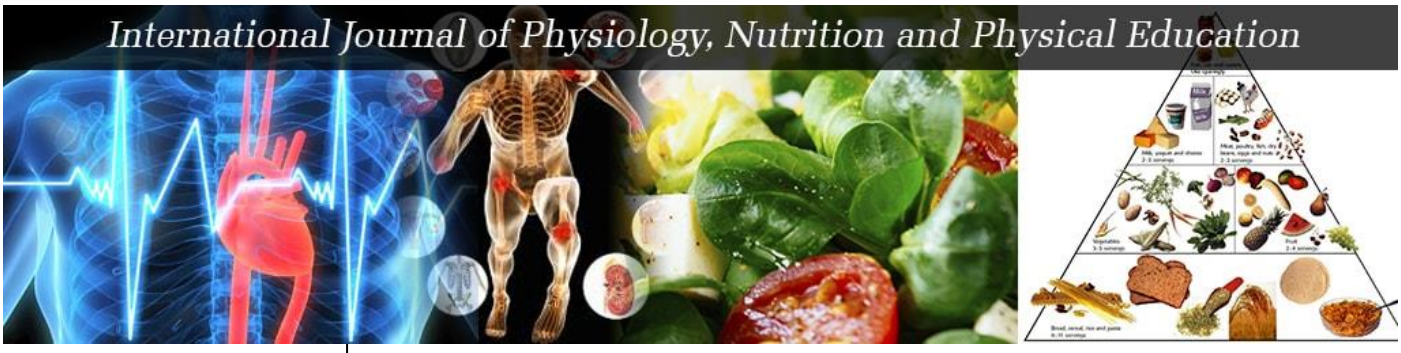

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Effect of diet with supplement protein intake on strength and body composition of power athletes

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Abstract
Nutrition enhances performance of the athletes and aid the recovery process. Nutrition also provides energy requirements to meet their daily needs, as the exercise they perform is intense and excessive. The present study was conducted in Huda Market, sector-15, Faridabad, Haryana, North India with 40 adult power athletes as subjects of endurance sport, wherein 20 subjects were given diet with supplement protein. 2 months resistance training program was given to the subjects and their strength was measured by 1 Repetition Maximum (1 RM) and 2 Repetition Maximum (2RM). The result revealed that 1 RM the subjects on diet with supplement protein, the differences for strength measured were statistically different ($p<0.05$). Regarding 2 RM of subjects on diet with supplement protein, the differences for strength measured were statistically different ($p<0.05$). The present study concluded that diet with supplement protein will have significant effect on strength and muscle mass of power athletes.

Keywords: Endurance sport, resistance training, supplement protein

Introduction

Strength is the ability of a muscle or muscle group to generate force. Strength is purely a measure of how much weight can be successfully lifted by an athlete. Power is the ability of a muscle or muscle group to generate force at high movement speeds. Instead of maximal weight, power is the ability to run, throw, and quickly change direction. Essentially, strength and power athletes require near maximal muscle force production [1].

Nutrition plays a number of important roles for athletes competing in sports where the expression of explosive power and strength are critical to competitive success. While total energy intake of strength-power athletes tends to be greater than that of endurance-focused athletes, intake relative to body mass is often unremarkable, with less known about distribution of nutrient intake over the day. Strength-power athletes will benefit from a greater focus on the strategic timing of nutrient intake before, during, and after exercise to assist them in optimizing resistance training work capacity, recovery, and body composition. Strength and power athletes create unique challenges for the nutrition service provider given their reliance on readily accessible sources of information, susceptibility to sports supplement marketing, potentially distorted body image and challenges associated with achieving a specified weight category in some sports [2].

