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PRACTICES OF DIETARY SUPPLEMENTATION AMONG FOOTBALL PLAYERS

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Summary

Dietary supplements are foodstuffs, medicinal herbs, plant or animal extracts and concentrates containing active compounds the purpose of which is to supplement the normal diet with the aim of gaining power and endurance as well as muscular weight. The active compounds in dietary supplements are nutrients (vitamins and minerals, fatty acids, proteins) or other substances with a physiological effect (enzymes, microorganisms, hormones). The most often used dietary supplements among athletes are fatty acids, whey proteins, fat burners, creatine and isotonic drinks. Football players use dietary supplements as ergogenic aids to meet elevated dietary needs and hasten recovery. The aim of this study was to assess dietary supplementation practices among football players. A cross-sectional study encompassed 20 active football players from Sarajevo. Data were collected using a short questionnaire which included the general characteristics of the study participant (age, height, weight, residence), information on the frequency of dietary supplement use, type of supplement and dosage, as well as the reasons for supplementation and source of recommendation to use it. Study participants most often reported taking omega-3-fatty acids, magnesium, whey proteins and branched amino acids. Performance was the most frequently stated reason for supplementation. Supplementation was supervised and recommended by a nutritionist or self-initiated and practiced in dosages as recommended. In conclusion, dietary supplements can be ergogenics and enhance performance on one the hand and help in recovery on the other. Still, their usage should always be recommended and supervised by a specialist.

Keywords: dietary supplements, football players, recommendations

Introduction

Supplementation for athletes has become commonplace. Demanding training processes and the desire for high scores are the most common reasons for taking nutritional supplements for athletes (Burke, 2007). Food supplements are concentrated active ingredients that are taken to enrich the diet, improve strength and increase muscle mass. The active ingredients may be vitamins, minerals, fatty acids, protein concentrates, enzymes, plant extracts, cultures of microorganisms, etc. The sport supplements commonly used are dietary supplements based on proteins (branched chain amino acids, whey proteins), fat-burning products, and various vitamin and mineral complexes. By taking dietary supplements, athletes strive to achieve better endurance and faster muscle recovery after training (Jager et al., 2017).

Athletes in Bosnia and Herzegovina mostly rely on dietary advice that they get from their coaches. Not many clubs employ nutritionists. This research collected data on the frequency of consuming dietary supplements among football players in the Sarajevo area. The aim of the research was to collect data on the types of dietary supplement the subjects consume and on whose recommendation they decided to use them.

Subjects

A cross-sectional study, using a specially designed questionnaire, collected data about the consumption of dietary supplements by 20 active athletes training football (Table 1).

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Table 1. Subjects

Average age	Average height	Average weight	Average BMI
26.4	181.7	77.55	23.49

Methods

The survey questionnaire is divided into two parts. The first part contains general information about respondents (age, height, weight, place of residence). In the second part of the questionnaire, data were collected on the frequency and types of dietary supplements taken, and the reasons and recommendations based on which the preparations were consumed.

Results and discussion

Of the 20 respondents/football players surveyed, the majority takes supplements regularly and occasionally (80%), while only 20% of respondents do not take dietary supplements (Table 2).

Table 2. Frequency of taking dietary supplements

Frequency of taking dietary supplements				**At whose recommendation:**	
	Periodically	Regularly	I do not take anything	Self-initiated	Nutritionist's
N	8	8	4	4	12
%	40	40	20	25	75

When it comes to the type of dietary supplements consumed, protein and amino acid preparations are taken by the largest number of subjects (Table 3).

Table 3. Type of dietary supplements that the respondents consume

	Protein or amino acids	**Minerals (Ca, Mg and complexes)**	**Omega- 3**	**L-carnation**	**vitamin D**
N	19	12	5	1	2
%	95	60	25	5	10

The above fact probably stems from the belief that taking pre-training protein can help improve performance and ease recovery of muscles after exercise. However, the scientific community has different opinions when it comes to this. According to the International Society for Sport Nutrition, on the basis of the above evidence, protein consumption before and after exercise can stimulate muscle synthesis (Jager et al., 2017). Taking protein from artificial sources, however, can produce consequences such as iron, zinc, niacin and thiamine deficiency. Very often, isolated amino acids such as arginine and lysine may result in less absorption of other amino acids (Mahan and Raymond, 2017).

That is why it is important to pay attention to the composition, origin and dose of dietary supplements taken. The general recommendation is 1.4 to 2.0 g protein / kg body weight per day to obtain muscle mass. To reduce body weight and lose fat then the intake should be more than 3 g protein / kg body weight per day (Jager et al., 2017). Caution should be exercised with such an intake, however, as it could put a strain on the kidneys (Mahan and Raymond, 2017). That is why intake recommendations must take into account all factors, in particular the extent of the efforts which the athlete is exposed to, body weight and the target to be achieved.

