# INPLASY PROTOCOL

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**Corresponding author:**
**Jianping Zhang**

**zjpzzq@163.com**

**Author Affiliation:**
**Zhejiang Chinese Medical University.**

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**Conflicts of interest:**
**None declared.**

# Aerobic exercise supplementation improves depression scores: A systematic review and meta-analysis of randomized controlled trials

Huang, Y[1]; Cen, HJ[2]; Hu, XY[3]; Ma, CX[4]; Zhang, JP[5].

**Review question / Objective:** **Population: Patients diagnosed with depression; medical clearance to participate in an exercise programme; and cognitively able to provide consent to participate. Intervention and Control: Test group: Additional aerobic exercise on the basis of control group. Control group: Conventional Treatment for Depression including Medication, Family Therapy and Psychotherapy. Outcome: To systematically evaluate the intervention effect of supplementation of aerobic exercise on depression. S: Randomized Controlled Trials(RCTs).**
**Eligibility criteria:** **To meet the needs of meta-analyses, articles to be included must meet the following conditions: (1)participants:patients diagnosed with depression; medical clearance to participate in an exercise programme; and cognitively able to provide consent to participate; (2)There should be an experimental group and a control group, and the aerobic exercise of the experimental group is based on the routine treatment of the control group; (3)outcomes analyzed:Article contains data on depression and other indicators related to depression; (4)study design: RCTs;(5) language:Studies published in English.**

**INPLASY registration number:** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 28 July 2022 and was last updated on 28 July 2022 (registration number INPLASY202270115).

## INTRODUCTION

**Review question / Objective:** **Population: Patients diagnosed with depression; medical clearance to participate in an exercise programme; and cognitively able to provide consent to participate. Intervention and Control: Test group: Additional aerobic exercise on the basis of control group. Control group: Conventional Treatment for Depression including Medication, Family Therapy and Psychotherapy. Outcome: To systematically evaluate the intervention effect of**

supplementation of aerobic exercise on depression. S: Randomized Controlled Trials(RCTs).

**Rationale:** The relationship between aerobic exercise and depression has been analyzed in several studies. However, the supplementation of aerobic exercise (that means on the basis of Conventional Treatment for Depression including Medication, Family Therapy and Psychotherapy) still remains unknown.

**Condition being studied:** Depression is a common mental illness with typical symptoms of depression, slow thinking, and reduced speech and movement. According to the third edition of the Chinese Classification and Diagnostic Criteria for Mental Disorders (CCMD-3), depression can be divided into mild depression or major depression according to the degree of impairment to social functions; according to whether there has been another depressive episode before (at least 2 months ago), depression is divided into first episode Depression and recurrent depression. Symptoms are complex, and no clear and effective treatment has yet been found. In recent years, more and more researches have been conducted on exercise and depression, but the research on supplementary aerobic exercise is still controversial due to differences in intervention sample, intervention time, intervention frequency, intervention method and intervention time, so this kind of research is selected for analysis.

## METHODS

**Search strategy:** We have selected several databases such as PubMed, Cochrane Library, Web of Science and EMbase, and searched in the form of Mesh subject terms + free words. Take the Depression for example, the entry terms include "Depressive Symptoms" "Depressive Symptom" "Symptom, Depressive" "Symptoms, Depressive" "Emotional Depression" and "Depression, Emotional". The specific search strategy is as follows. (Take PubMed as example) (("Exercise"[Mesh]) OR ((((((((((((((((((((((Exercise[Title/Abstract]) OR (Physical Activity[Title/Abstract])) OR (Activities, Physical[Title/Abstract])) OR (Activity, Physical[Title/Abstract])) OR (Physical Activities[Title/Abstract])) OR (Exercise, Physical[Title/Abstract])) OR (Exercises, Physical[Title/Abstract])) OR (Physical Exercise[Title/Abstract])) OR (Physical Exercises[Title/Abstract])) OR (Acute Exercise[Title/Abstract])) OR (Acute Exercises[Title/Abstract])) OR (Exercise, Acute[Title/Abstract])) OR (Exercises, Acute[Title/Abstract])) OR (Exercise, Isometric[Title/Abstract])) OR (Exercises, Isometric[Title/Abstract])) OR (Isometric Exercises[Title/Abstract])) OR (Isometric Exercise[Title/Abstract])) OR (Exercise, Aerobic[Title/Abstract])) OR (Aerobic Exercise[Title/Abstract])) OR (Aerobic Exercises[Title/Abstract])) OR (Exercises, Aerobic[Title/Abstract])) OR (Exercise Training[Title/Abstract])) OR (Exercise Trainings[Title/Abstract])) OR (Training, Exercise[Title/Abstract])) OR (Trainings, Exercise[Title/Abstract]))) AND (("Depression"[Mesh]) OR (((((((Depression[Title/Abstract]) OR (Depressive Symptoms[Title/Abstract])) OR (Depressive Symptom[Title/Abstract])) OR (Symptom, Depressive[Title/Abstract])) OR (Symptoms, Depressive[Title/Abstract])) OR (Emotional Depression[Title/Abstract])) OR (Depression, Emotional[Title/Abstract]))) AND (randomizedcontrolledtrial[Filter]) AND (aerobic exercise[Title/Abstract]).

