

Research Article

University Soccer Players Using Supplements Correctly?

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Abstract

A proper diet is a factor necessary for athletes to maintain and improve their health and performance. Supplements have become an inseparable part of athletes' diets. Studies have shown that athletes in events requiring endurance use more supplements than athletes in other sports. Many studies have shown that athletes report using a variety of supplements, with vitamins, proteins, and amino acids being widely used.

However, a mismatch between reasons for supplement use and products has been reported, especially among younger athletes. Given the above, we examined the use of supplements by university athletes and assessed whether or not the reasons for their use were appropriate. Sixty of the 80 athletes (75%) were taking supplements. Protein was the most common supplement consumed by athletes, followed by multivitamins, multivitamins/minerals, and jelly drinks. Of the 53 players taking proteins, 41 were only taking proteins. University athletes are not largely wrong with regard to the purpose and use of supplements. However, they do not receive sufficient energy, minerals, and other nutrients from their diets and supplements, suggesting that they do not use supplements based on an understanding of what is lacking in their diet. Athletes need to be educated on nutrition so that they can understand their own diet and use supplements as a way to improve their deficiencies.

Keywords: University soccer players; Diet; Supplements; Athletes

Introduction

A proper diet is a factor necessary for athletes to maintain and improve their health and performance. The basis of an athlete's diet is three meals, which should provide energy and necessary nutrients, and any deficiencies should be managed with supplements. Particularly for junior athletes, a full diet will lead to healthy growth and development in the future [1].

Supplements have become an inseparable part of athletes' diets. Regarding supplement use among athletes, Tscholl et al. [2] reported in a survey of 3887 top athletes that 67% took some type of supplement daily, and more than 30% took multiple nutrient supplements. Many studies have also reported relatively high supplement use among athletes, with Garthe et al. reporting that 40%-100% of athletes use supplements [3-6]. Lun et al. [6] reported an association between weekly training time and supplement use. They found that 67% of athletes who trained <5 h/week used supplements, as did 95% of those who trained >25 h/week.

Studies have shown that athletes in events requiring endurance use more supplements than athletes in other sports [4,6-8]. Many studies have shown that athletes report using a variety of supplements, with vitamins, proteins,

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and amino acids being widely used [9-11]. The frequency of protein powder (protein) intake has increased every year over the past 30 years, with usage starting at younger and younger ages [12].

However, a mismatch between reasons for supplement use and products has been reported, especially among younger athletes [3,13-16]. Heikkinen et al. [4] reported that only 27% of 372 elite athletes in Finland had the opportunity to consult a sports nutrition specialist [17]. Even when they had the chance, not all athletes consulted an expert, preferring instead to obtain nutritional advice from sources they already trusted [18]. Of 32 international-level junior track and field athletes, 72% reported that they had been able to consult with a sports nutritionist but had chosen not to, with coaches (65%) having the greatest influence on their decisions regarding supplement use while physicians (25%) and sports nutritionists (30%) were less important [19].

Given the above, we examined the use of supplements by university athletes and assessed whether or not the reasons for their use were appropriate.

Subjects and Methods

This study was conducted on 80 athletes belonging to a university soccer team. Prior to the experiment, the subjects were fully informed of the research outline and methods, and their written consent to participate in the study was obtained.

Participants responded to a questionnaire regarding supplements (use of supplements, supplements used, product name, amount used, frequency of use, and reasons for use). After answering the questionnaire, the 41 subjects who gave their consent were asked to complete a self-administered dietary frequency survey using the FFQ NEXT (National Cancer Center; Kenpakusya Co., Tokyo, Japan) and Excel Eiyokun plus (Kenpakusya Co.) [20,21]. A previous study found that accurate results could be obtained with the FFQ NEXT despite no explanation or assistance from a dietitian [22]. Data were analyzed using Excel Eiyokun software program (version 8; Kenpakusha Co.) based on the Standard Table of Food Composition in Japan.

This study was approved by the Ethics Committee of Kokushikan University (Nos. 23039 and 23039).

Results

Supplement intake by competition level is shown in Figure 1. Sixty of the 80 athletes (75%) were taking supplements, including 26 of 35 athletes from Team A, 19 of 24 athletes from Team B, and 15 of 21 athletes from Team C (74%, 74%, and 71%, respectively). The percentage of supplement intake according to the competition level was similar.

