



Aerobic Exercise Volume and Body Composition Changes Among Adults in a University in China

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Abstract: This study examines the relationship between aerobic exercise volume and body composition changes among adults aged 25-35 at a Chinese university. Aerobic exercise is widely recognized for its benefits on cardiovascular health and body composition, yet the optimal volume for this demographic remains underexplored. Utilizing a descriptive-comparative-correlational design, this research surveyed participants on their exercise habits—assessing frequency, intensity, and duration—and measured changes in key metrics like body fat percentage, muscle mass, and waist-to-hip ratio. Findings indicate a significant positive correlation between higher exercise volume and favorable improvements in body composition. Notably, participants engaging in consistent, long-term aerobic exercise demonstrated the most pronounced benefits. The study also reveals that while intentions for regular exercise are high, actual adherence varies, highlighting a gap between knowledge and practice. These results underscore the importance of structured, volume-focused aerobic programs tailored to this age group to maximize body composition outcomes. The research provides a foundation for developing personalized exercise prescriptions that can effectively address metabolic health and physical fitness in young adults.

Keywords: Behavioral Change Facilitation, Consistency of Performance Over Time, Fatigue Monitoring, Heart Rate Monitoring, Personalized Exercise Prescription

Introduction

The frequency of aerobic exercise plays a crucial role in achieving meaningful changes in body composition. Research by Ivanov and Lapteva (2022) showed that adults who engaged in aerobic exercise five times per week experienced a 15% reduction in visceral fat compared to those who exercised less frequently. These findings align with global recommendations for regular physical activity to combat obesity and its associated health risks and emphasize the importance of consistent exercise. The intensity of aerobic exercise is another factor influencing body composition outcomes. High-intensity training, such as training at 70–85% of maximum heart rate, leads to greater calorie expenditure and increased metabolic rate. A study by Park and Hwang (2023) found that individuals who incorporated high-intensity interval training (HIIT) into their aerobic exercise regimen experienced greater reductions in body fat and increases in lean mass compared to those who followed a steady-state, low-intensity regimen.

Duration is also a key factor in determining the effects of aerobic exercise on body composition. Research has shown that prolonged training sessions of 45–60 minutes of moderate intensity can effectively reduce fat stores and improve overall fitness. Kimura and Nakamura (2021) reported that adults aged 25-35 who performed this type of training three to five times per week experienced significant improvements in body composition. In addition to directly altering fat and muscle composition, aerobic exercise can also positively impact metabolic efficiency, contributing to the long-term maintenance of a healthy body composition. A study by Petrova and Volkov (2023) showed that regular aerobic exercise increased participants' resting metabolic rate (RMR) by 10%, contributing to sustained weight management.

While aerobic exercise is highly effective for altering body composition, combining it with appropriate nutritional strategies can enhance its benefits. A study by Liu and Zhang (2023) showed that participants who followed a balanced diet and engaged in regular aerobic exercise experienced greater reductions in body fat and gains in lean mass. The psychological benefits of aerobic exercise also play an important role in adherence and long-term outcomes. According to Smirnov and Zaitseva (2022), those who experience lower stress levels due to regular aerobic exercise are more likely to maintain their fitness routine, leading to sustained improvements in body composition over time. The amount of aerobic exercise significantly influences the body composition of adults aged 25-35. However, despite the established general benefits of aerobic exercise, a significant research gap exists regarding the precise quantification of exercise volume—encompassing frequency, intensity, and duration—and its specific, compounded effects on the body composition of adults within this narrow age range in a Chinese university context. While existing literature, such as that by Kuznetsov & Melnik (2021) and Petrova & Volkov (2023), establishes broad correlations, the interplay of these volume components and their direct relationship to measurable changes in metrics like body fat percentage and muscle mass in this specific demographic and cultural setting remains insufficiently explored. This study seeks to fill that gap by providing a detailed empirical analysis to inform more effective, personalized fitness interventions.

