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**Investigation of Ergogenic Aid and Nutritional Supplement Consumption  
Patterns in Judo Athletes**

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## **Investigation of Ergogenic Aid and Nutritional Supplement Consumption Patterns in Judo Athletes**

**Abstract:** This cross-sectional study aimed to examine the use of ergogenic aids and dietary supplements among judo athletes. A total of 205 voluntary participants representing various age groups, genders, and competition levels (amateur and professional) were included in the study. Data from 59 athletes who reported not using any supplements were excluded from the analysis, which was conducted based on 146 supplement users (71.22%). Data was collected via an online questionnaire developed in accordance with the relevant literature and finalized with expert input.

Among the participants, 92.47% reported using stimulant-type supplements, 75.34% recovery-oriented supplements, 59.59% performance-enhancing supplements, and 41.1% weight-control-related supplements. While stimulants and performance supplements were primarily used during pre-season and competition periods, recovery and weight-control supplements were used more consistently throughout the year.

Findings indicated notable differences in supplement use across age groups. A more consistent pattern of supplement use was observed in the 24–25 age group, whereas younger athletes reported lower usage rates. Furthermore, increased recovery demands in older age groups appeared to influence a greater tendency toward supportive supplement use.

In conclusion, dietary supplement use is prevalent among judo athletes; however, usage patterns vary significantly by supplement type, age group, and training phase. These findings underscore the need for individualized nutrition strategies tailored to athletes' age and developmental stage.

**Keywords:** Judo, Ergogenic Aids, Dietary Supplements, Athlete Nutrition, Performance-Enhancing Substances.

### **Introduction**

The use of ergogenic aids and nutritional supplements by athletes—aimed at enhancing performance, accelerating recovery, and supporting overall health—has garnered increasing attention in both academic and professional settings in recent years. Particularly in competitive sports, the rising expectations for success have led athletes to turn more frequently to such supportive products. While nutritional supplements are commonly used for general health, immune support, and to address dietary deficiencies, ergogenic aids are preferred for performance-related goals such as enhancing physical capacity, increasing training efficiency, and speeding up recovery processes (Maughan, 2013).

In sports such as judo, which simultaneously demand endurance, strength, and flexibility, the use of ergogenic aids and nutritional supplements plays a strategically important role. Due to high training loads and the stress associated with competition, athletes in this discipline may struggle to maintain energy balance. In this context, ergogenic aids stand out as valuable tools for judokas, offering benefits such as increased muscle strength, reduced fatigue, and accelerated recovery. Weight-class athletes often use various ergogenic aids and diets to improve performance and recovery as well as weight control (Slimani, et al., 2021; Bayburtlu &

Genç, 2022). Although ergogenic aids—spanning a wide range of substances—are commonly used to enhance performance across various sports disciplines, their long-term use may lead to serious health risks (Aydın & Genç, 2023). Unconscious or unnecessary use of such products can create both health risks and ethically controversial situations.

Studies have shown that the prevalence of supplement use among athletes ranges between 50% and 90%. Notably, younger athletes tend to use these supplements with less awareness compared to their professional counterparts (Al Khoury & Antoine-Jonville, 2012). The primary motivations driving athletes toward supplementation include compensating for inadequate nutrition, enhancing physical capacity under performance pressure, and accelerating post-exercise recovery. However, when the contents of some products are inaccurately labeled or consumed in excessive doses, they may pose health risks or lead to doping-like consequences (Maughan, 2013).

At the international level, there is a limited number of studies specifically examining nutritional habits and supplement use among judokas. Existing literature has largely focused on sports such as football, swimming, and athletics, leaving a research gap regarding judokas. This underlines the need for more in-depth investigations to define the ergogenic aid usage profiles of judokas and to raise awareness among these athletes. Moreover, thoroughly assessing athletes' levels of knowledge, their reasons for supplement use, and the effects of these products could significantly contribute to the sports science literature.

This study aims to investigate the ergogenic aid and nutritional supplement consumption profiles of judo athletes, with the objective of understanding current patterns and identifying potential health risks. Furthermore, the findings are expected to offer practical guidance for athletes and coaches, promoting the safer and more informed use of such products.

## **Materials and Methods**

### **Research Design**

This study was designed as a cross-sectional investigation aimed at evaluating the ergogenic aid and nutritional supplement use profiles of judo athletes.

