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THE EFFECT OF CREATINE SUPPLEMENTATION CONSUMPTION FOLLOWING A BOUT ASCENT TO 4000 METERS ON LEVELS OF CREATINE KINASE AND GLUCOSE IN MALE HIKER

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ABSTRACT

The effect of creatine supplementation on aerobic activity is considered less. Evidence suggests that creatine increases available substrates during aerobic activity and likely cause improving aerobic performance. The evidence in this regard is conflicting [1]. The purpose of this research is to examine the effect of creatine supplementation consumption following a bout ascent to 4000 meters on the levels of creatine kinase and glucose in male hiker. The present study is a semi experimental study. The statistical population included 20 people of men hikers. This study is a semi experimental study. The study consisted of 20 people of men hikers. That 16 of them randomly with ages 25 to 40 with the condition of, at least one year of climbing experience selected. Statistical analysis of data done by using statistical software of SPSS version 19. To investigate relationships within the group was used from statistical tests of dependent -t and to investigate relationship outside the group was used from statistical tests of independent-t. The results showed there are a significant increase with creatine supplementation consumption on creatine kinase, ($t=-4.524$, $p=0.003$) and without creatine consumption on Creatine Kinase ($t=-5.621$, $P=0.001$) and glucose ($t=-3.435$, $p=0.011$); But there are not a significant increase with creatine supplementation consumption on glucose ($t=-1.452$, $P=0.190$). Also, there isn't a significant difference between the effect of a bout ascent to 4000 meters without creatine supplementation consumption against a bout ascent to 4000 meters with creatine supplementation consumption on the levels of creatine kinase (t=-0.325, P=0.750) and glucose (t=-0.959, P=0.354)in male hiker. It is recommended in order to achieve better results and more clearly, more research be done.

Keywords: Creatine supplementation, creatine kinase, glucose, male hiker

INTRODUCTION

Creatine supplementation is a nutritional supplement that is widely used around the world. Amount annual consumption is about 7.2 million kg in the world [2]. Annual sales of Creatine in America in 2000 have been reported more than 400 million [3]. Creatine is a natural element in the diet, which also synthesize in the body by the liver. Creatine supplementation causes loading muscle with creatine and increasing its total reserves in free and phosphorylated forms (Creatine and phosphocreatine). Theoretically this loading leads to increasing ability of energy production during instants of intense physical activities and also increasing ability of recovery from intense sports activities [4]. Research results of Kashef [5] showed that creatine supplementation has a significant effect on amount activity of creatine kinase and lactate dehydrogenase of participants. In other words, creatine supplementation consumption increased the activity of these enzymes.

Creatine kinase is an enzyme which participates in the cycle of consumption and tissue energy storage especially in muscles. Creatine kinase is found in very small amounts in the blood, but its highest amounts exist in skeletal muscle, brain and heart tissue [6]. Reducing the level of muscle activity and muscle damage can be excitatory effects on Serum level of creatine kinase [7]. Serum concentrations of creatine kinase (CK) widely have been used as damage indicator of skeletal muscle fibers in sports and exercise (8). Several studies have investigated the use of dietary supplements as a means to offset exercise-induced muscle damage, as measured by CK activity. Branched chain amino acid (BCAA) supplementation appears to offset rises in serum CK after exercise. BCAA supplementation in subjects who were already ingesting recommended BCAA levels in their diets reduced the rise in CK (and LDH) after either vigorous endurance exercise [10 & 11] or resistance exercise [11]. Abundant evidence shows a variety of physiological and pathological conditions such as intense exercise [12], training at high altitude [13], immobility [14] the antioxidative capacity of the body can not completely prevent lipid peroxidation and muscle damage. Due to controversies arose in previous studies and as well as, investigating the effect of creatine supplementation consumption on level of the creatine kinase in hikers ever been done research in this case, so the aim of this study is to investigate this question that, do creatine supplementation consumption following a bout ascent to 4000 meters on the levels of creatine kinase and glucose male hiker is effective or not?

METHODOLOGY

This study is a semi experimental study with pre-test and post-test and two experimental groups (creatine supplementation) and the control (placebo) was conducted. The study consisted of 20 people of male hikers, That 16 of them randomly selected with ages 25 to 40 with the condition of, at least one year of climbing experience. After first introducing participants to the process of study doing, consent form was taken of them. Volunteers who had history of cardiovascular disease, diabetes, thyroid disease and any known pathological condition or were consuming any medication and (with or without prescription) or under any diet or other treatment, excluded of research process. Addiction to any drug, smoking, alcohol and caffeine consumption also led to the withdrawal of volunteers from the research process. Samples who were consumed creatine supplements during the past six months, excluded from study. Subjects with the double-blind plane, randomly divided into two groups: control (8n =) and experimental (8n =). Height, weight and body composition measurements were taken with calipers at the same location program. The experimental group consumed 0.3 grams of creatine per day for five days with fruit juice. The experimental group consumed 0.3 grams of creatine for every kilogram of body weight (medium dose). And one day used as the preservative. Consuming time of doses was during the day.