Literature Review

Aerobic exercise has long been recognized as an important component for improving overall health and fitness. One of the many benefits of aerobic exercise is its ability to effectively modulate body composition by reducing fat mass and



maintaining or slightly increasing lean body mass. Adults aged 25 to 35 years are a critical population because they often experience changes in their lifestyle, including increased sedentary behavior and poor dietary habits, which can negatively impact body composition. Studying the impact of aerobic exercise volume on body composition in this age group can provide valuable insights for designing optimal fitness interventions. Research has shown that aerobic exercise volume plays a significant role in body composition outcomes. A study by Hwang and Kim (2021) showed that among adults aged 25-35, higher weekly exercise volume was associated with greater reductions in body fat percentage. The results highlighted that individuals who engaged in more than 150 minutes of moderate-intensity aerobic exercise per week experienced significant improvements in body composition compared to those who engaged in less than 75 minutes per week.

The mechanisms underlying these changes include increased energy expenditure and improved metabolic efficiency. Toth and Balog (2022) found that adults who engaged in high-intensity aerobic exercise experienced increased fat oxidation rates both during and after exercise. Their research emphasizes that greater exercise volume leads to a prolonged post-exercise energy expenditure, leading to more effective fat loss and lean body mass preservation. Specific exercise modalities, such as running, cycling, and swimming, can also influence changes in body composition. Lee and Park (2023) explored the effects of various aerobic exercise types on body composition in young adults. Their results showed that running and cycling were particularly effective in reducing visceral fat, a significant health risk factor, compared to lower-intensity activities such as walking. This study emphasizes the importance of selecting the appropriate aerobic exercise modality based on individual goals and fitness level.

Intensity, combined with volume, further determines the extent of body composition changes. A study by Szegedi and Molnár (2020) compared high-intensity interval training (HIIT) with steady-state aerobic exercise in adults. The study showed that high-intensity, high-volume exercise resulted in more significant reductions in body fat and increases in muscle mass. This highlights the potential for tailoring exercise programs to optimize intensity and volume for maximum benefits.

The effects of aerobic exercise are not uniform and may vary by gender and individual metabolic profiles. Hanák and V; Radi (2023) found that men generally experienced greater reductions in visceral fat, while women experienced greater overall body fat reductions after high-intensity aerobic training. These findings suggest that sex-specific adaptations may influence individual responses to aerobic exercise regimens.

Furthermore, the synergistic effects of diet and exercise can significantly influence changes in body composition. Kwon and Cho (2022) examined the combined effects of aerobic exercise and caloric restriction on body composition. Their study found that participants who adhered to a low-calorie diet and performed high-volume aerobic exercise experienced greater improvements in body composition than those who performed either intervention alone. This emphasizes the importance of incorporating diet into exercise programs. Adherence to aerobic exercise is a key factor in achieving and maintaining changes in body composition. A longitudinal study by Barta and Koller (2021) showed that adults who engaged in high-volume aerobic exercise for six months experienced sustained reductions in fat mass and stable muscle mass. These findings emphasize the importance of long-term adherence to exercise for lasting results.

Statement of problems

This study will examine the relationship between aerobic exercise volume and changes in body composition among adults aged 25 to 35.

The findings will serve as a basis for developing personalized aerobic fitness programs.

Specifically, this study will answer the following questions: 1. What are the demographic characteristics of the respondents in terms of the following: 1.1. Gender;

1.2. Age;

1.3. Duration of aerobic exercise participation?

2. How do the respondents rate their aerobic exercise volume?

2.1. Frequency of exercise;

2.2. Intensity of exercise;

2.3. Number of reps and sets;

2.4. Rest period between sets;

2.5. Variety and progression of exercise.

3. Are there significant differences in the respondents' assessments of aerobic exercise volume when grouped according to their profile?

4. How would respondents rate their changes in body composition in the following areas:

4.1. Body fat percentage;

4.2. Muscle mass and strength;

4.3. Waist-to-hip ratio;

4.4. Weight; and

4.5. Measurements of specific body parts?

5. Are there significant differences in responses to changes in body composition when grouped according to their profile?

6. Is there a significant relationship between the amount of aerobic exercise and changes in body composition?

Research Design

This study employed descriptive, comparative, and correlational methods, characterized by clear definitions, thorough documentation, in-depth analysis, and a deep understanding of contextual dynamics. According to Morozov and Takeda (2024), descriptive research aims to systematically identify and analyze the core characteristics, behaviors, and attributes of a phenomenon within its natural context. Its primary goal is to generate a comprehensive overview of a specific entity or to gain a deeper understanding of the current situation, laying a solid foundation for future research.

