

Prague meeting

**Nutrition as a Missing Piece in the
Development of Youth Male Soccer Players:
A Scoping Review and Future Directions**

3rd September 2025



Subject: Erasmus+ (ERASMUS+)
Call: ERASMUS-SPORT-2024
Project: 101183703 — IN YOUTH FOOTBALL



Co-funded by the
European Union

► Introduction

- Youth soccer clubs and academies strive to develop well-rounded players, focusing on **technical**, **tactical**, **physical**, **physiological**, and **social skills** (Relvas et al., 2010; Gregson et al., 2022).
- As a result, more players are likely to progress to the senior level, which is link to both **sporting success** and **financial gains** for the clubs (Relvas et al., 2010).
- Coaches, staffs, family, medical staff – are part of **soccer academies**.
- **Meantime...**

Nutrition is undervalued in comparison to sports science and medical disciplines within soccer academies... (Carney et al., 2023)

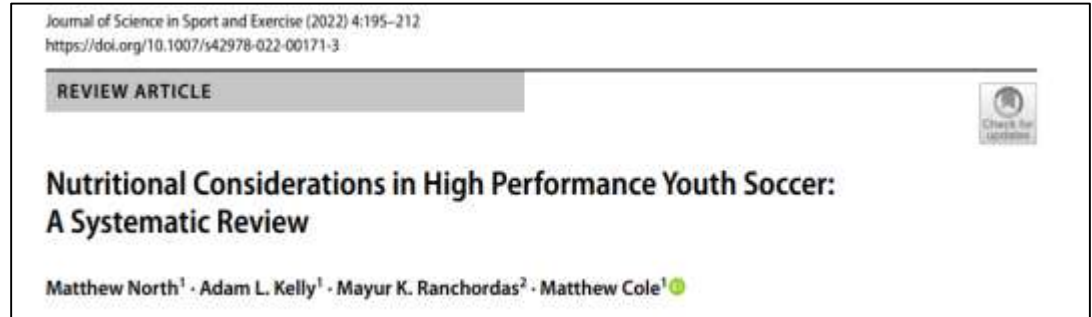


▶ Introduction



- Adequate nutritional enables youth soccer players to meet training demands **similar to those** of adult elite players (Hannon et al., 2021; Franceschi et al., 2024).
- Summarizing the nutritional evidence to support the **development of youth soccer players** is a crucial task for clubs and academies.

▶ Introduction



Limitations:

- (“football” OR “soccer”) AND (“Academy” OR “Youth” OR “adolescent” OR “young athlete”) AND (“Nutrition” OR “energy expenditure” OR “energy Intake” OR “dietary” OR “Nutritional”).
- “Online searches of MEDLINE and SPORTDiscus electronic databases were performed in November 2020” (p.196; [North et al., 2022](#)).
- Meta-analysis was not performed.

Introduction

Recognising the critical role of nutrition in soccer performance among youth, this scoping reviews aims:

- (1) describe **nutritional** and **energetic outcomes**
- (2) evaluate the **acute** and **chronic effects** of ergogenic supplements on performance
- (3) identify gaps in the literature to **provide suggestions for future research**

Methods

- Methodological frameworks:
 1. Cochrane guidelines ([Chandler et al., 2019](#))
 2. PRISMA 2020 guidelines ([Page et al., 2020](#))
 3. PRISMA extension for scoping reviews ([Tricco et al., 2018](#))

- **Eligibility criteria:**

Participants: Male youth players (under-9 to under-23) classified as Tier 3 (highly trained/national level) or Tier 4 (elite/international level) according to the participation classification framework [19].

Intervention: Studies describing dietary or nutritional practices or examining the effects of ergogenic aids on performance.

Comparator: Not applicable for observational studies; placebo or control groups in interventional designs.

Outcomes: Measures of energy and macronutrient intake, as well as energy expenditure (resting, exercise, total daily).

Study Design: Observational and interventional.

► Methods

- Studies that included multiple sports or involved recreational, university, or female players were excluded from this review ([Martinho et al., 2024](#)).
- Four electronic databases: PubMed, Scopus, SPORTDiscus, and Web of Science.

((nutrition* OR energ* OR intake OR expenditure OR diet* OR carbohydrate OR glucose OR protein OR collagen OR fat OR ketone* OR antioxidant* OR "vitamin D" OR polyphenol* OR fruit OR creatine OR caffeine OR nitrate* OR beetroot OR "beta alanine" OR "sodium bicarbonate") AND (soccer OR soccer) AND (academy OR youth OR adolescent* OR young* OR "young athlete"))

- Reference list ([North et al., 2022](#))

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Nutritional perspectives in female soccer: a scoping review

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André Rebelo ^f, Élvio R. Gouveia ^{b,g} and Hugo Sarmento ^h

