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The effects of different exercise modes on health markers in older adults with multimorbidity: a systematic review

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Carrijo, VHV¹; Vilas-Boas, JP²; Santos, CC³; Dechichi, JGC⁴; Moreira-Gonçalves, D⁵; Costa, MJ⁶.

Corresponding author:

Victor Hugo Vilarinho Carrijo

vilarinhovictorh@gmail.com

Author Affiliation:

Centre of Research, Education, Innovation and Intervention in Sport (CIFIID), Faculty of Sport, University of Porto, Porto, Portugal; Porto Biomechanics Laboratory (LABIOMEPL), Faculty of Sport, University of Porto, Porto, Portugal; Faculty of Sport, University of Porto, University of Porto.

ADMINISTRATIVE INFORMATION

Support - Foundation for Science and Technology from Portugal.

Review Stage at time of this submission - The review has not yet started.

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 17 November 2023 and was last updated on 17 November 2023.

INTRODUCTION

Review question / Objective The aim of this review is to systematically summarize the available literature that compared the efficacy of different types of physical exercise in health markers, body composition and psychological indicators in people with multimorbidity.

Rationale Multimorbidity, characterized by the coexistence of two or more chronic diseases, is on the rise globally due to the aging and expanding population, particularly among older adults. Older people with multimorbidity have a worse health status, more chances of hospitalization and a decrease in their quality of life. However, there are some interventions that can mitigate the impact of this condition, contributing to an improved quality of life and increased longevity for affected individuals.

Physical exercise is a non-pharmacological intervention that decreases rate of hospitalization for people who have one chronic disease. Physical exercise in aerobic and resistance modes has been indicated for people with multimorbidity, being effective on decreasing symptoms and mitigating the progression of many chronic diseases.

To date, few systematic reviews investigated the benefits and harms of physical exercise on a variety of outcomes such as physical health and psychosocial health in people with multimorbidity. Nonetheless, the question of whether aerobic exercise surpasses resistance exercise in enhancing health markers among individuals with multimorbidity remains inconclusive. Additionally, uncertainties persist regarding the anticipated effects of various exercise modes for this specific population.

Condition being studied How different types of physical exercise affect on treatment for people

with multiples chronic diseases (hypertension, diabetes mellitus, knee osteoarthritis and others) and compare this exercises on health markers how: blood pressure, heart rate, corporal composition and psychological markers.

METHODS

Search strategy This systematic review will be conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement. The Boolean search method (AND/OR) will be used as strategic to find relevant literature. Search lines selected will have: (((((((((((("Multimorbidity") OR ("multiple chronic diseases")) OR ("Chronic Diseases")) OR ("Cardiovascular Diseases")) OR ("Metabolic Diseases")) OR (hypertension)) OR ("diabetes mellitus")) OR ("heart failure")) OR ("chronic obstructive pulmonary disease")) OR (obesity))) OR ("anxiety and depression")) AND (((((((((((("aerobic exercise") OR ("combined exercise")) OR ("aerobic training")) OR ("resistance exercise")) OR ("resistance training")) OR ("Isometric Exercises")) OR ("aquatic exercise")) OR ("aquatic training")) OR ("Strength Training")))) AND (((((((((((("blood pressure") OR ("systolic pressure")) OR ("diastolic pressure")) OR ("Ambulatory Blood Pressure Monitoring")) OR ("Cardiac Rate")) OR ("heart rate")) OR ("heart rate variability")) OR ("Heart Rate Control")) OR ("Body Compositions")) OR ("Fat Body")) OR ("Body Mass Index")) OR (Anthropometry)) OR ("Body Measures")) OR ("Waist Circumferences")))) OR ("Psychiatric Status Rating Scales")) OR ("Mental Status and Dementia Test")) OR ("Patient Health Questionnaire 9") OR ("PHQ-9")) AND (((("Randomized Controlled Trial") OR ("Controlled Clinical Trial")) OR ("Clinical Trial")) OR ("Clinical Study"))). In each database we will use a similar strategy to find relevant articles.

