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The Effect of Aerobic Exercise with Taking Carnitine on Improving Blood Fats for Athletes

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Abstract

Through scientific research, it has been found that rapid weight loss significantly affects the physiological and physical aspects of athletes. Therefore, the researcher believes that the athlete's weight loss by this amount in a very short period leads to a "decrease in the physiological and physical condition", a weakness in the athlete's strength, reaching the stage of fatigue and exhaustion, and a negative impact on the level of physical and health fitness and performance level in the competition, which will also weaken his ability To resist and reduce his attention, as a sport requires the use of his maximum physical and psychological strength and ability to achieve victory and reach the highest levels. This research is considered within the applied research that the researcher hopes to benefit those interested in sports nutrition. The study is one of the recent studies dealing with the role of Carnitine in improving blood fats in athletes.

METHODS: This research is considered within the applied research that the researcher hopes to benefit those interested in sports nutrition. The study is one of the recent studies dealing with the role of Carnitine in improving blood fats in athletes.

RESULTS: The researcher attributes the statistical differences and the improvement rates of the group that used aerobic exercises in the variables under investigation to the effect of the training program applied to them, which contained exercises that resulted in a high level of those variables, and this improvement is due to the continuity of their regularity

Keywords: The Effect of Aerobic, Exercise with Taking, Improving Blood Fats for Athletes

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within the training program. Which led to the occurrence of the adaptation process in training and thus the rise in these variables.

Conclusions: The presence of significant differences between the previous and post-measurement of the control group in the measurements of blood fats. The valid post measurement of the boxing players in the Mansoura University team. There are differences in the rates of change between the pre-and post-measurements of the control group in the variables under investigation, the valid post-measurement, where the change percentages ranged from (3.885%) to (10.769%). The presence of significant differences between the pre-and post-measurement of the experimental group in measurements of blood fats. The valid post measurement is for athletes.

INTRODUCTION

Aerobic exercise is one of the most popular exercises in the market. It uses music, dance, and other, equipment and facilities used to perform the exercises and it is an exercise designed to increase the heart rate for some time. This would cause an increase in the amount of oxygen in the body, leading to improved blood circulation, a faster loss of calories and weight, and fat burning [(1)]

Where athletes are constantly looking for means that raise their level of performance to the extent that exceeds their capabilities to achieve sporting achievements and reach advanced centers at all levels, as the increase in training loads and their doses no longer meet the aspirations of the athletes, so the sports community is witnessing a fierce race to obtain the means It believes in the desired development and with the least possible side effects, and many workers in the sports field do not hide the fatal damage to stimulants and the addiction that they cause to their abusers, so many athletes have turned to search for an alternative, and nutritional supplements are one of these alternatives that are very popular because they are taken from food sources Natural and provides a suitable environment for the growth of body muscles, as well as the diet program for the practicing sports activity. [(1,2).]

Dietary supplements are considered one of the most common terms in the sports community, especially among high-level athletes, because of their many effects. Various scientific researches have proven their results on athletes, and nutritional supplements are not considered a substitute for the integration of nutrients in what the athlete consumes daily of food, but it is a compensation for the deficiency. In those elements as a result of practicing sporting activities of various kinds according to the diversity of training loads and their different intensity in aerobic and anaerobic work, research has proven the importance of various nutritional supplements in treating many of the negative effects of practicing sports activities, which may cause many diseases that reduce the physical competence of athletes. [(3).]

As carnitine is among the supplements that athletes are looking for, it plays an important role in fat metabolism: it is required for the breakdown of fatty acids into usable forms, as fatty acids are a major source of energy and muscle function, and it has been suggested that increasing the availability of carnitine will increase the rate of their absorption and breakdown (By oxidation) in the cells of the body, it enhances performance and includes improving fatty acid oxidation in muscles, modulating glucose regulation, and the ability of muscles to resist fatigue. Recent data indicate that carnitine reserves available for use by muscles can be manipulated through exercise and dietary consumption. Meat (especially red meat), fish, chicken, and dairy products are rich sources of carnitine, a non-essential amino acid that the body can synthesize from acids. The essential amino lysine and methionine in limited quantities are sufficient for the maintenance of normal health. [(4).]