Strength and power athletes are primarily interested in enhancing power relative to body weight and thus almost all undertake some form of resistance training. While athletes may periodically attempt to promote skeletal muscle hypertrophy, key nutritional issues are broader than those pertinent to hypertrophy and include an appreciation of the sports supplement industry, the strategic timing of nutrient intake to maximize fuelling and recovery objectives, plus achievement of pre-competition body mass requirements. Total energy and macronutrient intakes of strength-power athletes are generally high but intakes tend to be unremarkable when expressed relative to body mass. Greater insight into optimization of dietary intake to achieve nutrition-related goals would be achieved from assessment of nutrient distribution over the day, especially intake before, during, and after exercise. Sports nutrition recommendations for strength-power athletes should be directed at the individual athlete, focusing on their specific nutrition-related goals, with an emphasis on the nutritional support of training [3].

2. Materials and Methods

The present study was conducted to assess the effect of natural protein diet on strength and body composition of power athletes. The study was conducted in Huda Market, sector-15, Faridabad, Haryana, North India. Purposive sampling was done to select 20 adult power athlete subjects of endurance sport to conduct the present study. The subjects were given diet with supplement protein (1.6-1.8 g/kg IBW). Inclusion criteria were subject engaged in a program of regular exercise, no difficulty in walking and running, do not use any supplements, males were included in the study, subjects willing to participate in the study. Under Exclusion criteria, females were excluded, subjects not willing to participate, smokers were excluded, reported the history of cardiovascular, metabolic, neurological, orthopedic disorder. 2 months resistance training program was given to the subjects. Anthropometric measurements were done by using standardized tools. Strength was measured by 1 Repetition Maximum (1 RM) and 2 Repetition Maximum (2 RM). The Bioelectrical Impedance Analysis was done to measure % fat and % muscle mass with the help of Omron HBF-701, karada Scan Body Composition**.** Strength and body composition was measured at 0 day, 30th day and 60th day. Statistical analysis was done by SPSS 24 version.

Table 2.1: Exercises Involved In Resistance Training Program

Exercises Involved in Resistance Training Program per day	
Bench Press	3 sets
Military Press	3 sets
Sumo Squats	3 sets
Weighted Squats	3 sets
Dead Lift	3 sets
Pull Ups	3 sets
Push Ups	3 sets
Planks	3 sets
Barbell Curl	3 sets
Power Dumbbell Shrugs	3 sets
Dumbbell Front Raise	3 sets
Clean and Jerk	3 sets

3. Results and Discussion

Table 3.1: Mean and Standard Deviation of 1 RM of Subjects on Diet with Supplement Protein

1RM	0 DAY	30 DAY	60 DAY	ANOVA(P - value)
Weighted squats	108.5±34.68	119.75±35.18	129.5±33.16	.163
Bench Press	103.85±31.29	114.25±29.88	128.75±29.64	.040
Dead Lift	112±44.79	128±46.15	151.75±53.48	.039
Military Press	55.5±17.42	60.87±15.71	65.12±14.10	.165
Dumbbell Press	24.62±3.82	30.25±8.46	33±8.17	.002

Table3.1 depicts the mean and standard deviation of subjects on diet with supplement protein. At 0 day, 1RM of weighted squats was 108.5±34.68 on the other hand, on 30th day it was 119.75±35.18 and 60th day it was129.5±33.16 and the difference were not statistically significant (P=0. 163) i.e., strength of the subjects measured by 1RM of weighted squats did not enhanced at 60th day as compared to 0 day by diet with supplement Protein.

Regarding strength measured by Bench press revealed that, at 0 day, 1RM of bench press was 103.85±31.29 on the other hand, on 30th day it was 114.25±29.88 and 60th day it was and 128.75±29.64 the differences were statistically significant (P<0.05) i.e., strength of the subjects measured by 1RM of bench press enhances at 60th day as compared to 0 day by diet with supplement Protein.

Regarding strength measured by dead lift revealed that, at 0 day, 1RM of dead lift of subjects on natural diet at 0 day was 112±44.79 on the other hand, on 30th day it was 128±46.15 and 60th day it was 128.75±29.64 and the difference were statistically significant (P<0.05) i.e., strength of the subjects measured by 1RM of dead lift enhances at 60th day as compared to 0 day by diet with supplement Protein.

