Technical Note

The Effectiveness of Nutrition Interventions for Improvement of Professional and Semiprofessional Soccer Players: A Systematic Review Protocol

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Abstract: The unique physical demands of soccer necessitate optimal nutrition strategies for enhancing players' performance, recovery, and overall health. However, the effects of nutrition interventions on professional soccer players remain underexplored. This review aims to synthesize the current literature on the impact of nutrition interventions on professional soccer players' performance to inform future research and practical applications. The review will follow the PRISMA guidelines and the Cochrane Handbook of Systematic Reviews. We will employ a four-part search strategy to identify relevant studies, including electronic bibliographic databases, trial registers, the web of clinical trials, and bibliography screening. Inclusion criteria will encompass randomized clinical trials involving professional or semiprofessional soccer players utilizing a nutrition or diet intervention. Quality assessment will be conducted using the Risk of Bias 2 (RoB 2) tool. A narrative synthesis will be provided, detailing the intervention types and their effects on performance. This review will offer a comprehensive understanding of the potential benefits of nutrition interventions for soccer professionals, helping coaches, nutritionists, and players to tailor their approaches for optimal performance and recovery.

Keywords: protocol; soccer performance; supplements; diet; systematic review; soccer professional players

1. Introduction

This systematic review protocol aims to investigate the impact of nutrition interventions on professional soccer players' performance. Soccer, a popular sport [1–3] with unique physical demands, requires players to maintain high fitness levels, strength, endurance, and agility[4,5]. While the physical demands of matches have been extensively studied, training demands and nutrition's effect on performance remain understudied.

The correlation between nutrition and sports performance has gained significant attention and interest in recent scientific research. Various nutrition interventions, such as carbohydrate ingestion, dietary supplementation, and specific diet regimens, have been suggested to improve athletic performance, including endurance, strength, and recovery[6]. In 2018, the International Olympic Committee (IOC) issued a consensus statement identifying several ergogenic aids with sufficient scientific backing, deemed safe and effective for enhancing athletes' performance. These aids include caffeine, creatine, nitrate, sodium bicarbonate, and beta-alanine[7]. Other sports organizations have also issued guidelines, but the extent to which these interventions can impact professional soccer players' performance remains unclear [8,9]r.

Soccer players often face unique challenges compared to other athletes due to the sport's intermittent nature, combining high-intensity critical events with lower-intensity aerobic exercises and rest. These demands require a delicate balance of nutritional strategies to optimize performance, recovery, and overall health. Additionally, soccer players must consider the demands of their training schedules, which can vary significantly in intensity and duration, further complicating determining the most effective nutritional interventions.

There is limited evidence base information on the effects of nutrition on professional soccer players' performance. This systematic review aims to synthesize a comprehensive understanding of the potential benefits of nutrition interventions for professional soccer players by exploring their influence on performance. Examining the available literature aims to inform future research and practical applications within the sport, ultimately enhancing various nutrition strategies for soccer professionals. By determining which nutritional interventions are most effective for this population, coaches, nutritionists, and players can better tailor their approaches to optimize performance and recovery.

2. Methods

Data Search

We will conduct this systematic review according to the PRISMA recommendations and the guidelines of the Cochrane Handbook of Systematic Reviews[10,11]. We will use a four-part search strategy to identify studies (1) we will search electronic bibliographic databases for published work; A systematic search will be performed in PubMed, Scopus, and Web of Science (WOS), covering all studies published before February 25, 2023. (2) we will search trial registers for ongoing and recently completed trials. We will also search clinical trial registers, such as ClinicalTrials.gov, the WHO International Clinical Trials Registry Platform, and the European Clinical Trials Database. (3) We will also explore the web of clinical trials to identify relevant publications. We will search   Google Scholar for published articles of registered clinical trials not yet indexed in the databases (PubMed, Scopus, and WOS). (4)   We will examine the bibliographies of the studies incorporated in the analysis and the bibliographies of pertinent previously published analyses.

We will create search queries to link generic keywords associated with clinical trial interventions on nutrition or diet for professional or semiprofessional soccer players (Figure 1). We will not apply filters based on the players' gender or age. Whenever available, we will include the publication of a clinical trial's results in the review.

