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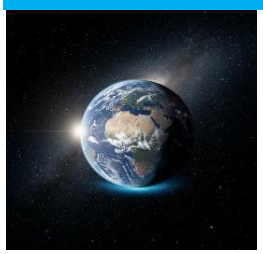

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Dietary supplements for sports enthusiasts - effective support or the impact of marketing campaigns? A narrative review

Paula Hauzer

Regional Specialist Hospital in Wrocław, Research and Development Center, ul. H. M. Kamieńskiego 73a, 51-124 Wrocław, Poland

https://orcid.org/0000-0002-3216-1525

Aleksandra Kaniak

Regional Specialist Hospital in Wrocław, Research and Development Center, ul. H. M. Kamieńskiego 73a, 51-124 Wrocław, Poland

https://orcid.org/0009-0009-7775-7785

Julianna Zielska
Lower Silesian Center of Oncology, Pulmonology and Hematology, Wrocław, pl. Hirszfelda 12, 53-413 Wrocław, Poland
https://orcid.org/0000-0002-0210-5549
Yuliia Protsenko
Private practice, Łódź, Poland
https://orcid.org/0009-0001-3356-7332
Kacper Forszt
Regional Specialist Hospital in Wrocław, Research and Development Center, ul. H. M. Kamieńskiego 73a, 51-124 Wrocław, Poland
https://orcid.org/0009-0009-0384-7331
Julia Andrzejewska
Regional Specialist Hospital in Wrocław, Research and Development Center, ul. H. M. Kamieńskiego 73a, 51-124 Wrocław, Poland
https://orcid.org/0009-0001-9414-3664

Abstract

Introduction and objective:

Dietary supplements are becoming increasingly popular, especially among physically active people, regardless of their level of experience. In Poland, as many as 90% of adults use such products, which highlights their importance in everyday life. The reasons for using supplements are varied, ranging from actual health needs to the influence of intensive marketing. Given the huge number of products available and insufficient market supervision, it is crucial to understand the principles of their use. The aim of this study is to assess the validity of supplementation among physically active people in the context of real health needs and the impact of marketing on consumer decisions.

Abbreviated description of the state of knowledge:

Supplements are products that supplement the diet and contain concentrated ingredients with physiological effects. Unlike drugs, they do not undergo rigorous clinical trials. They are often used without consulting experts, and knowledge about them comes mainly from advertising and the media. The Australian Institute of Sport (AIS) has divided supplements into four groups, A-D, according to their effectiveness and safety. Professional athletes usually seek the help of specialists, while amateurs often choose supplements on their own, which carries a risk of error.

Products that support recovery, performance, and concentration are particularly popular. Social media, through influential celebrities, often promote unverified information.

Summary:

Supplements can support the health of physically active people, but their use should be informed and consulted with specialists. Excessive trust in advertising and a lack of knowledge increase the risk of misuse of these products. Education, legal regulations, and professional advice are key to safe supplementation.

Key words:

dietary supplements, marketing, social media, athletes

INTRODUCTION

According to data from the Public Opinion Research Center, 9/10 adult Poles take dietary supplements, and athletes often use several preparations at the same time. The motivation to use dietary supplements in sports is high and closely related to the pursuit of better results.

In the nutrition of both professional and amateur athletes, the most important thing is a well-balanced diet correlated with the training load, which significantly reduces the risk of injury, overtraining, and hormonal disorders [1].

Dietary supplements seem to be an ideal solution to selectively supplement vitamin and mineral deficiencies and support not only athletic performance but also overall health, which is important for achieving long-term athletic results. The choice of supplementation for athletes depends largely on the sport they practice and increases with the intensity of training and age [2].

Due to the huge interest in the impact of nutrition on health and athletic performance, current dietary trends set by the pharmaceutical industry and social media are also important. Amateur athletes are often guided in their choices by intense advertising, considering the promoted products to be essential for athletic success. This group is exposed to many false messages suggesting that the use of certain dietary supplements is crucial for improving athletic

performance and overall physical condition. Influencers and famous athletes can further influence the perception of the effectiveness of supplements, which often leads to purchasing decisions based on their opinion rather than real need. However, this information is often marketing-driven, unreliable, and unsupported by scientific research, and influencers receive remuneration or other benefits for publishing such content on their profiles. The lack of clear legal regulations related to dietary supplementation and the possibility of unlimited aggressive advertising campaigns often lead to situations where manufacturers provide information in their advertising materials about the allegedly proven effects of preparations without confirming this data in scientific studies [3]. Unreliable information provided by manufacturers in leaflets (the difference between the actual and declared content of active substances), lack of cooperation with dietitians and doctors, and low public awareness of the purpose and effects of dietary supplements on the body often lead to potential negative health effects resulting from the incorrect use of these products.

