INPLASY PROTOCOL

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None declared.

Effects of exercise therapy on anxiety and depression in patients with coronary heart disease: a meta-analysis of a randomized controlled study

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Review question / Objective: The purpose of this review was to evaluate the effect of exercise therapy on anxiety and depression symptoms in patients with coronary heart disease(CHD).

Eligibility criteria: All available randomized controlled trials (RCTs)met the following criteria: Participants were over 18 years old and diagnosed with coronary heart disease (including acute coronary syndrome, angina pectoris, coronary artery disease confirmed by coronary angiography, percutaneous coronary intervention or coronary artery bypass grafting). A RCT was included, with elevated levels of anxiety and depression (clinically diagnosed as anxiety and depression or scores higher than the threshold on the effective scale) as the primary or secondary outcome, and there was an effective score of anxiety and depression scale at baseline or before and after the intervention.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 06 June 2021 and was last updated on 06 June 2021 (registration number INPLASY202160017).

INTRODUCTION

Review question / Objective: The purpose of this review was to evaluate the effect of exercise therapy on anxiety and depression symptoms in patients with coronary heart disease(CHD).

Condition being studied: Coronary artery is partially or completely blocked on the basis of atherosclerosis, which leads to myocardial ischemia, hypoxia or necrosis. It is called coronary heart disease (CHD) together with coronary spasm, and it is one of the main causes of death and life reduction worldwide. Depression and

anxiety are recognized as social and psychological risk factors for coronary heart disease, of which, about 15-20% of patients with coronary heart disease suffer from depression, resulting in increased mortality and decreased quality of life of patients with CVD. The prevalence of anxiety in patients with coronary heart disease is about 15%, and a meta-analysis by Roest et al. suggested that post-myocardial infarction anxiety increased the risk of adverse cardiac outcomes by 36%. However, epidemiological studies show that less than 20% of patients with depression have been properly treated, and the rate of anxiety and depression symptoms after coronary heart disease is even lower. This will result in a higher recurrence and mortality rate of coronary heart disease, as well as high health care expenditure. American Heart Association (AHA) published a scientific recommendation in 2008 to screen all patients with coronary heart disease (CAD) for depression, and European clinical guidelines for cardiovascular diseases also recommended the treatment of depression and anxiety. At present, the psychological and psychiatric intervention recommended by the guidelines seems to improve the degree of depression in patients with coronary heart disease. However, in the case of patients with coronary heart disease combined with anxiety symptoms, the effect of psychological treatment and psychotropic drugs is still unclear, indicating the need for other interventions. For patients with coronary heart disease combined with anxiety and depression, exercise may be a promising, flexible and easy to implement treatment option. Exercise can not only reduce anxiety and depression of patients without coronary heart disease, but also improve cardiac prognosis. Meta-analysis by Kugler et al. before 2000 suggested that exercise therapy might be beneficial to improve the mood of patients with coronary heart disease. However, there is also a systematic evaluation report that due to the general lack of data on the effect of exercise, it is impossible to draw a definite conclusion that exercise is effective for anxiety and depression symptoms of

patients with ischemic heart disease.In recent years, studies have shown that inspiratory muscle training can significantly improve anxiety symptoms after coronary artery bypass surgery (CABG). On the contrary, some studies have concluded that exercise-based cardiac rehabilitation has no obvious effect on improving patients' depression. Due to current evidence conflict, we performed a meta-analysis to evaluate the efficacy of exercise therapy on depression and anxiety symptoms in patients with coronary heart disease.

METHODS

Participant or population: Diagnosed with coronary heart disease (including acute coronary syndrome, angina pectoris, coronary artery disease confirmed by coronary angiography, percutaneous coronary intervention or coronary artery bypass grafting). A RCT was included, with elevated levels of anxiety and depression (clinically diagnosed as anxiety and depression or scores higher than the threshold on the effective scale) as the primary or secondary outcome.