### **Sample**

The research was conducted on a total of 205 judokas selected according to predetermined criteria. The sample included a diverse range of age groups, genders, and athletic levels (amateur and professional). Participation in the study was voluntary.

### **Data Collection Tool**

Data was collected using a questionnaire developed via Google Forms. The survey included items on demographic information, athletic background, use of ergogenic aids and nutritional supplements, frequency and types of usage, as well as reasons for consumption. The questionnaire was adapted based on previous studies in the literature and finalized with input from subject-matter experts.

### **Statistical Analysis**

The collected data were analyzed using SPSS version 26.0 (Statistical Package for the Social Sciences). Demographic data and survey responses were summarized using frequency and

percentage distributions. Specifically, variables such as age, gender, athletic experience, and ergogenic aid usage were analyzed through percentage breakdowns. Frequency and percentage analyses were presented in detail to clearly describe the participant profile and to visualize the distribution of the collected data.

## Results

The frequency and percentage analyses of the data obtained in the study are presented in detail through the following tables, revealing the participant profile and characteristics of ergogenic aid and nutritional supplement use related to performance.

Table 1. Descriptive Characteristics of Judo Athlete Participants (n = 205)

| Participant Characteristics               | n   | %     |
|-------------------------------------------|-----|-------|
| Age Distribution (Years)                  |     |       |
| 18-19                                     | 58  | 28.29 |
| 22-23                                     | 40  | 19.51 |
| 20-21                                     | 37  | 18.05 |
| 24-25                                     | 31  | 15.12 |
| 26-27                                     | 28  | 13.66 |
| ≥28                                       | 11  | 5.37  |
| Gender Distribution                       |     |       |
| Male                                      | 107 | 52.2  |
| Female                                    | 98  | 47.8  |
| Distribution of Sports Experience (Years) |     |       |
| ≥5                                        | 102 | 49.76 |
| 4                                         | 35  | 17.07 |
| 3                                         | 68  | 33.17 |
| Sporting Career Level                     |     |       |
| Local                                     | 114 | 55.61 |
| National                                  | 39  | 19.02 |
| International (non-medalist)              | 38  | 18.54 |
| International (Medalist)                  | 14  | 6.83  |
| Number of Training Days per Week (Day)    |     |       |
| 6                                         | 83  | 40.49 |

|   |    |       |
|---|----|-------|
| 5 | 53 | 25.85 |
| 3 | 43 | 20.98 |
| 4 | 26 | 12.68 |

Most participants were athletes in the 18–19 age group (28.29%), indicating that the sample was predominantly comprised predominantly of young athletes. The gender distribution was relatively balanced, with 52.2% male and 47.8% female participants. Regarding training experience, approximately half of the judokas (49.76%) had been practicing judo for five years or more. In terms of athletic career level, 55.61% competed at the local level, while only 6.83% had experience at the international level. As for weekly training frequency, a significant portion of the participants (40.49%) reported training six days a week. These findings suggest that most participants were young, experienced, and engaged in high-frequency training routines.

A general question was posed to participants regarding whether they had ever used any nutritional supplements throughout their athletic careers, and the responses are presented in Table 2.

Table 2. Nutritional Supplement Usage Status

| Response | n   | %      |
|----------|-----|--------|
| Yes      | 146 | 71.22  |
| No       | 59  | 28.78  |
| Total    | 205 | 100.00 |

An examination of the participants' nutritional supplement usage revealed that 71.22% (n=146) reported using supplements, while 28.78% (n=59) indicated they did not. The proportion of supplement users was found to be substantially higher than that of non-users.

Table 2. Nutritional Supplement Use by Age Group

| Age Group (years) | Total Athletes (n=205) | Supplement Users (n=146) | Overall Percentage (%) | Within-Group Usage Rate (%) |
|-------------------|------------------------|--------------------------|------------------------|-----------------------------|
| 18–19             | 58                     | 32                       | 21.92                  | 55.17                       |
| 20–21             | 37                     | 28                       | 19.18                  | 75.68                       |
| 22–23             | 40                     | 30                       | 20.55                  | 75.00                       |
| 24–25             | 31                     | 18                       | 12.33                  | 58.06                       |
| 26–27             | 28                     | 20                       | 13.70                  | 71.43                       |

|       |     |     |        |       |
|-------|-----|-----|--------|-------|
| 28+   | 11  | 8   | 5.48   | 72.73 |
| Total | 205 | 146 | 100.00 | —     |

According to the table, supplement use rates vary across age groups. The lowest usage rate was observed in the 18–19 age group at 55.17%, while the highest rate was recorded in the 20–21 age group at 75.68%. In the other age groups, usage rates ranged between 58.06% and 75.00%. Overall, 146 out of 205 athletes (71.22%) were found to use nutritional supplements.

