

EFFECT OF CREATINE MONOHYDRATE CONSUMPTION ON MUSCULAR POWER OF STATE LEVEL ATHLETES

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Abstract

Creatine is a naturally occurring substance in the human body. It is synthesized from the amino acids arginine, glycine, and methionine, and is naturally produced by the liver, kidneys, and pancreas. The purpose of the study was to find out the effect of creatine monohydrate consumption on muscular power of south Gujarat male state level athletes. The study was delimited to the young male students of state level competitions and tournaments of various sports from South Gujarat region. The study was delimited to the young male students of state level competitions and tournaments of various sports from South Gujarat region. The period of training for the experiment group was eight weeks. There would be positive improvement in increase peak power, relative peak power (RPP), mean power, and relative mean power (RMP) after Supplementation of creatine monohydrate. Supplementation of creatine monohydrate will significantly lower fatigue index. To achieve purpose of the study Seventy Five (75) male participants in the age group of 18-25 years were randomly selected from South Gujarat region of the state level tournaments and competition. All the 75 male participants belonged to different colleges of Veer Narmad South Gujarat University. The study was formulated as pre and post-test random group design in which seventy five subjects were divided into three equal groups. The experimental group I (n = 25 CM group) consumed 5g creatine monohydrate with glucose, Protein and Milk for eight weeks. Group II (n = 25 PM group) consumed Glucose, Protein and Milk. Group III (n = 25 PT group) had not consumed creatine monohydrate glucose, protein and milk at all. The experimental group I, II and Control group were given training for 8 consecutive weeks (6 days in a week). Every training session will be lasted for 40 to 60 minutes. This chapter presents the results of the study from the data analysis of the experimental study. The analyses were carried out through various statistical techniques such as the dependent t-test, the univariate analysis of covariance (ANCOVA), and the post hoc pair wise comparison using the LSD test analysis. The data were compiled and analysed using the *Statistical Package for the Social Science (SPSS)* for windows computer software.

Key Words: Creatine monohydrate, Muscular Power, t-test, LSD, ANCOVA

Introduction

Creatine is a naturally occurring substance in the human body. It is synthesized from the amino acids arginine, glycine, and methionine, and is naturally produced by the liver, kidneys, and pancreas. Creatine is also naturally present in the diet, found primarily in meat and fish. Creatine was initially discovered in 1835 by the French scientist, Chevreul, and was later followed by various studies in the early 1900's which included animal and human supplementation to identify the ultimate fate and function of Creatine. Creatine is primarily located in skeletal muscle and plays a pivotal role in cellular bioenergetics, specifically towards the reformation of a molecule essential for muscular contraction, adenosine triphosphate (ATP). Creatine supplementation, in relation to its use in athletic populations, is aimed at the ergogenic enhancement of high-intensity performance measures, such as power, strength, muscle mass, or multiple sprints.

Statement of the Problem

The purpose of the study was to find out the effect of creatine monohydrate consumption on muscular power of south Gujarat male state level athletes.

Delimitations

1. The study was delimited to the young male students of state level competitions and tournaments of various sports from South Gujarat region.
2. The study was further delimited to 75 (Seventy Five) young athletes of 18-25 years old and each group will be consisting of 25 athletes.
3. The subjects were selected randomly into three groups: Group A, Group B were experimental and group C was acted as control.
4. The period of training for the experiment group was eight weeks.

Limitations

The study was limited to the following aspects and these limitations were taken into consideration in the interpretation of data and result.

1. The influence of certain factors life style, daily routine work, diet and other factors on the results of the study was not taken into consideration.
2. The day-to-day activities that might have affected the performance during the test administration was considered as limitation.
3. The difference in economic and educational back ground of the athletes was not taken into consideration.
4. The influence of the selected criterion variables was not taken into consideration.

Objectives of The Study

1. To know the effect of Creatine on Muscles power
2. To know the effect of Creatine on Plyometric Training groups depth jumping and bounding
3. To know the effect of creatine on combination groups of weight training and plyometric training.
4. To know the effect of creatine on control groups.
5. To know which groups has better performance after and before Creatine Supplements.

Hypotheses

On the basis of literature reviewed, research findings, expert opinion and scholar's own understanding of the problem to following hypotheses were formulated:

1. There would be positive improvement in increase peak power, relative peak power (RPP), mean power, and relativemean power (RMP) after Supplementation of creatine monohydrate.
2. Supplementation of creatine monohydrate will significantly lower fatigue index.

