



Healthy Nutritional Supplements for Athletes: Enhancing Performance and Recovery

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SUMMARY. The study aims to identify the most important nutritional supplements in the field of sports and sports competitions, and with the great development in the performance of nutritional supplements, studying and knowing their components has become an important element to avoid the risks and side effects of taking them and to adopt them as the fastest way to reach them without disrupting the athlete's career, as well as treating some of the negative effects of practicing sports activities, which may cause many diseases that reduce the physical efficiency of athletes.

RESUMEN. El estudio tiene como objetivo identificar los complementos nutricionales más importantes en el ámbito del deporte y la competición deportiva, y con el gran desarrollo en el rendimiento de los complementos nutricionales, estudiar y conocer sus componentes se ha convertido en un elemento importante para evitar los riesgos y efectos secundarios. de tomarlos y adoptarlos como la forma más rápida de alcanzarlos sin perturbar la carrera del deportista, además de tratar algunos de los efectos negativos de la práctica de actividades deportivas, que pueden provocar numerosas enfermedades que reducen la eficiencia física de los deportistas.

INTRODUCTION

Athletes most lack proper nutritional habits and knowledge of healthy nutritional behaviors, as many studies conducted on college students in America, Britain, and Nigeria showed a decline in knowledge related to nutritional and health habits and behaviors and nutritional materials and supplements in providing the necessary energy. Proper nutrition and healthy eating habits play the essential role in improving the health of individuals, especially athletes, and increasing their abilities to perform at the best levels in sports Burke and Hawley (2018). Indicated that eating food inappropriately leads to health and physical problems and various diseases. Therefore, it is necessary to eat a balanced and integrated diet that includes all food elements according to the body's needs. Food has a special place for athletes in light of what has been proven by multiple scientific results in terms of correlation. The close relationship between nutrition, general health, fitness components, physical efficiency, and motor performance of motor skills, which led athletes to be interested in the extent to which the followed system affects the efficiency of their athletic

performance (Abdullah, 2009). As stated, that the primary goal of the individual athlete's nutrition is to provide the body with basic nutrients, and that the proper organization of nutrition in different training conditions in terms of training intensity and volume of training, as well as in matches, gives activity and vitality to the athlete's body. There are also many ways and means of nutritional culture because of its important role in determining the extent to which an individual benefits from the nutrition process and choosing the type and quantity of food according to the daily needs of the body, as there is a relationship between food and obesity, as obesity is due to incorrect food customs, traditions and culture (Abdullah, 2009), also confirmed that nutrition for athletes plays an important role in achieving athletic achievement and excellence by forming the body structure and supporting the energy production systems necessary to continue physical effort for a long time, as well as recovery processes, eliminating fatigue waste, and restoring energy components (Mazahra, 2009). The World Health Organization stated that proper nutrition is essential for human growth, the continuation

KEY WORDS: nutritional supplements, athletes, energy, healthy nutrition.

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of life, and even the maintenance of health. Food is the fuel that moves us, and the foodstuffs that each individual eats must be complete, diverse, and in appropriate quantities so that the person is not exposed to many health problems, and the habits that followed by healthy eating habits to ensure a healthy life free of diseases Burke et al., (2019). In the world of sports and athletics, achieving the highest level of performance is the ultimate goal. Athletes push their bodies to the limits, constantly striving to improve strength, endurance and agility. While proper training, rest, and nutrition play critical roles in their success, athletes often look for additional ways to improve their performance. One such approach is nutritional supplementation, which involves the strategic use of nutritional supplements to enhance athletic performance, support recovery, and promote overall well-being. In this discussion, we will explore the concept of nutritional supplements for athletes, examining the types of supplements commonly used, their potential benefits, and considerations for safe and effective supplements American College of Sports Medicine (2016), Moss et al., (2023). Nutritional supplements play a critical role in supporting the nutritional needs of athletes and improving their performance. Athletes undergo intense, physically demanding, and energy-intensive training sessions, making their nutritional requirements unique and often higher than those of the average person. While a balanced diet should be the foundation of any athlete's nutrition plan, some circumstances may require the use of nutritional supplements to fill nutritional gaps or enhance certain aspects of performance Lachance and McKenzie (2011). Dietary supplements include a wide range of products, including vitamins, minerals, protein powders, amino acids, herbal extracts and other substances. These nutritional supplements are designed to supplement an athlete's diet by providing concentrated forms of nutrients that may be difficult to obtain through food sources alone. However, it is important to note that nutritional supplements should never replace a healthy and varied diet, but rather serve as a supporting measure Mohd Daud et al., (2023). By incorporating targeted supplements into their nutritional plans, athletes aim to improve their energy levels, enhance recovery, support muscle growth, and improve overall performance. However, it is essential to handle supplements with caution, and ensure that the products are safe, legal, and backed by scientific evidence. With proper guidance and understanding, athletes can utilize the benefits of nutritional supplements to complement their training efforts and achieve their athletic goals Ranchordas et al., (2020).