Regarding strength measured by military press revealed that, at 0 day, 1RM of military press was 55.5±17.42 on the other hand, on 30th day it was 60.87±15.71 and 60th day it was 65.12±14.10 and the difference were not statistically significant (P=0. 165) i.e., strength of the subjects measured by 1RM of military press did not enhanced at 60th day as compared to 0 day by diet with supplement Protein.

Regarding strength measured by Dumbbell press revealed that, at 0 day, 1RM of dumbbell press was 24.62±3.82 on the other hand, on 30th day it was30.25±8.46 and 60th day it was 33±8.17 and the differences were statistically significant (P<0.05) i.e., strength of the subjects measured by 1RM of dumbbell press enhances at 60th day as compared to 0 day by diet with supplement Protein.

Table 3.2: Mean and Standard Deviation of 2 RM of Subjects on Diet with Supplement Protein

2RM	0 DAY	30 DAY	60 DAY	ANOVA(P - value)
Weighted squats	97±34.95	107±33.88	119.75±33.18	.115
Bench+ Press	93.25±30.44	105.25+_29.57	119.75±34.84	.037
Dead Lift	99.75±42.25	115.5±43.40	135.75±46.65	.042
Military Press	46.375±17.79	54.25±15.21	58.25±13.10	.056
Dumbbell Press	21.62±5.45	25.62±7.15	28±7.09	.012

Table 3.2 depicts the mean and standard deviation of subjects on diet with supplement protein. At 0 day, 2RM of weighted squats was 97±34.95 on the other hand, on 30th day it was107+_33.88 and 60th day it was 119.75±33.18 and the difference were not statistically significant (P=0. 115) i.e., strength of the subjects measured by 2 RM of weighted squats did not enhanced at 60th day as compared to 0 day by diet with supplement Protein.

Regarding strength measured by Bench press revealed that, at 0 day, 2RM of bench press was 93.25±30.44 on the other hand, on 30th day it was 105.25±29.57 and 60th day it was 119.75±34.84 and the differences were statistically significant (P<0.05) i.e., strength of the subjects measured by 2RM of bench press enhances at 60th day as compared to 0 day by diet with supplement Protein.

Regarding strength measured by dead lift revealed that, at 0 day, 2RM of dead lift was 99.75±42.25 on the other hand, on 30th day it was 115.5±43.40 and 60th day it was 135.75±46.65 and the difference was statistically significant (*P*<0.05) i.e., strength of the subjects measured by 2RM of dead lift enhances at 60th day as compared to 0 day by diet with supplement Protein.

Regarding strength measured by military press revealed that, at 0 day, 2RM of military press was 46.375±17.79 on the other hand, on 30th day it was 54.25±15.21 and 60th day it was 58.25±13.10 and the difference were not statistically significant (P=0. 056) i.e., strength of the subjects measured by 2RM of military press did not enhanced at 60th day as compared to 0 day by diet with supplement Protein.

Regarding strength measured by Dumbbell press revealed that, at 0 day, 2RM of dumbbell press was 21.62±5.45 on the other hand, on 30th day it was 25.62±7.15 and 60th day it was 28±7.09 and the differences were statistically significant (*P*<0.05) i.e., strength of the subjects measured by 2RM of dumbbell press enhances at 60th day as compared to 0 day by diet with supplement Protein.

Table3.3: Mean and Standard Deviation of Anthropometric Measurements of Subjects on Diet with Supplement Protein

Anthropometric measures	0 DAY	30 DAY	60 DAY	ANOVA (P - value)
Height	168.46±8.52	168.46±8.52	168.466±8.52	1.000
Weight	82.07±8.12	80.865±7.39	79.985±6.94	.679
BMI	28.615±2.77	27.315±2.09	25.975±1.80	.002

Table 3.3 depicts the mean and standard deviation of subjects on diet with supplement protein. At 0 day, the mean height of the subjects was 168.46±8.52 which remained same for the next two consecutive readings at 30th day and 60th day. And the differences were not statistically significant (P=1.000) i.e., the height of the subjects measured didn't changed at 60th day as compared to 0 day by diet with supplement Protein.