Significance of the Study

Physical educationists and sports scientists have examined constantly sports performance in relation to the individual skill and fitness standards. They have tried discovering those factors that contribute to high performance so that the finding could be utilized in the practical aspects of coaching and training.

1. The results from this study will provide a scientific base and guidance to the physical educationalist and coaches, sports scientist, exercise physiologist and fitness leaders to design the supplementation programme.
2. This study will enrich the physical education profession with better insight into methods to enhance dependent variable changes among the young state level athletes.
3. Findings of this research will give a basic knowledge to the trainers and fitness leaders to envisage and conduct further research in various methods of supplement loading, nutrition planning and diet management to enhance performance of athletes.

Review of Literature

Mayhew DL, Mayhew JL¹, Ware JS studied the effect of long-term Cr supplementation on blood parameters reflecting liver and kidney function. Twenty-three members of an NCAA Division II American football team (ages = 19-24 years) with at least 2 years of strength training experience were divided into a Cr monohydrate group (CrM, n = 10) in which they voluntarily and spontaneously ingested creatine, and a control group (n = 13) in which they took no supplements. Individuals in the CrM group averaged regular daily consumption of 5 to 20 g (mean SD = 13.9 5.8 g) for 0.25 to 5.6 years (2.9 1.8 years). Venous blood analysis for serum albumin, alkaline phosphatase, alanine aminotransferase, aspartate aminotransferase, bilirubin, urea, and creatinine produced no significant differences between groups. Creatinine clearance was estimated from serum creatinine and was not significantly different between groups. Within the CrM group, correlations between all blood parameters and either daily dosage or duration of supplementation were nonsignificant. Therefore, it appears that oral supplementation with CrM has no long-term detrimental effects on kidney or liver functions in highly trained college athletes in the absence of other nutritional supplements.

Gualano B, Ugrinowitsch C, Novaes RB, Artioli GG, Shimizu MH, Seguro AC, Harris RC, Lancha AH Jr. Studied the effect of Creatine (CR) supplementation on renal function in healthy sedentary males (18-35 years old) submitted to exercise training. A randomized, double-blind, placebo-controlled trial was performed. Subjects (n = 18) were randomly allocated to receive treatment with either creatine (CR) (approximately 10 g day⁻¹) over 3 months or placebo (PL) (dextrose). All subjects undertook moderate intensity aerobic training, in three 40-min sessions per week, during 3 months. Serum creatinine, serum and urinary sodium and potassium were determined at baseline and at the end of the study. Cystatin C was assessed prior to training (PRE), after 4 (POST 4) and 12 weeks (POST 12). Cystatin C levels (mg L⁻¹) (PRE CR: 0.82 +/- 0.09; PL: 0.88 +/- 0.07 vs. POST 12 CR: 0.71 +/- 0.06; PL: 0.75 +/- 0.09, P = 0.0001) were decreased over time, suggesting an increase in glomerular filtration rate. Serum creatinine decreased with training in PL but was unchanged with training in CR. No significant differences were observed within or between groups in other parameters investigated. The decrease in cystatin C indicates that high-dose creatine supplementation over 3 months does not provoke any renal dysfunction in healthy males undergoing aerobic training. In addition, the results suggest that moderate aerobic training per se may improve renal function.

Procedure

Selection of Subjects

To achieve purpose of the study Seventy Five (75) male participants in the age group of 18-25 years were randomly selected from South Gujarat region of the state level tournaments and competition. All the 75 male participants belonged to different colleges of Veer Narmad South Gujarat University, Surat and they were from varying socio-economic status.

Selection of Variables

Muscular Power

- Muscular power of shoulder and chest (Deltoid and Pectoral Muscles)
- Muscular power of Abdomen (Rectus and Abdomen Muscles)
- Muscular power of leg (Quadriceps, Hamstring Gastronomies Soleus Muscles)

Experimental Design

Random group design was adopted in this study. Equal numbers of subjects were selected randomly in to three groups; two experimental and one control consisting of 25subjects each. The treatment factors were also selected randomly in to two experimental groups A and B. The control group C was left free to participate in any of the activities of their own choice.

¹Mayhew DL, Mayhew JL, "Ware JSEffects of long-term creatine supplementation on liver and kidney functions in American college football players", Int J Sport NutrExercMetab, 12 : 4 (2002), 453 : 460.