Types of nutritional supplements: Nutritional supplements for athletes include a wide range of products, including vitamins, minerals, protein powders, amino acids, herbal extracts, and various energy-generating aids. Vitamins and minerals are essential for overall health and play important roles in energy metabolism, immune function, and muscle function. Protein powders, such as whey, casein, and soy protein, are popular among athletes to support muscle recovery and growth. Amino acids, the building blocks of proteins, are sometimes taken as supplements to enhance muscle protein synthesis and reduce muscle damage. Certain herbal extracts, such as ginseng and *Rhodiola rosea*, are thought to boost energy and improve stamina. Ergogenic aids, which can include substances such as creatine, caffeine and beta-alanine, are used to enhance performance, increase energy levels, delay fatigue and improve focus. Kerksick et al., (2008), Kerksick et al., (2018), Nastaj et al., (2023)

Protein Supplements: Protein is an essential macronutrient for muscle growth, repair and recovery. Athletes, especially those participating in strength or endurance training, may need a higher protein intake to support their increased physical requirements. Protein supplements, such as whey protein, casein protein, or plant-based options such as soy or pea protein, can provide a convenient, concentrated source of protein to meet these needs. They can be consumed in the form of shakes, bars or powders, either before or after exercise. Tipton et al., (2007).

Creatine: Creatine is a natural compound found in the body, primarily in muscle cells. It plays a crucial role in energy production during high-intensity, short-duration activities. Creatine supplements have been shown to increase muscle strength, power production, and overall exercise performance, especially in activities that involve repeated bursts of intense effort, such as sprinting or weight lifting. However, it may not be effective for endurance-based activities. Brosnan and Brosnan (2007).

Omega-3 fatty acids: Especially eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), are essential fats that provide many health benefits. They have anti-inflammatory properties if they do not eat fatty fish such as salmon or mackerel regularly. Algae-based fish oil and omega-3 supplements are commonly used and can support cardiovascular health, joint function, and brain health. For athletes, omega-3 supplements derived from fish oil or algae can help manage exercise-induced inflammation, reduce muscle soreness, and possibly promote recovery. Covington. (2004).

Vitamin and Mineral Supplements: While a balanced diet should provide most of the necessary vita-

mins and minerals, some athletes may have increased requirements or certain deficiencies due to their training loads or dietary preferences. Nutritional supplements such as vitamin D, vitamin B12, iron, or calcium may be recommended in such cases. However, it is important to evaluate individual needs through appropriate testing and consultation with a healthcare professional before starting any supplements. Mallick et al., (2023).

Vitamin D: Adequate vitamin D levels are essential for bone health, immunity function, and muscle strength. Athletes who train indoors or live in areas with limited sunlight exposure may be at greater risk of vitamin D deficiency and may benefit from nutritional supplements. Feng et al., (2023).

B Vitamins: B vitamins play a vital role in energy metabolism and red blood cell production. Athletes with high intensity training or restricted diets may benefit from vitamin B supplements. However, it is best to address deficiencies through dietary changes whenever possible. Lyon et al., (2020).

Iron: Iron is essential for transporting oxygen in the blood and plays a crucial role in athletic performance. Female athletes, vegetarians, and those with a history of iron deficiency may need iron supplements after appropriate evaluation and diagnosis of deficiency. Buratti et al., (2015).

Glucosamine sulfate: Glucosamine is a diabetic amino acid that occurs naturally in the body and is responsible for nourishing the cartilage and joints necessary to maintain their integrity and protect them from corrosion and injury. A study conducted on 178 Chinese patients with osteoarthritis of the knee found that 1500 mg daily was more effective and safer than painkillers. The World Health Organization has reviewed its effectiveness and approved that it is effective in treating rheumatism and joint pain. Setnikar and Rovati (2001).

