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ORIGINAL ARTICLE

Determination of Nutrition, Physical Activity and Ergogenic Support Usage Status in Fitness Athletes

Fitness Yapan Sporcularda Beslenme, Fiziksel Aktivite ve Ergojenik Destek Kullanım Durumunun Saptanması

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Abstract

Introduction: This study aims to determine the nutrition, physical activity, and ergogenic support usage status of male athletes, who are interested in fitness, and to evaluate the effects of the ergogenic support usage on body composition.

Methods: A total of 40 volunteers between the ages of 18 and 35 years, who do fitness in a sports center located in the Söğüt District of Bilecik Province, participated in the study. The data were collected by face-to-face survey method and analyzed using the SPSS 26 program.

Results: Among the participants, 45% were using ergogenic support products. The most commonly used ergogenic supplements were creatine and protein powder. It was observed that the participants started to use ergogenic support products in line with the recommendations they received from the media and books to improve sports performance and muscle ratio. The ergogenic support usage status of the athletes was compared with their body measurements and composition values, and it was determined that there was no statistically significant difference ($p>0.05$). The mean amount of energy, carbohydrate, protein, and fat obtained on the day of exercise is higher than on the day without exercise. A statistically significant difference was observed between the averages of energy and macronutrients consumed per day with and without exercise ($p>0.05$).

Discussion and Conclusion: Ergogenic supplements should be used as a supportive element of the training and nutrition program in accordance with the advice of professionals.

Keywords: Ergogenic aid; Fitness; Nutrition

Physical fitness is defined as the ability of muscles to do adequate work or to resist exerted efforts.[1] Physical fitness is assessed by measuring muscular endurance, muscular strength, cardiovascular capacity, body composition, and flexibility[2] to maintain a healthy and fit body while reducing health risks.[3] Nutrition is one of the most important factors in ensuring athletes' health and the development of their muscle structure.[4,5] Athletes should consume the energy

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and macro- and micronutrients required before, during, and after exercise in a balanced and adequate manner to improve exercise performance, recovery time, body weight maintenance, glycogen storage, and tissue building and repair.[6]

Ergogenic supplements help athletes improve their athletic performance, adapt to training, speed up post-exercise recovery, delay fatigue, prevent injuries, boost immune function, and improve overall athlete health.[7] Ergogenic nutritional supplements have long been popular among athletes. According to previous studies, young athletes, in particular, are increasingly using these products to improve both their appearance and athletic abilities.[8] When selecting these products, athletes should consider gender, age, type of exercise, whether they are amateur or professional, and any health issues. To ensure that the effects of these performance enhancers are beneficial, it should be investigated whether nutritional ergogenic supplements are safe, effective, and legal to use, and the assistance of experts should be sought.[9,10]

The aim of this study is to determine the nutrition, physical activity, and ergogenic support usage status of male athletes interested in fitness, as well as to evaluate the effect of ergogenic support usage status on body composition.

Materials and Methods

This research was conducted in accordance with the ethics statement of the committee of Lokman Hekim University before participation (Decision No.: 2021095, Date: August 9, 2021). Written parental permission was also provided for all of the volunteers. This study was conducted in accordance with the Declaration of Helsinki.

This study included 40 male volunteers between the ages of 18 and 35 years who exercised in a private fitness center in Bilecik's Söğüt District. As a data collection tool, a face-to-face survey method was used. Personal information, health and lifestyle, nutrition, physical activity, and ergogenic supports are all covered in the questionnaire. A 24-h food consumption record, including one training day and one nontraining day, was taken to determine the energy and macronutrients consumed daily. Türkomp was used for nutrient analysis. The bioelectrical impedance analysis (BIA) method was used to determine the anthropometric measurements of the participants. Body weight, body fat ratio, body fluid ratio, muscle mass, bone mass, body mass index, and basal metabolic rate were all measured in the study. A tape measure was used to determine body measurements such as height, waist, hip, and upper middle arm circumference.

Statistical Analysis

The data were analyzed using SPSS Statistics for Windows, Version 26.0 (IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp). Mean±standard deviation, number (n), and percentage (%) were used in descriptive statistical methods while evaluating the study data. The Chi-squared test was used to compare qualitative data, and Student's t-test was used for comparisons between the two groups. Significance was evaluated at $p<0.05$ level.

Results

The participants had a mean age of 25.03±3.99 years, 60% had a bachelor's degree, 32.5% had high school, and 7.5% had a master's degree. Of those polled, 95% mentioned that they had no chronic diseases and were not on any medications. It was discovered that 22.5% of the participants consumed alcohol and 17.5% smoked.

When the nutritional status of the athletes was examined, it was discovered that 42.5% of them consumed three meals per day and 75% skipped meals. Typically, 36.7% of skipped meals were snacks. Of the athletes, 36.7% who skipped meals did so because they were pressurized for time. Of the participants, 47.5% consumed 3–4 L of liquid every day. Of this, 1–2 L of fluid were consumed at a rate of 60% before and 77.5% after exercise. Of the participants, 35% consumed food 2 h before the exercise, while 32.5% consumed food 1 h before the exercise. When the feeding time after exercise was examined, 47.5% of the participants consumed food 1 h after the exercise. A combination of protein and carbohydrates was generally preferred before and after exercise.

