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Research Article



The Role of Supplementation in Enhancing Recovery and Endurance among Fitness Trainers

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Abstract

This study investigates the supplementation practices among fitness trainers in Istanbul, focusing on their experiences with supplements aimed at enhancing recovery and endurance. Utilizing a mixed-methods approach, the research involved a structured survey of 20 fitness trainers, gathering quantitative data on supplementation habits and qualitative feedback on their effectiveness. The results highlight trainers' widespread use of Branched-Chain Amino Acids (BCAAs), whey protein, creatine, pre-workout supplements, and L-carnitine to support muscle recovery and endurance during intense training sessions. The findings underscore the importance of these supplements in fitness trainers' routines, enabling them to sustain high training volumes and avoid overtraining. Additionally, the study reveals the role of ZMA in improving sleep quality, thereby enhancing recovery and overall performance. This research provides valuable insights into how these supplements contribute to trainers' overall fitness and performance, offering practical recommendations for optimizing physical capabilities.

Introduction

The fitness industry has evolved significantly over the past few decades, with an increasing emphasis on optimizing physical performance, enhancing recovery, and maintaining overall health [1,2]. Central to this evolution is the use of dietary supplements, which have become an integral part of the regimen for recreational and professional athletes [3-5]. Fitness trainers serve as mentors and role models within this industry and are at the forefront of this trend [6-8]. They guide their clients through training routines and influence their nutritional choices, often based on supplementation practices [9,10].

Dietary supplements are marketed for various purposes, including improving muscle strength, boosting endurance, facilitating recovery, and supporting overall health and wellness [1,11,12]. Among these, the supplements to enhance recovery and endurance are particularly critical for athletes and fitness professionals who train at high intensities [13-15]. Recovery supplements, such as Branched-Chain Amino Acids (BCAAs) and whey protein, are designed to reduce muscle soreness, accelerate muscle repair, and improve overall recovery times, allowing athletes to train more consistently

and with less risk of injury [16-18]. Endurance supplements, such as creatine and pre-workout formulas, are intended to sustain energy levels, improve stamina, and support prolonged physical activity [19-21].

For fitness trainers, the ability to recover quickly and maintain high levels of endurance is essential for their personal performance and critical in setting a positive example for their clients [22,23]. Effective recovery allows trainers to maintain the intensity and frequency of their training sessions, while enhanced endurance enables them to perform at their best over extended periods [24-26]. As a result, understanding which supplements are most effective in these areas can provide valuable insights for trainers looking to optimize their physical capabilities and overall health.

Despite the widespread use of supplements in the fitness community, there is often variability in the effectiveness of different products based on individual needs, training goals, and physiological responses [4,27]. This study seeks to explore the supplementation practices of fitness trainers in Istanbul, focusing specifically on their experiences with supplements aimed at improving recovery and endurance. By analyzing the types of supplements used, the frequency of

their use, and the qualitative feedback from trainers regarding their experiences, this study provides a comprehensive understanding of how these products contribute to trainers' overall fitness and performance, thereby offering valuable insights for fitness professionals and their clients.

Moreover, the study examines the demographic characteristics of the participants, including their age, years of experience as fitness trainers, and training habits, to contextualize the findings within the broader landscape of fitness training. Through this detailed exploration, the study hopes to offer actionable insights for fitness professionals and their clients, contributing to more informed decisions regarding supplement use to pursue optimal physical performance and health.

Method

This study employed a convergent parallel mixed-methods approach, integrating quantitative data from structured surveys with qualitative insights from in-depth interviews [28-30]. The quantitative data provided a statistical overview of supplementation practices, while the qualitative data offered rich, contextual insights into the trainers' experiences with supplementation. This methodological combination allowed for a comprehensive analysis, ensuring the statistical findings were grounded in the participants' lived experiences. The quantitative aspect involved a structured survey that collected detailed information on supplementation practices to enhance recovery and endurance [28]. Meanwhile, the qualitative aspect included in-depth interviews to capture the participants' experiences and perceptions [31]. The following subsections outline the key aspects of the methodology used in this study.

