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🌐 Effects of methodological variables during cycle ergometer exercise on blood pressure in individuals with arterial hypertension: a systematic review

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Protocol status: Working

We use this protocol and it's working

Created: April 22, 2025

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Protocol Integer ID: 133822

Keywords: aerobic exercise , hypertension, bicycle, cycle ergometer exercise on blood pressure, cycling exercise, frequency of exercise, cycle ergometer exercise, individuals with arterial hypertension, arterial hypertension, exercise as part, exercise protocol, cycling, exercise, blood pressure, secondary prevention of cvd

Disclaimer

Funding sources/sponsors: None

Conflicts of interest: None

Abstract

Current guidelines recommend exercise as part of primary and secondary prevention of CVD. In particular, cycling or cycling exercise. However, there has been little discussion about the effects of various variables - exercise protocol, its intensity and pedalling frequency. Systematic responses directly related to exercise depend on the intensity, duration and frequency of exercise.

Guidelines

The study will be conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement. The Preferred Reporting Items for Systematic Review and Meta-Analyses Protocols (PRISMA-P) statement. The study protocol will be writing before the search begins and will not be changing during or after the search. Filter by date - 10 years. No restrictions on the language of publication.

Inclusion criteria base on the PICOS system.

Search strategy:

	A	B
	PubMed	(("bicycle"[All Fields] OR "bicycled"[All Fields] OR "bicycles"[All Fields] OR "bicycling"[MeSH Terms] OR "bicycling"[All Fields]) AND ("exercise"[MeSH Terms] OR "exercise"[All Fields] OR "exercises"[All Fields] OR "exercise therapy"[MeSH Terms] OR ("exercise"[All Fields] AND "therapy"[All Fields]) OR "exercise therapy"[All Fields] OR "exercising"[All Fields] OR "exercise s"[All Fields] OR "exercised"[All Fields] OR "exerciser"[All Fields] OR "exercisers"[All Fields]) AND ("bicycle"[All Fields] OR "bicycled"[All Fields] OR "bicycles"[All Fields] OR "bicycling"[MeSH Terms] OR "bicycling"[All Fields]) AND ("hypertension"[MeSH Terms] OR "hypertension"[All Fields] OR ("arterial"[All Fields] AND "hypertension"[All Fields]) OR "arterial hypertension"[All Fields])) AND (y_10[Filter])
	Cochrane Library	(aerobic exercise and hypertension):ti,ab,kw
	Epistemonikos	(title:(title:(aerobic exercise) OR abstract:(aerobic exercise)) AND (title:(hypertension) OR abstract:(hypertension))) OR abstract:((title:(aerobic exercise) OR abstract:(aerobic exercise)) AND (title:(hypertension) OR abstract:(hypertension)))
	Elibrary	Аэробные упражнения, гипертония



Original language title

- 1 Влияние методических переменных при работе на велоэргометре на артериальное давление у людей с артериальной гипертонией: систематический обзор

Anticipated or actual start date

- 2 22.04.2025

Anticipated completion date

- 3 30.05.2025

Stage of review at time of this registration

- 4 Pilot screening completed

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PICOS

- 9 P (population), adults over 18 years of age with hypertension; I (intervention), bicycle ergometer exercise; C (comparison), control group; O (outcome), change in blood pressure; S, RCT.

Exclusion criteria

- 10 the intervention includes other physical activities in addition to the ergometer; variable intensity, protocol and pedalling frequency are not specified.

Review question

- 11 Effects of variable exercise on the cycle ergometer (intensity, protocol and pedal speed) on blood pressure in people with hypertension

Risk of bias (quality) assessment

- 12 Cochrane risk of bias tool 2. In parallel and independently by two authors

Searches

- 13 The literature search was carried out according to PRESS (Peer Review of Electronic Search Strategies) in the databases (without restrictions on the date and language of publication): PubMed, Cochrane Library, Epistemonikos and Elibrary.

Study selection. Two review authors (PD Rybakova and AG Antonov) independently and in parallel will screen article titles, abstracts, and, where appropriate, full texts from database records according to the eligibility criteria. Duplicates and articles that did not meet the criteria will be excluded from the search. Any discrepancies were resolved by consensus discussion, and any disagreements will resolve by another reviewer (AB Miroshnikov).

Study extraction. Two review authors (PD Rybakova and AG Antonov) independently and in parallel will screen the full texts according to the inclusion criteria. Duplicates and articles that do not meet the criteria will be removed. Whenever disagreements arose between the assessments of the two researchers, consensus will be reached either by

discussion or with the help of a third reviewer (AB Miroshnikov). Inter-rater (kappa) agreement have to range from 0.53 (weak) to 1.00 (almost perfect), as recommended by McHugh.

If the article was not publicly available, we will contact the authors and wait for a response within 14 days.

Data recording tool - Microsoft Excel

Strategy for data synthesis

- 14 The meta-analysis will be conducted using Cochrane's Review Manager software (version 5.4, UK) using standardized mean differences (SMD) as summary statistics for continuous data. The effects of caffeine supplementation on performance indicators will be estimated as 95% confidence intervals (CI) and weighted mean differences (WMD) for summary changes in study outcomes from baseline to endpoints in the experimental and control groups. The random effects model will be used for the analysis. Heterogeneity among RCTs will be assessed using the I^2 statistical method and the Cochrane Q-test. I^2 values of 25–50%, < 25%, 50–75% and > 75% will be considered as moderate, low, high and very high heterogeneity between RCTs, respectively. Subgroup sensitivity analysis will be used to identify potential sources of heterogeneity among included RCTs.

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