In this section, participants who reported not using any ergogenic aids or nutritional supplements (n=59, 28.78%) were excluded from further analysis. The analyses were conducted exclusively on judokas who stated that they used supplements (n = 146, 71.22%) (Tables 3–10).

### Use of Stimulant-Based Nutritional Supplements

Table 3. General Usage of Stimulant-Based Supplements

| Response | n   | %      |
|----------|-----|--------|
| Yes      | 135 | 92.47  |
| No       | 11  | 7.53   |
| Total    | 146 | 100.00 |

The data reflects the athletes' use of supplements with stimulant effects. According to the results, (92.47%; n = 135) reported using such supplements, while only 11 participants (7.53%) stated that they did not. These findings indicate a widespread tendency among athletes to consume supplements with stimulant properties.

Table 4. Distribution of Stimulant Supplement Use Across Different Times of the Year

| Period                     | n   | %      |
|----------------------------|-----|--------|
| Pre-season Only            | 55  | 40.74  |
| Competition Period Only    | 40  | 29.63  |
| Throughout the Entire Year | 40  | 29.63  |
| Total                      | 135 | 100.00 |

According to the findings, 40.74% of the participants (n = 55) reported using such supplements only during the pre-season period. The proportion of those who used them exclusively during competition periods was 29.63% (n = 40), while an equal proportion (29.63%; n = 40) indicated year-round usage. These results suggest that the use of stimulant supplements is largely concentrated in targeted periods (particularly pre-season or competition phases), although a considerable number of athletes tend to use them consistently throughout the year.

### Use of Performance-Enhancing Nutritional Supplements

Table 5. Usage Status of Performance-Enhancing Supplements

| Response | n | % |
|----------|---|---|
|----------|---|---|

|       |     |        |
|-------|-----|--------|
| Yes   | 87  | 59.59  |
| No    | 59  | 40.41  |
| Total | 146 | 100.00 |

A total of 59.59% of the participants (n = 87) reported regular use of performance-enhancing supplements, while 40.41% (n = 59) stated that they did not use such products. This indicates that a significant proportion of athletes tend to utilize performance-enhancing aids.

Table 6. Seasonal Use Patterns of Performance-Enhancing Supplements

| Period                     | n  | %      |
|----------------------------|----|--------|
| Pre-season Only            | 30 | 34.48  |
| Competition Period Only    | 27 | 31.03  |
| Throughout the Entire Year | 30 | 34.48  |
| Total                      | 87 | 100.00 |

The data indicates the periods of the year during which athletes use performance-enhancing supplements. Among the participants, 34.48% (n = 30) reported using these supplements only during the pre-season, while 31.03% (n = 27) used them exclusively during competition periods. Additionally, 34.48% reported consistent use throughout the year. These findings suggest that the use of performance-enhancing supplements may be both period-specific and continuous.

### Use of Nutritional Supplements for Weight Control

Table 7. Regular Use of Supplements for Body Weight Control

| Response | n   | %      |
|----------|-----|--------|
| Yes      | 60  | 41.1   |
| No       | 86  | 58.9   |
| Total    | 146 | 100.00 |

A total of 41.1% of the participants (n = 60) reported regularly using supplements for body weight control, while 58.9% (n = 86) stated that they did not engage in such use. Although the majority did not use supplements for this purpose, the findings indicate a noteworthy prevalence of supplement use aimed at weight management among athletes. This tendency may be particularly pronounced in sports where weight categories play a significant role.

Table 8. Timing of Nutritional Supplement Use for Weight Control

| Period                  | n  | %     |
|-------------------------|----|-------|
| Pre-season Only         | 22 | 36.67 |
| Competition Period Only | 18 | 30.0  |

|                            |    |        |
|----------------------------|----|--------|
| Throughout the Entire Year | 20 | 33.33  |
| Total                      | 60 | 100.00 |

According to the responses, 36.67% of athletes who used supplements for weight control did so only during the pre-season, while 30% reported using them exclusively during competition periods. Additionally, 33.33% indicated consistent use throughout the year. This distribution suggests that supplement use for weight control can be specific to either the preparation or competition phases, while for some athletes, it continues throughout the entire season.

