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Impact of Various Training Program on Selected Biochemical Variables among College Men Students

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Abstract

The purpose of the study was to find out the impact of various training program on selected biochemical variables among college men students. 60 men students were selected and aged between 18-24 years. The selected subjects were divided into Group I (Strength Training), Group II (Endurance Training), Group III (Concurrent Training) and control group. The group I, group II and group III named as experimental groups underwent training program for 12 weeks as well as control group did not underwent any specific training program. The selected dependent variable such as low density lipoprotein (LDL) and high density lipoprotein (HDL) was measured before and after the training period. The collected data was analyzed by using (ANCOVA) analysis of covariance. The findings of the present study have shown that there was significant improvement between the experimental and control groups after the 12 weeks of training.

Keywords: Strength Training, Aerobic Training, Concurrent Training, Low Density Lipoprotein and High Density Lipoprotein..

Introduction

Strength training is the kind of exercise that builds healthy muscle tissue. Strong muscles help you to move your body more efficiently. Some people refer to strength training as “lifting weights” but there are simple body weight exercises that qualify as strength training even though they don't involve lifting a dumbbell or a weight plate on a machine. Aerobic capacity describes the functional capacity of the cardiorespiratory system, (the heart, lungs and blood vessels). Aerobic capacity refers to the maximum amount of oxygen consumed by the body during intense exercises, in a given time frame.[15] It is a function both of cardiorespiratory performance and the maximum ability to remove and utilize oxygen from circulating blood. To measure maximal aerobic capacity, an exercise physiologist or physician will perform a VO_2 max test, in which a subject will undergo progressively more strenuous exercise on a treadmill, from an easy walk through to exhaustion. The individual is typically connected to a respirometer to measure oxygen consumption, and the speed is increased incrementally over a fixed duration of time. The higher the measured cardiorespiratory endurance level, the more oxygen has been transported to and used by exercising muscles, and the higher the level of intensity at which the individual can exercise.

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Blood stream carries the main forms of fat called cholesterol and triglycerides. These fats are lipids come partly from food, partly from the body’s own production in the liver. Fats are not water soluble and hence cannot travel through the blood easily. With the help of lipoprotein, digested fat from the liver is carried to various parts of the body by the blood vessels. The cholesterol returns to the liver and repeats its job. The lipoproteins are packages of cholesterol placed in liver. Lipoproteins are made from lipids and proteins. There are mainly four kinds of lipoprotein packages namely chylomicrons, very low density of lipoprotein (VLDL), low density of lipoprotein (LDL), high density of lipoprotein (HDL). High density of lipoprotein has more protein content.

Objective of the study

The main objective of the study was to investigate the impact of various training program on selected biochemical variables among college men students.

Methodology

The purpose of the study was to find out the impact of various training program on selected biochemical variables among college men students. 60 men students were randomly selected and aged between 18-24 years. The selected subjects were divided into Group I (Strength Training), Group II (Aerobic Training), Group III (Concurrent Training) and control group. The group I, group II and group III named as experimental group underwent training program for three days per week for 12 weeks of training period as well as the control group did not underwent any training program. The number of exercises, intensity, repetition, and set were manipulated every four weeks as the training progressed. The selected dependent variable such as LDL and HDL was measured before and after the training period. The collected data was analyzed by using (ANCOVA) analysis of covariance.

Hypotheses

It is hypothesis that there would be a significant difference among strength training, aerobic training, concurrent training and control groups on selected biochemical variables.

Analysis of the Data and Results of the Study

Table I. Analysis of covariance for LDL of strength training, aerobic training, concurrent training and control groups

	Strength Training	**Aerobic Training**	**Concurrent Training**	**Control group**	**SOV**	**Sum of squares**	***df***	**Mean square**	***F* ratio**
Pre-test mean SD	94.27 4.15	95.60 3.07	94.20 3.78	95.07 3.54	B W	20.32 747.87	3 56	6.77 13.36	0.51
Post-test mean SD	89.60 3.66	85.93 3.47	86.40 4.27	96.53 3.68	B W	1076.32 801.87	3 56	358.77 14.32	25.06
Adjusted post-mean	90.03	85.25	86.89	96.30	B W	1069.50 280.44	3 55	356.50 5.10	69.92

*Significant at 0.01 level.
The required table value at 0.01 level of significance for 3 & 56, 3 & 55 degrees of freedom are 4.15 and 4.16 respectively.

