are the non-judgmental awareness of thoughts, feelings and body sensations and the use of breathing as the focus of attention, teaching the participants to control their breathing through a kind attitude and accepting their breathing pattern as it is.<sup>12</sup> And the specific intervention content includes sitting meditation, mindful breathing, mindful yoga, mindful walking and body scanning.<sup>13–15</sup> Currently, mindfulness intervention forms include face-to-face group exercises,<sup>16</sup> mobile applications<sup>17</sup> and internet-based mindfulness treatment.<sup>18–19</sup> Among them, remote mindfulness-based interventions (internet-based mindfulness treatment) may be more promising than face-to-face interventions. Because they are low cost and anonymity, and they address the access barriers faced by many patients when attending face-to-face programmes.<sup>18–19</sup> Due to the fluctuations in symptoms of the disease, and the difficulty of COPD patients to leave home, face-to-face mindfulness intervention is limited to a certain extent. Meanwhile, considering the pandemic of COVID-19 in the recent 2 years,<sup>20</sup> in order to control the spread of the epidemic, quarantine and lockdown measures are often taken, which limits the activities of patients with COPD to a certain extent, thereby, as a result, on the one hand, it becomes difficult to resolve the patient's anxiety and depression symptoms face to face, on the other hand, the patients may have symptoms aggravated due to isolation. Therefore, remote mindfulness-based interventions may be more able to play its unique advantages and make up for the inconvenience of face-to-face treatment of symptoms of anxiety and depression in patients with COPD due to the COVID-19 epidemic and the fluctuation of COPD symptoms.

So far, four reviews have evaluated the effect of mindfulness-based interventions on patients with COPD. López-Lois *et al*'s study showed that mindfulness interventions could increase psychological resources in situations related to asthma and COPD symptoms, but he did not analyse the moderating effect of the age of the participants<sup>12</sup>; Farver-Vestergaard *et al* conducted a meta-analysis of the 20 included studies, and the results showed the effectiveness of different psychosocial interventions on health outcomes in people with COPD, reported an improvement in physical outcomes after mind–body interventions<sup>21</sup>; Harrison *et al* examined the effect of mindfulness on health-related quality of life, mindful awareness and stress in adults with respiratory diseases, such as asthma, COPD and respiratory failure, but due to wide differences in the interventions and measured outcomes, no conclusion could be drawn on the effectiveness of mindfulness-based interventions on COPD<sup>22</sup>; Clari *et al* conducted a mixed methods systematic review which showed that the limited published studies to date have not demonstrated the efficacy of mindfulness-based interventions in COPD, further methodologically sound

studies with bigger sample sizes and with consistent outcome measures were needed to verify their effectiveness, and they proposed that future could test the effect of internet-based mindfulness treatment on patients with COPD.<sup>23</sup>

Therefore, this study will conduct a meta-analysis of randomised controlled trials (RCTs) to evaluate the effect of remote mindfulness-based interventions on symptoms of anxiety and depression in patients with COPD, and taking into account the impact of COVID-19 pandemic in the recent 2 years, we will conduct a subgroup analysis based on pandemic versus non-pandemic, the participants' age, different intervention times and other variables.

## METHODS AND ANALYSIS

### Study registration

This protocol has been drafted under the guidance of the Preferred Reporting Items for Systematic Review and Meta-Analyses Protocols statement guidelines.<sup>24</sup>

### Inclusion criteria for study selection

#### Types of studies

All RCTs of remote mindfulness-based interventions for patients with COPD will be included. Non-RCTs, observational studies, cross-over studies, uncontrolled trials, reviews, duplicate research reports and insufficient data will be excluded.

#### Types of participants

Participants diagnosed with COPD, with no restrictions of age, gender, race, nationality and educational background will be included. Studies including individuals who have respiratory failure or were too unwell to participate, had signs of confusion or dementia (abbreviated mental state score < 8/10 and/or mini-mental status examination score < 25/30) will be excluded.

#### Types of interventions

##### Experimental interventions

In the intervention group, participants receive remote mindfulness-based interventions based on telephone or internet, or in combination with usual care.

##### Control interventions

The control group included participants who accept face-to-face mindfulness-based interventions, or in combination with usual care or usual care.

#### Outcome indicators

Symptoms of depression and anxiety will be accepted as the primary outcomes.

#### Search strategy

The following electronic databases will be used for selecting eligible studies published: PubMed, Embase, Cochrane Library, CNKI, PsycNET, MEDLINE, Psychology & Behavioral Sciences Collection and Web of Science.