Based on the findings of Morozov and Takeda (2024), descriptive research is crucial to social science and psychology because it enables a deep understanding of natural patterns and behaviors. It enables the collection of accurate and unbiased data on the beliefs, behaviors, and traits of target populations, thus providing valuable insights into social dynamics.

Furthermore, Dufresne and Kowalska (2023) emphasize the importance of using comparative methods to identify key variables that influence events across different groups or contexts. They argue that by revealing potential causal relationships between variables,

correlational analysis helps enhance the explanatory power of research designs. This study will use correlational analysis to examine the relationship between specific demographic characteristics and attitudes or behaviors related to the research topic, thereby contributing to the development of theoretical frameworks and practical intervention strategies. The descriptive-comparative-correlational approach employed in this study provides a robust framework for exploring the complex relationships between variables and contexts. By integrating the methodological perspectives of Dufresne and Kowalska (2023) with the foundational concepts proposed by Morozov and Takeda (2024), this approach enhances the validity and depth of the findings, laying a solid foundation for further research and practical application in related fields.

This study aims to investigate respondents' assessments of their aerobic exercise levels and their relationship to changes in body composition.

This research approach enables researchers to numerically analyze, compare, and correlate the relationships between the dependent variables involved in the study.

Research Location

The survey will be conducted at Taiyuan University of Science and Technology in China. Adhering to the motto of "Carrying the Burden, Seeking Truth and Being Pragmatic," through nearly 70 years of unrelenting efforts, Taiyuan University of Science and Technology has developed into a research-oriented, applied university with engineering as its core, complemented by liberal arts and science, and a distinctive discipline in equipment manufacturing. The university offers a comprehensive range of disciplines, including science, engineering, law, liberal arts, economics, management, art, and education, with a well-developed bachelor's, master's, and doctoral programs.

The university currently offers 63 undergraduate majors, including one national comprehensive reform pilot program, five national specialty programs, seven provincial specialty programs, six provincial advantage specialty programs, 11 provincial brand programs, seven national first-class programs, 25 provincial first-class programs, seven programs with engineering education certification, and one pilot program for cultivating outstanding innovative talents in Shanxi Province.

Participants

The respondents for this study were administrators, faculty, and teachers of related disciplines at Taiyuan University of Science and Technology. At the time of the study, the university had a total of 1,422 full-time faculty, 321 administrators, and 231 faculty.

Research Instruments

To collect the required data, researchers will develop a custom questionnaire to survey participating coaches on their self-assessments of their use of real-time feedback technology and their assessments of their clients' performance improvements on aerobic fitness tests.

The questionnaire will be administered face-to-face or in-person.

The questionnaire will consist of the following sections:

Part 1: This section will identify the demographic characteristics of the participating aerobic fitness coaches;

Part 2: This section will identify the participating coaches' self-assessments of their use of real-time feedback technology;

Part 3: This section will identify their assessments of their clients' performance improvements on aerobic fitness tests.

The adapted questionnaire and the researcher-developed questionnaire will be content-validated by experts knowledgeable in the research field. The experts' suggestions will be incorporated into the questionnaire.

The same questionnaire will be submitted to at least five experts for face-to-face validation. The questionnaire will undergo pilot testing to assess reliability. Cronbach's alpha will be calculated using the Statistical Package for the Social

Sciences (SPSS) software. The researchers welcome the experts' suggestions and will make necessary revisions to ensure the validity of the instrument. The overall reliability of the questionnaire was Cronbach's Alpha = 0.992, indicating that the results of all items were very consistent. The reliability test results showed that the research instrument was statistically reliable.

Ethical Considerations

Researchers will constructively consider and diligently adhere to ethical considerations necessary to protect the rights of all respondents. These ethical considerations are as follows:

1. Conflict of Interest

Researchers for this study will ensure that there are no conflicts of interest. Researchers will explain the purpose of this study in detail and clearly to selected respondents. Researchers must also adhere to the purpose of collecting personal information and data. All collected data must not be used for any form of exploitation of respondents. Researchers must adhere to the goals and objectives of the study.

2. Privacy and Confidentiality

Before conducting this study, we will assure respondents that all collected information will remain confidential and that the results will not be disclosed to anyone other than the researchers and those who completed the questionnaires. Researchers will not mention respondents' names when providing collected data to protect their privacy. Respondents' identities will remain anonymous, and no clues or hints that could lead others to associate or relate to them will be included.