### *Use of Recovery-Oriented Nutritional Supplements*

Table 9. Usage Status of Recovery Supplements Among Athletes

| Response | n   | %      |
|----------|-----|--------|
| Yes      | 110 | 75.34  |
| No       | 36  | 24.66  |
| Total    | 146 | 100.00 |

A total of 75.34% of the participants (n = 110) reported regular use of recovery-oriented supplements, while 24.66% (n = 36) stated that they did not use such products. This high proportion indicates that recovery-supporting supplements are widely adopted among athletes and play a significant role in post-training recovery processes.

Table 10. Seasonal Use Patterns of Recovery Supplements

| Period                     | n   | %      |
|----------------------------|-----|--------|
| Pre-season Only            | 40  | 36.36  |
| Competition Period Only    | 35  | 31.82  |
| Throughout the Entire Year | 35  | 31.82  |
| Total                      | 110 | 100.00 |

Findings regarding the timing of recovery supplement use show that 36.36% of participants used such supplements only during the pre-season. Two equally sized groups (31.82% each) reported using them exclusively during competition periods or consistently throughout the year. This distribution suggests that the use of recovery supplements is largely concentrated in preparation and competition phases, although a considerable number of athletes prefer continuous use year-round.

### **Discussion**

An examination of the demographic characteristics of the 205 judo athletes included in this study shows that the majority of participants were young athletes aged 18–19 years (28.29%), with a gender distribution of 52.2% male and 47.8% female. Approximately half of the participants had been practicing judo for five years or more. In terms of competitive level, 55.61%



competed at the local level, while only 6.83% competed internationally. Regarding training frequency, 40.49% reported training six days per week (Table 1).

This study explored the profiles of ergogenic aid and nutritional supplement use among judo athletes within the framework of their demographic characteristics, athletic history, and training habits. The findings indicated that 71.22% ( $n = 146$ ) of the participants used at least one type of supplement (Table 2). This relatively high proportion highlights the widespread use of supplements in physically demanding sports such as judo.

According to the results, the most used supplements among judo athletes were those providing basic nutritional support. This suggests that rather than prioritizing performance-enhancing supplements, athletes focused on maintaining energy balance and supporting recovery processes. Protein powders, vitamin-mineral complexes, and electrolyte supplements formed the foundation of general usage. Similar trends have been reported in the literature; for instance, Knapik et al. (2016) noted that multivitamins and vitamin C were frequently used by elite athletes.

Supplement usage rates varied across age groups (Table 3), with the lowest rate observed in the 18–19 age group (55.17%) and the highest in the 20–21 age group (75.68%). Other age groups showed rates ranging from 58.06% to 75.00%. These results indicate a modest increase in supplement use with age. However, this trend may be more closely associated with career stage, training intensity, and individual needs rather than age alone. Sundgot-Borgen et al. (2003) reported that supplement use among elite athletes is often influenced by coaches, medical staff, and teammates. Similarly, McDowall (2007) emphasized that young athletes' decisions regarding supplement use are shaped by environmental factors (coaches, family, peers) and knowledge levels. Wardenaar et al. (2017) found that supplement use was more prevalent among elite athletes and that dietary counseling contributed to more informed choices. Conversely, Braun et al. (2009) pointed out that some young athletes begin using supplements at an early age, often without sufficient guidance or information. These findings underscore that age is not the sole determinant—access to information, competitive level, and external influences also play critical roles.

Among participants, 59.59% ( $n=87$ ) reported using performance-enhancing supplements (Table 5). This proportion may be considered moderate compared to similar combat sports. Creatine monohydrate and pre-workout products were likely among the most frequently used performance aids. Despite their potential benefits, the relatively modest usage rates suggest that athletes may approach such products cautiously or lack sufficient information. Concerns about anti-doping regulations and supplement reliability may also contribute to this hesitancy. Backhouse et al. (2013) noted that athletes who use supplements may exhibit more permissive attitudes toward doping, which could correlate with broader doping behaviors. Similarly, Wardenaar et al. (2017) observed that athletes without access to dietary counseling made less informed decisions about supplements, often resulting in uncertainty regarding the safety of performance enhancers. Mettler, Mitchell, and Tipton (2010) affirmed the scientific basis for the use of creatine and beta-alanine, particularly for improving high-intensity exercise performance.

