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Original Research Paper

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EFFECT OF SPECIFIC AEROBIC AND SPECIFIC ANAEROBIC EXERCISE ON SELECTED BIOCHEMICAL VARIABLES OF ADULT OBESE MEN

Dr. N. Ganapathy Director Of Physical Education, SRM Valliammai Engineering College, Kattankulathur, Chengalpet

Dr. M. Rajashekaran* Professor, Department Of Physical Education And Sports Science, Annamalai University, Chidambaram *Corresponding Author

ABSTRACT The study was to investigate the effect of specific aerobic and anaerobic exercise on selected biochemical variables of adult obese men. To achieve the purpose of the study 60 adults from Chengalpet District, Tamil Nadu were selected as subjects and segregated into three groups of 20 subjects each as aerobic group, anaerobic group and control group and followed by random procedure. The experimental groups underwent exercise over a period of twelve weeks. The biochemical variables like high density lipoprotein (HDL), low density lipoprotein (LDL) and triglyceride (TG) selected for this study, and they were assessed before and after the experimental period. ANCOVA statistical method was used to analyze the collected data. The results of this study showed that there was a significant difference between and within experimental groups and control group. This experiment has effective on selected biochemical variables and it's significant at 0.05 level of significance.

KEYWORDS : Anaerobic, Aerobic, Obesity, Hdl, Ldl, Tg Analysis Of Co-variance (ancova)

INTRODUCTION

Obesity has become a worldwide issue. Obesity has become a major health, social and economical burden of today's world. [1] It has now been well established that obesity directly increases cardio metabolic risk by altering the secretion of adipokines and, indirectly, by promoting insulin resistance and its associated metabolic disorders, such as Type-2 diabetes. [2] Obesity is characterized by an increase in total body fat and is defined by a body mass index (BMI) ≥30kg/m2 (WHO). Aerobic training is a process whereby the heart and lungs are trained to pump blood more efficiently, allowing more oxygen to be delivered to muscles and organs. Aerobic training is a determining factor in performance in events with duration greater than 2mins. On the athletics track this would include all events in excess of 800m. For the physiological system of body to need fit, they must function well enough to support the specific activity the individual in performing. Moreover, different activities make different demands upon the organism with respect to circulatory, respiratory, metabolic and neurological process, which are specific to the activities. The lungs, heart and blood perform a vital function on the body's supply system. They supply to the muscles with necessary fuels, oxygen and carry waters such as carbon dioxide and lactic acid. Consequently, the cardio respiratory system in the athlete needs to be developed. Anaerobic means 'without oxygen'. During anaerobic work, involving maximum effort, the muscles is working so hard that the demands for oxygen and fuel go above the rate of supply and the muscles have to rely on the stored reserves of fuel. Anaerobic interval exercise can improve aerobic and anaerobic capacity, in particular, short work: rest exercise can utilize the contribution of aerobic and anaerobic pathways. [3] Aerobic exercise training that uses large muscles, unlike resistance training, seems to be effective in improving blood lipid profile. [4]

METHODOLOGY

The purpose of the study was to find out whether there would be any significant improvement on selected variables as the effect of specific aerobic and anaerobic exercise on selected biochemical variables of adult obese men. To achieve the purpose of the study 60 adults' men were selected as subjects from Chengalpet District, Tamil Nadu age ranged from 21 to 27. The participants were randomly selected and assigned to Group - I (Aerobic Training Group), Group - II (Anaerobic Group) and Group – III (Control group). Each group consisted of 20 subjects. After assigning the group all the subjects were administered with the criterion variable which was conside ring as a pre test. The experimental groups were treated with packages of exercise for the period of twelve weeks. After the treatment period was over all the subjects were administered with the criterion measures which was considered as post test.