**Participant or population:** Patients diagnosed with depression; medical clearance to participate in an exercise programme; and cognitively able to provide consent to participate.

**Intervention:** Additional aerobic exercise on the basis of control group.

**Comparator:** Conventional Treatment for Depression including Medication, Family Therapy andPsychotherapy.

**Study designs to be included:** Randomized Controlled Trials(RCTs).

**Eligibility criteria:** To meet the needs of meta-analyses, articles to be included must

meet the following conditions: (1)participants:patients diagnosed with depression; medical clearance to participate in an exercise programme; and cognitively able to provide consent to participate; (2)There should be an experimental group and a control group, and the aerobic exercise of the experimental group is based on the routine treatment of the control group; (3)outcomes analyzed:Article contains data on depression and other indicators related to depression; (4)study design: RCTs;(5) language:Studies published in English.

**Information sources:** We systematically searched PUBMED , EMBASE, Web of Science, Cochrane Library, psychoINFO and SPORTDiscus six databases for articles (two independent authors). Searching was restricted to published articles in the English.

**Main outcome(s):** The main results were classified into categories as follows: (1)CES - D ( Center for Epidemiologic Studies-Depression Scale). (2)Other scales related to depression.

**Quality assessment / Risk of bias analysis:** Risk of bias will be assessed using Jadad scale (1-3 is considered low quality, 4-7 is considered high quality) or Cochrane Risk Assessment Tool. As for Cochrane Risk Assessment Tool, the first edition contains seven types of biases in six categories, and each bias is divided into three levels: high, low, and unknown. If there is a conflict, a third party will evaluate it, discuss and reach a consensus.

**Strategy of data synthesis:** The study will strictly follow PRISMA-statement. We will use Revman V5.3.5 to calculate the mean deviation (MD), standard deviation (SD), confidence interval (CI) and p-value (P). I2 values of 25%, 50%, and 75% are considered as low, moderate, and high heterogeneity, respectively. When the heterogeneity test I2 ≥ 50%, a random-effects model will be use for meta-analysis. Otherwise, the fix-effect model will be adopted.

**Subgroup analysis:** Subgroup analyses will be conducted which aims to explain the potential causes of heterogeneity when necessitated. The subgroup analyses will be implemented according to age, gender, frequency, time, duration, and event.

**Sensitivity analysis:** After the data synthesis, we plan to conduct sensitivity analysis through excluding merged studies one by one and observe whether the synthesis result changes significantly. Significant change reflects that the removing study is enough to influence overall synthesized result, so, it is necessary for us to reassess it and decide cautiously whether to merge it. A valid reason must be given before we make a decision. If no significant change arises, we could consider that our synthesized result is firm.

**Language restriction:** English.

**Country(ies) involved:** China.

**Keywords:** Depression; aerobic exercise; supplementation.

**Contributions of each author:**
Author 1 - Yue Huang.
Email: huangyue202205@163.com
Author 2 - Huijie Cen.
Author 3 - Xinyi Hu.
Author 4 - Chenxi Ma.
Author 5 - Jianping Zhang.
Email: zjpzzq@163.com