Participants

The study sample consisted of 20 fitness trainers, representing a diverse cross-section of the fitness community in İstanbul. The participants varied in their years of experience as fitness trainers, ranging from 1 to 12 years. The demographic details of the participants are summarized in the Table 1.

Integration of methods

In this mixed-methods study, the quantitative data from the structured survey was complemented by qualitative insights gathered through interviews [28]. This approach provided a comprehensive analysis of the supplementation practices, ensuring that statistical data was enriched with personal experiences and perceptions from the participants [31]. The integration of these methods allowed for a robust understanding of how supplementation impacts recovery and endurance among fitness trainers.

Table 1: Demographic Characteristics of Study Participants.

Demographic Characteristic	Category	N
Gender	Male	12
	Female	8
Age Range	22-25 years	7
	26-30 years	9
	31+ years	4
Experience	1-3 years	6
	4-7 years	8
	8-12 years	6
Training Frequency	3-4 days per week	4
	5-6 days per week	14
	7 days per week	2
Training Duration	Less than 1 hour	4
	1-2 hours	14
	More than 2 hours	2

Sample selection, data collection, and analysis

The sample was selected using purposive sampling to ensure a broad representation of fitness trainers in İstanbul [32]. Data collection involved administering the structured survey and conducting in-depth interviews [28]. The quantitative data was analyzed using descriptive statistics to summarize the supplementation practices [33]. Meanwhile, the qualitative data was subjected to thematic analysis, identifying key patterns and insights related to trainers' attitudes and experiences with supplementation [34].

Survey design

The survey comprised closed and open-ended questions to capture quantitative data and qualitative insights [35]. The questions were structured to cover several key areas:

- 1. Demographic information:** Participants were asked about their age, gender, years of experience as fitness trainers, and typical training frequency and duration.
- 2. Supplementation habits:** Participants provided details about the types of supplements they used, the frequency of their use, and the specific purposes for which they were used (e.g., recovery, endurance, general health). This involved gathering data on various supplementation strategies, including creatine use and recovery supplements, which have been noted for their effectiveness in supporting athletic performance and recovery [3,5,17,36].
- 3. Perceived effects of supplements:** Participants were asked to describe their experiences with the supplements, focusing on how these products impacted their recovery, endurance, and overall performance.

- 4. Qualitative feedback:** Open-ended questions allowed participants to provide more detailed insights into their supplementation practices, including any challenges they faced, the perceived effectiveness of the supplements, and any recommendations they had for others in the fitness community [37].

Data analysis

The survey data were analyzed in two stages:

- 1. Quantitative analysis:** The quantitative data, including demographic information and supplementation habits, were analyzed to identify common participant patterns and trends. The results were summarized in frequency tables to provide an overview of the participants' characteristics and practices [29].
- 2. Qualitative analysis:** The qualitative feedback from participants was analyzed thematically. Responses were coded based on the type of supplement used and the specific benefits or challenges reported. This thematic analysis identified key trends and insights related to using supplements for recovery and endurance [37].

The combination of quantitative and qualitative analyses provided a comprehensive understanding of fitness trainers' supplementation practices. The findings from both analyses are presented in the results section, supported by direct quotes from participants to illustrate the practical impact of these supplements on their training regimens.

Results

The analysis of the survey data revealed that fitness trainers prefer several essential supplements for enhancing recovery and endurance. The results are summarized in Table 2 below, highlighting the supplements the participants used, their experience levels, and the specific benefits they reported.

The survey data revealed that 85% of the participants reported regular use of BCAAs, with 70% using whey protein as part of their recovery regimen. Creatine was utilized by 65% of trainers primarily for its performance-enhancing benefits. Notably, 40% of trainers reported using pre-workout supplements, with the majority (75%) indicating a preference for caffeine-based formulas. Additionally, L-carnitine was used by 35% of participants, particularly during extended cardio sessions. ZMA was used by 25% of the trainers, primarily for its sleep-enhancing benefits. These quantitative findings underscore the reliance on specific supplements for recovery and endurance among fitness trainers.