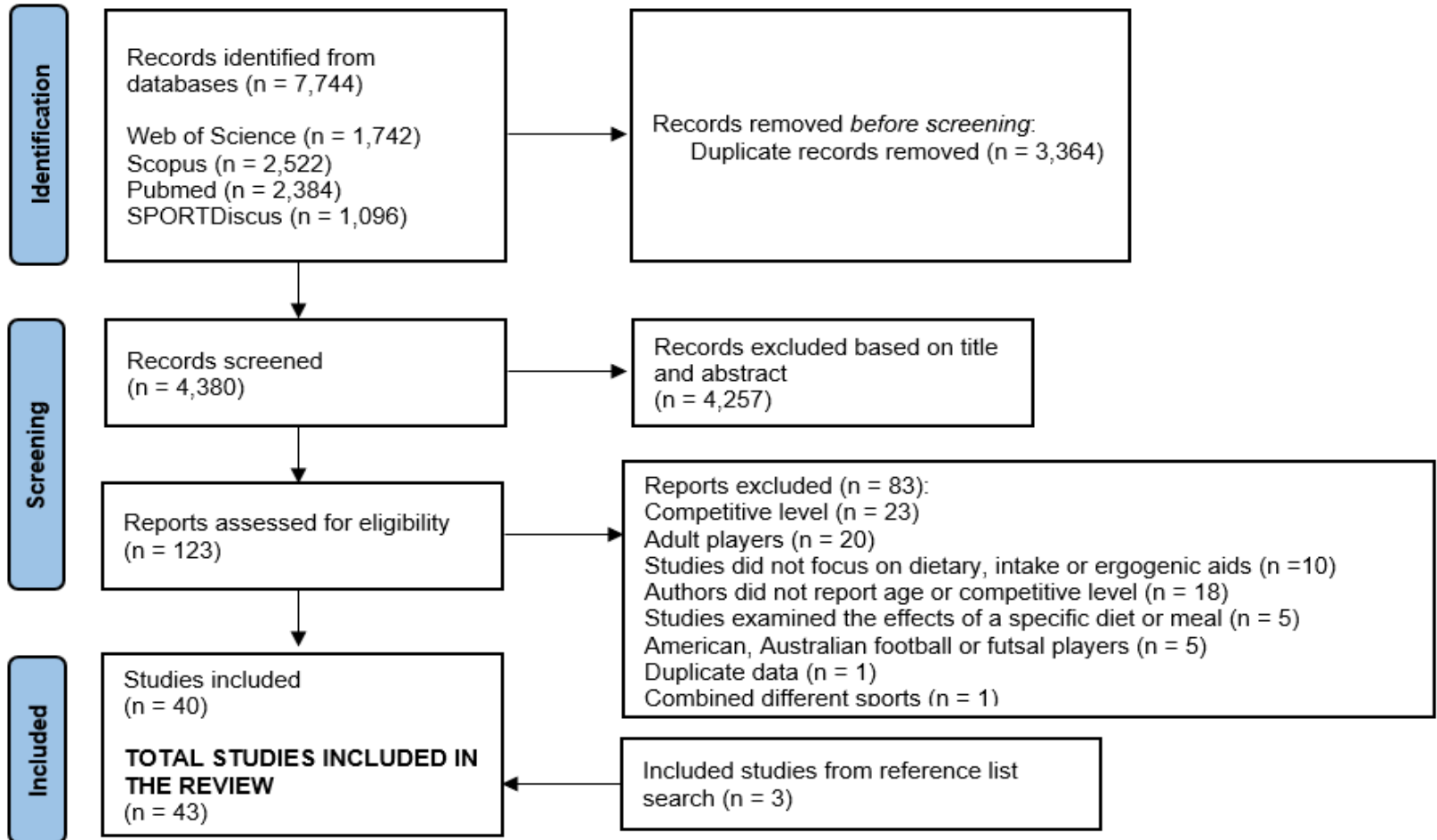
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Methods

- Studies description.
- Meta-analysis (overall energy intake, carbohydrate and protein consumption, energy expenditure, and resting energy expenditure).
- Difference between energy intake and energy expenditure was calculated using two approaches: reported of values energy intake; adjusted values of energy intake **increased by 15%** (Poslusna et al., 2009).
- The standard deviations of the within-participant differences were not reported; therefore, we utilized the previously reported correlation coefficients (Capling et al., 2017).
- The effects of **ergogenic aids on performance** were expressed as a percentage using the formula $(((\text{mean caffeine} - \text{mean placebo}) / ((\text{mean caffeine} + \text{mean placebo}) \div 2)) \times 100]$.

RESULTS

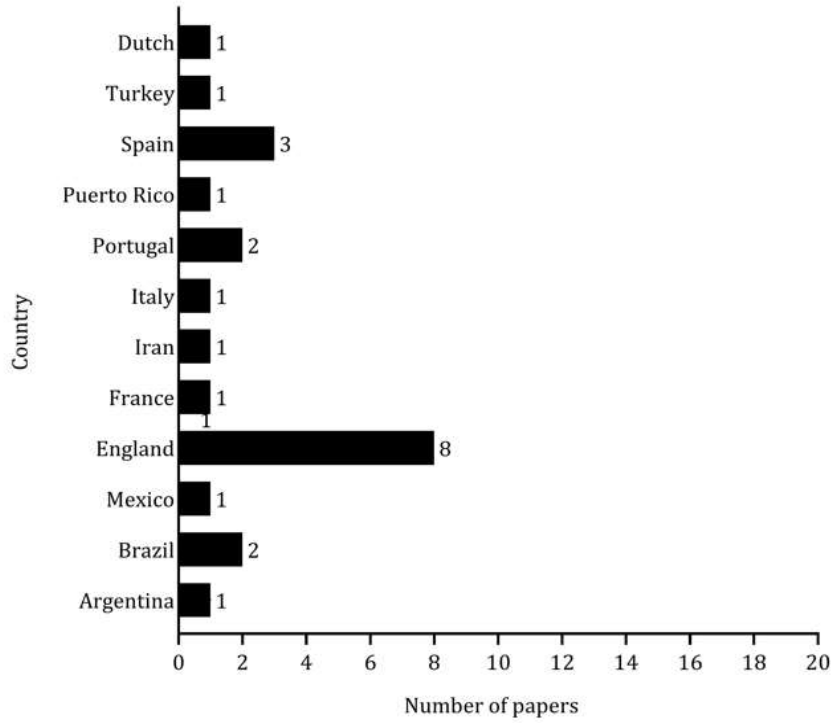
Identification of studies via databases and references list (September 17th, 2024)



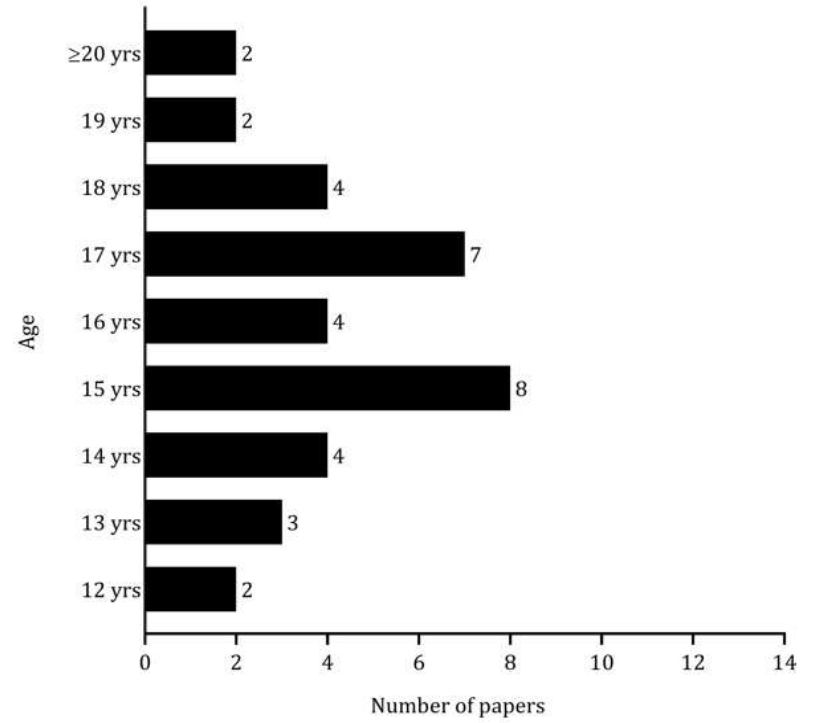


RESULTS

A.