Participant or population People with multimorbidity (including chronic diseases as hypertension, diabetes mellitus, knee osteoarthritis and others).

Intervention The intervention will include exercise programs about aerobic exercise, resistance exercise or both.

Comparator Any other intervention with exercise.

Study designs to be included Will be include studies with design at randomized controlled trial.

Eligibility criteria Only peer-reviewed articles published in journals with impact factors, written in English, Italian, French, Spanish, and Portuguese,

and released between January 2000 and the present year (2024) will be considered for inclusion in the review. The studies must comply with following eligibility criteria: A- Population: adults (≥ 18 y) diagnosed with two or more chronic conditions (e.g. hypertension, diabetes mellitus, obesity, heart failure, osteoarthritis, among others); B- Intervention: aerobic exercise, resistance exercise or combined exercise training. C- Comparison: any other exercise intervention; D- Outcomes: change in blood pressure: ambulatory blood pressure monitoring; heart rate: heart rate variability; body composition: body weight, circumferences and body fat; Psychological markers: Mini-mental, depression anxiety stress scales and patient health questionnaire 9. E- Type of study: randomized clinical trials.

Information sources The databases that will be used are: PUBMED, EMBASE, CINAHL, Sportsdiscuss and LILACS.

Main outcome(s) Data extraction will include: The type of exercise and characteristics (total volume, intensity, modality, duration); the values referring to blood pressure (Systolic blood pressure 24h, diastolic blood pressure 24h and variations); the values referring to heart rate (rest heart rate and standard deviation of variability heart rate); and the values of body composition (body mass, body fat and waist circumference).

Additional outcome(s) In additional this review aim a analisys the physicological effects how the second outcome, with scores by Mental Status and Dementia test and Patient Health Questionnaire 9.

Data management The data will be screened through at Endnote software to eliminate duplicates and Ryann software for a critical discussion and analyzes. The articles selection in both software will be conducted by expert reviewers.

Quality assessment / Risk of bias analysis To prioritize the quality of studies, all included articles will go through a risk of bias assessment. The RoB 2 scale will be used to assess the bias through five domains: bias by randomization of process, Bias from intended but unrealized interventions, bias due to missing data, bias in data selection, and bias in data measurement. The scale to judge each domain to risk of bias of: "low risk of bias," "some concerns," or "high risk of bias".

Strategy of data synthesis The studies will be evaluated by two independent reviewers during the

screening and data extraction phases. After the first phase all the disagreements will be solved by consensus. All data will be organized on Excel and others experts tools of reference manager. For studies presenting data in graphical form, we will employ the WebPlotDigitalizer software to extract the necessary data.

Subgroup analysis We will not perform subgroup analysis.

Sensitivity analysis Nothing to declare.

Language restriction Just international peer-reviewed studies written in English, Italian, French, Spanish and Portuguese will be selected.

Country(ies) involved Portugal and Australia.

Keywords Multimorbidity; hypertensive; diabetics; aerobic exercise; strength exercise; combined exercise; water exercise; systolic blood pressure; heart rate; body mass; mental health.

Dissemination plans This systematic review will be disseminated in conferences and published in international peer-reviewed journals with impact factor.

Contributions of each author

Author 1 - Victor Hugo Carrijo - VHVC participated in the planning, will participate in data extraction, review, original writing of the manuscript and approval of the final version.

Email: vilarinhovictorh@gmail.com

Author 2 - João Paulo Vilas-Boas - JPVB participated in the planning, will participate in data extraction, review, original writing of the manuscript and approval of the final version.

Author 3 - Catarina Costa Santos - CCS will participate in data extraction, review and original writing of the manuscript.

Author 4 - Juliene Gonçalves Costa Dechichi - JGCD will participate in data extraction, review and original writing of the manuscript.

Author 5 - Daniel Moreira-Gonçalves - DMG participated in the planning, will participate in data extraction, review, original writing of the manuscript and approval of the final version.

Author 6 - Mário Jorge Costa - MJC participated in the planning, will participate in data extraction, review, original writing of the manuscript and approval of the final version.