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recovery and endurance. The results have been summarized in the table below, highlighting the supplements the participants used, their experience levels, and the specific benefits they reported.

Table 2 above provides a detailed summary of the qualitative feedback received from the fitness trainers who participated in the study. Each row corresponds to a specific supplement, with columns detailing individual participant experiences and comments highlighting their observed benefits.

BCAAs

Participants P1, P2, P3, P10, P11, and P19 consistently reported that BCAAs were instrumental in reducing muscle soreness and fatigue, which allowed them to train more frequently and with greater intensity. The comments underscore BCAAs' role in recovery and endurance, making them a critical component of the participants' supplementation routines.

Whey protein

Trainers P4, P5, P6, P12, P16, and P18 emphasized the importance of whey protein in supporting muscle recovery. They noted that whey protein helped them meet their protein needs, facilitated faster recovery, and maintained muscle mass during intense training. This reflects the well-established role of whey protein in promoting muscle protein synthesis, especially post-workout.

Creatine

Participants P7, P8, P9, P15, P17, and P20 highlighted creatine's dual benefits in enhancing performance and reducing recovery time. Their comments suggest that creatine boosts strength and endurance and helps quicker recovery between sessions, allowing for more consistent training.

Pre-workout supplements

Trainers P13, P14, P15, P18, and P19 discussed the energy and endurance boost provided by pre-workout supplements. Their comments reflect the role of pre-workout formulas in sustaining high energy levels during prolonged or intense workouts, making them particularly valuable for endurance training.

L-carnitine

Participants P16, P17, and P18 reported that L-carnitine reduced muscle soreness and enhanced endurance, particularly during long cardio sessions. These comments suggest that L-carnitine's role in fat metabolism may contribute to its effectiveness in supporting endurance activities.

Table 2: Participant Feedback on Supplement Use for Recovery and Endurance.

Supplement	Participant	Comment
BCAAs	P1	"BCAAs helped significantly reduce muscle soreness after intense workouts, allowing me to train more frequently."
	P2	"Taking BCAAs before my workout has noticeably reduced fatigue, allowing me to train longer and harder."
	P3	"BCAAs are a staple in my recovery routine; they make a huge difference in how quickly I bounce back after a tough session."
	P10	"BCAAs help me maintain endurance during long sessions by reducing muscle fatigue."
	P11	"BCAAs have allowed me to recover faster and train more frequently without overtraining."
	P19	"BCAAs have been essential in my recovery, especially after heavy lifting sessions."
Whey Protein	P4	"Whey protein has been crucial in supporting my muscle recovery, especially when I struggle to meet my protein needs through diet alone."
	P5	"I have found that whey protein helps me recover faster and maintain muscle mass during intense training periods."
	P6	"Whey protein is essential for my recovery; without it, I notice a significant drop in my performance and energy levels."
	P12	"Whey protein shakes post-workout are non-negotiable for my recovery process."
	P16	"Incorporating whey protein into my diet has made a noticeable difference in my recovery and strength gains."
	P18	"Whey protein has been the key to maintaining muscle mass and speeding up recovery."
Creatine	P7	"Creatine not only boosts my performance but also helps with faster recovery between training sessions."
	P8	"After starting creatine, I noticed less soreness and quicker recovery times, which allows me to train harder the next day."
	P9	"Creatine is an all-around supplement for me—it significantly improves my strength and reduces recovery time."
	P15	"Creatine has been essential in sustaining my performance and aiding in faster recovery after intense workouts."
	P17	"Creatine has helped me increase my endurance and strength while reducing muscle soreness."
	P20	"Creatine has allowed me to push through tough workouts and recover quicker, making it indispensable in my routine."
Pre-workout	P13	"Pre-workout supplements give me that extra push I need to sustain energy and endurance throughout my training."
	P14	"The boost from pre-workout makes a huge difference in how long I can keep going, especially during cardio."
	P15	"With pre-workout, I feel more energized and can push through the toughest parts of my workout without fatigue."
	P18	"Pre-workout has been crucial for maintaining intensity during long training sessions."
	P19	"Pre-workout gives me the energy and focus I need to get through my toughest workouts."
L-Carnitine	P16	"L-Carnitine has been a game-changer in reducing soreness and speeding up my recovery after long, strenuous workouts."
	P17	"L-carnitine has been great for endurance, especially on longer cardio days where fat utilization is key."
	P18	"L-carnitine supports my recovery and helps me maintain energy levels during extended cardio sessions."
ZMA	P20	"ZMA helped improve my sleep quality, which made a noticeable difference in my recovery and energy levels the next day."
	P12	"With ZMA, I have seen improvements in my sleep and recovery, which has boosted my overall performance."
	P14	"ZMA has helped me maintain a regular sleep schedule, which is critical for recovery and overall well-being."