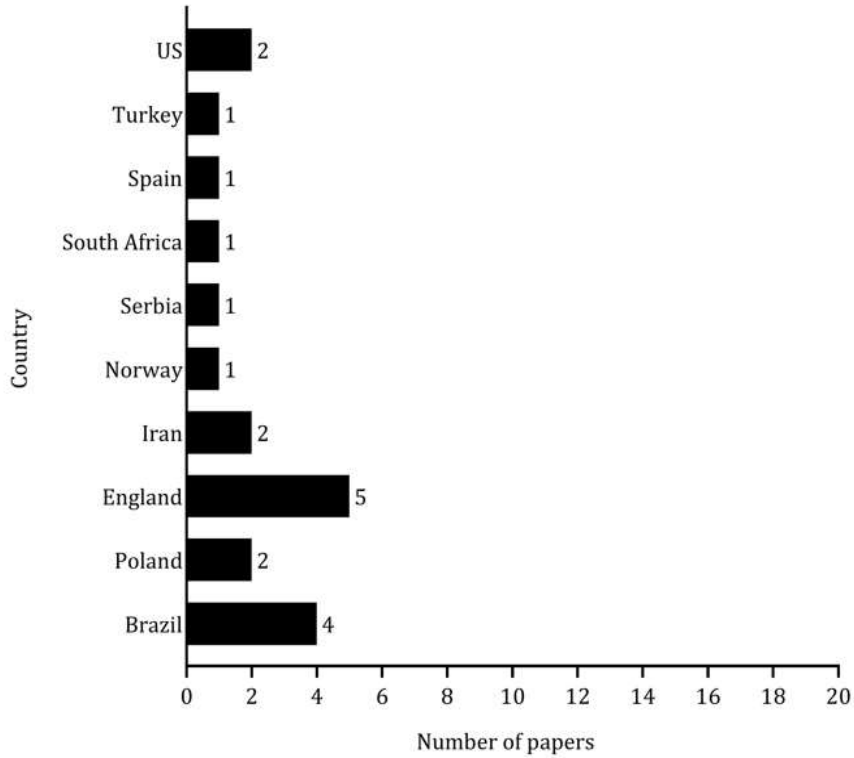
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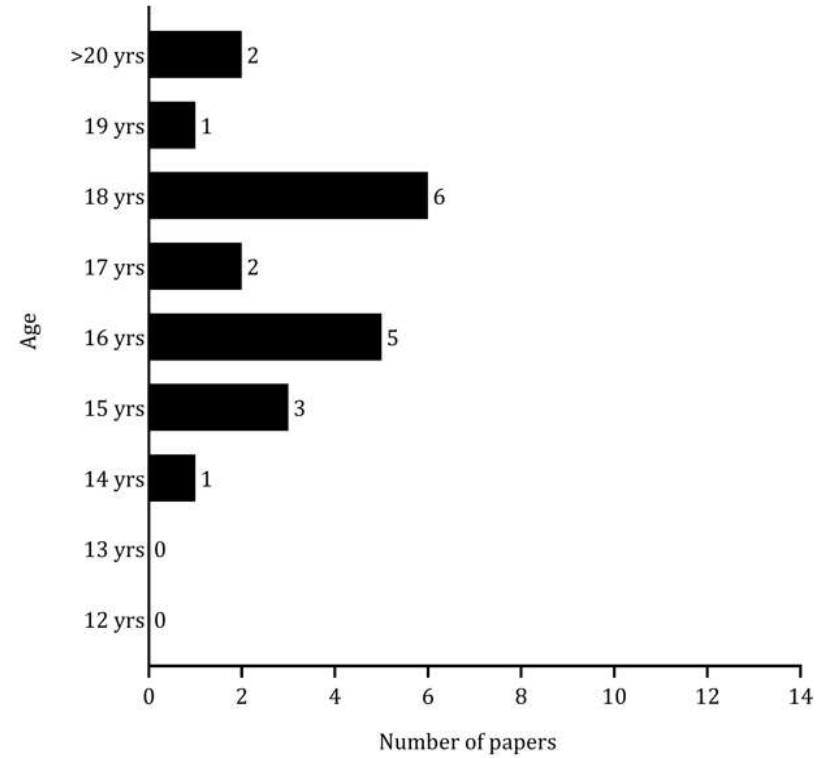


RESULTS

A.



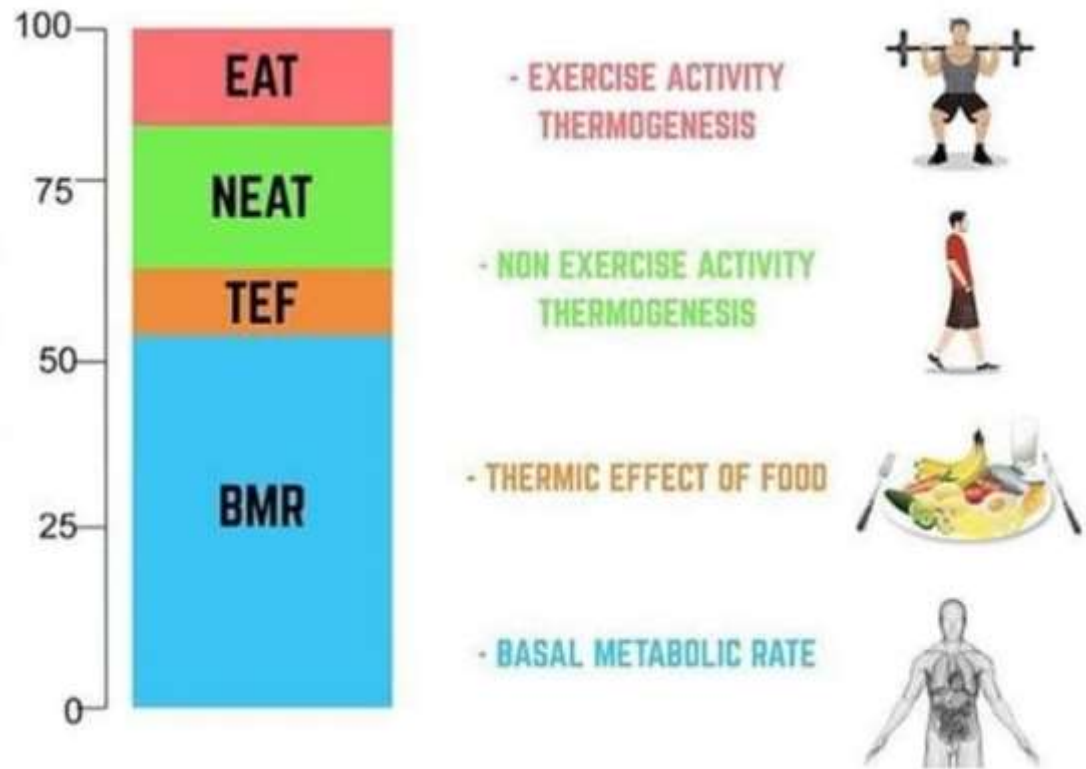
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2. ENERGY EXPENDITURE