The above table shows that the pre-test means of the strength training, aerobic training, concurrent training and control groups are 94.27, 95.60, 94.20 and 95.07 respectively. The obtained *F* ratio 0.51 is lesser than the required table value 4.15 for 3 & 56 degrees of freedom at 0.01 level of significance. This result shows that there is no significant change in LDL between the control and experimental groups before the training program. The post-test means of the strength training, aerobic training, concurrent training and control groups are 89.60, 85.93, 86.40 and 96.53 respectively. The obtained *F* ratio 25.06 is higher than the required table 4.15 for 3 & 56 degrees of freedom at 0.01 level of significance. This result reveals that there is significant change between the experimental and control groups after the training program. The adjusted post-test means of the strength training, aerobic training, concurrent training and control groups are 90.03, 85.25, 86.89 and 96.30 respectively. The obtained *F* ratio 69.62 is higher than the required table value of 4.16 for 3 & 55 degrees of freedom at 0.01 level of significance. This result reveals that there is significant change between the experimental and control groups after the training program**.**

Table II. Scheffe's post hoc test to measure ordered adjusted LDL means between the experimental and control groups

Strength Training	**Aerobic Training**	**Concurrent Training**	**Control group**	**Mean difference**	**CD**
90.03	85.25			4.78*	**2.93**
90.03		86.89		3.14*	
90.03			96.30	6.27*	
	85.25	86.89		1.64	
	85.25		96.30	11.05*	
		86.89	96.30	9.41*	

Confidence interval value at 0.01 = 2.93

The table shows the difference between paired adjusted means on LDL. The confidence interval value at 0.01 level is 2.93. The adjusted post test mean difference on LDL between experimental group I and experimental group II is 4.78 which is found to be significant at 0.01 level. The adjusted post test mean difference 3.14 between experimental group I and experimental group III is also significant at 0.01 level. The adjusted post test mean difference between experimental group I and control group is 6.27 and the obtained value is significant at 0.01 level. The adjusted post test mean difference between experimental group II and III 1.64 is lesser than the required value and is insignificant. The adjusted post test mean difference between experimental group II and control group is 11.05 which is significant at 0.01 level. The adjusted post test mean difference between experimental group III and control group is 9.41 which is also significant at 0.01 level. The above results indicates that all the experimental groups namely high intensity with low volume group, low intensity with high volume and manipulated intensity and volume group have significant reduction in LDL value, when compared with the control group .Overall it is indicated that the results of the experimental group II and III has proved to be better than the other groups in LDL. The mean values of pre-test, post-test and adjusted post-test of experimental groups and control group.

Line diagram I. showing the mean values of LDL of the strength training, aerobic training, concurrent training and control groups