AIM OF THE STUDY

The aim of this study is to analyze and evaluate the use of dietary supplements by physically active people, both professional athletes and amateurs, with particular emphasis on the actual needs of the body and the impact of marketing, especially in social media, on consumer purchasing decisions. The work aims to determine the extent to which supplementation results from actual health and training needs and to what extent it is the result of advertising and the lack of reliable sources of information. An additional objective is to highlight the potential risks arising from the incorrect use of dietary supplements, misinformation, and insufficient legal supervision of the market for these products.

MATERIALS AND METHODS

A literature review was conducted for the period 2000-2025 using the PubMed database. The review included publications in both Polish and English. Articles were searched using the following keywords: [Dietary supplements, social media, athletes]. Studies that did not fall within the scope of the study, did not have full access to the content, did not contain a detailed description of the methodology used, or showed signs of low reliability were rejected.

DIETARY SUPPLEMENTS - DEFINITION, CLASSIFICATION AND LEGAL REGULATIONS

The Act of August 25, 2006 on food and nutrition safety (Journal of Laws 2018, item 1541) defines a dietary supplement as "a food product intended to supplement the normal diet, being a concentrated source of vitamins or minerals or other substances with nutritional or physiological effects, marketed in a form allowing for dosing, excluding products with medicinal properties within the meaning of pharmaceutical law." [4].

The main ingredients of many dietary supplements are vitamins and minerals that occur naturally in food, as well as other substances with nutritional or physiological effects. The maximum daily doses of vitamins and minerals established on the basis of the guidelines of the Chief Sanitary Inspectorate (GIS) and the varying degrees of sensitivity of consumer groups should always be taken into account by manufacturers. Aspects to be taken into account include supplementation from other dietary sources and the recommended intake for a given physical activity in accordance with the available classification [2]. Numerous resolutions on proper supplementation are intended to facilitate the classification of a product as a dietary supplement or over-the-counter medicine and, on the other hand, to verify whether exceeding the upper recommended dose is justified and safe [5].

Unlike medicines, dietary supplements can be placed on the market without having to confirm their efficacy in clinical trials. Most products in this category also do not have information on the packaging about contraindications, side effects or possible interactions, as there is no legal requirement to do so. Food law also regulates the advertising of dietary supplements, leaving manufacturers with unlimited possibilities. Another problem is the very wide availability of this group of products, as apart from specialist outlets such as pharmacies and pharmacy outlets, they can be purchased in grocery stores, herbal stores, gas stations, nutrition stores, gyms, and on websites where sellers have no specific training or specialist knowledge about the products they sell, which may pose a serious threat to the life and health of consumers. Staff at non-specialized points of sale do not have the knowledge to determine the appropriate dosage, possible interactions, or predict health consequences when recommending supplements to customers.

Although dietary supplements undoubtedly play an important role, they also raise many doubts and controversies, especially among specialists in the field of dietetics and medicine [6]. According to dieticians, a well-balanced diet can provide the body with all the nutrients it needs. On the other hand, doctors point out that in the case of health problems, the use of dietary supplements does not lead to an improvement in the patient's condition, as they do not contain ingredients with therapeutic properties.

It is worth remembering that dietary supplements are a supplement to the daily diet with ingredients that the body does not receive in sufficient quantities from food for some reason. It is important that physically active people consult specialists, in particular sports medicine doctors or qualified dietitians or trainers, who are able to reliably assess the body's actual need for specific nutrients in relation to the sport practiced [2].
A reliable and helpful source of information is the classification of dietary supplements for athletes by the Australian Institute of Sport (AIS), which is regularly updated with new scientific findings. According to this classification, supplements are divided into four groups: A, B, C, and D.

Group A has three subcategories. The first is food for athletes (drinks, gels, electrolytes, and protein preparations). The second includes supplements containing nutrients such as iron, calcium, vitamin D, zinc, and probiotics. The last subcategory consists of supplements that improve exercise performance, such as caffeine, beta-alanine, sodium bicarbonate, beet juice, creatine, and glycerol. All supplements in group A have scientifically proven effects, confirmed efficacy and safety, and have protocols for practical use in specific sports indications.

