

# INPLASY PROTOCOL

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**Review Stage at time of this submission:** Data analysis.

**Conflicts of interest:**  
None.

## The effects of high-intensity interval training vs. moderate-intensity continuous training on exercise tolerance and prognosis in Heart Failure and Coronary Artery Disease Cardiac: a systematic review and meta-analysis

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**Review question / Objective:** Understand the impact of exercise-based cardiac rehabilitation on exercise endurance and prognosis of cardiovascular disease.

**Condition being studied:** In recent years, affected by factors such as population aging, the total number of deaths from cardiovascular diseases, especially coronary heart disease (CHD) and heart failure (HF), has increased rapidly. Cause a huge economic burden on the family and society. A large number of clinical studies have shown that cardiac rehabilitation exercise can significantly improve exercise tolerance, cardiac function, and prognosis in patients with CHD and HF. Currently, it has been widely proven that one of the benefits of aerobic exercise is an increase in peak VO<sub>2</sub>, which is one of the most important survival indicators for people with CAD and HF. At present, a large number of studies have found that high-intensity interval training (HIIT) has better peak VO<sub>2</sub> than moderate-intensity continuous training (MICT) in patients with CHD. However, whether HIIT is better than MICT in improving the prognostic indicators of CHD and HF such as maximum oxygen uptake, carbon dioxide equivalent slope and anaerobic threshold remains to be studied.

**INPLASY registration number:** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 27 August 2020 and was last updated on 27 August 2020 (registration number INPLASY202080112).

### INTRODUCTION

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rehabilitation on exercise endurance and prognosis of cardiovascular disease.

**Condition being studied:** In recent years, affected by factors such as population aging, the total number of deaths from cardiovascular diseases, especially coronary heart disease (CHD) and heart failure (HF), has increased rapidly. Cause a huge economic burden on the family and society. A large number of clinical studies have shown that cardiac rehabilitation exercise can significantly improve exercise tolerance, cardiac function, and prognosis in patients with CHD and HF. Currently, it has been widely proven that one of the benefits of aerobic exercise is an increase in peak VO<sub>2</sub>, which is one of the most important survival indicators for people with CAD and HF. At present, a large number of studies have found that high-intensity interval training (HIIT) has better peak VO<sub>2</sub> than moderate-intensity continuous training (MICT) in patients with CHD. However, whether HIIT is better than MICT in improving the prognostic indicators of CHD and HF such as maximum oxygen uptake, carbon dioxide equivalent slope and anaerobic threshold remains to be studied.

## METHODS

**Participant or population:** Patients diagnosed as coronary heart disease (CHD) and heart failure (HF) with no limitations on gender, age, course and co-morbidity will be included. But baseline characteristics of each study should be consistent.

**Intervention:** The training is carried out in rehabilitation facilities or hospitals, usually 2-3 times a week for 3-24 weeks, and is carried out under the guidance of a physical therapist. Training is generally carried out by cycling or running. The duration of medium-intensity interval training is generally 30-45 minutes, and the exercise intensity generally accounts for 60-75% of the maximum workload, peak oxygen uptake, peak heart rate or maximum power. High-intensity interval training generally consists of 10 stages, each 3-4 minutes of exercise, including the maximum workload, peak oxygen uptake, peak heart rate or maximum power 90%

interval of 1 minute, in the maximum amount of exercise 2-4 minutes rest at 30-45%.

**Comparator:** Control groups is generally 30-45 minutes, and the exercise intensity generally accounts for 60-75% of the maximum workload, peak oxygen uptake, peak heart rate or maximum power.

**Study designs to be included:** Inclusion criteria: RCTs. Exclusion criteria: Non-RCTs.

**Eligibility criteria:** Adults with coronary heart disease and heart failure treated by both High-intensity interval training and The duration of medium-intensity interval training.

**Information sources:** A comprehensive search of 8 medical databases, including PubMed, EMBASE (OVID), the Cochrane Library, China National Knowledge Infrastructure (CNKI), Web of science, Wanfang Database, ClinicaTrials.gov and Chinese Biomedical Database (CBM) through September 2019 will be conducted without language restriction.

**Main outcome(s):** Clinical outcomes will be eligible, including peak VO<sub>2</sub>, maximum oxygen uptake, carbon dioxide equivalent slope and anaerobic threshold ,left ventricular ejection fraction (LVEF).

**Data management:** Review Manager5.3.

**Quality assessment / Risk of bias analysis:** Quality assessment / Risk of bias analysis: Risk of bias (ROB) assessment was conducted by two independent authors. In the event of a disagreement while extracting data or assessing ROB, the third author resolved the discrepancy. The domains of ROB assessment are random sequence generation, allocation concealment, participant and personnel blinding, outcome assessment blinding, incomplete data, selective reporting and other biases according to the Cochrane handbook for systematic reviews. ROB was graded as high, low, or unclear.

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**Strategy of data synthesis:** Continuous data by mean difference (MD), with 95% confidence intervals.

**Subgroup analysis:** Subgroup analysis defined by disease, training time, and sensitivity analysis stratified by quality of included trials will be performed to detect heterogeneity or publication bias.

**Sensibility analysis:** We have done a sensitivity analysis of the peak oxygen uptake subgroup.

**Language:** English and Chinese.

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

**Keywords:** coronary heart disease , heart failure, high-intensity interval training, moderate-intensity continuous training.

**Contributions of each author:**

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