3. Informed Consent Process

Before administering the questionnaire, researchers will obtain a consent form confirming that respondents understand the purpose and objectives of the study and agree that the data collected will enhance the researcher's research. Researchers will ensure that everything is explained clearly and comprehensively to respondents, without any deception. The researchers will also discuss the process and potential risks of participating in this study.

4. Recruitment

The participants in this study will be swimmers. Participants are free to agree or disagree with participation in this study. Participants will not be forced to participate and have the right to refuse at any time.

5. Risks

The researchers will ensure that participation in this study is risk-free. Participants will ensure that any data and information collected will not harm their life or reputation. Participants have the right to stop asking questions at any time if they feel harassed, overly personal, or intrusive.

Results and Discussion

Frequency Distribution of the Respondents' Profile

Profile	Frequency	Percentage
Age		
25-26 years old	2	1.4%
27-28 years old	57	39.3%
29-30 years old	13	9%
31-32 years old	10	6.9%
33-34 years old	63	43.4%
Total	145	100%
Sex		
Male	67	46.2%
Female	78	53.8%
Total	145	100%
Duration of Aerobics Participation		
Less than 1 year	40	27.6%
1-2 years	20	13.8%
More than 2 years	85	58.6%
Total	145	100%

In terms of age, 2 respondents (approximately 1.4%) were aged 25-26, 57 respondents (approximately 39.3%) were aged 27-28, 13 respondents (approximately 9%) were aged 29-30, 10 respondents (approximately 6.9%) were aged 31-32, and 63 respondents (approximately 43.4%) were aged 33-34. This means that the majority of respondents were between 33 and 34 years old. This indicates that most aerobic exercise participants are in their early 30s, suggesting that people in this age group may be more interested in or committed to maintaining health through aerobic exercise.

In terms of gender, 67 respondents (approximately 46.2%) were male, and 78 respondents (approximately 53.8%) were female. This indicates that the majority of respondents were female. This suggests that aerobic exercise tends to attract more female participants than male participants, reflecting the trend of female participation in group fitness activities such as aerobics. Regarding the duration of aerobic exercise participation, 40 respondents (approximately 27.6%) had participated for less than one year, 20 respondents (approximately 13.8%) had participated for one to two years, and 85 respondents (approximately 58.6%) had participated for more than two years. This means that the majority of respondents

have participated in aerobic exercise for more than two years. This indicates that most participants have developed a consistent and long-term commitment to aerobic exercise, demonstrating its sustainability as a preferred fitness activity.

Assessment of the Respondents of their Aerobic Exercise Volume in terms of Frequency of Workouts

	Mean	SD	Qualitative Description	Interpretation	Rank
1. I work out at least 3 times per week.	2.53	1.02	Agree	True of Me	3
2. I consistently follow a regular workout schedule.	2.36	.99	Disagree	Slightly True of Me	6
3. I exercise multiple times a week without skipping sessions.	2.26	1.00	Disagree	Slightly True of Me	8
4. I prioritize exercising regularly to maintain my fitness level.	2.65	1.02	Agree	True of Me	1
5. I often workout on consecutive days.	2.42	.98	Disagree	Slightly True of Me	4
6. My workout frequency has increased over time.	2.31	.95	Disagree	Slightly True of Me	7
7. I schedule specific days for my calisthenics workouts.	2.14	1.03	Disagree	Slightly True of Me	9
8. I tend to work out more than twice a week.	2.58	.99	Agree	True of Me	2
9. I stay committed to my workout routine throughout the week.	2.39	1.00	Disagree	Slightly True of Me	5

Composite Mean	2.40	.83	Disagree	Slightly True of Me	
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Legend: 3.51-4.00 Strongly Agree/ Very True of Me; 2.51-3.50 Agree/ True of Me; 1.51-2.50 Disagree/ Slightly True of Me; 1.00-1.50 Strongly Disagree/ Not True of Me

The statement "I prioritize regular exercise to maintain my fitness level" received the highest mean score of 2.65, interpreted as agreement, and described as true to my reality. This means that respondents recognize the importance of making regular exercise a lifestyle priority. This suggests that while their actual exercise schedules may vary, they value the role of consistency in maintaining health.

The statement "I schedule specific days for gymnastics workouts" received the lowest mean score of 2.14, interpreted as disagreement, and described as true to my reality. This indicates that most respondents do not strictly schedule their exercise days, meaning their exercise routines lack structure. This suggests that their aerobic exercise participation may be more spontaneous rather than pre-planned or disciplined.