Climb program to altitude of 3961 meters of Tochal peak began from VELENJAK track. The first blood samples was taken overnight fasting before running the program and in location of the program (ascent source). Birding took place with, starting from station 5 (altitude 2935 m) until station 7 (altitude 3740 m) which lasted about 4 hours and from seventh station to the peak lasted about 50 minutes. The degree of difficulty of ascent route is semi heavy, route slope from Station 5 to 7 fluctuate between 25 and 35 degrees. Slope is gentile from Station 7 to the peak

(10 degrees less). The second blood samples were taken after ascent at 7 station. Due to lack of access to the centrifuge systems to prevent blood clots and separation of blood serum was used from clotting Pipes containing gel, After separation of blood serum, poured the serum into pipes with lid and were kept for convey to the laboratory in dry ice bags. Statistical analysis of data done by using statistical software of SPSS version 19. To investigate inter-group communications was used dependent t-test for and external- team communications was used independent t-test.

RESULTS

Describing characteristics of subjects including age, height, weight, resting heart rate, skin, chest skin wrinkles, abdomen skin wrinkles, and thigh skin wrinkles presented in Table 1.

According to the table 2, there is a significant difference between effect of a bout ascent to altitude of 4000 meters with creatine supplementation consumption on creatine kinase, (t=-4.524, P=0.003) in pre-test compared to post-test. But there is no significant difference between a bout ascent to altitude of 4000 meters with creatine supplementation consumption on glucose (t=-1.452, P=0.190) in pre-test compared to post-test.

According to the table 3, there is no significant difference between the effect of a bout ascent to altitude of 4000 meters without creatine supplementation consumption in front of a bout ascent to altitude of 4000 meters with creatine supplementation consumption on creatine kinase and glucose.

The results of investigating difference of among group without creatine supplementation consumption a bout ascent to altitude of 4000 meters in front of a bout ascent to altitude of 4000 meters with creatine supplementation consumption on the levels of creatine kinase and glucose of male hiker are shown in 4-5 and 4-6 diagram.

Table 1: Describing characteristics of participant

variable	group	Average (Standard deviation)	t	p
age(year)	experimental	(4.78)30.50 /#	0.274	0.790
	control	(1.92)30.00		
Heigh (cm)	experimental	(7.36)178.62	0.154	0.880
	control	(5.51)178.12		
weight (Kilogram)	experimental	(10.61)75.12	-0.910	0.378
	control	(11.86)80.25		
resting heart rate Number of beats per)	experimental	(9.87)69.87	-0.384	0.706
	control	(10.90)71.87		

(minute				
chest skin wrinkles (mm)	experimental	(4.55)13.12	-1.331	0.205
	control	(6.86)17.00		
abdomen skin wrinkles (mm)	experimental	(9.01)28.87	-1.547	0.144
	control	(11.65)37.93		
abdomen skin wrinkles (mm)	experimental	(5.45)19.90	-1.131	0.277
	control	(5.04)22.87		
Creatine kinase (U/L)	experimental	(62.54)135.38	0.209	0.837
	control	(49.06)141.25		
Glucose (Pg/ml)	experimental	(9.06)76.12	2.583	0.22*
	control	(7.51)86.87		

 # Data have been reported based on the average (standard deviation).
***Significant differences between the values of experimental and control groups (p<0.001),**

Table 2: Differences within the group a bout ascent to altitude 4000 meters without creatine supplementation consumption on the levels of creatine kinase and glucose of male hikers

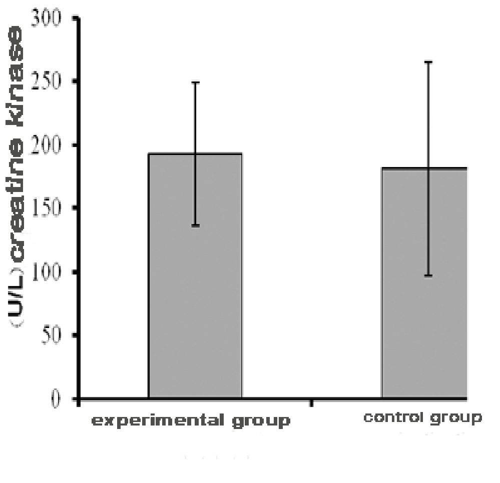
variable	pre-exam	Post- test	t	p
(U/L) creatine kinase	(49.06) 41.25#	(55.94) 193.00	-5.621	0.001 **
(Pg/ml) glucose	(7.51) 86.87	(147.78) 96.25	-3.435	0.011 *

****Significant differences has been reported between pre-test and post-test (p<0.001), # data based on the average (standard deviation).**