Benjamin Wall and others have confirmed the success of carnitine in providing muscle glycogen and diverting energy production from fat, thus avoiding the negative effects of muscle glycogen oxidation and providing an amount of energy twice the production of ATP during exercise from fat. [(5).]

This is useful for sports, fat reduction, and energy production.

Research problem

Through scientific research, it has been found that rapid weight loss significantly affects the physiological and physical aspects of athletes.

Therefore, the researcher believes that the athlete's weight loss by this amount in a very short period leads to a "decrease in the physiological and physical condition", a weakness in the athlete's strength, reaching the stage of fatigue and exhaustion, and a negative impact on the level of physical and health fitness and performance level in the competition, which will also weaken his ability To resist and reduce his attention, as a sport requires the use of his maximum physical and psychological strength and ability to achieve victory and reach the highest levels.

Through the researcher's review of previous studies in the field of health sciences, he found that it is a scientific attempt to use L-Carnitine with aerobic exercises before the competition long enough to lose weight without

affecting the physiological and physical condition of the athlete as L-Carnitine helps in the weight loss process as it transfers fats to the mitochondria, they are energy houses that generate energy by burning these fats and also work to reduce stress among athletes. The researcher hopes that athletes and sports workers will benefit from this research. [6–8]

Importance and need for research

This research is considered within the applied research that the researcher hopes to benefit those interested in sports nutrition. The study is one of the recent studies dealing with the role of Carnitine in improving blood fats in athletes.

Research objective:

The research aims to investigate the effect of an aerobic exercise program with taking L-Carnitine on the blood fats of athletes through:

- Identify the differences between the previous and post-measurement of the control group in the variables under investigation.
- Identify the differences between the previous and post-measurement of the experimental group in the variables under investigation.
- Identify the difference between the previous and post measurements (difference of differences) between the experimental and control groups in the variables under investigation.

Research hypotheses:

1. There are statistical hypotheses between the previous and post-measurement of the experimental group in blood lipids in favor of the post measurement.
2. There are statistical hypotheses between the previous and post-measurement of the control group in blood lipids in favor of the post measurement.
3. There are statistically significant differences between the previous and post-measurement of the control and experimental groups in favor of the post-measurement of the experimental group.

Terms used in the search:

- **Aerobic exercise:**

It is the type of exercise in which the practitioner uses the large muscle groups in the body through repeated and continuous rhythmic movements in which the respiratory circulatory system supplies the muscles with their need for oxygen. [9,10,21,22,23,24].

- **Carnitine:**

It is a vitamin-like substance produced in the body from two other amino acids, "lysine, methionine", with the help of some other nutrients. Carnitine stimulates the breakdown of fats for energy production and prevents the accumulation of fats in the heart, skeleton, and liver. [11,12,25].

- **Blood fats:**

They are organic substances of natural origin that dissolve in special solvents called lipid solvents, such as chloroform and ether alcohol, and do not dissolve in water, and they consist of a long chain of hydrocarbons or sterols. [7,13,23].

Foreign Studies:

1) Babak Nakhostin (2010)[14]: entitled the effect of L-Carnitine as a two-week dietary supplement on oxidative stress and muscle damage resulting from exercise, the study aimed to evaluate the effect of L-carnitine supplementation for two weeks on known signs of oxidation and muscle damage following acute bouts of exercise in the youth, the research sample was 21 players. The experimental method was used. The results resulted in increased enzymatic antioxidant capacity and mitigation of oxidative effects resulting from training and muscle damage.
2) Katerina Novakova (2012)[3]: entitled the effect of using carnitine as a dietary supplement on the general condition, energy production within muscles and physical performance in vegetarian men, the study aimed to identify the percentage of carnitine inside the body and how energy is produced during the intake of carnitine. The research sample was 60 players. Experimental approach the results resulted in an increase in the proportion of carnitine in the plasma, improved muscle strength on energy production from fats, and thus improved physical performance and decreased lactic content of the group that used carnitine.
3) Benjamin Wall (2011)[4]: Entitled: Eating carnitine and carbohydrates increases muscle carnitine content and changes the metabolism within the muscle. 14 athletes, who used the experimental approach, and the results resulted in the success of Carnitine in providing muscle glycogen and diverting energy production from fat, thus avoiding the negative effects of muscle glycogen oxidation and providing an amount of energy twice the production of ATP during the performance of exercises from fat.