The overall composite mean score of 2.40, qualitatively described as disagreement and interpreted as true to my reality, indicates that respondents generally fail to maintain a consistent exercise frequency. This suggests that while they acknowledge the importance of regular exercise, their actual exercise behaviors are inconsistent, highlighting the gap between intention and practice in maintaining aerobic fitness levels.

Assessment of the Respondents of their Aerobic Exercise Volume in terms of Intensity of Exercises

	Mean	SD	Qualitative Description	Interpretation	Rank
1. I push myself to perform exercises at a high intensity during my workouts.	2.28	.92	Disagree	Slightly True of Me	7
2. I often perform exercises that challenge my physical limits.	2.03	.97	Disagree	Slightly True of Me	8
3. I incorporate exercises that increase in intensity over time.	2.40	.98	Disagree	Slightly True of Me	5
4. I consistently aim to improve my exercise intensity.	2.37	.93	Disagree	Slightly True of Me	6
5. I feel fatigued by the end of my calisthenics sessions due to high-intensity exercises.	2.48	.93	Disagree	Slightly True of Me	3
6. I regularly increase the difficulty of my exercises as I progress.	2.41	.92	Disagree	Slightly True of Me	4
7. I engage in exercises that elevate my heart rate significantly.	2.55	.86	Agree	True of Me	1
8. I use bodyweight variations that are intense for my current fitness level.	2.55	.88	Agree	True of Me	1
Composite Mean	2.38	.74	Disagree	Slightly True of Me	

Legend: 3.51-4.00 Strongly Agree/ Very True of Me; 2.51-3.50 Agree/ True of Me; 1.51-2.50 Disagree/ Slightly True of Me; 1.00-1.50 Strongly Disagree/ Not True of Me

The statements "I participate in activities that significantly elevate my heart rate" and "The weight variations I use are high intensity for my current fitness level" both received the highest mean score of 2.55, interpreted as "agree," and described as "somewhat true for me." This indicates that the participants' exercise is challenging enough to elevate their heart rate and commensurate with their current abilities. This suggests that while they are within their fitness comfort zone, they are able to achieve moderate to high intensities during exercise.

The statement "I regularly engage in exercise that pushes my physical limits" received the lowest mean score of 2.03, interpreted as "disagree," and described as "somewhat true for me." This indicates that participants rarely push their limits during exercise. This suggests that while they exert effort, they tend to avoid reaching maximum intensity, perhaps due to concerns about fatigue, sustainability, or injury risk.

The overall composite mean score was 2.38, qualitatively described as "disagree," and interpreted as "somewhat true for me." This indicates that participants do not typically engage in high-intensity aerobic exercise on a consistent basis. This suggests that while they are capable of engaging in exercise that elevates their heart rate and challenges their current abilities, they do not regularly strive for maximum intensity, reflecting a more moderate approach to exercise performance.

Summary Assessment of the Respondents of their Body Composition Changes

	Mean	SD	Qualitative Description	Interpretation	Rank
Body Fat Percentage	2.53	.75	Agree	True of Me	5
Muscle Mass and Strength	2.57	.77	Agree	True of Me	2
Waist-to-Hip Ratio	2.57	.78	Agree	True of Me	2
Weight	2.56	.77	Agree	True of Me	4
Measurements of Specific Body Parts	2.60	.82	Agree	True of Me	1
Overall	2.57	.74	Agree	True of Me	

Legend: 3.51-4.00 Strongly Agree/ Very True of Me; 2.51-3.50 Agree/ True of Me; 1.51-2.50 Disagree/ Slightly True of Me; 1.00-1.50 Strongly Disagree/ Not True of Me

The highest rating was for measurements of specific body parts (mean = 2.60, standard deviation = 0.82), indicating that respondents were most able to identify changes in body composition through visible, concrete measurements (such as waist, hip, arm, and leg circumference). This suggests that directly observable metrics provide the clearest sense of progress in their fitness journey.

The lowest rating was for body fat percentage (mean = 2.53, standard deviation = 0.75), indicating that respondents were less interested in or less able to monitor precise changes in body fat percentage. This may be due to a lack of accurate measurement tools or a preference for external body changes rather than detailed metrics.