Languages will be restricted to English and Chinese. The search strategy in PubMed is as follows:

- ▶ #1 Search: “Mindfulness”[Mesh] Sort by: Most Recent.
- ▶ #2 Search: (((((((((meditation[Title/Abstract]) OR (Mindfulness-Based Stress Reduction[Title/Abstract])) OR (MBSR[Title/Abstract])) OR (Mindfulness-Based Cognitive Therapy[Title/Abstract])) OR (MBCT[Title/Abstract])) OR (Dialectical Behavioral Therapy[Title/Abstract])) OR (DBT[Title/Abstract])) OR (Acceptance[Title/Abstract] AND commitment therapy[Title/Abstract])) OR (ACT[Title/Abstract])).
- ▶ #3 Search: #1 OR #2.
- ▶ #4 Search: “Pulmonary Disease, Chronic Obstructive”[Mesh] Sort by: Most Recent.
- ▶ #5 Search: (((((((((((Chronic Obstructive Lung Disease[Title/Abstract]) OR (Chronic Obstructive Pulmonary Diseases[Title/Abstract])) OR (COAD[Title/Abstract])) OR (COPD[Title/Abstract])) OR (Chronic Obstructive Airway Disease[Title/Abstract])) OR (Chronic Obstructive Pulmonary Disease[Title/Abstract])) OR (Airflow Obstruction, Chronic[Title/Abstract])) OR (Airflow Obstructions, Chronic[Title/Abstract])) OR (Chronic Airflow Obstructions[Title/Abstract])) OR (Chronic Airflow Obstruction[Title/Abstract])).
- ▶ #6 Search: #4 OR #5.
- ▶ #7 Search: #3 AND #6.

## Data collection and analysis

### Study selection

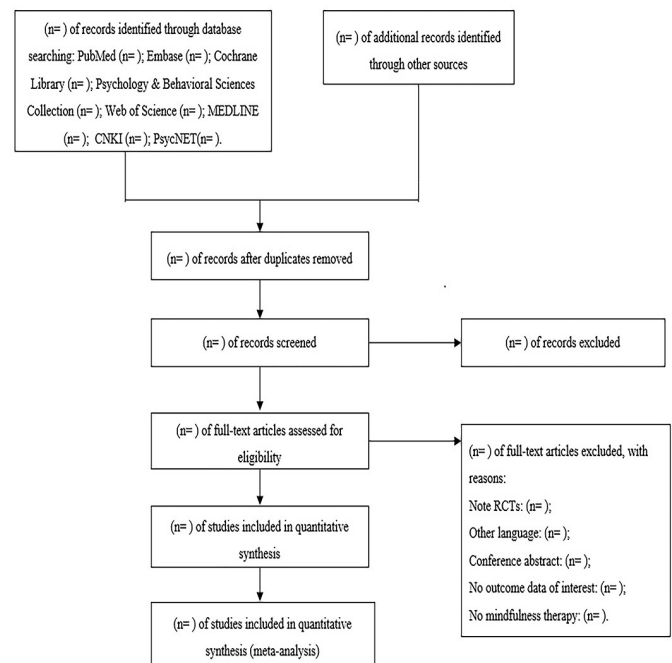
We will import the retrieved literature into EndNote X9 software and delete the duplicate data. After that, two reviewers will independently scan the titles and abstracts. Unrelated literature will be deleted. If they cannot determine whether to include the study, they will obtain the full text of the article for judgement. Two reviewers will independently evaluate the eligibility of these articles based on inclusion and exclusion criteria. Any disagreements will be resolved through group discussions. The study selection procedure is shown in [figure 1](#).

### Data collection and management

The data extraction for eligible studies will be completed independently by two authors, and any disagreement will be resolved through discussion with the third author. The extracted data will mainly include the first author, time of publication, country, sample size, participant age, recruitment site, remote mindfulness therapy duration and mode, outcome measures, specific treatment for the control groups, follow-up time and intervention content. If necessary, we will try to contact the author for the details by email.

### Dealing with missing data

If there are insufficient or missing data in the literature, the authors will be contacted via email. If the data are



**Figure 1** Flow diagram of the literature screening process and results. RCTs, randomised controlled trials.

still not available, only the currently available data will be analysed and the potential impacts will be discussed.

### Assessment of risk of bias

Two independent authors will evaluate the risk of bias among the final included studies using the risk of bias assessment tool by the Cochrane collaboration.<sup>25</sup> The contents will include (1) random sequence generation; (2) allocation concealment; (3) blinding of participants and personnel; (4) blinding of outcome assessment; (5) incomplete outcome data; (6) selective reporting; and (7) other sources of bias. Each study will be evaluated as high, low or unclear risk of bias for each item. Discrepancies will be resolved through further discussion with the third author.