The highest number of respondents (68.75%) adhered to the doses indicated on the product declaration (Table 4).

Table 4. The dose of dietary supplements

Which daily dose are you taking:			
	According to the declaration	According to the doctor's recommendation	Higher doses than recommended
N	11	4	1
%	68.75	25	6.25

Instructions on the use of supplements list gen-

eral information and are not a good source of information for a person who is professionally engaged in sports (Table 5). To ensure proper implementation and maximum effects, an individual approach is required. A disturbing factor is the deliberate intake of larger doses in order to achieve better results. Generally, doses above 40 g per day can be taken by older athletes, while doses above 70 g per day are associated with weakening of the muscles (Jager et al., 2017; Kim et al., 2016). It is also important how protein supplements are consumed. Studies dealing with the number and distribution of the meals showed that the best effect was achieved by eating 4-5 meals a day with 20-40 g protein, with or without training (Kinsey et al, 2016).

Table 5. Nutritional supplements based on proteins and amino acids that are used by respondents

	Name	Composition	Instructions on consuming
1	ISO GO	Glucose, maltodextrin, potassium chloride, sodium chloride, magnesium salts, citric acid, L-glutamine, BCAA, calcium, vitamin premixes: L-ascorbic acid, nicotinic acid, D-alpha tocopherol, d-calcium pantothenate, riboflavin, hydrochloride, thiamine mononitrate, folic acid, D-biotin, cyanocobalamin, aroma, acetyl L-carnitine, sucralose sweetener.	Do not exceed 3 servings a day.
2	Muscle On	Five fractions of high quality proteins: whey protein, mycelia casein, milk protein isolate.	For maximum performance, it is recommended to take a 30 g dose 30-60 minutes after training or an additional meal. When increasing muscle mass, to maintain a positive nitric balance, it is recommended to take it as a dietary supplement during the evening and during the day.
3	PreRace powder	It contains L-taurine, citrulline malignant 2: 1, neuro stimulative mixture: dimethyl amino ethanol, caffeine anhidrus, theobromine (cocoa (Theobroma cacao)), catechin extract from green tea (Camellia sinensis), quercetin and malic acid (citrulline malate).	Mix 1 vial (4.9 g) in EFS or a favourite electrolyte drink. Take 30-45 minutes before exercising. Start by using half a dose of the preparation and then evaluate your endurance.
4	Ultragen	A unique formula that holds whey protein isolates, whey protein hydrolysates, glutamine, branched chain amino acids, vitamins (A, B and D) and minerals (calcium, magnesium, zinc, sodium and potassium).	Mix 1 container in 1.8 dl of water and drink after completion of physical activity, or as recommended by a professional.
5	Whey protein	Hydrolyzed Whey Protein Isolate (from Milk, Emulsifier: Soy lecithin), Hydrolyzed Whey Protein Concentrate (from Milk, Emulsifier: Soy lecithin), Taste, Cocoa Powder (20-22%), Sweetener (Sukralose, Acesulfame K), Sodium Chloride, Xanthan Gum), Microgranulized β-galactosidase (Tolerase ™ L Lactase Enzyme), 28 g protein per portion.	Mix 1 serving (1 measuring = 35 g) in 350 ml of water. If possible, use a shaker with a mesh and then shake well. The best time to use is after training.
6	BCAA	5000 mg of branched-chain amino acid (BCAA) in dose	Mix one dose with 300 - 500 ml of water and drink it during training. You can also use 1-3 doses daily, before meals or after training or before bedtime. The product is best dissolved if the mixture is left to stand for a while.

The quality of the protein supplements taken is also very important. Protein quality is defined as protein efficacy to stimulate muscle protein synthesis and muscular hypertrophy (Lemon, 2000). Animal protein has a higher percentage of essential amino acids that helps improve muscle hypertrophy and protein synthesis in relation to plant protein sources (Campbell et al., 1999; Tang et al., 2009,). For essential amino acids to induce muscle protein synthesis, doses of 6 to 15 g are required. Up to 3 g per serving should be leucine, which is essential for protein synthesis in the body (Jager et al., 2017).

Leucine can also facilitate recovery after exercise. For this reason, athletes are advised for each meal to eat high-protein foods that are rich in leucine (Wilson et al., 2011). Essential branched-chain amino acids (BCAA), isoleucine, leucine and valine, play an important role in protein metabolism, neural function, and regulation of glucose and insulin levels (Norton and Layman, 2006, Blomstrand, 2006). That is why they are emphasized as vital ingredients in dietary supplements for athletes. Indeed, a dietary supplement is very often purchased because it contains BCAAs, as indicated by the types of supplements used by the study subjects (Table 3). BCAAs are recommended in the recovery phase of the organism after the training process in the amount of 3-5 g (Mahan and Raymond, 2017). Interestingly, even though a product declaration recommends taking one 5 g dose of BCAA, the respondents consume up to three doses per day. In this way it is suggested to consume more BCAAs than recommended in the literature.