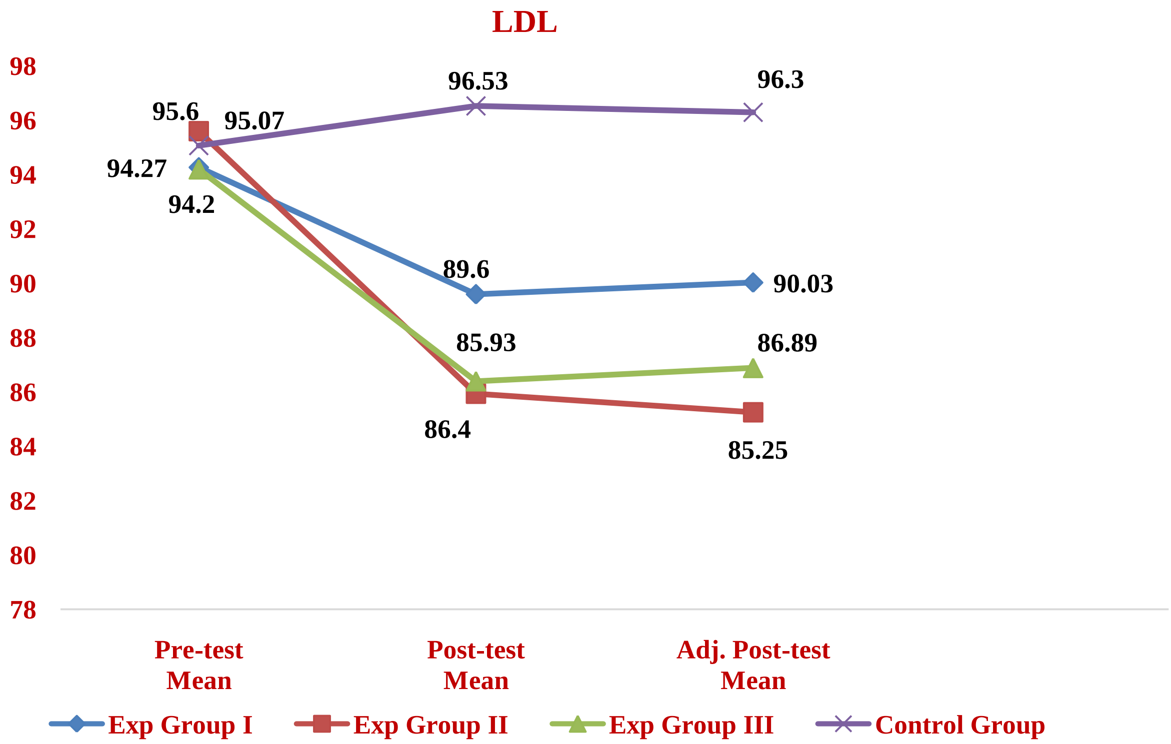


Table III. Analysis of covariance for HDL of strength training, aerobic training, concurrent training and control groups

	Strength Training	Aerobic Training	Concurrent Training	Control group	SOV	Sum of squares	*df*	Mean square	*F* ratio
Pre-test mean	42.87	43.33	43.40	43.87	B	7.53	3	2.51	0.38
SD	2.56	2.23	2.47	2.90	W	364.40	56	6.51	
Post-test mean	46.67	50.33	49.40	43.87	B	382.73	3	127.58	22.33
SD	2.23	2.19	2.47	2.64	W	320.00	56	5.71	
Adjusted post-mean	47.04	50.36	49.38	43.49	B W	417.30 113.97	3 55	139.10 2.07	67.13

*Significant at 0.01 level.
The required table value at 0.01 level of significance for 3 & 56, 3 & 55 degrees of freedom are 4.15 and 4.16 respectively.

The above table shows that the pre-test means of the strength training, aerobic training, concurrent training and control groups are 42.87, 43.33, 43.40 and 43.87 respectively. The obtained *F* ratio 0.38 is lesser than the required table value 4.15 for 3 & 56 degrees of freedom at 0.01 level of significance. This result shows that there is no significant change in HDL between the control and experimental groups before the training program. The post-test means of the strength training, aerobic training, concurrent training and control groups are 46.67, 50.33, 49.40 nad 43.80 respectively. The obtained *F* ratio 22.33 is higher than the required table 4.15 for 3 & 56 degrees of freedom at 0.01 level of significance. This result reveals that there is significant change between the experimental and control groups after the training program. The adjusted post-test means of the strength training, aerobic training, concurrent training and control groups are 47.04, 50.36, 49.38, and 43.49 respectively. The obtained *F* ratio 67.13 is higher than the required table value of 4.16 for 3 & 55 degrees of freedom at 0.01 level of significance. This result reveals that there is significant change between the experimental and control groups after the training program**.**

