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Effect of aerobic exercise and its combination with resistance training on risk factors associated with metabolic syndrome among middle aged men

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ABSTRACT

The purpose of the study was to find out the effect of aerobic exercise and its combination with resistance exercise on risk factors associated with metabolic syndrome among middle aged men. To achieve this purpose of the study, forty five middle aged men working at various departments in the Thanthai Hans Roever College, Perambalur, Tamil Nadu, India were selected as subjects at random. The group I performed aerobic exercise programme group II performed aerobic exercise with resistance training and group III acted as control group. The systolic blood pressure and diastolic blood pressure were assessed by sphygmomanometer. All the subjects of three groups were tested on selected criterion variables prior to and immediately after the eight weeks of training programme. Analysis of covariance (ANCOVA) and scheffe's post hoc test was computed. In all the cases, 0.05 level of confidence was fixed to test the significance. There was a significant difference between aerobic exercise group, aerobic exercise with resistance training group and control group on systolic blood pressure and diastolic blood pressure. The aerobic exercise with resistance exercise group had significantly reduced systolic blood pressure and diastolic blood pressure than the aerobic exercise group and control group.

Key Words: *Aerobic Exercises, Resistance Training, Metabolic Syndrome, Blood Pressure.*

INTRODUCTION

Aerobic exercise activating the large muscle groups, which can be maintained continuously and rhythmically in nature. It is a type of exercise that overloads the heart and lungs and causes them to work harder than at rest. The important idea behind aerobic exercise today, is to get up and get moving. Resistance training increases muscle strength by pitting muscles against a weight, such as a dumbbell, barbell or other type of resistance. Resistance training is pitting muscles against a resistance such as a weight or other type of resistance, to build the strength, anaerobic endurance, and or size of skeletal muscles. A well rounded program of physical activity includes strength training, to improve bone, joint function, bone density, muscle, tendon and ligament strength, as well as aerobic exercise, to improve our heart and lung fitness. **(Allan, et al. 1993).**

Metabolic syndrome is a disorder of energy utilization and storage. It has the following risk factors namely obesity, elevated blood pressure, elevated fasting plasma glucose, high serum triglycerides,

and low HDL cholesterol levels. Metabolic syndrome increases the risk of developing cardiovascular disease. Blood pressure is the amount of pressure of the blood because of the heart pumping and the resistance of the arterial walls. The maximum pressure occurs when the left ventricle contracts called the systolic pressure and the minimum pressure occurs just before the heart beats called as diastolic pressure **(Dengel, et al. 1998).** The metabolic syndrome is the serious problem in this present context and need an innovative training method to cure it. Thus the investigator combined the aerobic and resistance training to reduce the risk levels associated with metabolic syndrome.

METHODOLOGY

The purpose of the study was to find out the effect of aerobic exercise and its combination with resistance exercise on risk factors associated with metabolic syndrome among middle aged men. To achieve this purpose of the study, forty five middle aged men working at various departments in the Thanthai Hans Roever College, Perambalur, Tamil Nadu, India were selected as subjects at random. The group I performed aerobic exercise programme group II performed aerobic exercise with resistance training and group III acted as control group. The systolic blood pressure and diastolic blood pressure were assessed by sphygmomanometer. All the subjects of three groups were tested on selected criterion variables prior to and immediately after the eight weeks of training programme. Analysis of covariance (ANCOVA) and scheffe's post hoc test was computed. In all the cases, 0.05 level of confidence was fixed to test the significance.

Results and Discussions

The analysis of covariance of the data obtained for systolic blood pressure and diastolic blood pressure of pre-test and post-test, have been presented in Table I to IV.

TABLE- I

ANALYSIS OF COVARIANCE FOR THE DATA ON SYSTOLIC BLOOD PRESSURE BETWEEN PRE TEST AND POST TEST SCORES OF AEROBIC EXERCISE AEROBIC EXERCISE WITH RESISTANCE TRAINING AND CONTROL GROUPS

Test	AEG	AEGWRTG	Control Group	Sources of Variance	Sum of Square	df	Mean Squares	'F' Ratio
Pre Test Mean	125.53	124.87	124.53	Between	7.78	2	3.89	1.05
S.D	1.89	1.82	1.86	Within	155.2	42	3.695	
Post Test Mean	120.67	122.67	124.33	Between	101.11	2	50.555	23.60*
S.D	1.71	1.62	1.6	Within	90	42	2.142	
Adjusted Post Mean	120.29	122.74	124.63	Between	135.69	2	67.845	150.43*
				Within	18.51	41	0.451	

* Significant at 0.05 level of confidence.