Table I Type of Variables, Tests and Unit of Measurements

S.No.	Variables	Tests / Equipments	Units of Measurement
1.	High Density Lipoprotein	Auto analyzer	mg / dl
2.	Low Density Lipoprotein		
3.	Triglyceride		

SPECIFIC AEROBIC AND ANAEROBIC TRAINING PRO GRAMS

The training period, the experimental groups underwent their respective training programs three days per week (Alternative days) for 12 weeks. During the training days they worked out for 45 to 60 minutes approximately including warming up and warming down periods. Each group consists of 20 subjects. The Aerobic exercises such as long distance running, jump rope training, sit-ups, press-ups, crunches, pull ups, star jumps are crucial part of its training. The anaerobic exercise such as 20 – 50 mtrs running, 10 x 10 mtrs, Pushups, Squat Sit ups, Box steps, Alternate superman part of its training. [5]

STATISTICAL ANALYSIS

The data were collected on the selected test items as per the methods described. The pre test was conducted before the experimental period. After twelve weeks of the experimental period, the post test was conducted and the data were collected for the study. Test scores were subjected to statistical analysis the ANOCOVA were calculated for the biochemical variables. Whenever the 'F' ratio for adjusted post test was found to be significant, Scheff's post hoc test was applied to test the significant differences between the paired adjusted means. 0.05 level of confidence was fixed for biochemical variables to test the level of significance.

RESULTS

Table - II High Density Lipoprotein

Test	Aerobic Group	Anaerobic Group	Control Group	Source of Variance	Sum of Squares	df	Mean Squares	F-ratio

Pre-Test Mean	43.50	43.90	43.70	Between	1.60	2	0.80	0.077
				Within	595	57	10.43	
Post-Test Mean	46.35	46.10	41.60	Between	285.83	2	142.91	24.16*
				Within	337.150	57	5.915	
Adjusted Post-Test Mean	46.47	45.97	41.60	Between	287.75	2	143.87	84.49*
				Within	95.35	56	1.70	

* Significant at 0.05 level for the degrees of freedom (2, 56) and (2, 57), 3.15

Since significant improvements were recorded, the results were subjected to post hoc analysis using Scheffe's post hoc test. The results were presented in Table - III

Table - III Scheffe's post hoc test for the differences between the paired adjusted post-test means of High Density Lipoprotein

Aerobic Group	Anaerobic Group	Control Group	Mean Difference	Confidence Interval
46.47	45.97	--	0.5	1.02
46.47	--	41.60	4.87*	1.02
--	45.97	41.60	4.37*	1.02

* Significant at 0.05 level

The post hoc analysis of obtained ordered adjusted means proved that (1) there was significant differences existed aerobic training group and control group (2) anaerobic training group and control group. It shows there was no significant difference between aerobic training group and anaerobic training group.

Table - IV Low Density Lipoprotein

Test	Aerobic Group	Anaerobic Group	Control Group	Source of Variance	Sum of Squares	df	Mean Squares	F-ratio
Pre-Test Mean	163.35	164.25	165.60	Between	51.30	2	25.65	0.82
				Within	1777.1	57	31.177	
Post-Test Mean	145.70	154.90	167.45	Between	4768.03	2	2384.01	39.21*
				Within	3464.95	57	60.789	
Adjusted Post-Test Mean	146.8	155.1	166.2	Between	3686.84	2	1843.42	67.27*
				Within	1534.47	56	27.40	

* Significant at 0.05 level for the degrees of freedom (2, 56) and (2, 57), 3.15

Since significant improvements were recorded, the results were subjected to post hoc analysis using Scheffe's post hoc test. The results were presented in Table - V

Table - V Scheffe's Post Hoc test for the differences between the paired adjusted post-test means of Low Density Lipoprotein

Aerobic Group	Anaerobic Group	Control Group	Mean Difference	Confidence Interval
146.8	155.1	--	8.3*	4.125
146.8	--	166.2	19.4*	4.125
--	155.1	166.2	11.1*	4.125

* Significant at 0.05 level

The post hoc analysis of obtained ordered adjusted means proved that (1) there was significant differences existed aerobic training group and anaerobic training group (2) aerobic training group and control group (3) anaerobic training group and control group.