Among the athletes, 52.5% reported that they started exercising for a healthier lifestyle. Of the participants, 42.5% had been exercising for at least 5.5 years. Of the athletes, 37.5% said they exercised 5 or more days per week, while 35% said they exercised 4 days per week. At a rate of 67.5%, the time allotted for exercise was between 1.5 and 2.5 h per day.

Ergogenic support products are used by 45% of the participants. Of the ergogenic supplements, creatine (37.5%) and protein powder (32.5%) were the most commonly used ergogenic supplements. Of the athletes who used ergogenic support products, 50% had been doing so for less than a year. The reasons for use were determined to be an increase in sporting performance of 27.8% and an increase in body muscle ratio of 20.4%. It was discovered that 22.7% of ergogenic supports were used with recommendations from media and books.

Table 1. Distribution and analysis of body measurements by ergogenic support usage status

	Mean±SD			p
	Yes (n=18)	No (n=22)	Total (n=40)	
Height (cm)	178.89±7.13	176.77±4.77	177.73±5.96	0.270
Weight (kg)	74.46±10.21	71.14±11.25	72.64±10.79	0.339
BMI (kg/m^2)	23.19±2.23	22.71±3.10	22.93±2.72	0.583
Waist (cm)	85.64±6.69	82.36±7.30	83.84±7.14	0.151
Hip (cm)	103.17±5.94	100.00±7.29	101.43±6.82	0.146
Waist–hip ratio	0.83±0.06	0.82±0.05	0.82±0.05	0.720
Upper middle arm (cm)	35.78±3.66	32.98±3.23	34.24±3.67	0.014

BMI: Body mass index; SD: Standard deviation.

Table 2. Distribution and analysis of body composition measurements by ergogenic support usage status

	Mean±SD			p
	Yes (n=18)	No (n=22)	Total (n=40)	
Fat (%)	14.81±3.85	14.47±5.53	14.62±4.79	0.830
Muscle (kg)	60.09±6.51	57.25±5.10	58.53±5.88	0.129
Bone (kg)	3.16±0.31	3.02±0.25	3.08±0.28	0.140
Liquid (%)	59.65±3.93	60.64±5.03	60.2±4.54	0.500

SD: Standard deviation.

Table 1 demonstrates the distribution and analysis of body measurements according to the ergogenic support usage status of the athletes participating in the study. When the mean body measurement values of the athletes using ergogenic supports were examined, their height was 178.89±7.13 cm, body weight was 74.46±10.21 kg, body mass index was 23.19±2.23 kg/m^2, waist circumference was 85.64±6.69 cm, hip circumference was 103.17±5.94 cm, waist–hip ratio was 0.83±0.06, and upper middle arm circumference was 35.78±3.66 cm. The mean body measurements of the athletes who did not use ergogenic aids were: height 176.77±4.77 cm, weight 71.14±11.25 kg, BMI 22.71±3.10 kg/cm^2, waist circumference 82.36±7.30 cm, hip circumference 100.00±7.29 cm, waist–hip ratio 0.82±0.05, and upper middle arm circumference 32.98±3.23 cm. The athletes' use of ergogenic support was compared with their height, weight, body mass index, waist circumference, hip circumference, and waist–hip ratio, and no statistically significant difference was found ($p>0.05$).

Table 2 shows the distribution and analysis of body composition measurements according to the ergogenic support usage status of the athletes participating in the study. The athletes who used ergogenic support had an average fat ratio of 14.81±3.85%, an average muscle mass of 60.09±6.51 kg, an average bone mass of 3.16±0.31 kg, and an average fluid ratio of 59.65±3.93%. The athletes who did not use ergogenic support had an average fat ratio of 14.47±5.53%, an average muscle mass of 57.25±5.10 kg, an average bone mass of 3.02±0.25 kg, and an average fluid ratio of 60.64±5.03%. The athletes' ergogenic support usage status was compared with their fat ratio, muscle mass, bone mass, and fluid ratio, and no statistically significant difference was found ($p>0.05$).

Table 3. Distribution and analysis of the energy and macronutrients by exercising and non-exercise days

	Mean±SD		p
	Exercise day	Non-exercise day	
Energy (kcal/day)	2487.4±314.11	2308.73±286.55	0.000
Carbs (g/day)	351.04±49.98	328.92±46.83	0.000
Protein (g/day)	111.42±30.41	98.87±24.49	0.000
Fat (g/day)	59.35±9.44	55.71±9.39	0.000

SD: Standard deviation.

