

Exercise addiction, muscularity-oriented eating and beliefs about sports nutrition supplements in students who regularly exercise

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Abstract

Background and Study Aim Regular exercise has a positive effect on physical, psychological, and social health. However, excessive participation in exercise and the need for compulsive exercise can lead to exercise addiction. This addiction may result in several issues, including injuries, unhealthy eating behaviors, and negative attitudes. To prevent these potential problems, it is important to identify the extent of exercise addiction among individuals who exercise regularly. In this regard the study aims to examine the potential relationships between exercise addiction, muscularity-oriented eating and belief levels in sports nutritional supplements among students.

Material and Methods The study included 377 participants with a mean age of 24.46 ± 6.18 . All participants had been exercising regularly for at least one year, with a frequency of two days per week. Data were collected using a demographic form, the Exercise Addiction Scale, the Muscularity-Oriented Eating Test (MOET), and the Sport Nutritional Supplements Belief Scale.

Results The findings suggest that 84.6% of the participants may be classified as dependent on exercise addiction. There is a low-level but significant positive relationship between exercise addiction and muscularity-oriented eating levels ($r = 0.189$, $p < 0.001$). A similar relationship exists between exercise addiction and beliefs in sports nutrition supplements ($r = 0.179$, $p < 0.001$). Furthermore, a moderately significant positive relationship was found between muscularity-oriented eating and beliefs in sports nutrition supplements ($r = 0.361$, $p < 0.001$). Analyses based on exercise addiction levels revealed notable differences. The dependent group showed higher levels of muscularity-oriented eating compared to the risk group. They also exhibited stronger beliefs in sports nutrition supplements.

Conclusions Regular exercise among students leads to a higher likelihood of developing exercise addiction. Exercise addiction is associated with muscularity-oriented eating behaviors and strong beliefs in the efficacy of sports nutritional supplements. These behavioral patterns increase the risk of potential health issues related to excessive exercise and unhealthy dietary practices. Providing education on the effects of exercise, proper nutrition, and the responsible use of nutritional supplements is essential to mitigate these risks and promote healthier habits.

Keywords: exercises, exercise addiction, muscularity-oriented eating, sports nutritional supplement, health

Introduction

Regular exercise is widely recognized for its benefits to physical, psychological, and social health. However, when exercise becomes excessive and compulsive, it can lead to addiction and associated health risks. Exercise addiction may contribute to harmful behaviors, such as unhealthy eating patterns and a reliance on sports nutrition supplements. Understanding these relationships is essential to developing effective strategies for prevention and intervention.

Regular physical activity is an important lifestyle habit that positively impacts an individual's physical, mental, and social health [1]. Exercise, as a form of physical activity, supports physical, psychological, and psychosocial well-being. It also helps improve general health and

alleviates various psychopathological conditions [2, 3]. However, excessive exercise and compulsive exercise behavior can lead to exercise addiction [4]. Exercise addiction is a behavioral disorder where individuals lose control over their exercise habits. This addiction can negatively affect personal and social aspects of life [3, 5]. A strong desire to continue exercising despite injuries may cause several problems. These issues include feelings of deprivation, fatigue, and insomnia when exercise is not possible [6]. Additionally, exercise addiction can result in body image disturbances [7] and lead to eating disorders [8].

In recent years, muscularity-oriented eating behavior has gained attention as a factor closely associated with exercise addiction [9]. Muscularity-oriented eating refers to excessively manipulating eating habits to build muscle. This behavior is typically characterized by high-protein, low-carbohydrate diets [10]. While more common in

men, it is increasingly observed among female athletes [10, 11]. The relationship between exercise addiction and muscularity-oriented eating may be further reinforced by beliefs in sports nutritional supplements. These supplements are commonly used to accelerate muscle growth and enhance performance [12, 13]. However, false beliefs and exaggerated expectations about these products can lead to unhealthy eating habits [14]. The literature highlights that individuals with exercise addiction have a higher tendency to use sports supplements [13, 15, 16]. This behavior may result in negative health consequences [17, 18].