Group B includes supplements whose effects have not been sufficiently proven scientifically. These are preparations that do not have sufficient literature to confirm their effectiveness in specific sports disciplines. These include polyphenols, vitamin C, N-acetylcysteine, menthol, quinine, collagen, curcumin, ketones, fish oils, and carnitine.

Group C includes supplements for which there are no studies on their effect on sports performance or scientific studies that confirm their benefits for athletes. These include magnesium, alpha-lipoic acid, 3-hydroxy-3-methylbutanoic acid (HMB), amino acids (leucine, valine, isoleucine), prebiotics, vitamin E, tyrosine, phosphates, and all substances not included in groups A, B, and D [7].

Group D includes dietary supplements that are prohibited for athletes and considered doping substances. These include stimulants, prohormones, hormone and metabolism modulators, selective androgen receptor modulators, beta2-mimetics, growth hormone-releasing peptides, and colostrum [8].

Many athletes, coaches, and sports organizations verify the use of individual dietary supplements in strict accordance with AIS guidelines.

DIETARY SUPPLEMENTS RECOMMENDED FOR ATHLETES

Regular physical activity increases the demand for vitamins and macro- and microelements that support the body's metabolic processes [9].

An important element of supplementation is the proper supply of vitamins such as A, C, D, B vitamins, as well as beta-carotene, iron, calcium, and magnesium [10] [11].

In some situations, such as when following a low-calorie diet to reduce body weight, certain food groups are eliminated, which can lead to vitamin and mineral deficiencies. In such cases, under the supervision of a dietitian, the use of appropriately selected supplements may be helpful in covering the recommended daily intake of these substances. However, the priority should be to provide the necessary nutrients first and foremost through food, and only then consider supplementation according to the “food first” principle [12].

Many sources point to the potentially beneficial effects of substances belonging to the AIS group A, such as caffeine, creatine, ß-alanine, and nitrates [9].

One of the best-studied and most effective substances with ergogenic effects is creatine. Its use leads to an increase in creatine stores in the muscles, which can have a beneficial effect on physical performance and facilitate the body's adaptation to training. Studies show that creatine can improve the effectiveness of high-intensity exercise, which translates into better training results. In addition, it accelerates the replenishment of glycogen stores, which is an important support for athletes engaged in prolonged submaximal exercise or performing repetitive high-intensity exercises, as it is a major source of energy for the body. One of the effects of supplementation may be an increase in body weight of approximately 1–2 kg. When used correctly, creatine has no negative effects on health [13] [14].

Caffeine is another well-known ergogenic substance with a proven beneficial effect on physical performance during intermittent, endurance, and strength exercises. Caffeine is currently under

observation by the World Anti-Doping Agency (WADA), which may lead to its reclassification as a prohibited substance [15] [16].

β-alanine is very popular as a performance enhancer – it is used by about 61% of team sport athletes. Supplementation with this compound may increase carnosine levels in muscles, which increases the body's ability to buffer ions during intense exercise. As a result, it may contribute to improved performance during high-intensity and intermittent exercise.

β-alanine is on the list of permitted supplements in accordance with the regulations of the World Anti-Doping Agency (WADA) [17].

Nitrates and nitrites, previously considered inactive products of nitric oxide (NO) metabolism, are now seen as its precursors – nitrates are converted to nitrites and then to NO. Nitric oxide, also produced from l-arginine with the participation of the enzyme NOS, has a beneficial effect on muscle function, improving their performance and reducing ATP consumption. The effects are usually observed 2–3 hours after ingesting 5–9 mmol of nitrates (310–560 mg). Longer supplementation, exceeding 3 days, may further support performance, especially in trained athletes [18] [19].

FACTORS AFFECTING THE USE OF DIETARY SUPPLEMENTS BY PHYSICALLY ACTIVE PEOPLE

People who practice amateur sports decide to take dietary supplements for several reasons.

One of them is to increase muscle mass and accelerate muscle regeneration after intense exercise, which is important for continuous training. Protein supplements, nutrients, and other products of this type are often used to support muscle building, which is a key element in many sports [20]. This is why proper protein supplementation is so important, as physically active people have a much higher demand for protein than healthy adults. A balanced protein intake provides many benefits to the body, including influencing the proper process of building muscle mass and connective tissue, the function of peptide hormones, enzymatic and immune proteins, and plays a major role in the post-workout regeneration of muscle tissue [21] [6].