Table 3 shows the distribution and analysis of the energy and macronutrients taken according to the exercise and non-exercise days. On the day of exercise, an average of 2487.4±314.11 kcal of energy was consumed, the average daily carbohydrate intake was 351.04±49.98 g, the average protein intake was 111.42±30.41 g, and the average fat intake was 59.35±9.44 g. On the day without exercise, the mean values were 2308.73±286.55 kcal energy,

328.92±46.83 g of carbohydrate, 98.87±24.49 g of protein, and 55.71±9.39 g of fat. The athletes consumed more energy, carbohydrate, protein, and fat on the day of exercise than on a non-exercise day. There was a statistically significant difference in daily energy and macronutrient consumption with and without exercise ($p<0.05$).

Discussion

Ergogenic support products are used by 45% of the athletes in our study. Of the participants, 22.7% began using ergogenic supports based on recommendations from media and books, and 20.5% on their initiative. In parallel with our study, in the study conducted by Tian et al.,[11] it was determined that 39.7% of the participants obtained information about ergogenic supports from the media. Many studies observed that the advice given by coaches is the primary reason for athletes to start using ergogenic support products.[12–16] Creatine is recommended as the most effective ergogenic supplement used to increase athletic performance and lean muscle mass.[17] In our study, it was determined that the most commonly used performance enhancers were creatine and amino acid. Besides, the study conducted by Ercen[18] in 2016 determined that the athletes mostly used protein powder (83.33%) and branched-chain amino acid (40.74%). Similarly, the study by Duran et al.[19] showed that 40.5% of individuals use protein powder, 23% amino acids, 23% creatine, and 13.5% carnitine.

The athletes' use of ergogenic support was compared with their height, weight, BMI, waist circumference, hip circumference, and waist–hip ratio, and no statistically significant difference was found ($p>0.05$). Some studies claim that there is a significant relationship between the use of ergogenic support products and height, weight, and BMI.[17,19]

The athletes in the study had an average fat ratio of 14.62%, an average muscle mass of 58.53 kg, an average bone mass of 3.08 kg, and an average fluid ratio of 60.2%. According to this study, there was no statistically significant difference in the use of ergogenic support with fat ratio, muscle mass, bone mass, and fluid ratio ($p>0.05$) although athletes who used ergogenic support had higher muscle, bone, and fat values than those who did not. According to Alpar's[17] study, there was no significant relationship between nutritional supplement use and body fat, lean mass, and fluid ratio. Bardak et al.'s[20] study showed no significant relationship between the use of ergogenic support and body fat ratio. However, a statistically significant relationship between the use of ergogenic support and the amount of lean body mass and body fluid was observed.

The athletes in the study provided two retrospective 24-h food consumption records, including exercise and non-exercise days. It was discovered that on the day of exercise, carbohydrates accounted for 56.45% of daily energy intake, proteins 17.91%, and fats 21.47%. On the non-exercise day, an average of 56.98% of the daily energy intake was derived from carbohydrates, 17.12% from proteins, and 21.71% from fats. According to the results of these data, while the amount of carbohydrates taken on the day of exercise and on the day without exercise was at the recommended level, protein intake was above the recommended amount and fat intake was below the recommended amount. Because athletes consume more energy, carbohydrate, protein, and fat on exercise days than on non-exercise days, a statistically significant difference was observed between the average energy and macronutrient consumption consumed on exercise and non-exercise days ($p<0.05$). According to a similar study, 37.65% of the energy consumed by athletes on the day of training was carbohydrate, 27.47% protein, and 34.53% fat. On a nontraining day, carbohydrates accounted for 35.88% of total energy consumed, proteins 25.14%, and fats 36.64%. A significant difference was found in macronutrient consumption on the days with and without training.[18] Another study found that 38% of the energy consumed on the day of training was made up of carbohydrates, 23% of protein, and 39% of fat. On the day without training, carbohydrates provided 39% of the energy, proteins 23%, and fats 39%. There was no significant difference in energy and macronutrient intake on the days with and without training.[21]

Conclusions

As a result, the participants began to use ergogenic support products in accordance with the recommendations from media and books to increase sports performance and muscle ratio. Only the upper middle arm circumference was significantly different between the ergogenic support users and non-users, among body composition measurements. It has been established that athletes receive more energy and macronutrients on exercise days. While the amount of carbohydrates consumed on the days with and without exercise was found to be at the recommended level, protein intake was above the recommended level and fat intake was below the recommended level. Athletes interested in fitness sports should consult with specialists such as trainers, dietitians, doctors, and geneticists about nutrition, exercise practices, and the use of ergogenic supports in this context. Ergogenic aids can be harmful as well as beneficial. Side effects from the use of inappropriate supplements, excessive amounts, or misuse should not be

overlooked. Instead of believing that ergogenic supports are the only way to improve athletic performance, they should be used as a supplement to a well-planned training and nutrition program. More scientific researches on ergogenic supplements, as well as some proven positive and negative effects, are required.

Peer-review: Externally peer-reviewed.

Ethics Committee Approval: The Lokman Hekim University Ethical Committee of Non-invasive Clinical Research granted approval for this study (date: 09.08.2021, number: 2021095).

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