ZMA

Trainers P20, P12, and P14 mentioned ZMA's impact on improving sleep quality, directly influencing recovery and energy levels. This highlights the importance of rest in the recovery process and suggests that ZMA could be a valuable supplement for trainers seeking to optimize their recovery through better sleep.

Discussion

The results of this study underscore the critical role of supplementation in the recovery and endurance strategies employed by fitness trainers. The qualitative feedback provided by the participants offers valuable insights into how specific supplements contribute to their overall fitness and performance.

Recovery

BCAAs emerged as a key supplement for recovery, with participants reporting significant reductions in muscle soreness and fatigue. This aligns with the known benefits of BCAAs in promoting muscle protein synthesis and reducing exercise-induced muscle damage [16,18,38]. The ability of BCAAs to enhance recovery is particularly valuable for trainers who engage in frequent and intense training sessions, as it allows them to maintain a higher training volume without risking overtraining. Moreover, these findings are consistent with existing literature highlighting BCAAs' role in decreasing markers of muscle damage, thereby enabling quicker recovery between sessions [39]. This is especially crucial for trainers with limited recovery time due to back-to-back training commitments, making BCAAs an indispensable part of their regimen.

Whey protein was also highlighted as essential for recovery. Its high bioavailability and rich amino acid profile make it an ideal supplement for post-workout recovery. The trainers' comments suggest that whey protein supports muscle repair and helps maintain muscle mass, which is crucial for long-term performance [3,17,22,23]. The anabolic properties of whey protein, facilitated by its rapid absorption and high leucine content, have been well-documented in scientific studies, providing a robust basis for its widespread use among fitness professionals [40]. Additionally, whey protein's role in reducing recovery time and preventing muscle catabolism is particularly beneficial for trainers managing high-intensity workout regimens, ensuring they can sustain their performance over extended periods [3].

Creatine was noted for its dual role in improving performance and supporting recovery. The trainers reported quicker recovery times and reduced muscle soreness with creatine use, consistent with the literature on creatine's benefits in reducing muscle damage and inflammation. This makes creatine a versatile supplement for trainers who need to optimize their performance and recovery [3,17]. Beyond its well-known effects on strength and power, creatine's impact on enhancing muscular endurance and reducing the perception of fatigue highlights its multifaceted benefits. Recent studies suggest that creatine supplementation may also support cognitive function and recovery from mental fatigue, which is critical for maintaining focus and decision-making during extended training sessions or competitions [19].

Endurance

Creatine also stood out for its impact on endurance. Participants noted that creatine allowed them to sustain energy levels and maintain performance during high-intensity workouts. This suggests that creatine's benefits extend beyond strength and power, making it an effective supplement for endurance athletes [19,41,42]. The ability of creatine to enhance the phosphocreatine system, thereby improving ATP resynthesis during short bursts of high-intensity activity, is well-supported by research [3,42]. This mechanism is particularly advantageous for sports requiring repeated intense effort, such as sprinting, weightlifting, and high-intensity interval training (HIIT). Moreover, creatine's potential to support sustained aerobic performance through improved mitochondrial efficiency is an emerging area of interest, broadening its applicability beyond traditional strength-focused disciplines [19,41].

