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Effects of exercise modes and doses on cardiovascular system function in adults: A meta-analysis of randomized controlled trials

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ADMINISTRATIVE INFORMATION

Support - Shanghai Sports Science and Technology Project of China.

Review Stage at time of this submission - Formal screening of search results against eligibility criteria.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 04 February 2024 and was last updated on 04 February 2024.

INTRODUCTION

Review question / Objective The objective of this study was to examine the effects of different exercise modes and doses on cardiovascular system function in adults.

Condition being studied The World Heart Federation (WHF) announced that cardiovascular disease (CVD)-induced mortality had accounted for 33% of all death domains worldwide. According to American Heart Association, the number of CVD patients worldwide in 2019 was 523 million and CVD-induced deaths were up to 18.6 million. As the leading cause of death worldwide, CVD morbidity and mortality had far exceeded the occurrence and progression of other diseases, and had become a huge burden on the global economy and public health care.Currently, a large body of evidence has demonstrated the value of exercise in improving cardiovascular system function in the prevention and treatment of CVD. But early studies mainly focus on the effects of exercise on single cardiovascular system or the single effects of exercise on single cardiovascular system, but no studies have comprehensively and specifically probed into the effects of exercise mode and dose on major cardiovascular system function in adults.

METHODS

Participant or population Age ≥ 18; no motor impairment.

Intervention Exercise(aerobic exercise, intermittent exercise, Resistance traing and slo on).

Comparator The control group with routine care or medication but without exercise intervention.

Study designs to be included Randomized controlled trials(Human).

Eligibility criteria InclusionCriteria 1) Population : Age ≥ 18; no motorimpairment 2) Intervention measures : Exercise(aerobic exercise, intermittent exercise, Resistance traing and sloon). 3) control group : The control group with routine care or medication but without exerciseintervention 4) Outcome indicators : systolic blood pressure (SBP), diastolic blood pressure (DBP), carotid intima-media thickness (cIMT), left ventricular ejection fraction (LVEF), mitral ratio of peak early to late diastolic filling velocity (E/A), baroreflex sensitivity(BRS) 5) Study type : randomized controlledtrials(Human).

Information sources PubMed(Search date: 2022/12/17;Retrieval restrictions: title and summary), Web of Science (Search date: 2022/12/17;Retrieval restrictions: title and summary) , EMBASE (Search date: 2022/12/17;Retrieval restrictions:abstrac and title) , The Cochrane Library (Search date: 2022/12/17;Retrieval restrictions:Trials).

Main outcome(s) Effect size.

Quality assessment / Risk of bias analysis The following 6 domains were considered: Random sequence generation (selection bias), Allocation concealment (selection bias), Blinding of participants and personnel (performance bias), Blinding of outcome assessment (detection bias), Incomplete outcome data (attrition bias), Selective reporting (reporting bias), other sources of bias.

Strategy of data synthesis Meta-analysis was performed using the “meta” package in R (Version 4.2.3; the R Foundation, St. Louis, MO, USA). Considering different assessment units and instruments used in the studies, effect size was estimated with SMD. The confidence interval of the effect size was 95%-CI. Intersection of diamond with the null line indicated no significant effect present.

Subgroup analysis Subgroup analysis was conducted according to exercise intensity, exercise duration, exercise frequency and exercise mode.

Sensitivity analysis Robustness of the results was assessed by eliminating the studies one by one.

Country(ies) involved China.

Keywords Adults; Cardiovascular system; Cardiovascular health; Data synthesis; Exercise.

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