Chondroitin sulfate: It is the main element that carries water and nutrients and is used to treat osteoporosis. It is also used to treat anemia, high cholesterol, and heart disease. Mikami and Kitagawa (2013).

Methyl sulfonyl methane: It is a natural organic substance found in the human body, vegetables, fruits, meat, and legumes. 34% of its composition is sulfur. It is one of the components of protein materials in hair and nails, and one of the components of collagen, hormones, enzymes, and tissues. Butawan et al., (2017).

Calcium: The most abundant mineral in the human body. It is necessary for building bones, in addition to its role in transmitting signals to the central nervous system, blood clotting, and necessary for muscle contraction. Brini et al., (2013).

Vitamin C: A powerful antioxidant, as it protects the body from harmful wastes that result from vital processes in the body and plays an important role in healing the body from wounds. Lee, (2019).

Carbohydrates: Their role is crucial to generating energy along with proteins. As recommended by all experts, carbohydrates are necessary after exercise to restore glycogen levels in the muscles and liver by ensuring proper adaptation to training. Consumption varies according to the sport, intensity, and body weight. Usually, the current recommendations for carbohydrates are 5- 10 g/kg of body weight is required for most athletes who engage in moderate to high-intensity sports for 1-3 hours per day. A smaller intake of 3-5 g/kg of body weight is also suggested for athletes who perform low-intensity training, while skill-based training is recommended with a higher amount of 8-12 g/kg body weight during extreme endurance training Abaza et al., (2021); Baroni et al., (2023); Burke et al., (2011).

Benefits of nutritional supplements for athletes

When used appropriately and in conjunction with a balanced diet, nutritional supplements can offer many potential benefits to athletes. Some advantages include:

1. **Improving performance:** Some nutritional supplements, such as creatine and caffeine, have been proven to enhance strength and endurance, leading to improved athletic performance.

2. **Promote recovery:** Protein supplements, especially those containing essential amino acids, can support muscle repair and recovery after intense training sessions or competitions.

3. **Nutritional Support:** Athletes with specific nutritional restrictions or deficiencies may benefit from targeted nutritional supplements to ensure their nutritional requirements are met for optimal performance.

4. **Convenience:** Dietary supplements provide a convenient and practical way to obtain essential nutrients in concentrated forms, especially when it is difficult to consume adequate amounts through regular meals alone Helms et al., (2014), National Library of Medicine (2023).

Considerations for safe and effective nutritional supplements

While nutritional supplements can offer benefits, it is essential for athletes to handle supplements with caution and adhere to certain guidelines:

1. **Individual Needs:** Athletes should consider their specific nutritional requirements, training goals, and any underlying health conditions before beginning any supplement regimen. Consulting a sports nu-

tritionist or qualified health care professional can help determine individual needs.

2. Quality and Safety: Athletes should choose reputable brands and products that undergo rigorous testing for quality, purity and safety. Third-party certifications, such as NSF Certified for Sport or Informed Sport, can provide additional assurance.

3. Proper dosage and timing: It is essential to follow the recommended dosage and timing instructions. Excessive supplementation or incorrect use can have adverse effects on health and performance.

4. Whole foods first: It is important to remember that food should be the primary source of nutrients. Athletes should prioritize a balanced diet consisting of nutrient-dense whole foods before considering supplements Maughan et al., (2018)

Energy

The most important aspect of a sports diet is energy consumption; Satisfying energy requirement is a nutritional priority for all athletes. Insufficient energy intake negates the benefits of training, hampers performance, and can lead to health complications such as loss of muscle mass and/or bone density, in addition to increasing the risk of overtraining, injuries, and illness. Energy requirements vary between athletes. Depending on their sport, its intensity, and the periodic training activities they practice (which can change from day to day and throughout the season). Other factors that influence energy requirements include gender, age and body composition Burke et al., (2011), Phillips and van Loon (2011), Thomas et al., (2016).

CONCLUSION

Nutritional supplements can be a valuable tool for athletes seeking to improve their performance, support recovery, and meet their nutritional needs. By understanding the different types of nutritional supplements available, their potential benefits, and precautions for safe and effective use, athletes can make informed decisions regarding their supplementation strategies. However, it is important to remember that nutritional supplements should never replace diet and overall lifestyle, which remain the foundation of athletic success.

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