

INPLASY

Effects of Combined Exercise and Dietary Intervention on Cognitive Function in Older Adults With Subjective Cognitive Decline and Mild Cognitive Impairment: A Meta-Analysis

INPLASY202460020

doi: 10.37766/inplasy2024.6.0020

Received: 06 June 2024

Published: 06 June 2024

Yi, Q; Qi, YF; Liu, ZH; Feng, XW.

Corresponding author:

Qing Yi

yqfd606@163.com

Author Affiliation:

Faculty of Sports and Exercise Science, Universiti Malaya, Kuala Lumpur, Malaysia.

ADMINISTRATIVE INFORMATION

Support - No funding.

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

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202460020

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 06 June 2024 and was last updated on 06 June 2024.

INTRODUCTION

Review question / Objective This study aimed to systematically evaluate the impacts of combined exercise dietary Intervention on cognitive Function in older adults with subjective cognitive decline and mild cognitive impairment.

Condition being studied Mild cognitive impairment (MCI) is an intermediate stage in the transition from normal cognitive decline to dementia (3), and it progresses more rapidly than expected without affecting daily function (4). The 10% yearly conversion rate from MCI to dementia is much higher than the 1-2% incidence rate for the general population.

Subjective cognitive decline (SCD) is considered to be a condition in which some individuals present with subjective cognitive complaints but have no evidence of objective cognitive impairment through neuropsychological tests and tests of daily functioning. SCD is increasingly recognised as the earliest precursor stage of AD. SCD is considered

to be the earliest precursor stage of AD. 74% of people aged 70 and over who perform normally on standardised cognitive tests self-report cognitive decline.

METHODS

Search strategy The databases were retrieved using the following combination methods: #1 AND #2 AND #3 AND #4

#1 Dietary intervention terms

diet* OR dietary OR "dietary intervention" OR "dietary supplements" OR "diet therapy" OR "lifestyle intervention" OR "Mediterranean Diet" OR "Ketogenic diet" OR "DASH diet" OR "Atkins diet" OR "carbohydrate-restricted" OR "Caloric restriction" OR "fat-restricted" OR "Weight reduction programs" OR "weight intervention" OR "nutritional supplements"

#2 Exercise intervention terms

exercis* OR sport* OR "physical activity" OR "physical exercise" OR "physical training" OR "sports training" OR "aerobic exercis*" OR "aerobic train*" OR "aerobic fitness" OR "aerobic program*" OR "resistance exercis*" OR "resistance train*" OR "anaerobic exercis*" OR "anaerobic train*" OR "resistance program*" OR motor OR movement OR "functional training" OR "core training" OR "acute exercise*" OR "isometric exercises" OR "flexibility training" OR "high-intensity interval training" OR HIIT OR walking OR resistance OR strength OR bicycl* OR "bike rid*" OR "bicycle rid*"

#3 Aging population terms

"older adults" OR elder* OR senior* OR adult* OR older OR aging OR "the aged" OR "old people" OR "senior citizens" OR retirement

#4 cognitive impairment

"cognitive dysfunction*" OR "cognitive impairment*" OR "cognitive decline" OR "mild neurocognitive disorders" OR "mild cognitive impairment*" OR "mildly cognitively impaired" OR MCI OR "subjective cognitive dysfunction" OR "subjective cognitive impairment" OR dementia OR "Alzheimer's disease".

Participant or population This study included participants were older adults with SCD and MCI.

Intervention The intervention is a combined exercise and dietary Intervention.

Comparator The comparators in this study were the exercise intervention alone, the dietary intervention and a blank control.

Study designs to be included Published, peer-reviewed reports of randomized controlled trial (RCT) non-RCT, and cluster-RCT should be included. Studies were excluded including unpublished articles, case reports, reviews, study protocols, case studies, thesis, dissertations, and book chapters.

Eligibility criteria No.

Information sources The information sources consists of four databases: PubMed; Embase; Web of Science; Cochrane Library.

Main outcome(s) The main outcome of this study is cognitive function, such as executive functioning, memory, attention, etc.

Additional outcome(s) The secondary outcome of this study was physical function, such as grip strength, gait, etc.

Quality assessment / Risk of bias analysis The RCTs' quality was assessed by two reviewers independently using the Cochrane Risk of Bias Tool. The risk of bias criteria of RCTs in the Review Manager 5.4.1 was adopted to perform a qualitative evaluation of the included studies. However, given that all studies included behavioral interventions, particularly physical exercise, it would not be possible to achieve participant blinding. Therefore, the criteria 'blinding of participants and personnel (performance bias)' was omitted from this risk assessment. Consequently, we conduct a qualitative evaluation of the six aspects of RCT: random sequence generation (selection bias), allocation concealment (selection bias), blinding of outcome assessment (detection bias), incomplete outcome data (attrition bias), selective reporting (reporting bias) and other bias, and each index was judged by "low bias risk," "uncertain bias risk," or "high bias risk."

Strategy of data synthesis Data analysis was conducted using Review Manager 5.4. The analysis involved reporting the overall effect size, heterogeneity, and the forest plots. The outcomes of included studies, cognitive and physical functions, were regarded as continuous variables. Due to the integration of data from studies that employed different scales to assess identical outcomes, the Standardized Mean Difference (SMD) was chosen as the effect indicator, with a 95% confidence interval (CI) provided. This approach allowed for the calculation of pooled SMDs, which quantified the effect size for each evaluated outcome, covering overall cognitive abilities, specific cognitive areas, and physical performance. When I² values were over 50%, this analysis utilized the random-effects model rather than the fixed-effects model (Borenstein et al., 2021). Moreover, heterogeneity tests were performed using the statistic I². Heterogeneity was assessed with the I² statistic, categorizing it into low (25%), moderate (50%), and high (75%) levels.

Subgroup analysis Subgroup analyses of the effects of combined exercise and dietary interventions on executive function in older adults with SCD and MCI will be conducted.

Sensitivity analysis Sensitivity analyses were implemented for I2 values exceeding 50%, and sensitivity analyses should be conducted by excluding included studies on a case-by-case basis to explore the stability of the results.

Country(ies) involved China.

Keywords Dietary patterns, physical training, cognitive dysfunction, aging, combined intervention.

Contributions of each author

Author 1 - Qing Yi.

Email: yqfd606@163.com

Author 2 - Yufei Qi.

Author 3 - Zuhong Liu.

Email: zuhong_liu@163.com

Author 4 - XiaoWei Feng.

Email: fengxiaowei@std11.cn