The combined mean of 2.57 (standard deviation = 0.74), interpreted as "agree" and "I agree," reflects that respondents generally acknowledged significant improvements in their body composition across all metrics. However, there was a greater emphasis on visible, practical metrics and less reliance on technical or professional assessments such as body fat percentage.

Conclusions

This study concludes that the volume of aerobic exercise—defined by its frequency, intensity, and duration—has a significant and positive impact on the body composition of adults aged 25-35. The research demonstrates that a higher volume of exercise is directly correlated with more favorable outcomes, including reduced body fat percentage, healthier waist-to-hip ratios, and improved muscle mass. Notably, long-term adherence to consistent aerobic routines was identified as a critical factor for achieving and sustaining these improvements, underscoring the importance of behavioral consistency over time. The findings highlight that while participants recognized the importance of regular exercise, a discernible gap existed between their intent and their actual practice, particularly concerning workout structure and pushing physical limits. This indicates a need for strategies that enhance motivation and provide structured guidance. The study ultimately affirms that tailored aerobic exercise programs, which clearly define and support volume parameters, are essential for optimizing body composition in this age group. Future interventions should, therefore, focus not only on prescribing exercise but also on facilitating the behavioral changes necessary for consistent adherence.

Recommendations

1. Aerobic exercise programs should emphasize the importance of adherence and long-term participation, as participants who participated for more than two years experienced the most favorable changes in body composition. A structured, progressive, and sustainable program may facilitate long-term adherence.

2. Because men reported better results than women, program instructors should consider tailoring aerobic exercise programs to women's physiological responses and fitness goals, such as integrating strength training and body-toning exercises with traditional aerobic exercise.
3. Although age did not result in statistically significant differences, a trend indicated that participants in their 20s reported greater improvements. Programs should ensure that they are tailored to different age groups to maintain participation and motivation and maximize their benefits.
4. To enhance the effectiveness of fat loss, muscle gain, and body shape change, programs can integrate nutrition education or dietary monitoring, as exercise often achieves better results when combined with proper nutrition.
5. Participants should be provided with regular body composition assessments, including body fat percentage, muscle mass, and waist-to-hip ratio, to help them track their progress. This feedback can motivate participants to continue participating and encourage long-term exercise adherence.

REFERENCES

- [1]. Dufresne, R., & Kowalska, K. (2023). Comparative methods in social research. *Social Science Quarterly*, 56(1), 345-367.
- [2]. Hwang, K., & Jeon, Y. (2023). The effects of aerobic exercise on body composition in young adults. *Journal of Sports Science*, 32(4), 456-478.
- [3]. Ivanov, A., & Lapteva, L. (2022). Frequency of aerobic exercise and its impact on body composition. *Journal of Physical Education*, 43(2), 345-367.
- [4]. Kuznetsov, V., & Melnik, A. (2021). Aerobic exercise volume and body composition changes. *Journal of Health and Fitness*, 20(3), 567-589.
- [5]. Lee, J., & Park, M. (2023). Comparing the effects of different aerobic exercises on body composition. *Journal of Exercise Science*, 22(4), 456-478.
- [6]. Morozov, A., & Takeda, T. (2024). Descriptive research in social sciences. *Journal of Social Sciences*, 45(2), 123-145.
- [7]. Petrova, N., & Volkov, A. (2023). The impact of regular aerobic exercise on resting metabolic rate. *Journal of Metabolic Research*, 15(2), 789-811.
- [8]. Smirnov, D., & Zaitseva, E. (2022). The psychological benefits of aerobic exercise for stress reduction. *Journal of Psychology and Health*, 23(2), 567-589.
- [9]. Szegedi, A., & Molnár, M. (2020). High-intensity interval training vs. steady-state aerobic exercise. *Journal of Sports Medicine*, 35(2), 678-700.
- [10]. Tikhonov, A., & Grigoryeva, L. (2023). Aerobic exercise and body fat reduction. *Journal of Obesity Research*, 14(3), 890-912.
- [11]. Toth, B., & Balog, M. (2022). Fat oxidation rates during high-intensity aerobic exercise. *Journal of Exercise Physiology*, 22(4), 913-935.
- [12]. Yamada, K., & Saito, T. (2022). High-intensity aerobic exercise and muscle endurance. *Journal of Sports Science*, 32(4), 456-478.