TDEE - TOTAL DAILY ENERGY EXPENDITURE

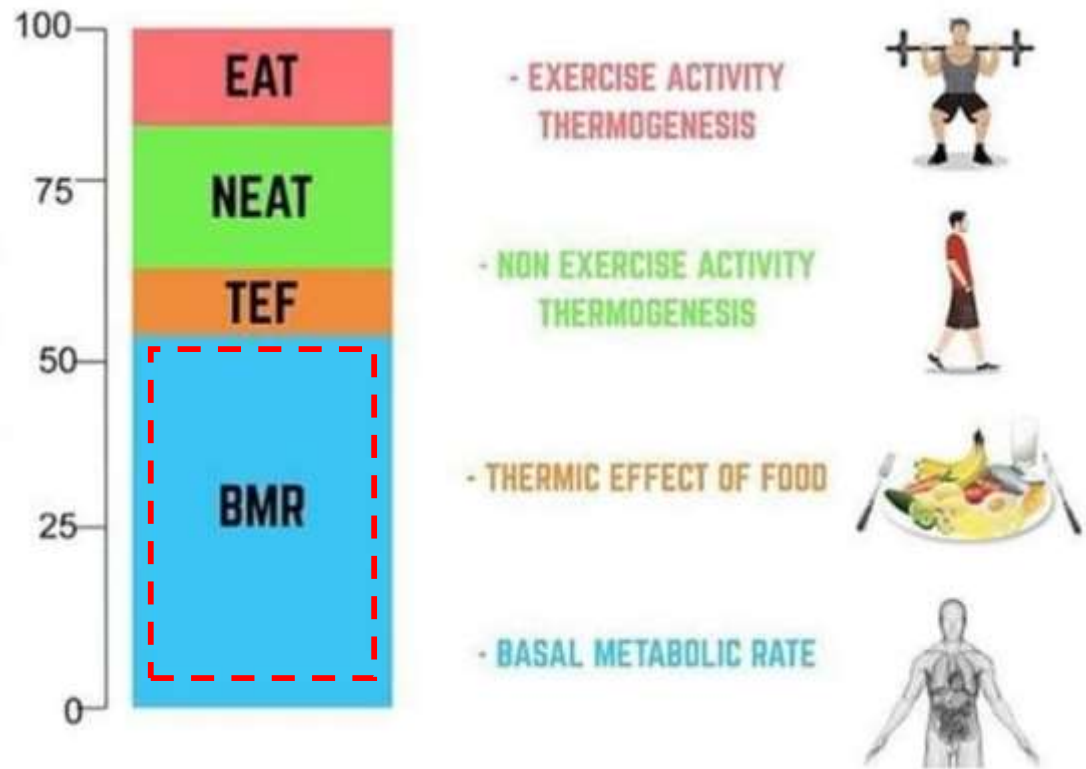
ELFITNESS



2. ENERGY EXPENDITURE

TDEE - TOTAL DAILY ENERGY EXPENDITURE

ELFITNESS



▶ RESULTS

- There are many equations, but nutritionists often rely on those that were created to **generally predict resting energy expenditure...**
- These equations are generally validated for **adult populations.**

$$RMR (kcal.day^{-1}) = 1315 + (11.1 \times FFM \text{ in kg})$$

$$RMR(kcal.day^{-1}) = 1254 + (9.5 \times \text{body mass in kg})$$

YOUTH PREMIER LEAGUE PLAYERS (Hannon et al., 2020)

Predicting resting energy expenditure among athletes: a systematic review

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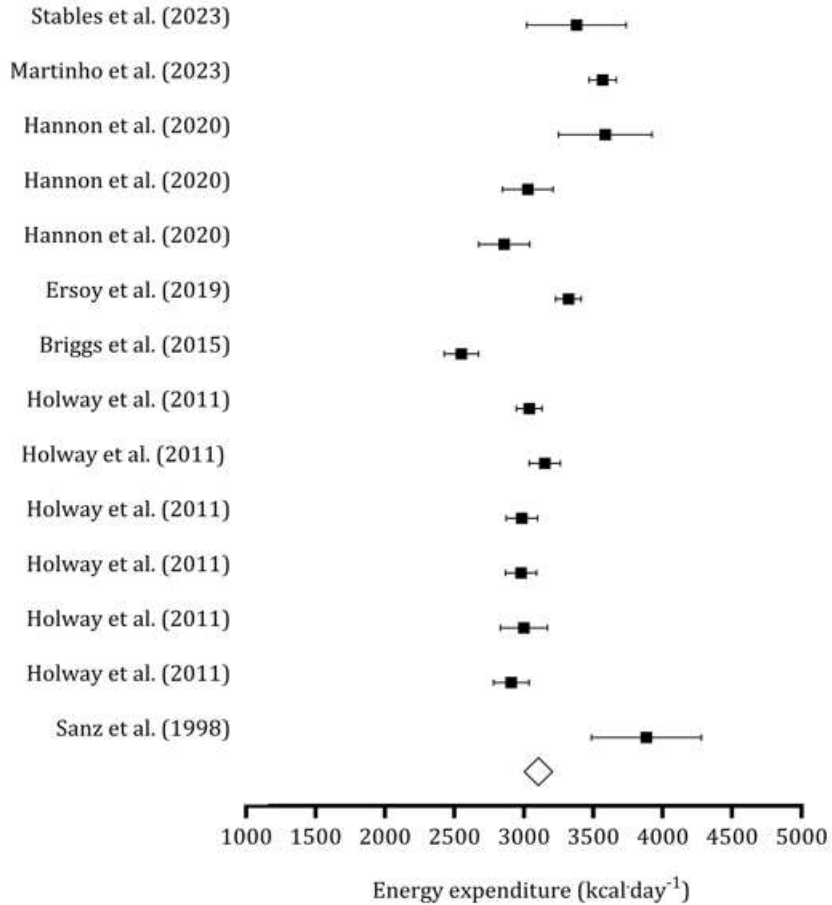
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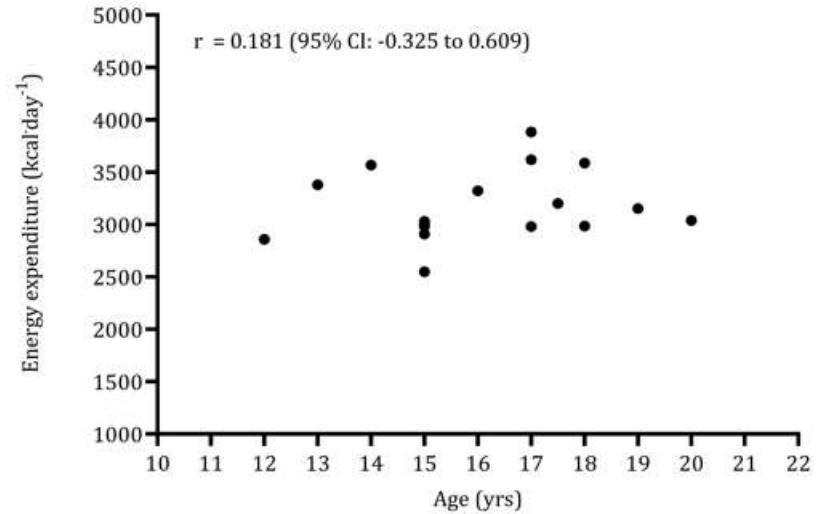