At 0 day, the mean weight of the subjects was 82.07±8.12 on the other hand, on 30th day it was 80.865±7.39 and 60th day it was 79.985±6.94 and the difference was not statistically significant (P=0.679) i.e., weight of the subjects did not showed any significant change at 60th day as compared to 0 day by diet with supplement protein.

At 0 day, mean BMI of the subjects was 28.615±2.77 on the other hand, on 30th day it was 27.315±2.09 and 60th day it was 25.975±1.80 and the differences were statistically significant (*P*<0.05) i.e., the BMI of the subjects showed significant change at 60th day as compared to 0 day by diet with supplement Protein.

Table 3.4: Mean and Standard Deviation of Body Composition of Subjects on Diet with Supplement Protein

Body Composition	0 DAY	30 DAY	60 DAY	ANOVA (P - value)
Muscle Mass%	30.46±2.21	31.85±2.17	33.4±2.30	.001
Fat%	26.96±3.85	25.33±3.65	23.89±3.65	.040

Table 3.4 depicts the mean and standard deviation of subjects on diet with supplement protein. At 0 day, the mean muscle mass% of the subjects was 30.46±2.21 on the other hand, on 30th day it was 31.85±2.17 and 60th day it was 33.4±2.30 and the differences were statistically significant (*P*<0.05) i.e., muscle mass % of the subjects showed significant change at 60th day as compared to 0 day by diet with supplement Protein.

At 0 day, the mean fat% of the subjects was 26.96±3.85 on the other hand, on 30th day it was 25.33±3.65 and 60th day it was 23.89±3.65 and the differences statistically significant (*P*<0.05) i.e., fat% of the subjects showed significant change at 60th day as compared to 0 day by diet with supplement Protein.

Table 3.5: Mean and Standard Deviation of Dietary Assessment of Subjects on Diet with Supplement Protein

Dietary Assessment	0 DAY	30 DAY	60 DAY	ANOVA (P - value)
Energy	2619.25±432.21	2087.5±148.56	2087.5±148.56	.000
Protein	91.35±21.51	135.85±12.80	135.85±12.80	.000
CHO	379.15±95.68	208.5±41.20	208.5±41.20	.000
Fats	72.55±21.06	70.8±16.25	70.8±16.25	.939

Table 3.5 depicts the mean and standard deviation of subjects on Diet with Supplement Protein. At 0 day, the mean energy assessment of the subjects 2619.25±432.21 was on the other hand, on 30th day it was 2087.5±148.56 and 60th day it was 2087.5±148.56 and the difference were statistically significant (*P*<0.05) i.e., the energy intake of the subjects were decreased on 60th day as compared to 0 day.

At 0 day, the mean protein of the subjects was 91.35±21.51 on the other hand, on 30th day it was 135.85±12.80 and 60th day it was 135.85±12.80 and the differences were statistically significant (*P*<0.05) i.e., the protein intake of the subjects were improved on 60th day as compared to 0 day.

At 0 day, the mean CHO of the subjects was 379.15±95.68 on the other hand, on 30th day it was 208.5±41.20 and 60th day it was 208.5±41.20 and the differences were statistically significant (*P*<0.05)i.e., the CHO intake of the subjects were decreased on 60th day as compared to 0 day.

At 0 day, the mean fat of the subjects was 72.55±21.06 on the other hand, on 30th day it was 70.8±16.25 and 60th day it was 70.8±16.25 and the difference were not statistically significant (P=0. 939) i.e., the fat intake of the subjects were same on 60th day as compared to 0 day.

4. Conclusion

The study concluded that regarding subjects on diet with supplement protein, the strength of the subjects measured by 1RM, 2 RM of weighted squats, bench press, dead lift, military press, dumbbell press enhances at 60th day as compared to 0 day (*P*<0.05). Regarding height, weight, were not statistically enhanced at 60th day as compared to 0 day

(P>0.05) but BMI of subjects decreased at 60th day as compared to 0 day (P<0.05). Regarding muscle mass% and fat% enhanced at 60th day as compared to 0 day (P<0.05).
There was a significant enhancement of strength, % muscle mass of power athletes by diet with supplement protein.

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