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Effects of manipulation and intensity control of high-intensity interval training on blood pressure in persons with arterial hypertension: A Systematic Review and Meta-Analysis of Randomized Clinical Trials

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ADMINISTRATIVE INFORMATION

Support - The review does not present funding sources/sponsors.

Review Stage at time of this submission - Data analysis.

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 29 August 2024 and was last updated on 29 August 2024.

INTRODUCTION

Review question / Objective To analyze the effect of manipulating and controlling the intensity of HIIT training on blood pressure in people with arterial hypertension.

Rationale Arterial hypertension (HTA) is a pathology that has currently contributed as the main cause of morbidity and mortality in America. Increasing physical activity levels and starting a physical exercise program reduces the risk of suffering from HTA and that together with diet control are the non-pharmacological therapeutic tools that have the greatest effect in the treatment of HTA. Current evidence has shown that predominantly aerobic exercises have a great protective role in the development of hypertension. Within aerobic training there are new methodologies such as High Intensity Interval Training (HIIT), which has various health benefits, such as, for example, improvements in cardiorespiratory fitness, improvements in body weight control, BMI, fat percentage, total

cholesterol, reducing risk factors in people with hypertension. However, exercise protocols present methodological discrepancies making them difficult to reproduce by presenting a large range in the manipulation and control of the intensity of HIIT training.

Condition being studied Arterial hypertension is considered a pathology that is increasing exponentially around the world. It represents the highest risk of morbidity and mortality among existing cardiovascular diseases and a high financial cost for states. Hypertension is characterized by peripheral vascular resistance and has been associated with endothelial dysfunction of peripheral blood vessels.

METHODS

Search strategy (((((hypertension) OR ("High Blood Pressure")) OR ("Arterial Hypertension")) OR ("Primary Hypertension")) OR ("Blood Pressure, High")) AND (((("High-Intensity Interval Training") OR ("Interval Training")) OR ("High-Intensity

Interval")) OR ("High-Intensity Intermittent Exercise")) OR (HIIT).

Participant or population Mild to moderate hypertensive adults (SBP between 130-180 mmHg and/or DBP between 80-120 mmHg).

Intervention HIIT is a type of training characterized by being an intermittent exercise with periods performed at high intensity and/or submaximal interspersed with periods of low intensity, or active rest.

Comparator Compare with a control group, or with another experimental group that performs a training different from HIIT.

Study designs to be included Randomized clinical trials.

Eligibility criteria Studies that analyzed the effects of HIIT on a cycle ergometer or treadmill on systolic and diastolic blood pressure in hypertensive patients of both sexes with mild to moderate hypertension (SBP between 130-180 mmHg and/or DBP between 80-120 mmHg). The studies had to compare HIIT with another type of training or with a control group. The experimental group could only be intervened with HIIT and could not be combined with other types of training. All studies had to report the control of HIIT intensity either by Heart Rate (HR), % of maximum Heart Rate (% HRmax), % Heart Rate Reserve (%HRR), % of peak oxygen consumption (VO₂peak) and by self-selected intensity (SSI) and manipulation during the training period.

Information sources Studies were identified by searching four electronic databases: PubMed, Scopus, EBSCOhost and Web of Science (WOS).

Main outcome(s) If proper control and manipulation of intensity is performed in high-intensity interval training, significant effects will be produced in the reduction of systolic and diastolic blood pressure in hypertensive patients of legal age, compared to when these training parameters were not controlled (mean, standard deviation), significance level, effect size will be obtained).

Additional outcome(s) An Excel spreadsheet is used for data recording and the RevMan 5.4 software for data analysis.

Quality assessment / Risk of bias analysis Study quality and risk of bias for each study and outcome were assessed using Cochrane's Risk of

Bias (RoB2). Risk of bias was graded as low, high, or some concerns.

Strategy of data synthesis A meta-analysis with random effects will be performed with a descriptive table with the pre- and post-test mean and standard deviation, to demonstrate the effects of the intervention protocol on the population.

Subgroup analysis Subgroups will be conducted for HIIT intensity control and HIIT intensity manipulation.

Sensitivity analysis Does not apply.

Language restriction English.

Country(ies) involved The study will be carried out in Chile, there is an international investigation from Spain.

Keywords High blood pressure; blood pressure; exercise; high intensity interval training; intensity; control; manipulation.

Contributions of each author

Author 1 - Luis Romero-Vera - The author wrote the manuscript, carried out the search strategy, analyzed the results, wrote the discussion and generated conclusions.

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