



ORIGINAL ARTICLE

The Effect of Short-term Creatine Supplementation on Lactate Dehydrogenase after a Session of Intense Aerobic and Anaerobic Activity in Active Women

Smaeel Ghorbanian

Department of Sport science, Damghan Branch, Islamic Azad University, Damghan, Iran

KEY WORDS

Active women;
Creatine supplements;
Intense aerobic and anaerobic activity;
Lactate dehydrogenase

ABSTRACT

The aim of the current research was to the effect of short-term creatine supplementation on lactate dehydrogenase after a session of intense aerobic and anaerobic activity in active women. For this purpose, 40 active women of Damghan city with an average age (25 ± 5 years), weight (63 ± 7 kg), height (165 ± 7.5 cm) and body mass index (25 ± 5 kg m⁻²) voluntarily participated in this research. The research was of a semi-experimental type, and the subjects were randomly divided into four groups iaerobic supplementation (10 people), aerobic placebo (10 people), anaerobic supplementation (10 people), and anaerobic placebo (10 people) and studied. The supplement group consumed creatine every day (0.3 grams per kilogram of body weight) in 4 meals (8, 12, 16, and 20 hours) for 7 days; the placebo group consumed the same amount of corn powder. The aerobic group performed the Bruce test before and after completing it, and the anaerobic group performed the Wingate test. Blood samples were taken from the subjects after aerobic and anaerobic tests and after taking supplements and repeating the tests to measure lactate dehydrogenase (LDH). Index measurement was done using the relevant kits and with the help of an auto-analyzer, the analysis of variance test was used to analyze the data. The results of the research showed that there is no significant difference between the LDH level of the aerobic creatine group and the aerobic placebo group, as well as the anaerobic creatine group and the anaerobic placebo group, but the comparison of the LDH level of the aerobic creatine group and the anaerobic creatine group showed that there is a significant difference. In other words, taking a creatine supplement along with a session of acute aerobic activity led to a greater decrease in LDH than taking this supplement after anaerobic activity. In general, it can be concluded that creatine monohydrate loading does not significantly reduce LDH levels.

Introduction

Many athletes use numerous contributing factors such as specific training, nutrition, psychoanalysis, and sports supplements to increase and develop sports performance and performance during competition. The use of sports supplements has gained a lot of influence in today's societies many supplements have a psychological effect on people and some supplements can delay fatigue increase lactate

tolerance and improve the speed of sports performance and in training It is used in competitions. Simultaneously with the occurrence of oxidative stress, the activity of the body's antioxidant system also becomes more active, and the use of some antioxidant supplements to moderate the resulting oxidative stress reduces the activity of the body's antioxidant system. One of these supplements is

*Corresponding author: Email address: es.ghorbanian@yahoo.com

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creatine. Creatine is a dietary supplement that is popular among athletes as the most widely used supplement today. For example, (Kashef *et al.*, 2013) compared the effect of creatine supplements and creatine-carbohydrate mixture on anaerobic capacity and cell damage indicators of 15-18-years old boys. The findings show that in addition to the positive effects it has on anaerobic performance, creatine causes cell damage and the levels of creatine kinase and lactate dehydrogenase enzymes in the blood show a significant increase. Determining the effect of loading creatine supplements on cell damage indicator enzymes in the serum of 18 young soccer players was done by Atsek *et al.*, (2007). Research findings indicate that creatine supplementation cannot significantly increase the range of changes in lactate dehydrogenase enzyme activity. While the range of changes in creatine kinase enzyme activity increased significantly. So far, the effect of creatine supplementation on antioxidant indicators cell damage and blood lactate has not been stated with certainty, and these results have been contradictory in both men and women. However, the results of research on the response of cell damage factors to Creatine supplementation have been quite controversial.

There are conflicting opinions regarding the effects of creatine monohydrate supplementation on people's health indicators. Some studies in this field have not reported any danger to people's health. For example, Cooke *et al.*, showed that the amount of CK enzyme decreases significantly with creatine monohydrate supplementation.

Also, Rosene 2022 and colleagues showed that none of the serum indicators of cellular damage, CK and LDH, increases with creatine supplementation. Popzecki 2021 and colleagues reported that the use of creatine supplements does not have a significant effect on cell damage indicators. While Atashek and Jafari 2023 reported that the consumption of creatine supplements along with resistance exercise will have a significant effect on CK activity.

Lin *et al.*, 2020, by examining and comparing

untrained and trained rats (running on a treadmill with 70% of the maximum oxygen consumption), observed a statistically significant increase in CK, LDH, lactate, and uric acid values of trained subjects. 2021. Muscle injuries caused by exercise occur after high-intensity resistance and endurance exercise.