Research Methodology and Society

The researcher used the experimental method to suit its suitability to the nature of the research by using the experimental design. The two groups, one experimental and the other control.

Where the research community represents athletes interested in losing weight, and the research sample was chosen deliberately and included (20) athletes, and they were divided into a control sample that used the aerobic exercise program and reached (10) athletes and other experimental ones that used aerobic exercise with taking Carnitine. There are (10) players, and Table (1) shows the description of the research sample.

Table 1. Characterization of the research sample

Sample	Amount	Percentage
Experimental sample	10	%50
Control sample	10	%50
Total	20	%100

The statistical description of the members of the research community:

The variables of age, height, weight, physiological and biochemical tests were homogeneous for all members of the research sample to ensure that all of them fall under the moderate curve and the following table shows that:

Table 2. The statistical description of the basic variables of the research sample, (N = 20)

	Measurements	Unit of measurement	Arithmetic average	Mediator	Standard deviation	Pearson Coefficient

1	Age	Year	22.5	22	0.961	0.522
2	Height	Cm	178.6	178	7.75	0.631
3	Weight	Kg	79.45	79	16.04	1.147
4	Age of training	Age	5	4.5	1.783	0.607

It is evident from table (2) that all Pearson coefficients are close to zero, and are limited to (± 3), which indicates a lack of dispersion, moderate values, and homogeneity of the research sample in the basic variables before conducting the basic study.

Table 3. Statistical characterization of blood lipids of the research sample, N = 20

Measurements	Arithmetic average	Mediator	Standard deviation	Pearson Coefficient
Cholesterol	195.3	194.2	5.304	1.549
Triglycerides	97.4	95.5	4.56	0.254
HDL	54.1	53.7	2.104	0.303 –
LDI	124.33	123.8	3.3	0.674

It is evident from the table (3) that all torsion coefficients are close to zero, and are confined to (±), which indicates non-dispersion, moderate values, and homogeneity of the individuals of the research sample in the variable blood lipids before conducting the basic study.

Equivalence between the two research groups:

The researcher divided the research sample into two groups (the experimental and the control group), and the parity between the two groups was carried out through the pre-measurement of the athletes before applying the basic study as shown by the following tables.

Table 4. The significance of the differences between the mean ranks and the pre-measurements of the two groups. Control and experimental variables

N = 10

	Measurements	Unit of measurement	Control group		Experimental group		Mann-Whitney	Z Value	Significance level
			Average ranks	Total Ranks	Average ranks	Total Ranks			
1	Age	Year	5	50.12	6.5	65.15	8	0.9314	0.659
2	Height	Cm	6.3	63.15	4.7	47.11	8	0.8682	0.443
3	Weight	Kg	5.8	58.14	5.5	55.13	11.5	0.116	0.945
4	Age of training	Year	6	60.14	4	40.09	6	1.7091	0.219

Tabular "z" significance is at the level of 0.05 - 1.962

It is evident from Table (4) and by using the Mann-Whitney test for the significance of the differences that there are no significant differences in the pre-measurements between the control and experimental group of the basic variables since the calculated "z" value is less than its tabular value at a significance level of 0.05, which indicates parity between the two research groups. Before applying the basic study.

Table 5. The significance of the differences between the mean ranks of the pre-measurements of the two groups. Control and experimental variables in physiological and biochemical variables

N = 10

	Measurements	Unit of measurement	Control group		Experimental group		Mann-Whitney	Z Value	Significance level
			Arithmetic average	Total Ranks	Average ranks	Total Ranks			
1	Age	Year	5.4	54.13	6.8	68.16	8.5	1.003	0.366
2	Height	Cm	4.2	42.10	5.2	52.12	11.5	0.243	0.931
3	Weight	Kg	5.5	55.13	5.3	53.12	12	0.117	0.942
4	Age of training	Year	4.8	48.11	7	70.16	6.5	1.311	0.209

Tabular "z" significance is at the level of 0.05 - 1.962

It is evident from Table (5), using a test that shows the significance of the differences, that there are no significant differences in the pre-measurements between the control and experimental group of the variable blood lipids, as the calculated value of "z" is less than its tabular value at a significant level of 0.05, which indicates parity between the two groups. Research before applying the basic study.