The origin of protein and amino acids in dietary supplements differs. They are most often derived from milk and whey. Each protein has its advantages and disadvantages. The protein value is estimated based on the content of individual amino acids, fat and micronutrients. An important criterion is the leucine content as well as the rate of digestion (Jager et al., 2017). Whey proteins are digested faster than other proteins and have a higher amount of leucine. However, some research suggests that a protein blend could have more beneficial effects on the training process. The key ingredients in such mixtures are the leucine content, the content of essential amino acids, and the level of bioactive peptides and antioxidants (Jager et al., 2017).

In addition to protein-based dietary supplements, the subjects used L-carnitine. L-carnitine is an amino acid derivative synthesized from lysine and methionine in the human body. The food is contained in foodstuffs of animal origin. Metabolism plays a key role in energy production, helping to transfer fatty acids into mitochondria. It is very common in dietary supplements whose purpose is to better "burn" fat (Rebouche, 1992). Although there are numerous studies to confirm the positive effect of carnitine in dietary supplements for athletes, more comprehensive research is still required to demonstrate efficacy and the ergogenic role in supplementation (Luckose et al., 2015).

Omega-3 fatty acids, which are active against inflammation, help muscle recovery after intense exercise. It is therefore recommended that omega-3 fatty acids be supplemented, especially after injury (Mahan and Raymond, 2017). The 2014 study reveals a higher risk of injury for athletes who had deficiencies of iron, vitamin D and calcium (McClung et al., 2014). Vitamin D is associated with better muscle strength, endurance, stronger bones, smaller inflammations, increased testosterone secretion and faster recovery after training (Dahlquist et al., 2015; Farrokhyar et al., 2015; Maroon et al., 2015). Therefore, the proper supplementation of vitamins and minerals is essential.

In the study, 70% of respondents (Table 3) use vitamin and mineral nutrition supplements. This is a commendable fact, especially considering that the nutritional supplements are taken in recommended doses and under professional supervision. It is also positive that the majority of respondents (12 or 75%) take nutritional supplements at a nutritionist's recommendation, while only 4 respondents (25%) decided to self-initiate supplementation (Table 2).

Conclusion

Nutritional supplements can contribute to greater strength and endurance of athletes, and help faster recovery after demanding sports preparation and competition. The choice of dietary supplements should be carried out under the super-

vision of an expert and should not be taken according to an athlete's own discretion. When consuming nutritional supplements, the recommended doses should not be exceeded.

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KORIŠTENJE DODATAKA PREHRANI MEĐU NOGOMETAŠIMA

Izvorni znanstveni rad

Sažetak

Dodaci prehrani su hrana, biljke ili ekstrakti podrijetlom iz biljaka ili životinja koji sadrže aktivne sastojke za nadopunu prehrane a sa ciljem povećavanja snage, izdržljivosti ili mišićne mase. Aktivne komponente u njima su hranjive tvari (vitamini, minerali, masne kiseline, bjelančevine) ili ostale komponente koje mogu imati fiziološko djelovanje (enzimi, mikroorganizmi, hormoni). Najčešće korišteni dodatci među sportašima su masne kiseline, proteini sirutke, sredstva za izgaranje masti, kreatin i izotonični napitci. Nogometaši koriste dodatke prehrani sa ciljem zadovoljenje povećanih energetskih potreba, kao ergogena sredstva ili za ubrzavanje oporavka. Cilj ovog rada je procijeniti naviku korištenja dodataka prehrani među nogometašima. Presječna studija je obuhvatila 20 aktivnih nogometaša iz Sarajeva. Podaci su prikupljeni korištenjem kratkog upitnika koji je uključivao opće značajke ispitanika (dob, visina, težina, mjesto stanovanja), podatak o učestalosti korištenja dodataka, vrstu dodataka i korištenu količinu, razloge za korištenje kao i podatak o tome tko im je preporučio korištenje dodataka prehrani. Rezultati su pokazali da ispitanici najčešće koriste omega-3 masne kiseline, magnezij, proteine sirutke i razgranate aminokiseline. Najčešći razlog uzimanja je bila želja za boljom sportskom izvedbom. Preporuka i nadzor nad korištenjem provodili su nutricionisti ali i sportaši su se samostalno odlučivali za korištenje preporučenih količina. Može se zaključiti da dodaci prehrani mogu biti ergogena sredstva i poboljšati sportsku izvedbu s jedne strane dok s druge strane pomažu oporavku, ali korištenje mora biti pod nadzorom stručnjaka.

Ključne riječi: dodaci prehrani, nogometaši, preporuke