



Sport supplement use in Brazilian cyclists: Where is the information coming from?

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Background: Prevalence of dietary supplement use by athletes has been widely investigated, with prevalence in Brazil ranging from 37% to 98% (Nabuco et al., 2016). The American College of Sports Medicine categorises supplements as sports foods, medical supplements, specific performance supplements and others (Thomas et al., 2016). However, not all supplements are supported by strong scientific evidence according to the International Olympic Committee (Maughan et al., 2018). Commonly employed sports and functional foods with solid evidence include sports/energy drinks and gels, protein supplements and sports bars while only five supplements have good to strong evidence of achieving benefits to performance when used in specific scenarios (beta-alanine, caffeine, sodium bicarbonate, nitrate and creatine). Nowadays, there is an overwhelming amount of information readily available, albeit not all from reputable scientific sources, making it difficult for individuals to make the right choices. The dietary supplement market promotes countless supplements despite growing evidence that does not support their use, such as HM- β (Valenzuela et al., 2019), glutamine (Ramezani Ahmadi et al., 2018) and BCAAs (Wolfe, 2017). It is of the utmost importance that individuals procure reliable information to guide their supplementation choices. The main aim of this study was to investigate supplementation use, and sources of supplement information in Brazilian cyclists.

Methods: One-hundred and four recreational to well-trained Brazilian cyclists (55 men, 49 women; age 38 ± 9 y; body weight 70.9 ± 13.2 kg; height 1.71 ± 0.09 m; relative $\text{VO}_{2\text{max}}$ 49.9 ± 8.0 mL·kg·min⁻¹) completed a questionnaire regarding their supplementation habits. The supplement questionnaire provided a comprehensive list of supplements and required the volunteer to indicate which ones they were currently taking; space was also provided to include unlisted supplements. Participants were also requested to indicate their source of information behind their supplement choices (Friend, Family, Athletic Friend, Medic, Nutritionist, Physical Educator, Pharmacist, Scientific Articles, Magazine, Internet, Television, Other). Completion of all questionnaires were performed under the supervision of an investigator who clarified any issues or confusion regarding questions.

Results: Of the 104 cyclists, 88 were using some type of dietary supplement (84.6%), with an average of 4 supplements per athlete (range 0 to 18). Forty-six men (83.6%) and 42 women (85.7%) reported using at least one dietary supplement. Sports foods were among the most commonly employed supplements, such as whey protein (55.8%), maltodextrin (28.8%), sports drinks (28.8%) and carbohydrate gels (22.1%) were. Multivitamins (15.4%), vitamin C (19.2%) and D (9.6%) were the most commonly employed medical supplements. Low numbers of individuals were using beta-alanine (2.9%), sodium bicarbonate (0.9%), nitrates (0.9%) and creatine (4.8%), although caffeine use was slightly higher (15.4%). Use of HM- β was similarly low (0.9%) but BCAA (50.9%) and glutamine (26.9%) supplementation was higher (Figure 1). Most of the athletes sought information about supplements from health professionals (71.1%), but the majority also reported using non-scientific sources (91.3%) (Table 1).

Table 1. Sources of information for supplement choices.

Source of information	Men	Women	Total
	Number (%)	Number (%)	Number (%)
Friend	8 (14.5)	7 (14.3)	15 (14.4)
Family	1 (1.8)	1 (2.0)	2 (1.9)
Athletic Friend	16 (29.1)	19 (38.8)	35 (33.7)
Medic	5 (9.1)	15 (30.6)	20 (19.2)
Nutritionist	24 (43.6)	30 (61.2)	54 (51.9)
Physical Educator	8 (14.5)	7 (14.3)	15 (14.4)

Pharmacist	0 (0)	0 (0)	0 (0)
Scientific Articles	5 (9.1)	4 (8.2)	9 (8.7)
Magazine	2 (3.6)	0 (0)	2 (1.9)
Internet	14 (25.2)	9 (18.4)	23 (22.1)
Television	0 (0)	0 (0)	0 (0)
Other	2 (3.6)	1 (2.0)	3 (2.9)

