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DOI: www.ijmer.in/2025/01/254/1453

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN:2277-7881; IMPACT FACTOR :9.014(2025); IC VALUE:5.16; ISI VALUE:2.286
UGC Approved (2017), Peer Reviewed and Refereed International Journal
Volume:14, Issue:1(2), January: 2025
Scopus Review ID: A2B96D3ACF3FEA2A
Article Received: Reviewed : Accepted
Publisher: Sucharitha Publication, India
Online Copy of Article Publication Available : www.ijmer.in

EFFICACY OF RESISTANCE TRAINING WITH AND WITHOUT PROTEIN SUPPLEMENTATION ON PERCENT BODY FAT AMONG OVERWEIGHT MALE STUDENTS

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Abstract

The study was designed to find out the effect of resistance training and resistance training with protein supplementation on percent body fat. To achieve this purpose, forty-five male students were randomly selected as subjects. The age of the selected subjects was ranged from 18 to 24 years. The selected subjects were divided into three equal groups of fifteen subjects each at random. Group-I underwent resistance training for three days per week for twelve weeks. Group-II underwent resistance training with protein supplementation for three days per week for twelve weeks. Group-III acted as control. The percent body fat was selected as dependent variable. The data collected from the experimental and control groups on selected dependent variable was statistically analyzed by paired 't' test to find out the significant differences if any between the pre and post test. The data collected from the three groups prior to and post experimentation on selected dependent variable was statistically analyzed to find out the significant difference if any, by applying the analysis of covariance (ANCOVA). In all the cases the level of confidence was fixed at 0.05 level for significance. The result of the study also produced 4.08% of changes due to resistance training, and 10.62% of changes due to resistance training with protein supplementation on percent body fat of overweight male students.

Key Words: Resistance Training, Protein Supplementation and Percent Body Fat.

INTRODUCTION

Now a day's body composition is considered one of the components of fitness as it plays important role in developing fitness (Singh et al., 2004). Fat is an essential component of the human body, critical in maintaining normal physiological function and homeostasis. The majority of body fat is stored in adipose tissue in subcutaneous sites. There are some deposited around vital organs to play a primarily protective role in the case of trauma. However, elevated body fat composition is undesirable, given the strong associations to various diseases including coronary heart disease and non-insulin dependent diabetes mellitus (Gidding et al., 2004).

Many people take up resistance training to improve their physical attractiveness. Most men can develop substantial muscles; most women lack the testosterone to do it, but they can develop a firm, toned physique, and they can increase their strength by the same proportion as that achieved by men. An individual's genetic make-up dictates the response to resistance training stimuli to some extent.

Resistance training also provides functional benefits. Stronger muscles improve posture, provide better support for joints, and reduce the risk of injury from everyday activities. The ability of the body to resist the stress that can result from an injury can be increased by obtaining a greater amount of strength. That is true in the athletic world and it has its advantages in performing everyday activities, such as lifting or carrying objects. Strength contributes to the overall efficiency of the human body. Starting a resistance training program means one has started a new lifestyle because strength is reversible. It will decline if we do not continue to obtain a strength stimulus throughout our entire life. For many people in rehabilitation or with an acquired disability, such as following stroke or orthopedic surgery, resistance training for weak muscles is a key factor to optimize recovery. For people with such a health condition, their resistance training is likely to need to be designed by an appropriate health professional, such as a physiotherapist.

The contribution that nutrition can make to the general health of any individual which has been generally accepted has not been given the attention it deserves. As the saying "A sound mind in a sound body", it is needless today that one can never think or act promptly if that person is in ill health or malnourished. Good nutrition is therefore vital to optimal event performance. Physical activity is essential for normal development in early adolescence. Exercise alone cannot be

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beneficial to the body. Proper exercise and balanced diet are the true basic necessities for a healthy man. Fitness is a combination of heart and muscle capacity to use oxygen for energy production. Nutrition and well being hence assumes a vital role in the field of sports.

Nutrition is an important feature of any training program. Education of coaches and athletes is needed in regard to both nutritional needs and the role of different foods in the diet. Intakes of some nutrients were much higher than is required, particularly protein, calcium and vitamin C and although these are usually harmless, the diet would be economical. During training there is an increased need for protein, in the order of 3gm per kilogram of body weight. Muscle tissue must be built, and there is an increase of plasma protein and of iron containing muscle and blood proteins. Suring very strenuous, stressful physical work, the red blood cells become fragile and there is a transient anemia that is corrected after about 2 weeks of training. If the diet is adequate in protein and iron reserves are normal.

Resistance training with protein supplementation has been the source of debate for many years and it still unresolved. In this present study an attempt has been made to find out whether there any changes on percent body fat due to the effect of resistance training protocol and resistance training with protein supplementation among overweight male students.