PubMed	((Nutrition or Diet) AND (semi-professional or professional or elite) AND ((Soccer or Football) AND player) AND Clinical Trial) OR(("Diet Therapy"[Mesh]) AND "Soccer"[Mesh] AND ("clinical trial"[Publication Type] OR "clinical trials as topic"[MeSH Terms] OR "clinical trial"[All Fields]))
Scopus	TITLE-ABS-KEY ((nutrition OR diet) AND (semi-professional OR professional OR elite) AND (soccer OR football) AND (player) AND (clinical AND trial))
WOS	TITLE-ABS-KEY ((nutrition OR diet) AND (semi-professional OR professional OR elite) AND (soccer OR football) AND (player) AND (clinical AND trial))

Figure 1. Search strategy in different databases.

Inclusion criteria and exclusion criteria

The inclusion criteria of this study will be formulated according to the PICOS principles as follows: (1) P: The subjects will be professional or semiprofessional soccer players (2) I: The experimental group will use to use a nutrition or diet Intervention. C: The control group will require a different intervention (e.g., another supplement or placebo). (4) O: The outcomes will improve the players' performance (without specific outcome measures specified). (5) S: The study type will be   Randomized Clinical trials.

We will apply the following exclusion criteria: (1) repeated publication; (2) inability to obtain the full text; (3) incomplete or unavailable data; and (4) studies not published in Spanish or English. We will exclude clinical trials recruiting participants, or that did not publish results in clinical trial registries or scientific publications. If available, we will select the most up-to-date information from the clinical trials registry and scientific publications.

Data extraction

We will use EndNote (version 20; Clarivate Analytics) [12] to eliminate duplicate studies. The study selection process will be facilitated with assistance from the Rayyan website and a mobile application [13]. Two reviewers (SGA and FGG) will screen the titles, abstracts, and keywords independently. If a study is deemed a candidate, the full text will be assessed and evaluated independently based on inclusion and exclusion criteria. Any disagreements will be resolved by the third reviewer (LGA) through consultation with the first two. The authors will access the full text whenever a study meets the inclusion criteria. After searching and evaluating complete articles, four authors (SGA, FGG, LGA, and IAO) will independently review the text of all selected studies to determine their inclusion. Any discrepancies in their selections will be resolved through discussion. If they cannot agree, the writers will consult a fifth author (RAB). A pre-tested standardized form will extract data from the selected studies to evaluate study quality and evidence synthesis. This form will be utilized for extracting the following information: The information extracted from the included articles will include: the author (year), country, participants, the sample size in the experimental and control group (E/C), intervention (E/C), length of intervention days, and outcomes.

Quality assessment

To evaluate the quality of the literature, we will use the Risk of Bias 2 (RoB 2) tool, which is recommended by the Cochrane Systematic Review Manual (5.1.0) [11][14]. This tool will be strictly employed to assess the risk of bias in the included literature. For crossover designs, we will use the Risk of Bias tools - RoB 2 for crossover trials[15]. Independent assessments of the risk of bias for each included article will be conducted by two reviewers (IAO and LGA), categorizing them as "low risk," "some concerns," or "high risk." Any disagreements will be reviewed and resolved by another reviewer (RAB).

Presentation of the results.

We will write a narrative synthesis of the findings from the included studies, which will be structured first according to the intervention's timing, whether it occurred previously o simultaneously with the game or during the recovery period. In each group, we will describe the studies according to the type of diet or supplement.

3. Conclusion

This systematic review of nutrition interventions will produce a detailed summary of the evidence of the effectiveness of nutrition intervention in improving the performance of professional and semiprofessional soccer players.

References

1. Dvorak, J.; Junge, A.; Graf-Baumann, T.; Peterson, L. Editorial. *Am J Sports Med* **2004**, *32* (1_suppl), 3–4. https://doi.org/10.1177/0363546503262283.

2. FIFA. *Big Count 2006*; Fédération Internationale de Football Association: Zurich, 2007.

3. FIFA. *Professional Football Report 2019*; Fédération Internationale de Football Association: Zurich, 2019.

4. Rampinini, E.; Impellizzeri, F. M.; Castagna, C.; Coutts, A. J.; Wisløff, U. Technical Performance during Soccer Matches of the Italian Serie A League: Effect of Fatigue and Competitive Level. *J Sci Med Sport* **2009**, *12* (1), 227–233. https://doi.org/10.1016/j.jsams.2007.10.002.