Criterion to Measure

Sr. No.	Criterion variables	Test Items	Units of Measurement
1	Muscular power of shoulder and chest	Shot Put Test	Maximum distances of throw in meters and inches
2	Muscular power of Abdomen	1 minute Sit ups Test	Number of Sit ups completed in 1 min.
3	Muscular power of legs	Standing Broad Jump Test	Distance covered by jump in meters and inches

Experimental Design

The study was formulated as pre and post-test random group design in which seventy five subjects were divided into three equal groups. The experimental group I (n = 25 CM group) consumed 5g creatine monohydrate with glucose, Protein and Milk for eight weeks. Group II (n = 25 PM group) consumed Glucose, Protein and Milk. Group III (n = 25 PT group) had not consumed creatine monohydrate glucose, protein and milk at all.

Training Programme

The experimental group I, II and Control group were given training for 8 consecutive weeks (6 days in a week). Every training session will be lasted for 40 to 60 minutes. The training program was scheduled for uniform time between 6:00 am to 7: 00 am in the morning. Subjects will do high volume low intensity isotonic isokinetics and isometric weight training. Each muscles group of upper body and lower body was trained twice a week with proper amount of rest and recovery.

Statistical Procedure

In this study to know effect of consumption of creatine monohydrate on muscular power research scholar had analysed the obtained data as under.

- To find the mean difference of pre and post treatment T –test was applied.
- When the adjusted post-test was significant the f-ration was applied for statistical analysis.

Analysis of the Data and Results of the Study**Analysis of Data**

This chapter presents the results of the study from the data analysis of the experimental study. The analyses were carried out through various statistical techniques such as the dependent t-test, the univariate analysis of covariance (ANCOVA), and the post hoc pair wise comparison using the LSD test analysis. The data were compiled and analysed using the *Statistical Package for the Social Science (SPSS)* for windows computer software.

Findings

The present study demonstrated that short-term creatine supplementation (5 gram per day for eight weeks) led to significant improvements in Muscular power of abdomen (lower-body maximal strength), Muscular power of shoulder and chest and muscular power of legs. The enhancement was more marked in the lower- than in the upper-extremity muscles

Discussion of Findings

The result of the study indicates that the experimental group had significantly improved the selected dependant variables when compare to the control group.

Discussion on Hypotheses

The hypotheses earlier stated in this study are accepted.

Summary, Conclusions and Recommendations**Summary**

The purpose of the study was to find out the effects of CreatineMmonohydrate supplements on Muscular power. For this study 75 male college students were selected at random from the various colleges affiliated to Veer Narmad South Gujarat University, Surat, Gujarat (INDIA) and the age of subject's range from 18 to 25 years. The selected subject were divided into three groups of 25 subjects each namely two experimental groups and a control groups.

The experimental group I, II and Control group were given training for 8 consecutive weeks (6 days in a week). Every training session will be lasted for 40 to 60 minutes. Each muscles group of upper body and lower body was trained twice a week with proper amount of rest and recovery. The criterion variable selected for these studies were Muscular power of shoulder and chest, Muscular power of Abdomen and Muscular power of legs.

Muscular power of shoulder and chest was assessed by Shot Put Test. Muscular power of Abdomen was assessed by 1 minute Sit ups Test while Muscular power of legs was assessed by Standing Broad Jump Test.

The experimental design used in this study was pre and posttest random group design involving 75 subjects who were divided at random into three groups of 25 each. The data collected from the three groups before and after the experimental period were statistically examined for significant improvement by paired sample 't' test.

75 subjects were divided at random and assigned into three groups of 25 each. No attempt was made to equate the groups in any manner. Hence, to make adjustments for difference in the initial means and to test the adjusted post-test means for significant difference among the groups, the analysis of covariance (ANCOVA) was used. Whenever the 'F' ratio for adjusted post-test means was found to be significant, the LSD test was followed as a post hoc test to determine which of the paired means difference was significant. In all the cases 0.05 level was fixed as significant level to test the hypothesis.

Conclusions

Based on the findings and limitations of the study, the following conclusions were drawn.

1. The present study has demonstrated that eight week resistance training program, coupled with loading and maintenance phase supplementation with creatine monohydrate, is effective for increasing muscle creatine uptake.
2. Control group did not improve the selected Muscular power components variables such as Muscular power of shoulder and chest, Muscular power of Abdomen and Muscular power of legs.

Recommendations

In the light of the conclusions drawn, the following recommendations have been made

1. The physical education teachers, coaches and trainers may employ creatine monohydrate supplementations programmer to improve Muscular power.
2. Similar studies may be carried out by selecting different age categories, sex and performance levels.
3. Different means and methods of training may be employed for further research studies than those employed here.
4. Same study may be repeated by employing a larger sample with longer duration of training and keeping nutrition, daily routine as controlled factors.

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