METHODOLOGY

Subjects and Variables

To achieve the purpose of the study forty-five (N=45) male students from Sree Vivekananda College, Kunnamkulam Thrisssur district, Kerala, India were selected as subjects. Their age ranged from 18 to 24 years. The selected subjects were divided into three equal groups of fifteen subjects each at random. Group-I underwent resistance training, group-II underwent resistance training with protein supplementation and group-III acted as control. The percent body fat was selected as dependent variable.

Training Protocol

During the training period, the two experimental groups (group I & II) namely resistance training group and protein supplementation with resistance training group underwent their respective training programme, three days per week for twelve weeks, in addition to their regular activities. For the both training groups eight exercises were given in order to keep the number of the sets were kept constant for each exercise. In between exercises, stretching exercises were done properly and specifically. The load was fixed for the two experimental groups after seeing the one repetition maximum (1 RM) of each participant in each exercise. All the subjects of the two experimental groups performed the same volume, intensity and frequency of training. However, 1.2 g/kg protein was supplemented for the subjects of experimental group-II before performing resistance training.

Statistical Technique

The data collected from the experimental and control groups on percent body fat was statistically analyzed by paired ‘t’ test to find out the significant differences if any between the pre and post test. Further, percentage of changes was calculated to find out the chances in selected dependent variables due to the impact of experimental treatment. The data collected from the three groups prior to and post experimentation on percent body fat was statistically analyzed to find out the significant difference if any, by applying the analysis of covariance (ANCOVA). Since three groups were involved, whenever the obtained ‘F’ ratio value was found to be significant for adjusted post test means, the Scheffe’s test was applied as post hoc test. In all the cases the level of confidence was fixed at 0.05 level for significance.

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RESULT

The descriptive analysis of the data showing mean and standard deviation, range, mean differences, 't' ratio and percentage of improvement on percent body fat of experimental groups are presented in table-I.

Table – I: Descriptive Analysis of the Pre and Post Test Data and 'T' Ratio on Percent Body Fat of Experimental and Control Groups

Group	Test	Mean	SD	MD	't' ratio	Percentage of Changes
Resistance Training	Pre test	26.90	1.19	1.10	11.00*	4.08%
	Post test	25.80	1.22			
Resistance Training with Protein Supplementation	Pre test	27.30	1.33	2.19	29.00*	10.62%
	Post test	24.40	1.26			
Control Group	Pre test	26.70	1.34	0.40	0.61	1.49%
	Post test	27.10	1.37			

Table t-ratio at 0.05 level of confidence for 14 (df) =2.15
**Significant*

The obtained 't' values of resistance training and resistance training with protein supplementation groups are 11.00 and 29.00 respectively which are greater than the required table value of 2.15 for significance at 0.05 level for 14 degrees of freedom. It revealed that significant differences existed between the pre and post test means of experimental groups on percent body fat. However, there is no significant differences existed between the pre and post test means of control group on percent body fat since, the obtained 't' value 1.49 is lesser than the required table value of 2.15 for significance.

. The result of the study also produced 4.08% of changes due to resistance training, and 10.62% of changes due to resistance training with protein supplementation on percent body fat of overweight male students.

The pre and post test data collected from the experimental and control groups on percent body fat is statistically analyzed by using analysis of covariance and the results are presented in table–II.

Table – II: Analysis of Covariance on Percent Body Fat of Experimental and Control Groups

	Resistance Training Group	Resistance Training with Protein Supplementation Group	Control Group	S o V	Sum of Squares	df	Mean squares	'F' ratio
Adjusted Post test Mean	25.91	23.84	27.25	B	56.35	3	18.78	20.18*
				W	32.57	35	0.93	

(The required table value for significance at 0.05 level of confidence with degrees of freedom 2 and 42 and 2 and 41 is 3.23)
**Significant at .05 level of confidence*

Table-II shows that the adjusted post-test means on percent body fat of resistance training and resistance training with protein supplementation groups and control group are 16.45, 15.19 and 18.14 respectively. The obtained 'F' value of 109.05 on percent body fat is greater than the required table value of 3.23 of 2, 41 df at 0.05 level of confidence. Hence, it is concluded that significant differences exist between the adjusted post test means of resistance training,

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resistance training with protein supplementation and control groups on percent body fat.

Since, the obtained 'F' value in the adjusted post test means is found to be significant, the Scheffe's test is applied as post hoc test to find out the paired mean difference, and it is presented in table-III.