Pre-workout supplements were frequently mentioned in the context of endurance. The energy boost provided by these supplements, often due to their caffeine content, was crucial for sustaining performance during long or intense training sessions. The trainers' comments reflect the

importance of maintaining energy levels and focus during workouts, critical factors in endurance performance [43-45]. The ergogenic effects of caffeine, such as increased alertness, reduced perception of effort, and enhanced fat oxidation, are well-established in the literature [43]. These benefits can significantly enhance endurance performance by delaying the onset of fatigue and improving time to exhaustion. Additionally, other ingredients commonly found in pre-workout formulas, such as beta-alanine and citrulline malate, may further enhance endurance by buffering lactic acid and improving blood flow, respectively [44,45].

L-carnitine was specifically mentioned to enhance endurance through improved fat metabolism. The trainers' experiences suggest that L-Carnitine may be beneficial during longer cardio sessions, where sustained energy is required [39,46]. L-carnitine's role in facilitating the transport of fatty acids into the mitochondria for oxidation is crucial for endurance athletes who rely on fat as a primary energy source during prolonged exercise [39]. By enhancing fat utilization, L-carnitine spares glycogen stores and helps maintain steady energy levels, reducing the likelihood of hitting the so-called "wall" during endurance events. The potential of L-carnitine to improve recovery by reducing muscle soreness and oxidative stress further underscores its value in an athlete's supplement arsenal [14,38].

ZMA, while not directly linked to endurance, plays an indirect role in improving sleep quality, which is essential for recovery. Better recovery, in turn, supports overall endurance by reducing fatigue and allowing for more consistent training [47,48]. The importance of sleep in athletic performance cannot be overstated, as during sleep, the body undergoes critical recovery processes, including muscle repair, memory consolidation, and hormonal regulation [47]. ZMA, a combination of zinc, magnesium aspartate, and vitamin B6, has been shown to enhance sleep quality by promoting deeper and more restful sleep, thus facilitating better recovery and overall performance. For athletes who may struggle with sleep due to the demands of training or competition schedules, ZMA offers a natural and effective solution to support their recovery needs [47].

While the study focused on widely used supplements like BCAAs, whey protein, and creatine, it is important to acknowledge other less commonly used supplements that may still offer benefits. For example, beta-alanine and beetroot juice have been suggested to improve endurance and reduce muscle fatigue. However, they have yet to be widely reported by the participants in this study.

Study limitations

The study is limited by its small sample size of 20 participants, which may not fully represent the broader

population of fitness trainers. Additionally, the self-reported nature of the data introduces potential biases, such as recall bias and social desirability bias. Future studies should include a larger, more diverse sample and consider longitudinal designs to assess the long-term effects of supplementation.

This study provides valuable insights into fitness trainers' supplementation practices, highlighting the critical role of certain supplements in enhancing recovery and endurance.

Conclusion

This study provides valuable insights into fitness trainers' supplementation practices, highlighting the critical role of certain supplements in enhancing recovery and endurance. BCAAs, whey protein, and creatine are the most favoured supplements for supporting muscle repair and improving workout performance. The findings suggest that fitness trainers prioritize supplements that offer tangible benefits in their training regimens, particularly those that contribute to faster recovery and sustained endurance. Future research could explore the long-term effects of these supplements on fitness outcomes and their potential role in preventing overtraining and injury.

Ethical considerations

This study followed the highest ethical standards and received approval from the Social and Human Sciences Ethics Committee at Istanbul Aydin University (Approval No: 2024/01). Informed consent was obtained from all participants before their inclusion in the study, ensuring their awareness and voluntary participation in the research and its publication.

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