5. Bradley, P. S.; Sheldon, W.; Wooster, B.; Olsen, P.; Boanas, P.; Krustrup, P. High-Intensity Running in English FA Premier League Soccer Matches. *J Sports Sci* **2009**, *27* (2), 159–168. https://doi.org/10.1080/02640410802512775.

6. Anderson, L.; Orme, P.; Di Michele, R.; Close, G. L.; Morgans, R.; Drust, B.; Morton, J. P. Quantification of Training Load during One-, Two- and Three-Game Week Schedules in Professional Soccer Players from the English Premier League: Implications for Carbohydrate Periodisation. *J Sports Sci* **2016**, *34* (13), 1250–1259. https://doi.org/10.1080/02640414.2015.1106574.

7. Maughan, R. J.; Burke, L. M.; Dvorak, J.; Larson-Meyer, D. E.; Peeling, P.; Phillips, S. M.; Rawson, E. S.; Walsh, N. P.; Garthe, I.; Geyer, H.; Meeusen, R.; van Loon, L. J. C.; Shirreffs, S. M.; Spriet, L. L.; Stuart, M.; Vernec, A.; Currell, K.; Ali, V. M.; Budgett, R. G.; Ljungqvist, A.; Mountjoy, M.; Pitsiladis, Y. P.; Soligard, T.; Erdener, U.; Engebretsen, L. IOC Consensus Statement: Dietary Supplements and the High-Performance Athlete. *Br J Sports Med* **2018**, *52* (7), 439–455. https://doi.org/10.1136/bjsports-2018-099027.

8. Kerksick, C. M.; Arent, S.; Schoenfeld, B. J.; Stout, J. R.; Campbell, B.; Wilborn, C. D.; Taylor, L.; Kalman, D.; Smith-Ryan, A. E.; Kreider, R. B.; Willoughby, D.; Arciero, P. J.; VanDusseldorp, T. A.; Ormsbee, M. J.; Wildman, R.; Greenwood, M.; Ziegenfuss, T. N.; Aragon, A. A.; Antonio, J. International Society of Sports Nutrition Position Stand: Nutrient Timing. *J Int Soc Sports Nutr* **2017**, *14* (1). https://doi.org/10.1186/s12970-017-0189-4.

9. Position of the American Dietetic Association, Dietitians of Canada, and the American College of Sports Medicine: Nutrition and Athletic Performance. *J Am Diet Assoc* **2009**, *109* (3), 509–527. https://doi.org/10.1016/j.jada.2009.01.005.

10. Page, M. J.; McKenzie, J. E.; Bossuyt, P. M.; Boutron, I.; Hoffmann, T. C.; Mulrow, C. D.; Shamseer, L.; Tetzlaff, J. M.; Akl, E. A.; Brennan, S. E.; Chou, R.; Glanville, J.; Grimshaw, J. M.; Hróbjartsson, A.; Lalu, M. M.; Li, T.; Loder, E. W.; Mayo-Wilson, E.; McDonald, S.; McGuinness, L. A.; Stewart, L. A.; Thomas, J.; Tricco, A. C.; Welch, V. A.; Whiting, P.; Moher, D. The PRISMA 2020 Statement: An Updated Guideline for Reporting Systematic Reviews. *Syst Rev* **2021**, *10* (1), 89. https://doi.org/10.1186/s13643-021-01626-4.

11. Cumpston, M.; Li, T.; Page, M. J.; Chandler, J.; Welch, V. A.; Higgins, J. P.; Thomas, J. Updated Guidance for Trusted Systematic Reviews: A New Edition of the Cochrane Handbook for Systematic Reviews of Interventions. *Cochrane Database of Systematic Reviews* **2019**. https://doi.org/10.1002/14651858.ED000142.

12. EndNote. Clarivate Analytics: Philadelphia, PA, USA 2022.

13. Ouzzani, M.; Hammady, H.; Fedorowicz, Z.; Elmagarmid, A. Rayyan-a Web and Mobile App for Systematic Reviews. *Syst Rev* **2016**, *5* (1), 210. https://doi.org/10.1186/s13643-016-0384-4.

14.   Risk of bias tools - Current version of RoB 2 https://www.riskofbias.info/welcome/rob-2-0-tool/current-version-of-rob-2 (accessed 2023 -03 -05).

15.   Risk of bias tools - RoB 2 for crossover trials https://www.riskofbias.info/welcome/rob-2-0-tool/rob-2-for-crossover-trials (accessed 2023 -03 -05).