Research areas:

- The Human Domain:

The human field of mathematical research included various types of sports and those interested in losing their weight.

- Time Domain:

The basic experiment for research and conducting pre and postal measurements were carried out during the period from (2/2/2019) to (10/3/2019).

Measurements used in the research:

1- Anthropometric measurements:

- age measurement.
- Measuring the total length of the body.
- Weighting.

• Measuring training age.

2- Biochemical measurements:

• Cholesterol level in the blood.

• The proportion of high-density and low-density protein fats in the blood.

• Relative to blood triglyceride.

Program content:

The researcher has codified the content of the proposed program, which includes aerobic exercises, which were applied according to the following procedural steps:

Determine the program goal:

Anaerobic exercise program aims to improve the blood lipid profile of athletes.

Principles of developing the program:

When designing the proposed exercise program for the research sample, the following principles were taken into consideration:

- Take into account that the proposed exercises are in line with the overall goal of the program.
- Appropriateness of the proposed exercises to the physical and physiological condition of athletes.
- The gradual performance of exercises from easy to difficult and from simple to complex and from assisted exercises to free exercises and then exercises against different resistance.
- Diversifying exercises and taking into account the thrill and excitement factor by introducing different tools.
- Take into account the manifestations of fatigue by allocating breaks between each exercise and another and between each group.
- Do negative stretches with the help of a therapist whenever possible.
- Integration of all program contents.
- Choose exercises aimed at increasing the physiological state of the players.

Doses of Carnitine:

The experimental group took L-Carnitine in addition to the suggested aerobic exercise program through constant daily doses of 8 grams per day for a month, while the control group took a placebo (placebo) to give the same effect.

Statistical treatment

After collecting data and recording the results of the various tests and measurements of the variables that were used in it using statistical laws, as well as the computer using statistical programs (Excel) and the statistical program for statistical packages for social sciences symbolized by the symbol (SPSS) using the following statistical treatments:

- arithmetic mean.
- Standard Deviation.
- percentage.
- coefficient of torsion.
- "Mann Whitney" test for differences in independent samples.
- Wilcoxon test for differences in correlated samples.
- rates of change.

Presentation and discussion of results:

Table 6. The significance of the differences between the grade averages, the pre-and post-measurements, of the control group in the variables under investigation

Measurements	Determination (After)		Determination (Before)		Z Value	Significance level
	Average ranks	Total Ranks	Average ranks	Total Ranks		
Cholesterol	3	30.00	0	0.00	*2.023	0.043
Triglycerides	3	30.00	0	0.00	*2.023	0.043
HDL	0	0.00	3	30.00	*2.032	0.042
LDL	3	30.00	0	0.00	*2.023	0.043

The tabular "z" value is at a significant level of 0.05 - 1.962

It is evident from Table (6), using the Wilcoxon test for the significance of differences, that there are statistically significant differences at (0.05) between the mean ranks of the pre-and post-measurements of the control group in the significant constraint variables (research, in favor of the postal measurement as the calculated "z" value, is greater than its tabular value.

Table 7. Differences of change percentages between the mean of the previous and post measurements of the control group in the variables under investigation

Measurements	Determination (After)		Determination (Before)		Different in average	Percentage of change
	Arithmetic average	Standard deviation	Arithmetic average	Standard deviation		
Cholesterol	194.8	6.203	178	1.89	16.8	%8.62
Triglycerides	96.2	4.768	90.7	2.15	5.5	%5.72
HDL	49	2.87	60.3	1.03	11.3 –	%23.06
LDL	122.32	3.8	116.4	1.25	5.92	%4.84

It is clear from Table (7) that there are differences in the rates of change between the previous and post measurements of the control group in the variables under discussion, in favor of the post-measurement, where the

change rates ranged between (3.885%) to (10.769%).