The use of stimulant-based supplements (e.g., caffeine, guarana, ginseng, pre-workout blends) was reported by 92.47% of participants, indicating an exceptionally high prevalence (Table 4). This rate is notably higher compared to findings in other combat sport studies. It

suggests that judo athletes frequently rely on such supplements to optimize cognitive and physiological parameters such as alertness, reaction time, and mental focus during competition and intense training periods. Goldstein et al. (2010) found that caffeine consumption positively affects endurance, short-duration high-intensity performance, and attention. Similarly, Guest et al. (2021) highlighted that appropriate caffeine dosing can enhance performance but should be personalized. Nonetheless, high doses of stimulant supplements such as caffeine may lead to side effects, including elevated heart rate, anxiety, insomnia, and gastrointestinal discomfort—particularly in sensitive or unaccustomed individuals (Spriet, 2014). Therefore, factors such as individual tolerance and competition-related stress play critical roles in ensuring the safe use of these products.

The prevalence of recovery-focused supplement use was also high, at 75.34% (Table 9), indicating that athletes made conscious choices to support post-training recovery. Products such as protein supplements, BCAAs (branched-chain amino acids), and glutamine were among the most frequently used in this category. Tipton and Wolfe (2004) reported that amino acid and protein intake after resistance training significantly enhances muscle protein synthesis, thus facilitating recovery. Similarly, Pasiakos, McLellan, and Lieberman (2014) demonstrated the positive effects of protein supplementation on muscle strength, mass, and recovery in a systematic review. Jäger et al. (2017) also showed that BCAA use can reduce exercise-induced muscle damage and help maintain muscle performance. In light of this literature, regular use of such supplements by judo athletes exposed to high training loads is physiologically justifiable.

Supplement use for weight control was reported at a lower rate (41.1%) compared to other supplement types (Table 6). In weight-class sports such as judo, these supplements are often used during the pre-competition period. Consistently, the present study found that the most common period for use was the pre-season 36.67% (Table 7). Nonetheless, it is likely that many athletes attempt to manage their weight through natural methods such as diet, fluid restriction, or sweating. Maughan et al. (2018) emphasized the importance of considering individual physiology and dosing when using such supplements. Reale et al. (2017) reported that rapid weight loss strategies remain prevalent in combat sports, potentially impacting performance and health in both the short and long term. Similarly, Demirhan et al. (2016) emphasized that combat sport athletes are often compelled to follow weight-control strategies, particularly during competition periods. Fogelholm (1994) also drew attention to the adverse effects of rapid weight loss on energy metabolism and fluid balance. In this context, supplements for weight control should not be viewed as alternatives to natural methods but rather as structured complements to them.

The findings indicate that supplement use varies not only by type but also by timing throughout the year. Among those using performance-enhancing supplements, 31.03% used them only during competition periods, 34.48% during the pre-season, and another 34.48% year-round (Table 6). Similar patterns were observed in the use of recovery supplements: 36.36% used them only in the pre-season, while 31.82% used them either only during competitions or year-round (Table 10). For stimulant supplements, the highest usage rate was recorded in the pre-season (40.74%), followed by equal proportions during competition periods (29.63%) and throughout the year (29.63%) (Table 4). These data demonstrate that supplement use is not arbitrary but structured according to the physiological and psychological demands of preparation and competition phases. Reale et al. (2017) stated that athletes in combat sports adjust

their supplement strategies throughout the season depending on performance goals. Similarly, Maughan et al. (2018) emphasized that supplement use should be aligned with seasonal needs.

In conclusion, the findings of this study indicate that supplement use is widespread among judo athletes; however, both the types of supplements and their timing of use vary considerably. While athletes remain cautious about performance-enhancing and stimulant-based products, consistent use of recovery and general nutritional supplements is prominent. Consistent with the literature, factors such as lack of knowledge, trust issues, concerns about doping, and financial considerations are among the key determinants shaping supplement use behaviors. Further studies involving larger and more diverse athletic populations across various sports disciplines are recommended to deepen our understanding of this topic.

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