▶ RESULTS

A.



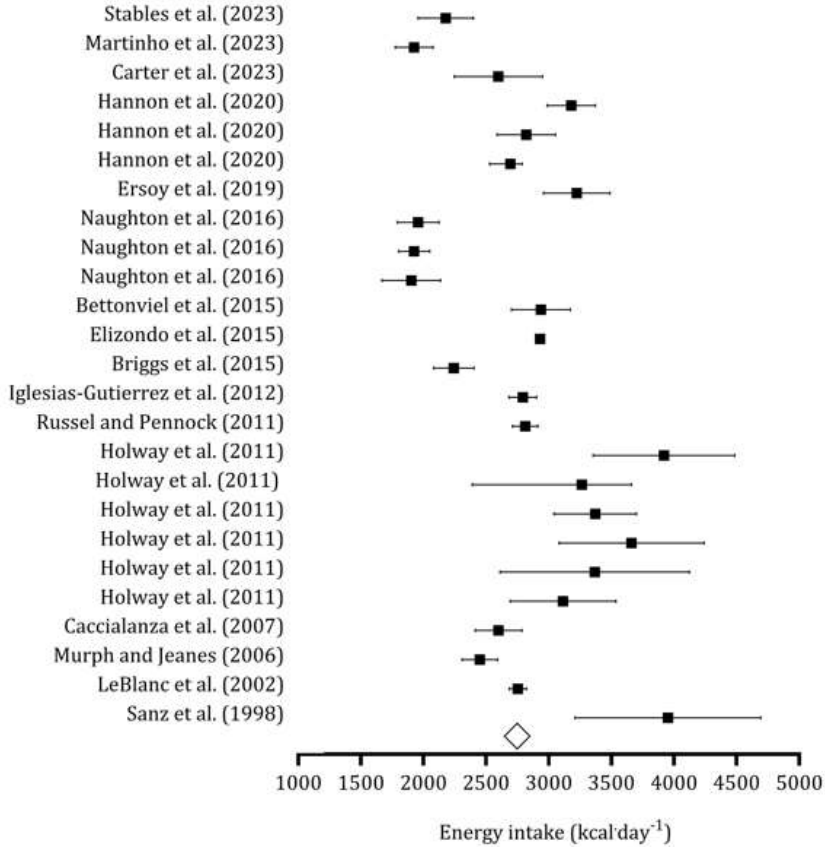
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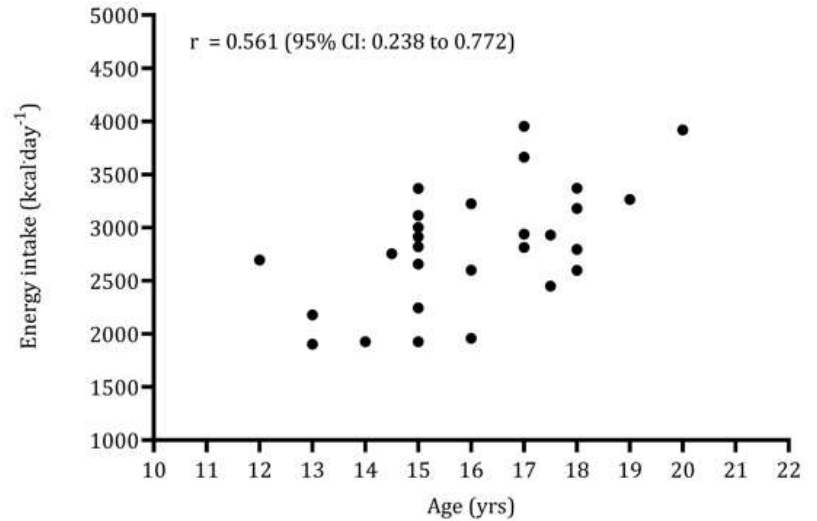
3000-3500 kcal·day⁻¹

RESULTS

A.



B.



2500-3000 kcal·day⁻¹

RESULTS

Table 4. Sensibility analysis using different correlation coefficients to interpret the difference between energy intake and energy expenditure in absolute values and adjusted by 15%.

Meta-analysis with reported values of energy intake	Correlation coefficient, study [24]	Energy balance (intake – expenditure)				Egger's regression intercept		Duval and Tweedie's trim and fill			
		Difference in means	Lower limit	Upper Limit	<i>p</i> -value	Intercept	<i>p</i> -value	Trimmed studies	Point estimate	Lower limit	Upper Limit
	<i>r</i> = 0.893 (Ebbine et al. 2002)	-230	-455	-7	0.043	-0.887	0.794	2	-358	-567	-150
	<i>r</i> = 0.02 (Fudge et al., 2006)	-253	-525	-21	0.070	-0.462	0.825	3	-422	-668	-175
Meta-analysis with adjusted values of energy intake by 15% (Posluna et al., 2009)	<i>r</i> = 0.893 (Ebbine et al. 2002)	289	162	417	0.001	1.957	0.244	2	215	87	343
	<i>r</i> = 0.02 (Fudge et al., 2006)	196	-88	481	0.177	-0481	0.82T6	2	56	-215	327