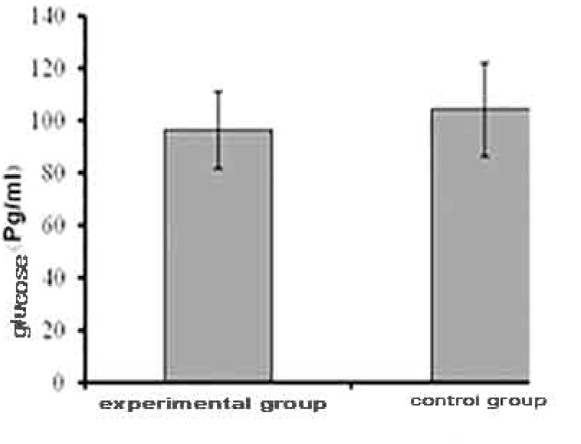
Table 4: investigating difference of among group without creatine supplementation consumption a bout ascent to altitude of 4000 meters in front of a bout ascent to altitude of 4000 meters with creatine supplementation consumption on the levels of creatine kinase and glucose of male hiker

variable	group	Average (standard deviation)	t	p
(U/L)creatine kinase	experimental	(55.94) 193.00 #	0.325	0,750
	control	(84.21)181.38		
(Pg/ml) glucose	experimental	(14.78)96.25	-0.959	0.354
	control	(17.90)104.12		

 # Data have been reported based on the average (standard deviation



With creatine supplementation consumption



Without creatine supplementation consumption

CONCLUSION

Much research taken in the field of effect of creatine supplementation consumption on various sporting activities, but is low in the field of cellular damage, especially creatine kinase and glucose. The aim of this study is to investigate the effect of creatine supplementation consumption following a bout ascent to altitude of 4000 meters on the levels of creatine kinase and glucose of male hikers. Results showed that, there are a significant difference between effect of a bout ascent to altitude of 4000 meters without creatine supplementation consumption on creatine kinase and glucose in the pre-test compared to post-test. Exercise leads to an increase in oxidative enzymes and tiny injury in skeletal muscle. The results of this hypothesis correspond with the research of Hazar and colleagues, [15] that in a study entitled Effect of maximum aerobic exercise increasingly on serum- muscle enzymes in professional hockey players, 31 players (13 women and 18 men) were selected voluntarily. Blood samples were taken of the participants immediately after exercise and an hour later. The results showed that the timing and hard practice creatine increased kinase levels that, this was significant statistically (p=0.002 men, p=0.00 women). The research results of Asmich and colleagues [16] showed that, intense exercise causes an increase in lactic acid and catecholamine levels, change some plasma factors such as glucose, fatty acid and insulin levels that correspond with the results of this hypothesis. In another study entitled comparing the effects of a exercise bout as swimming, resistive and aerobics on amount of appetite, glucose and lactate of female students were discussed to check glucose levels of participants before, immediately and after 3 hours of practice. The results showed that didn't observe significant changes in blood glucose levels immediately after exercise. But 3 hours after exercise decreased glucose levels was significant (p=0.003). Likely, the reason for this discrepancy is related to the type of sport and interval time after practice.

Also there was a significant difference between the effect of a bout ascent to altitude of 4000 meters with creatine supplementation consumption on creatine kinase in the pre-test compared to post-test. The results of this hypothesis correspond with the research results of scholars such as Krider (1998), Kashef [5] and Krider [17] that declared: levels of serum enzymes activities such as creatine kinase and lactate dehydrogenase increases after creatine consumption; but is inconsistent with research results of Kamber (1999) and Santos (2004) and Tarnovyolovsky (1999) that, Indicates: creatine supplementation consumption cannot increase levels of these enzymes and thereby cause of cells damage [17, 18, 19, 20, 21, 22] and also, The research of Robinson and colleagues [23] conducted on 48 healthy subjects showed that, creatine supplementation consumption cannot increase blood level of blood enzymes activity. Probably reason of the conflict is related to the type of sport and the intensity and scheduling exercise. Also according to the statistical results of within the group, in the experimental group glucose average increased in the pre-test compared to post-test, this wasn't a significant increasing (t=-1.452, P=0.190). In other words, it can be concluded that there is not a significant difference between the effect of a bout ascent to altitude of 4000 meters with creatine supplementation consumption on glucose in the pre-test compared to post-test.

The third hypothesis results showed that there isn't a significant difference between the effect of a bout ascent to altitude of 4000 meters without creatine supplementation consumption in front of a bout ascent to altitude of 4000 meters with creatine supplementation consumption on creatine kinase and glucose. The results show that the exercise here is a bout ascent to altitude, whether with creatine supplementation consumption or without it, there is no difference and in both cases, increased levels of creatine kinase which correspond with research results of Krider [20] and Kashef [5].

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