Table –III: Scheffe's Post Hoc Test for the Differences among Paired Means of Experimental and Control Groups on Percent Body Fat

Resistance Training Group	Resistance Training with Protein Supplementation Group	Control Group	Mean Difference	Confidence Interval
25.91	23.84		2.07*	1.03
25.91		27.25	1.34*	1.03
	23.84	27.25	2.37*	1.03

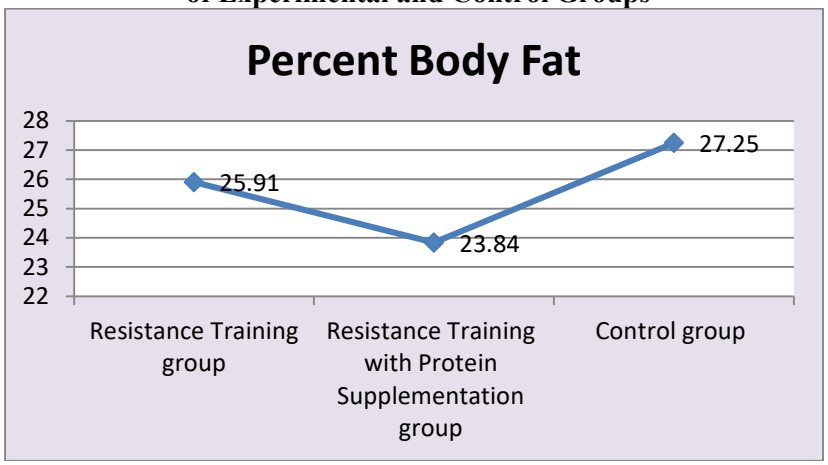
**Significant at .05 level*

As shown in table-III the Scheffe's post hoc analysis proved that significant mean differences existed between resistance training and resistance training with protein supplementation groups, resistance training and control groups, resistance training with protein supplementation and control groups on percent body fat since, the mean differences 1.26, 1.69 and 2.95 are higher than the confident interval value of 0.51 at 0.05 level of significance.

Hence, it is concluded that due to the effect of resistance training and resistance training with protein supplementation the percent body fat of the inter collegiate athletes is significantly reduced. It is also concluded that resistance training with protein supplementation is significantly better than resistance training in reducing percent body fat of the athletes.

The pre, post and adjusted post test mean values of resistance training, resistance training with protein supplementation and control groups on percent body fat is graphically represented in figure-II.

Figure – II: Diagram Showing the Mean Values on Percent Body Fat of Experimental and Control Groups



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DISCUSSION

Research on the effect of resistance training on health and fitness determinants revealed that resistance training, like other types of exercise, positively affects physical performance and body composition and a number of health parameters (Miller, *et al*., 1984; Stone, 1991; Toth, *et al*., 1995). According to Hakkinen et al., (2003) the strength and endurance training showed significant decreases in the body fat percentage throughout the experimental training period. Whereas fat-free mass only increased in groups performing resistance training regardless of endurance training inclusion (Kraemer et al., 1995). Changes in body composition are typically observed after chronic resistance training favouring an increase in fat-free mass and a decrease in the percentage of body fat (Hakkinen et al., 2003; Williams et al., 2002; Knapik, 1997). Davis et al., (2008) found decline in fat mass and percent body fat of concurrent training group. Hass et al., (2001) documented that concurrent training, resulted in significant reductions in fat mass and percentage body fat.

Athletes often choose a high protein diet because muscles are built of protein. Actually, a well-balanced diet should give athletes enough protein. Lemon and proctor (1991) showed that exercise causes an increased utilization of several amino acids particularly the branched chain amino acids and that under certain conditions such as decreased muscle glycogen, total oxidation may become significant. Endurance athletes require between 1.2 and 1.4g/Kg body weight /day of protein. This additional protein is needed to cover for the increased loss of amino acid during exercise to help repair exercise induced muscle damage (Lemon, 1995).

Protein supplements are often used after exercise training to enhance physical adaptations and future performance. The use of a carbohydrate/protein supplement has been shown to improve glycogen resynthesis, lean body mass, and overall performance (Esmarck *et al*., 2001). It has been suggested that muscle protein provided the primary fuel for muscle contraction but it appears that even early Greak athletes believed that adding meat to their diets would improve performance. Recent studies suggest that some protein may be used during exercise, and that under certain situation, protein may contribute upto 15% of the energy utilized during exercise. Several sources suggest that 1.0 to 1.5 g protein per kilogram of body weight is sufficient for most human athletes. Some athletes consume high protein diet in order to support changes in body composition such as increased muscle or lean body mass.

Conclusion

It is concluded that due to the effect of resistance training and resistance training with protein supplementation the percent body fat of the male student is significantly changed. It is also concluded that resistance training with protein supplementation is significantly better than resistance training in altering percent body fat of the subjects. The result of the study produced 8.95% of changes due to resistance training, and 15.85% of changes due to resistance training with protein supplementation on percent body fat of male students.

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