### Quantitative data synthesis and statistical methods

#### Quantitative data synthesis

We will conduct statistical analysis through review manager software V.5.3. For categorical data, we will calculate with the risk ratio and 95% CIs. For continuous variables, mean difference (MD) will be included in the meta-analysis. If outcome variables are measured on different scales, data will be synthesised by using Hedge *g* of standardised MD with 95% CI.

#### Assessment of heterogeneity

According to the Cochrane Handbook,  $\chi^2$  test and  $I^2$  value could be used to evaluate the heterogeneity.  $I^2$  values of 25%, 50% and 75% are considered as low, moderate and high heterogeneity, respectively.



### Assessment of reporting bias

When more than 10 studies are included, a funnel plot will be generated to detect the reporting bias. In addition, we will use the Egger test<sup>26</sup> to check the asymmetry of the funnel plot.

### Subgroup analysis

If significant heterogeneity is detected, we will conduct subgroup analysis based on different intervention forms, different intervention times, age of participants, different countries, pandemic versus non-pandemic and outcome measures.

### Sensitivity analysis

We will use sensitivity analysis to examine the stability of the results by removing individual trials to determine whether the removed study had a particular effect.

### Assessment of quality of evidence

For grading the strength of evidence from the results obtained, we will use the Grades of Recommendation, Assessment, Development and Evaluation<sup>27</sup> approach. The level of evidence will be divided into high, moderate, low and very low quality.

### Patient and public involvement

The protocol is a summary of previous research. There is no recruitment of patients or public to participate in study design.

## DISCUSSION

The prevalence of COPD dramatically increases with age.<sup>28</sup> With the intensification of global ageing, the morbidity and mortality of people with COPD are on the rise,<sup>29</sup> which also means that the number of patients with COPD with symptoms of anxiety and depression is increasing. However, it is difficult to communicate with patients face to face to solve these psychological problems due to the fluctuations in symptoms of COPD and COVID-19 prevalence, which may lead to further deterioration of patients with COPD and further increase of mortality.<sup>6 7</sup> In the past, studies had found that mindfulness-based interventions could reduce individual symptoms of anxiety and depression.<sup>9 10</sup> At the same time, four scholars conducted systematic review and meta-analysis to evaluate the effect of patients with COPD based on mindfulness interventions: For example, López-Lois *et al* did not analyse the moderating effect of the age of the participants<sup>12</sup>; Farver-Vestergaard mainly reported the improvement of the psychological and physical health outcomes of patients with COPD after psychosocial interventions<sup>21</sup>; Harrison *et al* studied the efficacy of mindfulness in patients with multiple respiratory diseases and did not target COPD alone, therefore, it is not yet possible to draw conclusions about the effectiveness of mindfulness interventions on COPD<sup>22</sup>; Clari *et al*'s research showed that the effectiveness of mindfulness-based interventions on COPD needed to be further verified, and he proposed

that the effect of Internet-based mindfulness treatment on patients with COPD could be tested in the future.<sup>23</sup> Remote mindfulness therapy is a powerful, sustained and affordable form of intervention that has shown unique advantages when face-to-face mindfulness interventions are restricted. And there is still no meta-analysis on the effectiveness of remote mindfulness-based interventions on symptoms of anxiety and depression in patients with COPD. Thus, in this paper, we will systematically evaluate whether remote mindfulness-based interventions have a positive effect on symptoms of anxiety and depression in patients with COPD and conduct a subgroup analysis on the moderating effect of variables.

We hope that this study will provide evidence for remote mindfulness-based interventions to improve mental health in patients with COPD. In addition, personalised interventions can be developed according to the physical and mental characteristics of patients with COPD to maximise the role of remote mindfulness-based interventions.

### Ethics and dissemination

Since this study is a systematic review, the findings are based on the published evidence. Therefore, examination and agreement by the ethics committee are not required in this study. Our research results will be shared and demonstrated through peer-reviewed journals.

**Contributors** XW conceptualised the review. XW, HH and DL developed the design for the protocol and will be involved in data acquisition. XW, HH and R-YJ will analyse the data, and XW, HH and C-RC will be involved in the interpretation of the results. All authors have consented to publication.

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**Competing interests** None declared.

**Patient and public involvement** Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

**Patient consent for publication** Not applicable.

**Provenance and peer review** Not commissioned; externally peer reviewed.

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