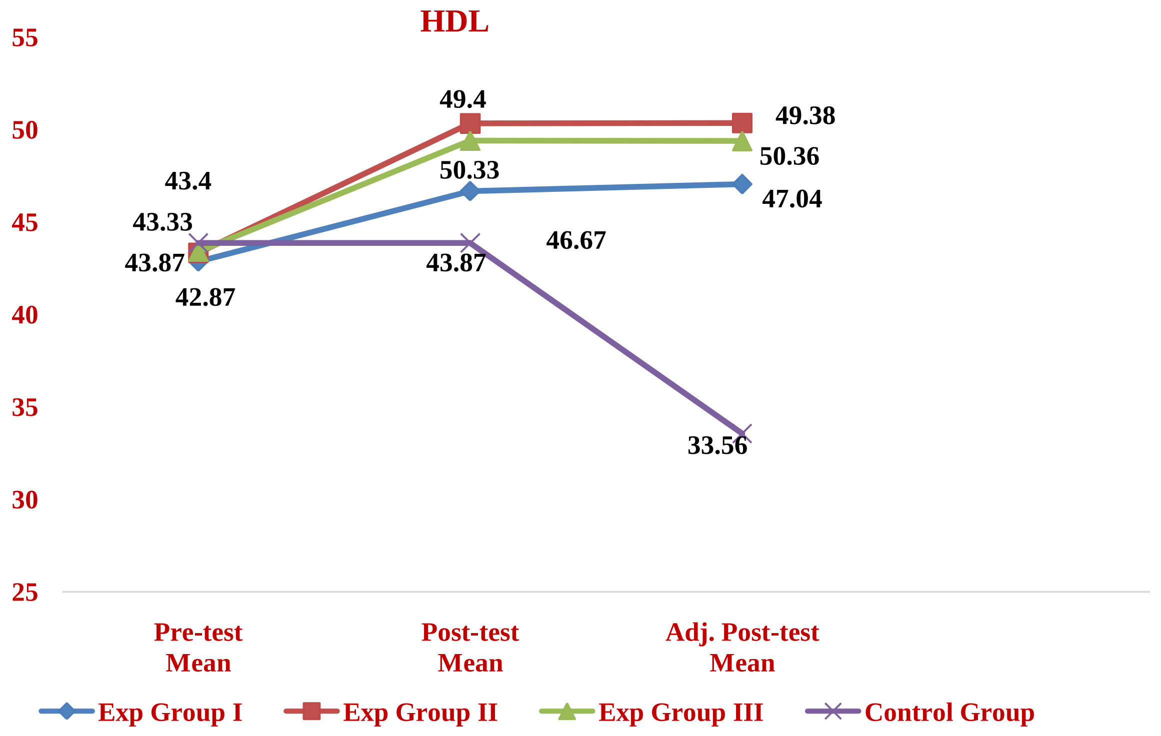
Table IV. Scheffe's post hoc test to measure ordered adjusted HDL means between the experimental and control groups

Strength Training	Aerobic Training	Concurrent Training	Control group	Mean difference	CD
47.04	50.36			3.32*	**1.87**
47.04		49.38		2.34*	
47.04			43.49	3.55*	
	50.36	49.38		0.98	
	50.36		43.49	6.87*	
		49.38	43.49	5.89*	

Confidence interval at 0.01 = 1.87

The table shows the difference between paired adjusted means on HDL. The confidence interval value at 0.01 level is 1.87. The adjusted post test mean difference on HDL between experimental group I and experimental group II is 3.32 which are found to be significant at 0.01 level. The adjusted post test mean difference 2.34 between experimental group I and experimental group III which is also found to be significant at 0.01 level. The adjusted post test mean difference between experimental group I and control group is 3.55 and the obtained value is significant at 0.01 level. The adjusted post test mean difference between experimental group II and III is 0.98 and is insignificant. The adjusted post test mean difference between experimental group II and control group is 6.87 which is significant at 0.01 level. The adjusted post test mean difference between experimental group III and control group is 5.89 which is also significant at 0.01 level. The above results indicates that all the experimental groups namely high intensity with low volume group, low intensity with high volume and manipulated intensity and volume group have significantly increased their HDL value, when compared with the control group. Overall it is indicated that the results of the experimental group II and III has proved to be better than the other groups in HDL. The mean values of pre-test, pos-test and adjusted post test of experimental groups and control group.

Line diagram II. Showing the mean values of HDL of the strength training, aerobic training, concurrent training and control groups



Discussion

The results of the study indicate that all the three experimental groups have shown a significant improvement in LDL level and the control group did not show any significant result. This indicates that the training program is having a positive influence towards LDL values of the subjects. Further while comparing between experimental groups it was found that aerobic training and concurrent training groups have significantly reduced their LDL value. Hence it was concluded that aerobic training and concurrent training are better in maintaining LDL value.

It is clearly evident that all the three experimental groups have improved significantly in HDL when compared to control group. While comparing between the experimental groups it is found that aerobic training and concurrent training groups have significant improvement in HDL. Hence it was concluded that aerobic training and concurrent training are better in improving HDL values.

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