Previous research indicates a clear connection between exercise addiction, muscularity-oriented eating behaviors, and the use of sports nutritional supplements. These studies suggest that individuals who exhibit signs of exercise addiction are more likely to engage in rigid dietary practices aimed at muscle gain and rely heavily on supplements, often driven by false beliefs and unrealistic expectations. Such patterns can result in negative physical and psychological outcomes, including injuries, disordered eating, and body image disturbances.

The hypotheses addressed in this study are as follows:

H1a: There is a significant positive relationship between the level of exercise addiction, the level of muscularity-oriented eating, and the level of belief in sports nutritional supplements among individuals who exercise regularly.

H1b: There is a significant difference between the levels of muscularity-oriented eating and belief in sports nutritional supplements of individuals according to their level of exercise addiction.

In this regard I this regard, this study aims to examine the potential relationships between exercise addiction, muscularity-oriented eating

and belief levels in sports nutritional supplements among students.

Materials and Methods

Participants

The study participants were selected using a non-probability convenience sampling method. All participants exercised regularly for at least two days a week and resided in the Marmara region. A total of 377 individuals who had been exercising regularly for at least one year were included. The mean age of the participants was 24.46 ± 7.18 years. The majority of the participants were male (79.6%) and university students (94.2%). Detailed demographic information is presented in Tables 1 and 2.

Research Design

Ethics committee approval for the study was obtained from the University Ethics Committee on 01.10.2024, with protocol number 2024/228. All participants provided signed informed consent before participation. Individuals were included in the study voluntarily through the convenience sampling method. Participants completed a demographic form and the study scales. The entire process took approximately 15 minutes.

Demographic Form. The demographic form collected information on participants' age, gender, weight, height, and number of weekly workouts.

Exercise Addiction Scale. The Exercise Addiction Scale (EAS) was developed by Tekkurşun-Demir et al. [19] to measure exercise addiction levels. The scale consists of 17 items divided into three sub-dimensions, using a 5-point Likert-type rating (1 = Strongly Disagree; 5 = Strongly Agree).

The scoring categories are as follows:

- 1–17 points: Normal group;

Table 1. Descriptive information about the characteristics of the sample

Variables	N	$\bar{x} \pm SD$	Min.	Max.
Age (years)	377	24.46 ± 7.18	18.00	50.00
Weight (kg)	377	77.21 ± 15.22	42.00	150.00
Height (cm)	377	176.88 ± 8.43	148.00	195.00

Table 2. Frequency information about the characteristics of the sample

Variables		Frequency	%
Gender	Female	77	20.4
	Male	300	79.6
Number of weekly workouts	Minimum 2 days per week	162	43.0
	3-4 days a week	134	35.5
	4-5 days a week	49	13.0
	Over 5 days a week	32	8.5
Educational Level	University	355	94.2
	Postgraduate education	22	5.8

- 18–34 points: Low-risk group;
- 35–51 points: Moderate-risk group;
- 52–69 points: Dependent group;
- 70–85 points: Highly dependent group.

The Cronbach's alpha value for the total scale was 0.88. In the current study, the total score of the scale was used, and the Cronbach's alpha value was 0.83.

Muscularity-Oriented Eating Test (MOET). The Muscularity-Oriented Eating Test (MOET) was developed by Murray et al. [20], with Turkish validity and reliability established by Çalışkan and Alim [21]. The scale evaluates individuals' irregular eating habits related to muscularity and associated malnutrition. Higher scores indicate higher levels of muscularity-oriented eating behavior. The MOET consists of 15 items within a single dimension. It uses a 5-point Likert scale (0 = *Definitely Not True* to 4 = *Always True*). There are no reverse-scored items. The Cronbach's alpha value for the original scale was 0.88. In the current study, the total score of the scale was used, and the Cronbach's alpha value was found to be 0.74, confirming the scale's validity and reliability.

Sport Nutritional Supplements Belief Scale. The Sport Nutritional Supplements Belief Scale was developed by Hurst et al. [22], with Turkish validity and reliability established by Karafil et al. [23]. This scale assesses participants' beliefs about the use of nutritional supplements. The scale consists of 6 items within a single sub-dimension. It employs a 5-point Likert structure (0 = *Definitely Not True* to 4 = *Always True*). The Cronbach's alpha value for the original scale was 0.86. In the current study, the total score of the scale was used, and the Cronbach's alpha value was found to be 0.92, indicating high reliability.

