

Dietary practices, nutritional perspectives and ergogenic strategies in CrossFit®: a scoping review with evidence gap map

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ADMINISTRATIVE INFORMATION**Support** - N/A.**Review Stage at time of this submission** - The review has not yet started.**Conflicts of interest** - None declared.**INPLASY registration number:** INPLASY202460059**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 16 June 2024 and was last updated on 16 June 2024.**INTRODUCTION**

Review question / Objective The aims of this scoping review are: (1) summarize the dietary practices of participants, (2) describe nutritional and energetic intake, (3) examine the acute and chronic effects of ergogenic supplements on performance and recovery; (4) identify the gaps of available literature and provide suggestions for future research.

Background The practice of CrossFit® gained worldwide popularity in the last decade. According to data from the World Metrics Report (<https://worldmetrics.org/crossfit-growth-statistics/>), the number of CrossFit® affiliations increased by 118% from 2005 to 2015. The CrossFit® Open, an event that allows everyone to compete for three weeks, accounted for 429,157 participants in 2018. Athletes need to train distinct capacities (cardiorespiratory, stamina, strength, flexibility, power, speed, coordination, agility, balance and accuracy) in order to perform a variety of types of movements (e.g. deadlift, squat, power clean,

push-ups, pull-ups, burpees, rowing, running, cycling) at high intensities and with short periods of recovery (Claudino et al., 2018; Schlegel, 2020). Optimizing performance and recovery are two central aspects of success in CrossFit® participation (Rios et al., 2023; Mangine et al., 2021). Therefore, a considerable number of studies described the physical and physiological aspects of CrossFit® workouts (Fernandez et al., 2015; Rios et al., 2024a; Rios et al., 2024b) and also focused on examining the time the necessary to recovery from a specific workout (Sousa et al., 2022; Forte et al., 2022; Tibana et al., 2018). Data from Spanish CrossFit® participants showed that 48 to 72 hours are necessary to restore normal levels of physical performance and creatine kinase (Tibana et al., 2019). Among Brazilian practitioners, 48 hours of recovery allowed them to re-establish physical performance, whilst creatine kinase values were higher 72 hours after the CrossFit® training than before the workout (Sousa-Neto et al., 2022). In this context, adequate dietary and nutritional practices and appropriate ergogenic supplements

permit optimising the performance and recovery process (Thomas et al., 2016).

Rationale The dietary recommendations for CrossFit® participants are to follow the Paleo or Zone Diets (Maxwell et al., 2017). Both dietary practices tend to neglect the importance of carbohydrates (Coulston et al., 1983; Cordain & Field, 2005), which is surprising given the systematic evidence about the impact of ingesting carbohydrates before, during and after training in order to improve performance and reduce fatigue (Burke et al., 2011; Carmak & Van Loon, 2013; Jeukendrup, 2014). Two recent reviews that include 14 and 13 studies summarized the effects of dietary choices and ergogenic effects among CrossFit participants focused exclusively on performance (Quaresma et al., 2021; de Souza et al., 2023) and did not consider recovery outputs. Moreover, given the popularity of CrossFit®, there is an expected increase in the number of studies in the field of nutrition. The description of energetic and nutritional intake in CrossFit® practitioners is scarce. This issue needs particular attention, mainly because the recommended diets are not typical in sports nutrition literature, to understand if they meet the recommendations developed for athletes. Although protein, creatine, pre-workouts and multivitamins are commonly ingested by CrossFit® athletes (Brisebois et al., 2022), the acute and chronic effects of these and other ergogenic supplements on performance and recovery claim scientific evidence.

METHODS

Strategy of data synthesis The search strategy will include the combination of the following terms: ((nutrition* OR “nutritional strategy” OR “nutritional intervention” OR diet*, carbohydrate OR glucose OR protein OR collagen OR fat OR ketone* OR antioxidant* OR vitamin OR polyphenol* OR fruit OR creatine OR caffeine OR nitrate* OR beetroot OR “tart cherry” OR beta alanine OR sodium bicarbonate OR supplement* OR energy* OR macronutrient* OR micronutrient* OR mineral* OR electrolyte*) AND CrossFit). The search will be divided into two different phases: 1) identification of studies via databases; 2) identification of studies via other methods (dissertation and thesis database; grey literature database; trials results platforms, other systematic reviews, reference list of included studies). Four electronic databases were consulted: PubMed, Web of Science, Scopus and SportDiscus. The Open Access Thesis and Dissertations (<https://otad.org>) was used to check master dissertations and doctoral thesis. Two platforms will be used to identify trials registers

(<https://clinicaltrials.gov/>; <https://trialssearch.who.int/>), following the Cochrane Guidelines (Lefebvre et al., 2024). The references of another systematic reviews in the same topic will be consulted in the Web of Science database to check other potential references. The search strategy adopted will be similar to the mentioned above including the Boolean connector “AND” with the term “systematic review”. The titles of reference list of the included studies will be consulted to check additional papers. The search strategy will be conducted in the same day for all databases and platforms.

Eligibility criteria Original manuscripts published in peer-review journals, master dissertations, doctoral thesis, research reports, doctoral dissertations, conference presentations, abstracts and clinical trials written in English, Portuguese and Spanish will be included in the present review. The Participants, Intervention, Comparator, Outcomes and Study Design (PICOS) framework will be used to define the eligible studies for the present review: Participants – adult CrossFit® participants; Intervention – studies that described dietary practices or examine the effects of ergogenic supplements on performance or recovery; Comparator – studies about dietary practices did not involve a comparator whilst, the impact of supplements on performance or recovery needs to be contrasted with placebo or control groups; Outcomes – energy and/or macronutrient intake, energy expenditure, energy balance, performance and/or recovery outputs; Study design – for dietary intake observational studies will be included to examine the effects of ergogenic supplements control or placebo trials will be considered. No restrictions will be applied in terms of publication date.

Source of evidence screening and selection A reference manager software (EndNote™ 21.0, Clarivate™) will be used to combine the papers extracted from electronic databases. Duplicates will be automatically removed and manually checked by two authors (DVM/HS). Firstly, the screening will be performed according to the title and abstract. Subsequently, the full text of the manuscripts will be reviewed to ensure that studies met the eligibility criteria. These processes will be conducted by two researchers (DVM/HS) and, when necessary, a third author (AR) will be contacted to solve the cases of the disagreement. The other sources of evidence will be managed manually by two authors (DVM/HS).

Data management The first author (DVM) created a template data to organize the relevant data. Two

main groups of studies were considered: (1) dietary studies; (2) ergogenic supplements. Within the first group two different sub-groups were created: (1.1) comprised observational studies about food, energetic, macronutrient or micronutrient ingestions; (1.2) studies about the accuracy of diets in performance or recovery outputs. Meta-analysis will depend on the number and design of the papers extracted.

Language restriction dissertations, doctoral thesis, research reports, doctoral dissertations, conference presentations, abstracts and clinical trials written in English, Portuguese and Spanish will be included.

Country(ies) involved Portugal, United Kingdom.

Keywords crossfit; nutrition; ergogenic; evidence map.

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