The researcher attributes the statistical differences and the improvement rates of the group that used aerobic exercises in the variables under investigation to the effect of the training program applied to them, which contained exercises that resulted in a high level of those variables, and this improvement is due to the continuity of their regularity within the training program. Which led to the occurrence of the adaptation process in training and thus the rise in these variables, as Awais Al-Jabali (2000 AD)[14] points out that acclimatization in training and upgrading can only be achieved or developed through continuous and continuous training. As Katerina Novakova (2012)[10] points out: That change may occur in some variables as a result of training and practice.

The researcher believes that the aerobic exercises given in the program had a clear effect on the emergence of this development and improvement of blood lipids in the research sample in the postal measurements.

Aerobic exercise is not stressful for the heart and muscles, as it is effective in exercising the heart muscle and pumping a greater amount of blood. Caused by only antenna activities. (7,8,15,23,24).

The results of this study are in agreement with the study of Babak Nachosten (2010), the results of which led to a decrease in the blood lipid variables (total cholesterol, high-density, and low-density lipoproteins, and triglycerides) for the first-class players of the research sample. (6,16,26).

Table 8. The significance of the differences between the mean ranks of the previous and post measurements of the experimental group in the variables under investigation

N = 10

Measurements	Pre analogy		Telemetry		Value of z Calculated	Significance level
	Average ranks	Total Ranks	Average ranks	Total Ranks		
Cholesterol	3	30.00	0	0.00	*2.023	0.043
Triglycerides	3	30.00	0	0.00	*2.032	0.042
HDL	0	0.00	3	30.00	*2.023	0.043
LDL	3	30.00	0	0.00	*2.023	0.043

The tabular "z" value is at a significant level of 0.05 - 1.962

It is evident from Table (8) and using Wilcoxon's test of significance, the differences are there are statistically significant differences at (0.05) between the mean ranks of the previous and post measurements of the experimental group in the variables at a significant level (research, in favor of the postal measurement, as the calculated "z" value is greater than its tabular value.

Table 9. Differences of change percentages between the mean of the previous and post measurements of the experimental group in the variables under investigation

N = 10

Measurements	Determination (After)		Determination (Before)		Different in average	Percentage of change
	Arithmetic average	Standard deviation	Average ranks	Standard deviation		
Cholesterol	193.5	5.9	180.8	4.6	12.7	%6.56
Triglycerides	96	4.156	81	5.12	15	%15.63
HDL	50.3	1.8	64.1	6.4	13.8 –	%27.44
LDL	125.8	4.3	111.6	2.408	14.2	%11.29

It is clear from Table (9) that there are differences in the rates of change between the previous and post measurements of the experimental group in the variables under investigation, in favor of the post-measurement, where the change rates ranged between (7.951%) to (19.157%).

The researcher attributes these results to the experimental group taking carnitine, which was given to them through constant daily doses, which affected the compensation of the deficiency in nutrients resulting from the exercise of sports activities of varying types according to the variety of training loads and their different intensity in aerobic and anaerobic work.

Benjamin et al. (2011)[4] indicate that daily administration of L-carnitine before intense exercise delays the onset of fatigue and thus reduces muscle fatigue in healthy people and significantly improves the rate of strength synthesis, resulting in an improvement in the recovery process after performing vigorous training. (14,17,18,22).

The results of this study are consistent with the study of Katerina Novakova (2012)[10]: which found a significant increase in the number of red blood cells and lymphocytes, increased protection of the immune system, improved induction of the immune cell membrane during intense physical exercise with no significant shift in the rest of the other variables. This indicates the safety of carnitine supplementation on blood components. (12,19,24)

Also, Michelle Set Al (2012)[3] pointed out that practicing aerobic activities according to a structured program leads to a reduction in the level of cholesterol in the blood, as a decrease of cholesterol in the blood by 1% leads to a decrease of the incidence of heart disease by 8%. (1,18,19,25).

It is evident from Table (10), using the Mann Whitney test for the significance of the differences, that there are statistically significant differences at a significant level (0.05) between the mean averages of the ranks. The calculated "z" is greater than its tabular value.

