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Effects of natural extract interventions in cognitive function of healthy adults : A systematic review and network meta-analysis

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Wang, ZY.

Corresponding author:
Zhi-yuan Wang

18003661063@163.com

Author Affiliation:
Department of Emergency Medicine and Laboratory of Emergency Medicine, West China Hospital, Sichuan University, Department of Emergency Medicine and Laboratory of Emergency Medicine, West China Hospital, Sichuan University, China.

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.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 2 November 2024 and was last updated on 2 November 2024.

INTRODUCTION

Review question / Objective Effect of natural extract interventions in cognitive function of healthy adults.
PICOS: P: the study population consisted of Healthy adults (≥18 years)with or without subjective cognitive decline; I: the intervention involved natural extracts; O: outcomes of interest included global cognitive state and several cognitive dimensions(executive function, memory, attention, cognitive flexibility, psychomotor speed, and reaction time); S: the study designs included both randomized controlled trials (RCTs).

Condition being studied Over the years, people have been searching for effective dietary patterns and natural extracts to improve cognitive function. Despite numerous experimental studies on natural extracts, the evidence supporting the efficacy of most natural extracts seemed insufficient, making it challenging to recommend their use. Our study aims to conduct a network meta-analysis to assess the impact of natural extracts in cognitive function of healthy adults.

METHODS

Participant or population The study population will consist of healthy adults (≥18 years)with or without subjective cognitive decline.

Intervention Research where intervention group receives treatment with different natural extracts.

Comparator Control: placebos.

Study designs to be included Randomized controlled trial (RCT).

Eligibility criteria The inclusion criteria utilized in present meta-analysis are defined within PICOS framework as follows: (1) Studies involving cognitive function of healthy adults; (2) Research where intervention group receives treatment with different natural extracts; (3) Comparison of the

intervention measures with inactive controls (such as placebos, standard care, no treatment, or habitual diet); (4) Study reports must include one or more of the following outcomes: global cognitive state, executive function, memory, attention, cognitive flexibility, psychomotor speed, and reaction time.

Information sources We will search the electronic database PubMed, Embase, Cochrane Library and Web of Science for relevant.
English language literature until September 2024. The electronic database search will be supplemented by a manual search of the reference lists of included articles.

Main outcome(s) Outcomes of interest included global cognitive state, memory, attention, cognitive flexibility, executive function.

Quality assessment / Risk of bias analysis Two raters will independently assess the methodological quality of included studies using the Cochrane Bias Risk Assessment Tool for RCTs. Seven domains were considered: (1) randomized sequence generation, (2) allocation concealment, (3) blinding of participants and personnel, (4) blinding of outcome assessment, (5) incomplete outcome data, (6) selective reporting, and (7) other bias. Trials were categorized into three levels of risk of bias: low risk, high risk, and unclear risk (no reporting or missing information).

Strategy of data synthesis To account for potential differences among studies, random-effects model will be employed for analysis. Stata MP15.0 will be utilized, following the PRISMA NMA guidelines, a Bayesian framework with Markov Chain Monte Carlo simulation will be used for NMA meta-analysis. Researchers will use Node-splitting analysis to assess indirect and direct comparisons consistency, with p-value > 0.05 indicating consistency. We will generate a network diagram for various natural extracts. To determine the ranking of interventions, we will employ a parametric bootstrapping procedure with 10,000 resamples to calculate the ranking probabilities for all rankings and outcomes. We will calculate the average ranking for each intervention and Surface Under the Cumulative Ranking (SUCRA) values.

Subgroup analysis No subgroup analysis.

Sensitivity analysis To explore the potential impact of bias in studies on NMA results, network funnel plot will be assess its symmetry by symmetry test.

Country(ies) involved China.

Keywords natural extract, cognitive function, healthy adults, network meta-analysis.

Contributions of each author
Author 1 - Zhi-yuan Wang.
Email: 18003661063@163.com