Intervention: We included studies that received exercise therapy alone or as part of a comprehensive cardiac rehabilitation program that included psychological interventions or health education.Exercise can be any combination of aerobic, strength or balance training. There are no restrictions on the length of time, frequency and method. Exercise-based cardiac rehabilitation, deep breathing exercises or inspiratory muscle training are also included.

Comparator: If the exercise intervention was compared with standard medical care or any other intervention(such as psychological education, antidepressant drugs or stress management), the study was included.

Study designs to be included: All studies were randomized controlled；The searches

were limited to studies published in English.

Eligibility criteria: All available randomized controlled trials (RCTs)met the following criteria: Participants were over 18 years old and diagnosed with coronary heart disease (including acute coronary syndrome, angina pectoris, coronary artery disease confirmed by coronary angiography, percutaneous coronary intervention or coronary artery bypass grafting). A RCT was included, with elevated levels of anxiety and depression (clinically diagnosed as anxiety and depression or scores higher than the threshold on the effective scale) as the primary or secondary outcome, and there was an effective score of anxiety and depression scale at baseline or before and after the intervention.

Information sources: We searched MEDLINE, Embase, the Cochrane Library and Web of science from 1 January 2000 to 1 February 2021. This period was chosen to select recent studies that reflect contemporary clinical cardiology practice.

Main outcome(s): The primary outcomes were depression and anxiety severity. Anxiety was assessed by HADS-A, GAD 7, HAMA, and DASS-A; Depression was assessed by HADS-D, HAMD, SDS, PHQ-9, BDI, DASS-D, and CDS, all of which were effective self-reporting tools. Such as the Hospital Anxiety and Depression Scale(HADS), The questionnaire consists of 14 items, seven each measuring anxiety and seven to measure depression. According to research literature, the cut-off point for elevated anxiety and depression as measured by the HADS is eight. For example, SDS consisted of 20 items that described depressive symptoms. Respondents described how often they experienced each symptom on a 4-level scale, from "no or few" to "most or all". Lower scores represent a more favorable psychological state.

Quality assessment / Risk of bias analysis: Using the Cochrane Collaboration bias risk tool, we identified the following domains as relevant for assessing the RCTs: sequence generation, allocation concealment, blinding of participants and personnel, incomplete outcome data, selective outcome reporting and other sources of bias. Blinding was assessed at outcome level. Two reviewers (LW, ZW) independently classified each domain as having low, high or unclear risk of bias. If half or more of the seven items in RCT are low-risk, it can be judged that the RCT is a low-risk research on the whole, otherwise it is a high-risk research. Disagreement about the risk of bias was resolved by discussion with the third reviewer(LL).

Strategy of data synthesis: The statistical analyses were performed using RevMan, version 5.3 and STATA, version 12.0.The mean difference(MD) or standardized mean difference(SMD) with 95%CI was used to analyze continuous outcomes. The SMD statistic was selected when the outcome was assessed by the different scales. I2 statistics were calculated to assess the heterogeneity and to choose the effect model. If I2> 50% and the P value of theχ2 was less than 0.1, meaning that statistical heterogeneity existed among studies, a random-effects model was selected. Otherwise, a fixed-effects model was used. If the pooled result included clinical heterogeneity, subgroup analysis was performed to search for the source of heterogeneity. Moreover, to examine the stability of the analysis result, we also conducted a sensitivity analysis by removing one study at a time. In studies that reported multiple depression results, to prevent double counting in the meta-analysis, we randomly selected one.

Subgroup analysis: Exercise therapy can be subdivided into exercise-oriented cardiac rehabilitation, aerobic exercise, breathing exercise and yoga exercise. To analyze the effects of each exercise on anxiety and depression symptoms in patients with coronary heart disease.

Sensitivity analysis: Moreover, to examine the stability of the analysis result, we also conducted a sensitivity analysis by

removing one study at a time. Use STATA, version 12.0 for sensitivity analysis.

Country(ies) involved: China.

Keywords: Exercise therapy; Coronary heart disease; Anxiety; depression; meta-analysis.

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