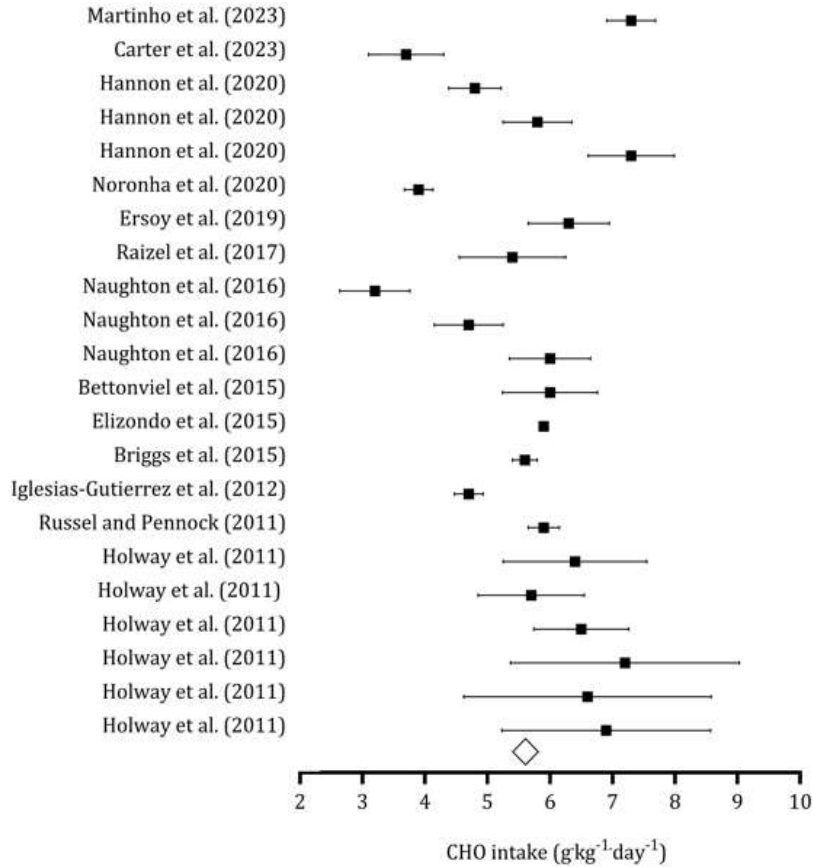
RESULTS

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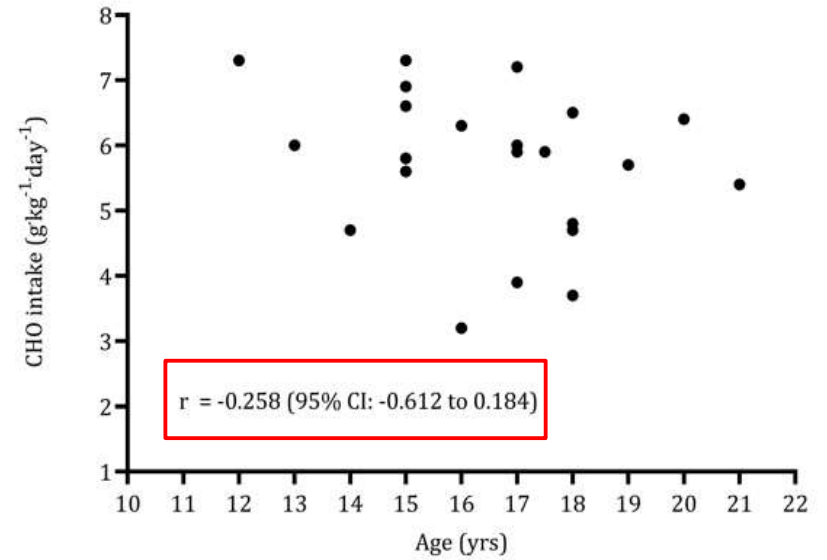
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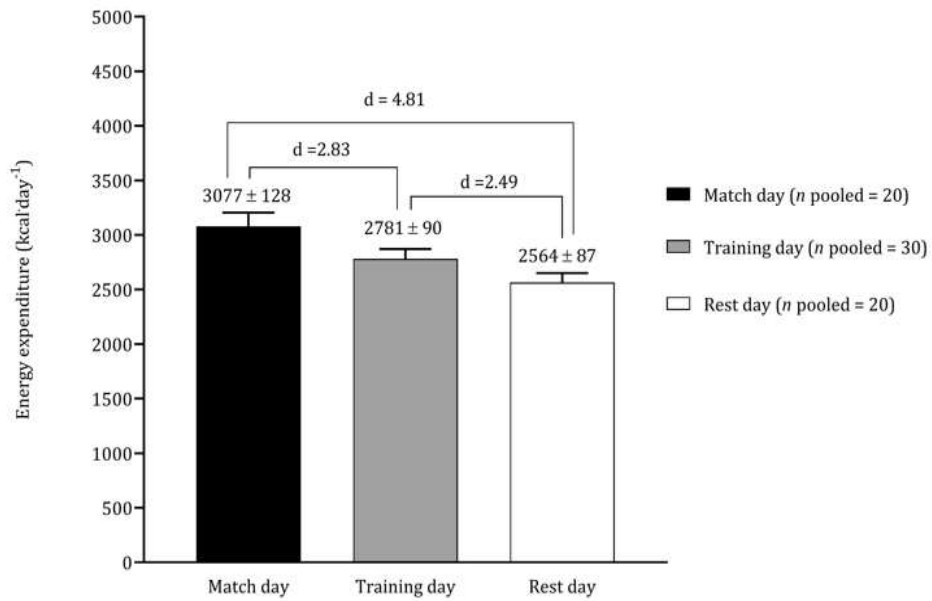


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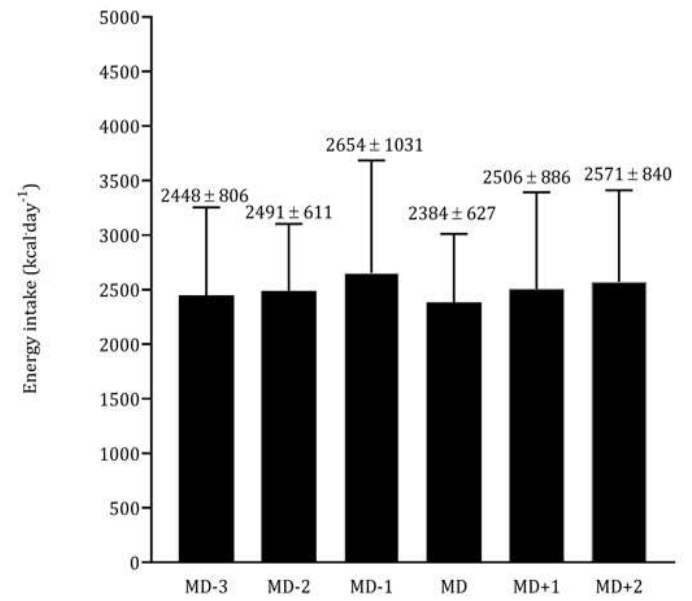


▶ RESULTS

A.