Another reason is to support the body's performance. A properly balanced supply of carbohydrates, which are the main source of energy for the body's cells, has a significant effect on reducing peripheral and central fatigue, which makes it possible to increase performance

during further exertion. Well-chosen supplements can increase endurance, strength, and overall physical performance, allowing for better results during training [22].

Another motivation for using supplements is the desire to improve concentration and mental performance. Some preparations containing, among others, caffeine, L-theanine, tyrosine or certain adaptogens can improve concentration and mental performance, which is important in sports requiring high precision and strategy. Deficiencies in the supply of fats in the diet, especially unsaturated fatty acids (EFAs), can significantly reduce the efficiency of the nervous, immune and circulatory systems [7].

Replenishing deficiencies is also a common reason why physically active people reach for various preparations.

Active people usually need more of certain nutrients such as protein, vitamins, and minerals, which can be difficult to obtain through diet alone [23]. However, nutritionists emphasize that even the best supplementation cannot compensate for poor food choices and an inadequate diet [24].

Among amateur athletes, a common argument for using supplements is “just in case.” Surveys also show that this group is willing to take dietary supplements without reliable information about their ingredients [25].

In the group of professional athletes, one of the reasons for dietary supplementation given by athletes is the financial gain resulting from cooperation with sponsors, as well as easy access to free products.

Proper supplementation should always be based on knowledge and consultation with professionals to avoid excessive or inappropriate doses [22].

The first and fundamental step in selecting the right supplementation should be an assessment of the current diet of the person increasing their physical activity. This should be done correctly on the basis of anthropometric, biochemical, clinical, and environmental data. The assessment should be carried out by a doctor, dietitian, or other qualified person [24].

An analysis of data on the prevalence of dietary supplement use among physically active individuals showed significant differences in the use of these preparations between professional athletes and recreational athletes. Among 787 athletes, 70% consumed dietary supplements, while among 576 amateur athletes, 48% used supplements [26]. While it can be assumed that dieticians or coaches were involved in the choices made by athletes and that the selected preparations are based on the actual needs of the body, in the case of amateur sports, they are mostly chosen independently or under the influence of marketing.

RISKS ASSOCIATED WITH THE IMPACT OF SOCIAL MEDIA ON SUPPLEMENT CONSUMPTION AMONG PEOPLE WHO ARE ACTIVE IN SPORTS

There are a number of diverse marketing activities on social media aimed at attracting the attention of potential customers, building trust in the brand and, above all, encouraging them to purchase and use dietary supplements.

These include several strategies, such as posts with educational content. These are articles and infographics explaining the benefits of supplementation, presenting different types of supplements and their effects. They may also include advice on dosage and effects.

Another example is influencer marketing, which involves collaborating with influencers and famous athletes who promote dietary supplements on their profiles. These individuals share their personal experiences and show the effects of using the products [27] [28]. Videos and stories are now an extremely popular form of online marketing. This involves creating videos showing the process of preparing products such as protein shakes, using supplements before or after training, and their impact on performance. Reactions on Instagram or TikTok are an effective way to engage audiences and encourage them to make a purchase. Unique offers and promotions for “healthy training supplements” that frequently appear in the media space are becoming an effective marketing strategy [29]. Announcements of discounts and promotions, slogans such as “buy one, get one free,” loyalty programs, or contests with prizes engage fans to integrate with the brand [30].

Another promotional technique is testimonials and reviews. Publishing user reviews and case studies of how supplements have helped achieve specific results builds customer trust in the brand.

Numerous advertising campaigns that use paid advertising on social media platforms such as YouTube, Instagram, Facebook, and TikTok to target people interested in sports and healthy lifestyles are also a popular persuasion technique [29].

Organizing numerous online events, such as webinars, podcasts, or fitness challenges where participants can use dietary supplements and share their results, is another effective way to advertise specific products.

A common communication tactic is the widespread use of “before and after” posts in the media. These are photos published “before and after” the use of a given supplement, showing the effects that can be achieved through regular use [31].

The internet is full of numerous incentives to use expert consultations, which offer free advice, usually online, from dietitians or personal trainers who advise on the use of supplementation tailored to individual needs.

Another advertising strategy is to create or actively participate in groups and communities on online platforms focusing on health, sports, and fitness. These allow users to share their experiences with supplementation and benefit from the opinions of other consumers.

Another example of the media's influence are numerous educational campaigns that publish information about the active ingredients in supplements and their beneficial effects on health, which potentially contributes to increased awareness and trust in products and, consequently, greater willingness to purchase them.

