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Effect of dietary ergogenic aids and supplementation on handball performance: A systematic review with meta-analysis

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ADMINISTRATIVE INFORMATION

Support - None.

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

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202410079

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 18 January 2024 and was last updated on 18 January 2024.

INTRODUCTION

Review question / Objective This systematic review aimed to identify and summarize studies that have looked at the effects of supplementation on sports performance in handball (vertical heigh jump, horizontal jump, sprinting time, change-of-direction, VO2, performance biomarkers).

Condition being studied Physical performance of supplemented handball players.

METHODS

Search strategy Keywords and synonyms were entered in various combinations in the title, abstract or keywords: ("supplement*" OR "ergogenic* aid*" OR "diet*" OR "nutr*" OR "ingestion" OR "intake") AND ("handball") AND ("performance" OR "exercis*" OR "fitness" OR "capacit*").

Participant or population Handball players of any age, sex and level, with normal vision, no injuries or partial/chronic diseases and no history of neuropsychological impairment.

Intervention Use of one or more dietary supplements for athletic performance.

Comparator Same conditions with placebo or without dietary supplements.

Study designs to be included Randomized controlled trials, crossover or parallel intervention, blind or double-blind.

Eligibility criteria Inclusion cirteria:1) handball court or handball beach players of any age, sex, competitive level without injury or disease, with normal vision, without injury or partial/chronic disease and without a history of neuropsychological impairment; 2) Research conducted with one or more dietary supplements for sports performance; 3) same conditions with

placebo or without dietary supplements; 4) randomized controlled trials, crossover or parallel intervention, blind or double-blind; 5) Original studies published online peer-reviewed in English with full text. Exclusion criteria: Exclusion criteria: (1) Other population other than handball players or handball population with special conditions (e.g., injury, treatment, illness, disease); (2) Other physiological or physical conditions not related to the included outcomes; (3) Other study designs other than those described above; (4) Publications written in a language other than English; (5) Publications written in a language other than English. Other types of articles that are not original (e.g., reviews, letters to editors, trial registries, protocol proposals, editorials, book chapters, and conference abstracts).

Information sources Electronic databases (PubMed, Scopus, SPORTDiscus, and Web of Science) were searched for relevant publications prior to 17 January 2024.

Main outcome(s) Vertical height jump, horizontal jump, sprinting time and change-of-direction time, performance biomarkers, VO2max.

Data management Data extraction was conducted using a Microsoft Excel sheet (Microsoft Corporation, Redmond, WA, USA) following the Cochrane Consumers and Communication Review Group's data extraction template. The Excel sheet was employed to assess inclusion criteria and subsequently tested across all selected studies.

Quality assessment / Risk of bias analysis The quality assessment criterion employed for cross-over studies involved a tool comprising nine elements: (i) appropriate cross-over design; (ii) randomized treatment order; (iii) carry-over effect; (iv) unbiased data; (v) allocation concealment; (vi) blinding; (vii) incomplete outcome data; (viii) selective outcome reporting; and (ix) other bias. Each of these elements could be scored as low, unclear, or high risk.

Simultaneously, two authors (J.S.-C. and F. T. G.-F.) independently appraised the risk of bias in the included studies using the Cochrane Risk of Bias (RoB) Tool V.2, encompassing five domains: bias arising from the randomization process, bias due to deviations from intended interventions, bias due to missing outcome data, bias in measurement of the outcome, and bias in selection of the reported results. Each potential source of bias was categorized as low risk of bias, some concerns, or high risk of bias. Discrepancies were resolved

through consensus among authors or consultation with a third reviewer (HS).

Strategy of data synthesis Analysis and interpretation of results in this systematic review were only conducted in the case of at least study groups provided scientific evidence found in previous literature regarding the effect of supplementation on sports performance in handball (vertical height jump, horizontal jump, sprinting time, change-of-direction, VO2, performance biomarkers).

Subgroup analysis Type of supplementation and ergogenic aids; Level of competition; age, and sex.

Sensitivity analysis To adjust for publication bias, a sensitivity analysis was conducted using the trim and fill method, with LO as the default estimator for the number of missing studies.

Language restriction English.

Country(ies) involved Spain and Portugal.

Other relevant information N/A

Keywords Handball; supplementation; performance; ergogenic aids; nutrition.

Contributions of each author

Author 1 - Jesús Siquier-Coll - Lead the project, performed the search and methodological search and made the synthesis of results. Wrote and revised the manuscript.

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Author 2 - Almudena Carneiro-Barrera - Performed the statistical analysis and report. Wrote and revised the manuscript. Performed the methodological search. Wrote and revised the manuscript.

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