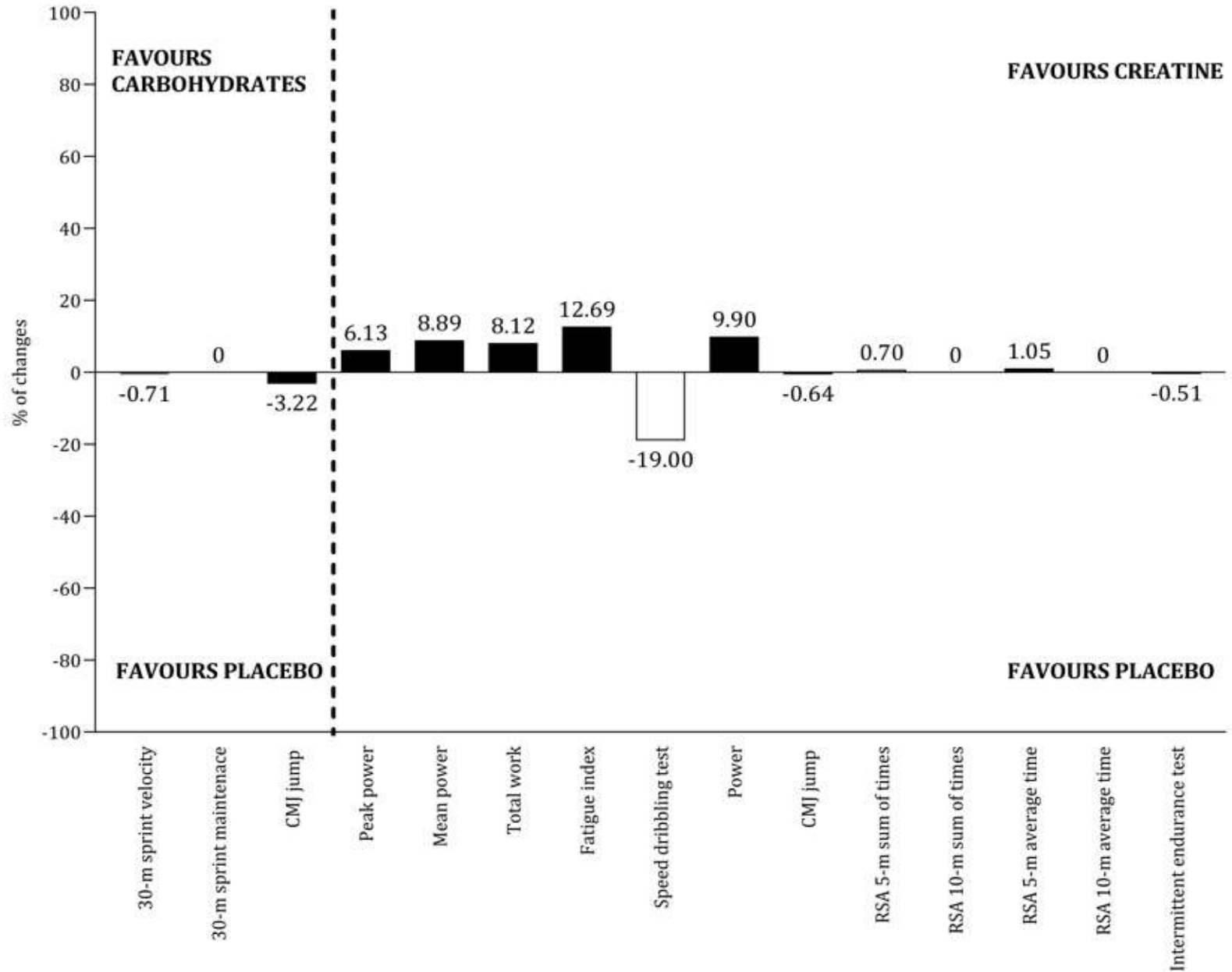


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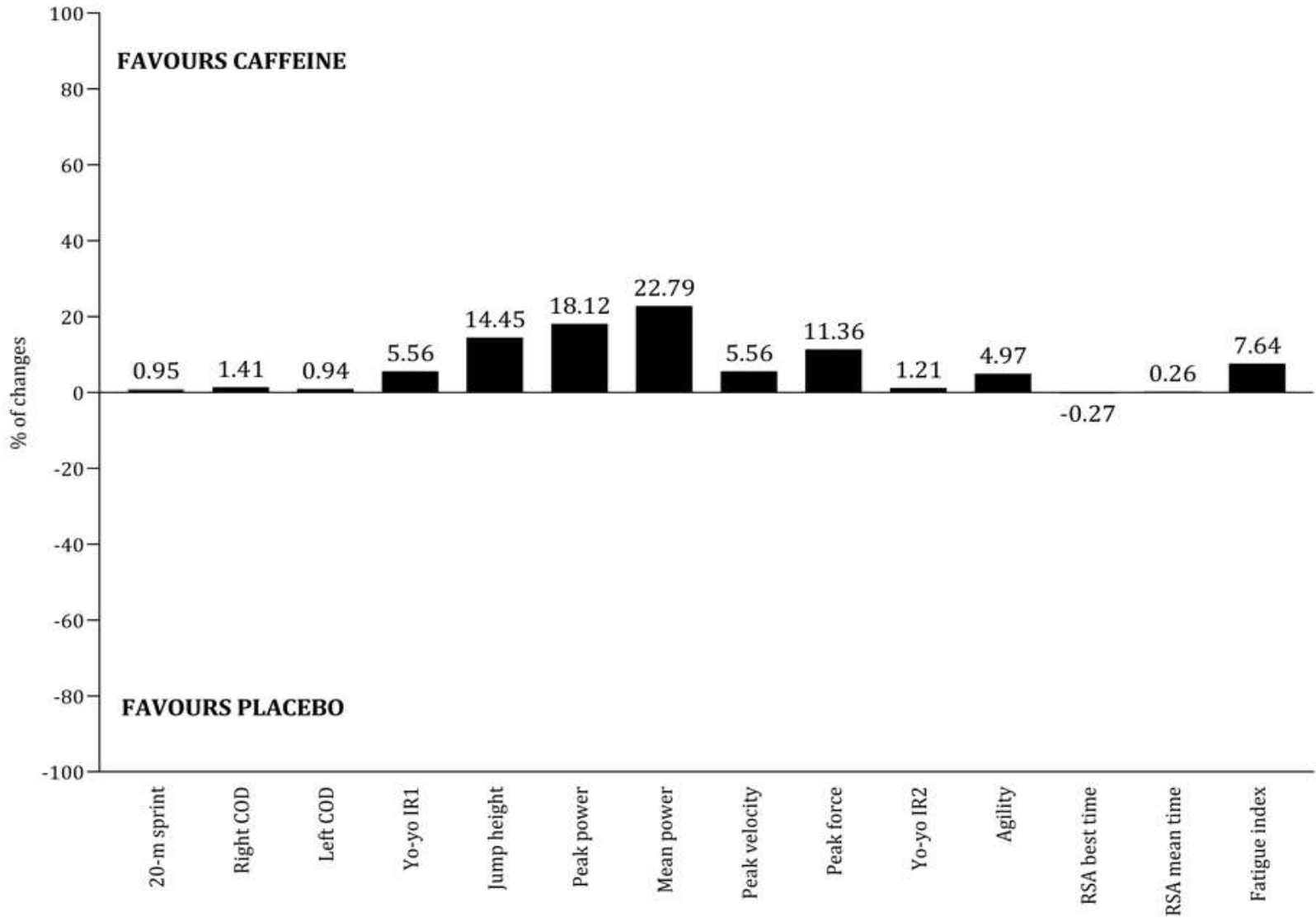