The supplements used are listed in Table 1. Protein was the most common supplement consumed by athletes,

followed by multivitamins, multivitamins/minerals, and jelly drinks. Of the 53 players taking proteins, 41 were only taking proteins. Of the athletes taking supplements, 4 did not take protein.

The reasons for taking supplements are shown in Figure 1. Thirty-two athletes were taking supplements to recover from training, and 16 were taking supplements to supplement an inadequate diet. The age at which they started taking supplements was a mean of 16 (standard deviation [SD] 1.9) years and the number of years they had been taking supplements was a mean of 4.0 (SD 1.8) years.

The results of the dietary survey are shown in Figure 2. The percentage sufficiency of each nutrient relative to the daily requirement is shown separately for Diet A alone (Diet A) and diet plus supplements (Diet S). Diet A met the requirement for vitamin C but not for energy, protein, fat, carbohydrate, calcium, iron, vitamins A, B1, B2, or dietary fiber. Diet S met the requirements for protein and vitamins A, B1, B2, and C but not for energy, fat, carbohydrate, calcium, iron, or dietary fiber. Diet S had significantly higher amounts of energy, protein, calcium, and vitamins B1 and B2 than Diet A.

Figure 1: Reasons for supplement intake.

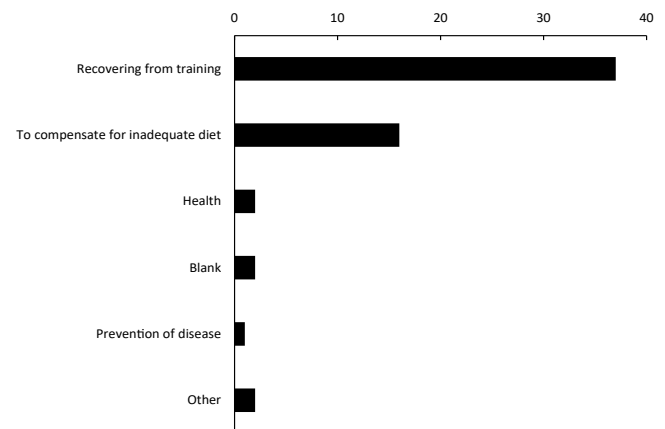
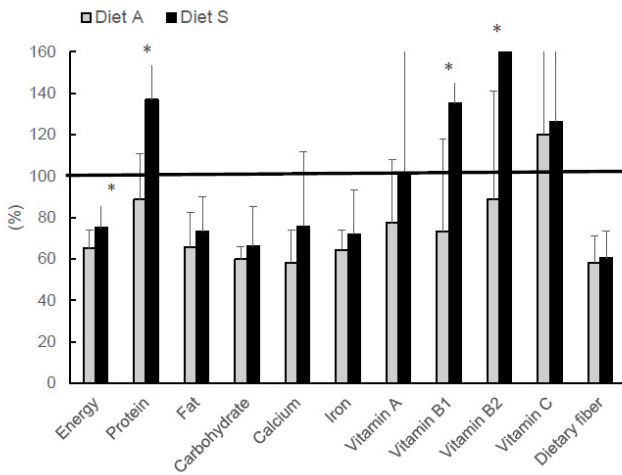


Table 1: Type and number of supplements taken (multiple responses allowed).

| Supplement | n = 60 |
|-------------------------|--------|
| Protein | 56 |
| Multivitamins | 10 |
| Vitamin C | 1 |
| Multivitamin/Mineral | 3 |
| Minerals (Zn) | 2 |
| Mineral (Fe) | 1 |
| Creatine | 1 |
| Citric acid | 1 |
| Intestinal regulators | 1 |
| Unsaturated fatty acids | 1 |
| Jelly drinks | 5 |
| Sports drinks | 2 |

Figure 2: Percentage of nutrient intake from dietary and supplemental sources*; vs. Diet A.



Discussion

University athletes were surveyed to determine whether or not their supplement use and reasons for use were appropriate. The results showed that 75% of the athletes were taking supplements, and 93% of them were taking protein. Most of the reasons for consuming the protein were to recover from training and to supplement an inadequate diet. Therefore, a comparison was made between dietary and supplemental daily intake (Figure 2).

Many athletes were taking protein, but 90% of their required daily amount was already present in their diet. The greater the amount of protein consumed, the less muscle hypertrophy there is. If the diet provides sufficient energy and protein, there is no need to supplement protein.