Statistical Analysis

Data were analyzed using the SPSS 25 software package. Skewness and kurtosis tests were performed to assess the normality of the scales. Skewness values between -1.5 and +1.5 and kurtosis values between -7 and +7 indicated that

the data were suitable for a normal distribution [24, 25]. Parametric testing techniques were applied to analyze the variables. Descriptive statistics, Independent Sample *t*-tests, and Pearson correlation tests were conducted. The level of statistical significance was set at $p < 0.05$.

Results

Table 3 presents the internal consistency coefficients, total mean scores, and normality indicators for each scale used in the study. The results show that the internal consistency coefficients for all scales are within acceptable ranges, indicating good reliability. The skewness and kurtosis values fall within the recommended thresholds for normal distribution [24, 25]. These findings suggest that the data meet the criteria for normality and are suitable for further parametric analyses.

In addition, as seen in Table 4, within the scope of the Exercise Addiction Scale results, 58 (15.4%) of the participants were found to be in the risk group in terms of exercise addiction and 319 (84.6%) were in the addicted group.

As shown in Table 4, participants were categorized into different exercise addiction levels based on their scores. Most participants were classified as dependent, while a smaller proportion fell into the risk group.

Table 5 indicates significant positive relationships between the scales. Exercise addiction is positively associated with both muscularity-oriented eating behaviors and beliefs in sports nutritional supplements. Additionally, there is a moderate positive relationship between muscularity-oriented eating and beliefs in sports nutritional supplements.

Table 6 demonstrates a significant difference in muscularity-oriented eating and beliefs about sports nutritional supplements based on exercise addiction levels. Participants with higher exercise addiction scores exhibited higher levels of muscularity-oriented eating and stronger beliefs in the efficacy of sports nutritional supplements.

Table 3. Information on total scale scores

Scales	N	$\bar{x} \pm SD$	Min.	Max.	Skewness	Kurtosis	Cronbach alfa
Exercise Addiction Scale	377	59.70 $\pm$ 8.52	30.00	83.00	-0.17	0.35	0.83
Muscularity Oriented Eating Test	377	30.21 $\pm$ 6.34	1.00	51.00	-1.36	4.41	0.74
Sport Nutritional Supplements Belief Scale	377	26.66 $\pm$ 5.81	6.00	36.00	-0.86	1.75	0.92

Table 4. Exercise addiction levels of participants according to Exercise Addiction Scale score ranges

Groups	Frequency	%
Exercise Addiction Level	Risk group	58
	Dependent group	319
		15,70
		84.6

Table 6. Participants' muscularity-orientated eating and sport nutritional supplement beliefs according to their level of exercise addiction

Scales	Exercise Addition Levels	n	$\bar{X} \pm SD$	t	df	p
Muscularity Oriented Eating Test	Risk group	58	27.98 $\pm$ 9.65	-2.019	63.79	0.048*
	Dependent group	319	30.61 $\pm$ 5.46			
Sport Nutritional Supplements Belief Scale	Risk group	58	23.71 $\pm$ 7.13	-3.547	69.29	0.001*
	Dependent group	319	27.19 $\pm$ 5.38			

Note. * : p < 0.001

Table 5. The relationship between the total scores of the scales

Scales		1	2	3
Exercise Addiction Scale (1)	r	1		
	p			
Muscularity Oriented Eating Test (2)	r	0.189	1	
	p	0.000*		
Sport Nutritional Supplements Belief Scale (3)	r	0.179	0.361	1
	p	0.000*	0.000*	

Note. * : p < 0.001

Discussion

In this regard, this study aims to examine the potential relationships between exercise addiction, muscularity-oriented eating and belief levels in sports nutritional supplements among students. The findings revealed that a majority of participants exhibited signs of exercise addiction. Additionally, significant positive relationships were identified between exercise addiction, muscularity-oriented eating, and beliefs in sports nutritional supplements.