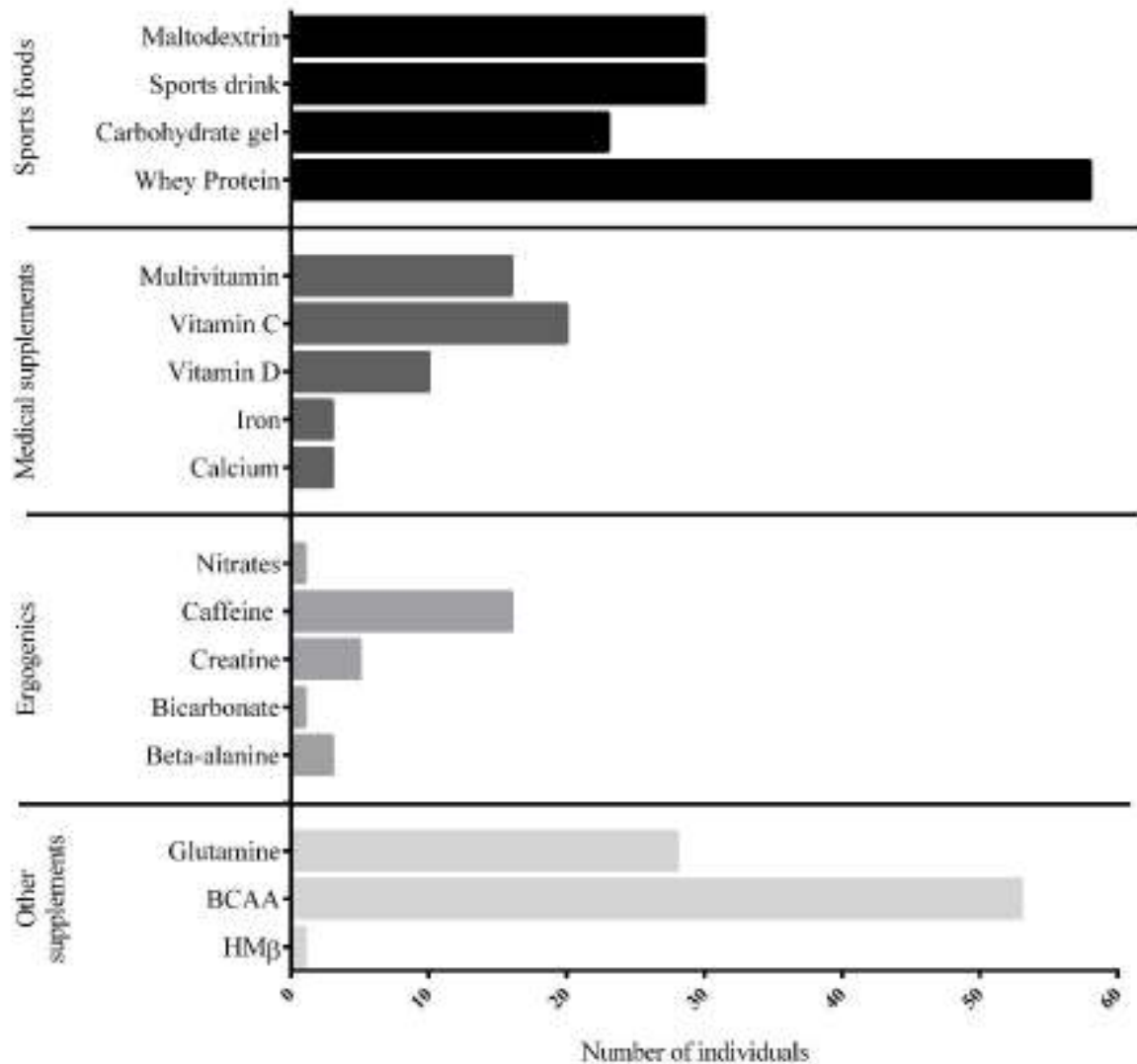


Figure 1. Number of individuals consuming different supplements

Discussion: The present study shows that there is a high prevalence of supplement use in Brazilian cyclists. Sports and functional foods with high prevalence of use by these cyclists were those containing proteins and carbohydrates. The use of carbohydrates for prolonged cycling is well-known, since maintenance of glycogen content during physical exercise is

associated with improved performance (Jeukendrup, 2014). Similarly, proteins are of great importance for muscle strength and endurance performance (Williamson et al., 2019). Therefore, the use of such supplements may well be prudent, particularly during prolonged and intense periods of cycling.

The use of vitamins and multivitamins was also high in the current population. Deficiency of micronutrients can reduce sport performance, since vitamins and minerals are co-factors to many enzymes that work in energetic metabolism (Lukaski, 2004).

Several of the supplements taken by these individuals do not have strong scientific evidence to support their use. Those supplements considered to have good to strong scientific evidence (Maughan et al., 2018) supporting their use (beta-alanine, sodium bicarbonate, creatine, nitrates and caffeine), were infrequently used, while several supplements with poor evidence (i.e., glutamine and BCAAs) were more commonly used, suggesting a failure of scientific evidence translating into practice. Indeed, our data show that information about supplements attained by this population is not based on scientific articles, although this may be expected. More than half of the sample based their decisions on information provided by a nutritionist, which is positive, although it should be determined whether supplements with poor evidence are being recommended by such health professionals or if these supplement choices were made based upon other sources. Athletic friends, medics and the internet were also frequent sources of information. Further research should determine sources of information of health professionals and their criteria for recommending supplements to their clients.

Conclusion: Our data show that the consumption of supplements by recreational to well-trained Brazilian cyclists is highly prevalent, with sports and functional foods with solid evidence, such as those containing carbohydrates and proteins, commonly employed. Low frequency of ingestion of ergogenic supplements with good scientific evidence and the high frequency of ingestion of those with little scientific support suggests there is a lack of translation from science to practice. Nutritionists were the greatest source of information regarding supplements, highlighting the importance of this occupation in Brazil.

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