The above-mentioned marketing activities in social media advertising dietary supplements may also pose risks. One of the most serious is misinformation leading to a situation where false or exaggerated opinions about the effectiveness of supplements may mislead consumers and push them to make inappropriate decisions about their health and diet [20].

Another serious risk is addiction to supplements. Promoting supplements as a basic part of the diet may encourage people to rely on them instead of focusing on a balanced diet, which can lead to deficiencies in nutrients that are important for health [32].

According to a review of the literature, people who exercise often take several supplements at the same time. They often duplicate ingredients in different products under different trade names [25].

It is important to determine the specific needs and selection of supplements in order to reduce potential risks. Unreliable sources of information on dosage can lead to excessive consumption of supplements, which has a negative impact on health. Some dietary supplements may cause side effects or interact with other preparations, which is particularly dangerous if they are used long-term and without consulting a specialist. Intensive promotion of dietary supplements that encourages excessive consumption may also contribute to eating disorders, especially among athletes and active people who may feel pressure to achieve better results with supplements rather than a healthy, balanced diet. Advertisements promote the idea that supplements are an easy way to achieve better results, which effectively discourages people from following laborious diets or working hard without support in sports. Ethical issues related to influencer marketing are equally important. Collaboration with influencers is not always fair and transparent, and in many situations consumers are unaware that a product is being promoted in exchange for remuneration [27] [28].

On the other hand, negative feedback from users in discussion groups on social media platforms from users who have not achieved the promised results can damage the reputation of a pharmaceutical company and affect the perception of the entire category of supplements [33].

In the face of growing consumer complaints and health problems related to incorrect supplementation or poor-quality supplements, regulatory authorities may introduce strict regulations that will affect the way companies conduct their marketing activities.

In its reports on the market and quality of dietary supplements in Poland, the Supreme Audit Office (NIK) points out that legal regulations related to the marketing and advertising of dietary supplements, as well as the supervision of supplements on sale, do not ensure an adequate level of safety.

Current legal regulations lead to the appearance on the market of products that do not meet quality standards and norms or are potentially contaminated, which does not sufficiently protect

consumers, and intensive marketing activities are not able to ensure the safety and effectiveness of the advertised product.

For the above reasons, it is very important that marketing activities are carried out by competent persons who take responsibility for the content communicated, taking into account consumer health and safety, and based on reliable information and scientific evidence [32].

CONCLUSION

Dietary supplements play a key role in the daily nutrition of athletes and active people, but their use is controversial. Although many consumers believe that they are necessary to improve performance, the wrong choice of products and misleading marketing information can lead to serious health risks.

There is insufficient legal oversight of the supplement market, which means that many products do not meet the relevant quality standards. With the growing interest in supplementation, it is important that both athletes and amateurs consult their needs with qualified professionals. Marketing activities on social media, which are often perceived as reliable, are based on unverified information, which highlights the need for responsibility in the promotion of supplements.
The future of the supplement market should be based on solid scientific data and manufacturer responsibility to protect consumers from the potential risks associated with their use.

Author's Contribution Statement

Conceptualization: Paula Hauzer, Julia Andrzejewska, Aleksandra Kaniak,
Methodology: Paula Hauzer, Aleksandra Kaniak, Julianna Zielska,
Software: Kacper Forszt, Yuliia Protsenko, Julianna Zielska,
Check: Julia Andrzejewska, Aleksandra Kaniak, Julianna Zielska,
Formal analysis: Paula Hauzer, Julia Andrzejewska, Yuliia Protsenko
Investigation: Paula Hauzer, Julia Andrzejewska, Kacper Forszt,
Resources: Aleksandra Kaniak, Julianna Zielska, Yuliia Protsenko
Data curation: Paula Hauzer, Kacper Forszt, Yuliia Protsenko
Writing - rough preparation: Paula Hauzer, Julianna Zielska, Kacper Forszt
Writing - review and editing: Julia Andrzejewska, Aleksandra Kaniak,

Visualization: Julia Andrzejewska, Kacper Forszt, Yuliia Protsenko
Supervision: Paula Hauzer, Julia Andrzejewska,
Project administration: Paula Hauzer, Julia Andrzejewska, Aleksandra Kaniak,

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In preparing this work, the authors used ChatGPT for the purpose of refining the language and structure of the article. After using this tool/service, the authors have reviewed and edited the content as needed and accept full responsibility for the substantive content of the publication.

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