It is evident from Table (11) that there are differences in

the percentages of change between the postal measurements of the control and experimental groups in the variables under investigation, in favor of the measurement of the experimental group that used aerobic exercises and taking L-carnitine, where the differences in change percentages ranged between (3.96%) to (8.50) %).

The researcher attributes these results to the commitment in the experimental group taking the food supplement, which led to the improvement of physiological and biochemical variables, and this is consistent with what Babak Nakhostin et al. (2014)[1] indicated that providing athletes with antioxidants increased in the proportion of antioxidant enzymes in the body, which led to a decrease The percentage of oxidation pressures, and that L-Carnitine leads to increased oxidation of fats and thus reduces the oxidation of carbohydrates, which reduces the oxidation products in addition to the presence of vitamin C and zinc in the supplement, which led to a decrease in the secondary oxidants of fats and improved antioxidant capacity within the body. [13,20].

Table 10. Significance of the differences between the mean ranks of postal measurements of the two control groups and experimental variables in under investigation

N = 10

Measurements	Control		Experimental		Mann-Whitney	Z Value	Significance level
	Average ranks	Total Ranks	Average ranks	Total Ranks			
Cholesterol	9	90.00	4	40.00	0	*2.635	0.08
Triglycerides	8	80.00	3.2	32.00	0.5	*2.522	0.012
HDL	4	40.00	9	90.00	0	*2.635	0.08
LDL	8	80.00	3	30.00	0	*2.619	0.09

The tabular "z" value at the level of significance = 1.962 - 0.05

Table 11. Differences in change percentages between the mean of the previous and post measurements of the control and experimental groups in the variables

Measurements	Control		Experimental		Different in average	Percent of change
	Arithmetic average	Percent of change	Arithmetic average	Standard deviation		
Cholesterol	189	%4.12	174.8	0.11	14.2	%7.51
Triglycerides	94	%6.97	80	0.13	14	%14.89
HDL	54	%12.77	68.2	0.22	14.2 –	%26.30
LDL	118.4	%3.99	120.8	0.09	2.4 –	%2.03 –

The results of this study are in agreement with the study of Katerina Novakova (2015)[10], which concluded that an increase in the proportion of carnitine in the plasma and an improvement in muscle strength in the manufacture of energy from fats and thus the improvement of physical performance and a decrease in the lactic ratio of the group that used carnitine. [3].

And the study of Katrina Novakova (2012)[10]: which concluded that the terms of the training program prepared by the researcher according to aerobic exercises as well as the use of carnitine contributed to weight loss and reduction of the lipid and non-lipid component of the members of the research sample of the first group. [5].

CONCLUSIONS

1. The presence of significant differences between the previous and post-measurement of the control group in the measurements of blood fats. The valid post measurement of the boxing players in the Mansoura University team.

There are differences in the rates of change between the pre-and post-measurements of the control group in the variables under investigation, the valid post-measurement, where the change percentages ranged from (3.885%) to (10.769%).

2. The presence of significant differences between the pre-and post-measurement of the experimental group in measurements of blood fats. The valid post measurement is for athletes.

3. There are differences in the rates of change between the pre-and post-measurements of the experimental group in the variables under investigation, in favor of the post-measurement, where the change percentages ranged from (7.951%) to (19.157%).

4. The presence of significant differences in the telemetry between the control and experimental group in favor of the experimental group of athletes.

5. There are differences in the rates of change between the postal measurements of the control and experimental groups in the variables under investigation, in favor of the measurement of the experimental group, which used aerobic exercises and taking L-carnitine, where the differences in change rates ranged between (3.96%) to (8.50%).

6. Aerobic exercise and carnitine intake affect the blood lipid variable of the experimental group, which indicates the positive effect and effectiveness of the program with carnitine administration on these variables.

Recommendations

1. The application of aerobic exercise with the administration of L-Carnitine, which led to the improvement of biochemical parameters.

2. Paying attention to biochemical indicators, especially blood fats, when addressing the issue of nutritional supplements, because they are the only and true indicator that reflects the activity of most of these supplements in

the body and muscles.

3. Sports coaches were guided by the use of L-Carnitine, which helps improve the athlete's biochemical and physiological variables.

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