RESULTS





RESULTS



▶ MAIN CONCLUSIONS

- The issue of higher energy expenditure relative to energy intake, commonly referred to as **under-fuelling**, has been reported in youth soccer players (Naughton et al., 2016; Martinho et al., 2023; Holway et al., 2011).
- Additionally, studies that assessed daily energy intake indicated a positive association with age, even the energy expenditure remains relatively stable during this period. **Low energy availability?**

(exercise energy expenditure - daily energy intake ÷ divided by fat-free mass), defined as $30 \text{ kcal} \cdot \text{kg fat-free mass}^{-1} \cdot \text{day}^{-1}$ (Stables et al., 2023)

▶ MAIN CONCLUSIONS

“Relative intakes of carbohydrates (CHO), fat, and protein corresponding to **6–8**, **1.5–2.5**, and **2** g·kg⁻¹ ·d⁻¹ of body mass would provide a reasonable starting point to meet the daily energy requirements of academy soccer player” (Hannon et al., 2021)

- CHO below the recommendations.
- Under-reporting associated with CHO intake?
- YES! Nutritionists: different approaches to quantify the intake (Stables et al., 2023; Hannon et al., 2021; Carter et al., 2023; Stables et al., 2024)
- NO! Nutritional intervention should be **comprehensive**, involving **parents** and **managers**, as their influence on **food preferences and choices of players is significant** (Carney et al., 2024; Foo et al., 2024).

▶ MAIN CONCLUSIONS

- During intense training periods, particularly those focused on developing physical capacities in late adolescents, evidence suggests that a **caffeine** dose of at **least 3 mg·kg⁻¹** is an effective ergogenic aid.
- About creatine is challenging to **draw robust conclusions due to variability in interventions regarding dosage and timing.**
- CHO (?) Further evidence given the lack of studies and the challenges soccer players face in meeting the recommendations of 30–60 g·h⁻¹ as proposed by the Union of European Soccer Associations ([Collins et al., 2021](#); [Kasper et al., 2024](#)).

MAIN CONCLUSIONS

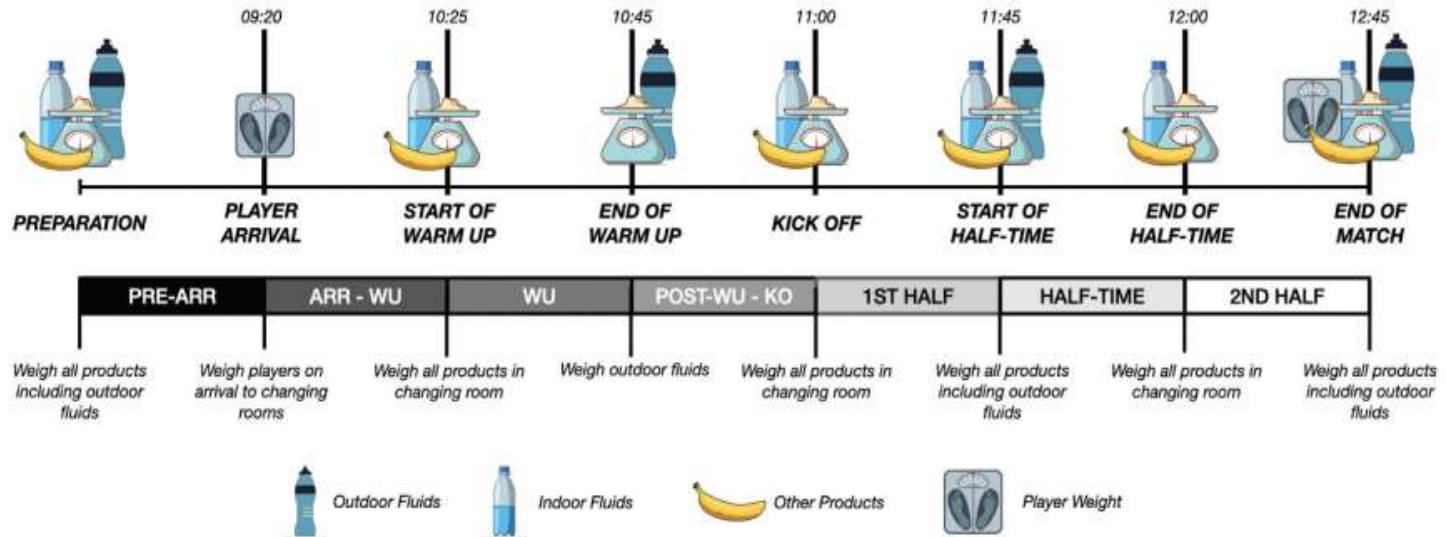


Figure 1. Overview of the observational design.

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Ingredientes: Água, açúcar, reguladores de acidez: ácido cítrico e citrato de sódio, estabilizadores: E-414 e E-445, antioxidante: ácido ascórbico, aromas, edulcorantes: E-950 e E-955 e corante: E-160a.

INFORMAÇÃO NUTRICIONAL			
Por:	100 ml	250 ml	(%*)
Energia:	96 kJ/23 kcal	240 kJ/58 kcal	(3%)
Lípidos:	0 g	0 g	(0%)
dos quais saturados:	0 g	0 g	(0%)
Hidratos de carbono:	5,2 g	13 g	(5%)
dos quais açúcares:	5,2 g	13 g	(14%)
Proteínas:	0 g	0 g	(0%)
Sal:	0,13 g	0,33 g	(5%)

* Dose de referência para um adulto médio (8.400 kJ/2.000 kcal).

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