Table - VI Triglyceride

Test	Aerobic Group	Anaerobic Group	Control Group	Source of Variance	Sum of Squares	df	Mean Squares	F-ratio
Pre-Test Mean	179	179.60	178.90	Between	5.73	2	2.86	0.018
				Within	9008.60	57	158.04	
Post-Test Mean	160.30	170.15	180.25	Between	3980.23	2	1990.11	11.45*
				Within	9904.50	57	173.76	
Adjusted Post-Test Mean	160.40	169.80	180.50	Between	4018.49	2	2009.24	29.21*
				Within	3852.61	56	68.79	

* Significant at 0.05 level for the degrees of freedom (2, 56) and (2, 57), 3.15

Since significant improvements were recorded, the results were subjected to post hoc analysis using Scheffe's post hoc test. The results were presented in Table – VII

Table - VII Scheffe's Post Hoc Test for the differences between the paired adjusted Post-Test Means of Trigly ceride

Aerobic Group	Anaerobic Group	Control Group	Mean Difference	Confidence Interval
160.4	169.8	--	9.4*	6.55
160.4	--	180.5	20.1*	6.55
--	169.8	180.5	10.7*	6.55

* Significant at 0.05 level

The post hoc analysis of obtained ordered adjusted means proved that (1) there was significant differences existed aerobic training group and anaerobic training group (2) aerobic training group and control group (3) anaerobic training group and control group.

DISCUSSION:

The concentration of HDL is inversely correlated with the risk of coronary heart disease. The exercise enhances the production of the enzymes that facilitate HDL transportation of cholesterol back into the liver to be broken down. Thus, HDL acts as a scavenger in the reverse transport of cholesterol. [6] As the level of total cholesterol and LDL cholesterol rises, the risk of coronary artery disease increases. Every 1% decrease in the level of LDL cholesterol lowers 2% the risk of the coronary artery disease occurrence. The accumulation of fat around abdomen, waist and hip increases blood lipids especially LDL/HDL cholesterol rate, blood pressure and triglycerides level, and thus increases the risk of cardiovascular disease. [7] In which the group engaging in the high intensity physical exercise (75 at 90% HRmax) had a significant percent fat reduction. [8] There was a significant interaction between plasma TG levels and waist circumference or BMI in modulating HDL particle size. Indeed, an increased waist circumference or BMI was associated with a significant reduction in HDL particle size among subjects with plasma TG levels <or=3.5 mmol/l, but not among those with marked hypertriglyceridemia (TG levels >3.5 mmol/l). [9] Despite minimal weight of less than 2% loss in all groups, there were significant beneficial decreases in triglycerides and increases in HDL cholesterol. These results are supported by a recent Cochrane review examining clinical trials where exercise as a sole weight loss intervention was investigated. They reported that exercise as a sole weight loss intervention resulted in significant reductions in some of the biological risk factors for CVD and diabetes including diastolic blood pressure, triglycerides and fasting glucose even if no weight is lost. [10] *After 12 weeks, physical exercise showed reductions in Waist circumference, fat mass and triglycerides; and increases in height, HDL-C and VO 2peak. In addition, the group with metabolic syndrome presented reduced systolic blood pressure and increased insulin sensitivity.* [11] The aerobic exercise and resistance training shows the reduction in very low density lipoprotein (VLDL) and improvement in HDL levels. [12] The levels of total cholesterol (TC), triglyceride (TG), low density lipoprotein cholesterol (LDL-C) and very Low density lipoprotein cholesterol (VLDL-C) decreased significantly while high density lipoprotein cholesterol (HDL-C) increased as the duration of exercise training period progressed. Significant reduction was also observed in TC/HDL-C ratio as the duration of physical training progressed. The regular physical exercise has possible effect on improving lipid metabolism as lipid profile improved with increase in duration of exercise training period. [13] The 8-week aerobic-step exercise protocol, that HDL-K increased but triglyceride increased in the overweight and obese groups before and after exercises, and LDL-K decreased in the overweight group. [14] The anaerobic training initially increasing skeletal muscle size, facilitating fiber type transitions, and enhancing its biochemical and ultra structural components. These changes result in enhanced muscular strength, power, and muscular endurance.

In present study, the result shows that the aerobic training group and anaerobic training group were better than control group and its shows positive improvement on high density lipoprotein. Thus, it was proved that the aerobic training group and anaerobic training group decreased the level of low density lipoprotein and triglyceride compared to control group, aerobic training group were better than anaerobic training group in level of low density lipoprotein and triglyceride.

CONCLUSION:

The twelve weeks Specific Aerobic and Anaerobic Exercise on the adult obese men has proved to be effective on selected biochemical variables and it's significant at 0.05 level of significance.

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