Today, the desire to be muscular and strong, common among men, and the desire to achieve a size-zero figure, common among women, often lead to body dissatisfaction [26]. This dissatisfaction can result in exercise addiction, driven by increased training and changes in eating behaviors and attitudes [9, 27, 28, 29]. Hamurcu [9] found a significant positive relationship between exercise addiction and muscularity-oriented eating. The current study supports these findings, showing that exercise addiction is related to muscularity-oriented eating behaviors. This suggests that individuals who exercise regularly exhibit more muscularity-oriented eating as their level of exercise addiction increases. However, this study did not measure whether this relationship is influenced by body dissatisfaction or the desire to be muscular. Future research should explore these factors to provide a deeper understanding of the motivations behind these behaviors.

Research shows that as the drive to become muscular increases among athletes, the use of sports supplements also rises [29, 30]. More than half of individuals who attend gyms reportedly

use nutritional ergogenic aids to enhance muscle growth [31, 32]. Studies have indicated that individuals at high risk of exercise dependence are more likely to use nutritional supplements compared to those not at risk [16]. Yurdakul [33] found that exercise addiction is associated with a belief in sports supplements and that muscularity-oriented eating contributes to excessive supplement use. Furthermore, sports supplement use has been shown to mediate the relationship between exercise addiction and eating disorders [15]. The results of the current study align with these findings. The study demonstrated that higher levels of exercise addiction correspond with stronger beliefs in sports nutrition supplements among regular exercisers. Additionally, muscularity-oriented eating behaviors were found to be associated with beliefs in sports supplements.

According to the results of the current study, 84.6% of individuals who engage in regular exercise are classified as addicted to exercise, while 15.4% are at risk of becoming addicted. This indicates that regular exercisers are prone to exercise addiction. However, research suggests that exercise addiction in athletes may stem from factors such as competitive drive, passion for their sport, and professional commitment, rather than pathological addiction [34]. Therefore, the high prevalence of exercise addiction observed in this study is unlikely to reflect a pathological condition.

Nevertheless, exercise addiction can lead to secondary issues. For example, studies show that exercise addiction is associated with eating disorders and that excessive exercise influences athletes' eating behaviors [35]. Smaoui et al. [36] found that

athletes at risk of exercise addiction had a higher risk of eating disorders compared to those who were not. In line with these findings, the current study revealed that exercise-addicted individuals exhibited higher levels of muscularity-oriented eating and stronger beliefs in sports supplements than those at risk of addiction. This suggests that regular exercisers may be prone to disordered eating and the unconscious use of sports nutrition supplements. Given that the misuse of sports supplements can lead to various health problems, it is important to raise awareness among this population regarding proper supplement use. Additionally, since muscularity-oriented eating behaviors can disrupt the boundaries of a healthy diet, individuals who exercise regularly should receive education on healthy eating practices.

Limitations of the Study

The participants were selected solely from individuals who exercise regularly, which may restrict the generalizability of the findings. Future research should consider analyzing larger and more diverse sample groups to enhance the validity of the results. Additionally, the study did not include factors such as body satisfaction and eating awareness, which could provide valuable insights into eating behaviors and nutritional habits. Further

research on the frequency and effectiveness of actual sports supplement use would also help clarify the alignment between beliefs and usage behaviors.

Conclusions

This study found significant relationships between exercise addiction, eating behaviors, and attitudes in individuals who exercise regularly. Positive relationships were observed between exercise addiction, muscularity-oriented eating, and beliefs in sports nutrition supplements. The level of exercise addiction in this population was higher than anticipated, suggesting that regular exercisers are more likely to engage in muscularity-oriented eating and hold strong beliefs in the benefits of sports supplements.

These patterns indicate that unhealthy eating behaviors and unnecessary supplement use may develop, potentially posing health risks. Given the high prevalence of exercise addiction, early detection and prevention strategies are crucial. Additionally, implementing educational programs on healthy nutrition and appropriate supplement use, supported by multidisciplinary teams, could promote healthier exercise habits and reduce associated risks.

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