Nutrition, along with training and rest, is a factor that ensures training effectiveness and enhances athletic performance. Protein is a nutrient of particular interest to athletes. The protein intake amount that is safe for health and effective for enhancing the effects of muscle hypertrophy from training is 1.4 to 2.0 g/kg body weight/day [23,24]. The International Association of Athletics Federations' statement on nutrition for athletes states that no more than 1.7 g/kg body weight/day of protein is required for all track and field athletes [25]. Tarnopolsky et al. [26] reported that increasing protein intake from 0.86 to 1.4 g/kg of body weight/day and during strength training increased total body protein synthesis, but increasing protein intake to 2.4 g did not further increase body protein synthesis. Therefore, the upper limit of protein intake to enhance muscle synthesis by exercise is approximately 2 g/kg body weight/day [27]. Furthermore, the International Olympic Committee's Consensus Statement on Sports Nutrition 2003 states that there is little evidence to suggest that a high protein intake of 2.0-3.0 g/kg body weight/day is necessary.

In the sports field, it is not uncommon for athletes to take supplements such as protein and amino acids in addition to food to obtain more protein than they need. According to a report from the Japan Institute of Sports Sciences (JISS), 88.1% of top athletes ≥ 20 years old use supplements. Many athletes use protein supplements (amino acids and/or proteins), with reported reasons being "to relieve fatigue," "to supplement what is lacking in the diet," "to improve athletic performance," and "to gain muscle and weight," findings that were similar to the results of the present study.

In the present study, 75% of athletes consumed proteins. The reasons for taking supplements were "to recover from training," followed by "to supplement missing nutrients". However, most of the participants in this study were able to obtain sufficient protein from their diet, suggesting that supplementation may not be necessary.

The vitamin/mineral intake was lower than the target amount but was able to be met by supplementation. However, the number of athletes taking vitamin or mineral supplements was relatively low (10/80). It is believed that eating a diet that incorporates many foods leads to mineral and vitamin deficiencies due to money and a lack of familiarity with cooking [please clarify the meaning of the highlighted text]. The required amount of vitamins was met among athletes with supplemental intake, suggesting that vitamin supplemental intake may be helpful for student athletes who have difficulty managing their diets to compensate for nutrient deficiencies.

Kim et al. [27] reported that vitamins were the most commonly used supplement among Korean athletes at the Beijing Olympics, followed by oriental supplements and amino acids [24]. The reasons were "to improve muscle strength," "to relieve fatigue," and "to maintain health/supplement missing nutrients," which was consistent with the reasoning of "to supplement missing nutrients" found in the present study. These findings suggest that vitamins and minerals should be prioritized over protein intake as supplements. Based on our findings, athletes do not seem to understand what nutrients they consume adequately and what nutrients they lack or comprehend their own dietary status.

The most common reason for taking protein supplements in the present study was "to supplement missing nutrients," as reported by more than half of those taking such supplements. However, the protein intake was fully met by the dietary intake. The International Olympic Committee's Statement on Sports Nutrition 2010 states that "[supplements] can be used to supplement essential nutrients for short periods of time, although this is not enough as a way to improve diet." Although many Olympic athletes also use supplements [4,28,29], we believe that the results of this survey support the importance of research and education on athletes' supplement use, dietary behavior, and eating habits.

The 2020 International Olympic Committee's Supplement Consensus Statement states that "in athletes, [supplement] use may be considered in some circumstances" [18]. This suggests an increased tolerance for the use of supplements. In addition, it has been reported that athletes are influenced by their surroundings and tend to overdo things when taking supplements [30,31].

Conclusion

Seventy percent of athletes used protein supplements, and 12.5% used vitamins (vitamins and minerals). The reasons for use were "recovery from training" and "to supplement an inadequate diet". When the dietary survey was conducted, Diet A only met the required amount for vitamin C, and while supplementation did improve the vitamin intake, the energy intake was still inadequate. University athletes are not largely wrong with regard to the purpose and use of supplements. However, they do not receive sufficient energy, minerals, and other nutrients from their diets and supplements, suggesting that they do not use supplements based on an understanding of what is lacking in their diet. Athletes need to be educated on nutrition so that they can understand their own diet and use supplements as a way to improve their deficiencies.

Competing Interests

The authors declare that they have no competing interests.

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