In the study by Sousa 2022 and colleagues, it was recommended to use nutritional supplements as a strategy to reduce muscle injuries caused by exercise.

In some studies, it has been reported that creatine does not reduce muscle damage after intense and heavy exercise.

In a review study, it was determined that the consumption of creatine reduces muscle damage by reducing inflammatory responses and oxidative stress, and creatine may be useful through a supplemental diet to prevent muscle damage and facilitate the return to the original state after intense activity.

Considering the possible effect of creatine supplementation in reducing cell damage, this research aimed to determine the effect of short-term creatine supplementation on cell damage indicators after a session of intense aerobic and anaerobic activity in active women.

Materials and Methods

The present research is of semi-experimental type, 40 active women of Damghan city with average age (25 ± 5 years), weight (63 ± 7 kg), height (165 ± 7.5 cm) and body mass index (5 ± 25 kg m⁻²) voluntarily participated in this research. The research was semi-experimental, and the subjects were randomly divided into four groups: aerobic supplementation (10 people), aerobic placebo (10 people), anaerobic supplementation (10 people), and anaerobic placebo (10 people). The supplement group was studied every day. (0.3 grams per kilogram of body weight) in 4 meals (at 8, 12, 16, and 20) for 7 days, the placebo group consumed the same amount of corn powder. The aerobic group before and after supplementing the Bruce test, and the B group Aerobics did the Wingate test. Blood samples were taken from subjects after

aerobic and anaerobic tests and supplementation to measure lactate dehydrogenase. The index was measured using the relevant kit and with the help of an autoanalyzer, and analysis of variance was used to analyze the data.

Results

The findings of the research showed that there is no significant difference between the LDH level of the

aerobic creatine group and the aerobic placebo group, as well as the anaerobic creatine group and the anaerobic placebo group, but comparing the LDH level of the aerobic creatine group and the anaerobic creatine group showed that there is a significant difference (Table 1). In other words, taking a creatine supplements along with a session of acute aerobic activity led to a greater decrease in LDH than taking this supplement after anaerobic activity (Table 2).

Table 1. Results of LDH analysis using the Kruskal-Wallis test .

Variable	X ²	Df	Sig.
LDH	33.10	3	0.016

Table 2. Pairwise comparison of means using the Mann-Whitney test

Levels		u	z	Sig.
Placebo and aerobic	Creatine and placebo	19	-1.6	0.144
Placebo and aerobic	Creatine and placebo	44	-0.082	0.934
Placebo and aerobic	Creatine and placebo	8	-3.02	0.002

Discussion

The aim of the present research was to the effect of short-term creatine supplementation on cell damage indicators after a session of intense aerobic and anaerobic activity in active women. The results of the present study showed that aerobic exercise along with creatine supplementation led to a decrease in LDH, which was not statistically significant. Anaerobic training with creatine supplementation caused an increase in LDH, which was not statistically significant, which was in line with the results of Kashif *et al.*, research (2013). The reasons for being in line with Kashif *et al.*, research were the duration of creatine supplementation and the use of anaerobic power tests, and it was against the research of Ateshek *et al.*, (2006) and Shenkman *et al.*, (2006). The possible reasons for the duration of using creatine supplements, the amount of daily dose of creatine supplements used in their research, the exercise protocol used, the age of the subjects, their gender, and also the intervals of blood sampling. In the study of Atsek *et al.*, (2007), eight circular exercises were used, and blood sampling was done 24 hours after the

circular exercises, while in the present study, the exercise protocol was Bruce's test. The reason for the difference between Shenkman *et al.*, (2006) research and the current research is the amount of creatine consumption (20 grams per day in the first week of training, then five grams per day) and the training protocol that includes 10 weeks of resistance training (knee extension), gender studied young men, and the time of blood sampling, which was taken after 24 hours after exercise, could be one of the reasons for the difference from the present study, which took blood immediately after The test has been done.

Conclusions

In general, it can be concluded that creatine monohydrate loading does not significantly reduce LDH levels, but there is a possibility that creatine supplementation in aerobic exercise leads to a reduction in cell damage. However in anaerobic sports, it leads to increased cell damage. in the context of the effect of creatine supplementation on performance, although most research has indicated the

positive effect of this supplement, in the context of the effect on cell damage indicators, the results are completely contradictory, while the results of some research conducted in this field have shown that the use Creatine has not had a significant effect on the serum indicators of cell damage or has reduced the damage, and few studies have reported the positive effects of this supplement, but many studies also indicate the negative effect of this supplement on the indicators of cell damage, which indicates There is a need for comprehensive research in this field.

Conflict of interests

NO conflict.

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