The adjusted post-test means on systolic blood pressure of aerobic exercise group aerobic exercise with resistance training group, and control group are 120.29, 122.74 and 124.63 respectively. The obtained 'F' ratio of 150.43 for adjusted post-test means scores was greater than the required table value of 3.22 for df 2 and 41 required for significance at 0.05 level of confidence on systolic blood pressure. Since the obtained 'F' ratio for adjusted post was found to be significant, the scheffe's test was computed to find out the paired mean differences and it was presented in table-II

TABLE - II
THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN PAIRED MEANS OF SYSTOLIC BLOOD PRESSURE

Adjusted Post Test Means			Mean Difference	Confidence Interval
AEG	AEGWRTG	Control Group		
122.74	120.29	-	2.45*	0.91
122.74	-	124.63	1.89*	0.91
-	120.29	124.63	4.34*	0.91

The table II shows that the mean difference between aerobic exercise group and aerobic exercise with resistance training group, aerobic exercise group and control group, aerobic exercise with resistance training group and control group are 2.45, 1.89 and 4.34 respectively on systolic blood pressure which were greater than the confidence interval 0.91 for significance.

TABLE-III
ANALYSIS OF COVARIANCE FOR THE DATA ON DIASTOLIC BLOOD PRESSURE BETWEEN PRE TEST AND POST TEST SCORES OF AEROBIC EXERCISE AEROBIC EXERCISE WITH RESISTANCE TRAINING AND CONTROL GROUP

Test	AEG	AEGWRTG	Control Group	Sources of Variance	Sum of Square	df	Mean Square	'f' Ratio
Pre Test Mean	85	85.4	85.27	Between	1.24	2	0.62	0.301
S.D	1.37	1.36	1.44	Within	86.53	42	2.06	
Post Test Mean	82.93	80.73	85	Between	136.58	2	68.29	44.90*
S.D	1.39	1.47	1.32	Within	63.87	42	1.521	
Adjust Post Mean	83.11	80.59	84.96	Between	144.14	2	72.07	311.99*
				Within	9.48	41	0.231	

* Significant at 0.05 level

The adjusted post-test means on diastolic blood pressure of aerobic exercise group, aerobic exercise with resistance training group and control group are 83.11, 80.59 and 84.96 respectively. The obtained 'F' ratio of 311.99 for adjusted post-test means scores was greater than the required table value of 3.22 for df 2 and 42 required for significance at 0.05 level of confidence. Since the obtained 'F' ratio for adjusted post was found to be significant, the scheffe's test to find out the paired mean differences and it was presented in table-IV

TABLE-IV

THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN PAIRED MEANS OF DIASTOLIC BLOOD PRESSURE

Adjusted Post Test Means			Mean Difference	Confidence Interval
AEG	AEGWRTG	CG		
83.11	80.59	-	2.52*	1.14
83.11	-	84.96	1.85*	1.14
-	80.59	84.96	4.37*	1.14

* Significant at 0.05 level

The table IV shows that the mean difference values between aerobic exercise group and aerobic exercise with resistance training group, aerobic exercise group and control group, aerobic exercise with resistance training group and control group are 2.52, 1.85 and 4.37 respectively on diastolic blood pressure which were greater than the confidence interval 1.14 for significance.

Figure 1: Shows the mean values of Systolic Blood Pressure on both the experimental and Control Groups

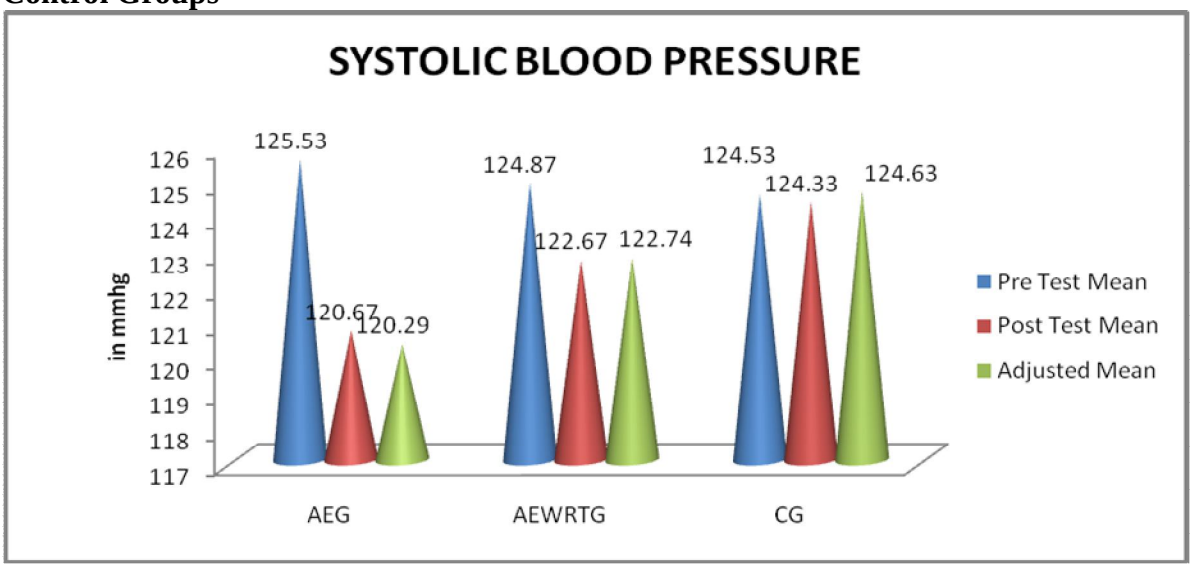
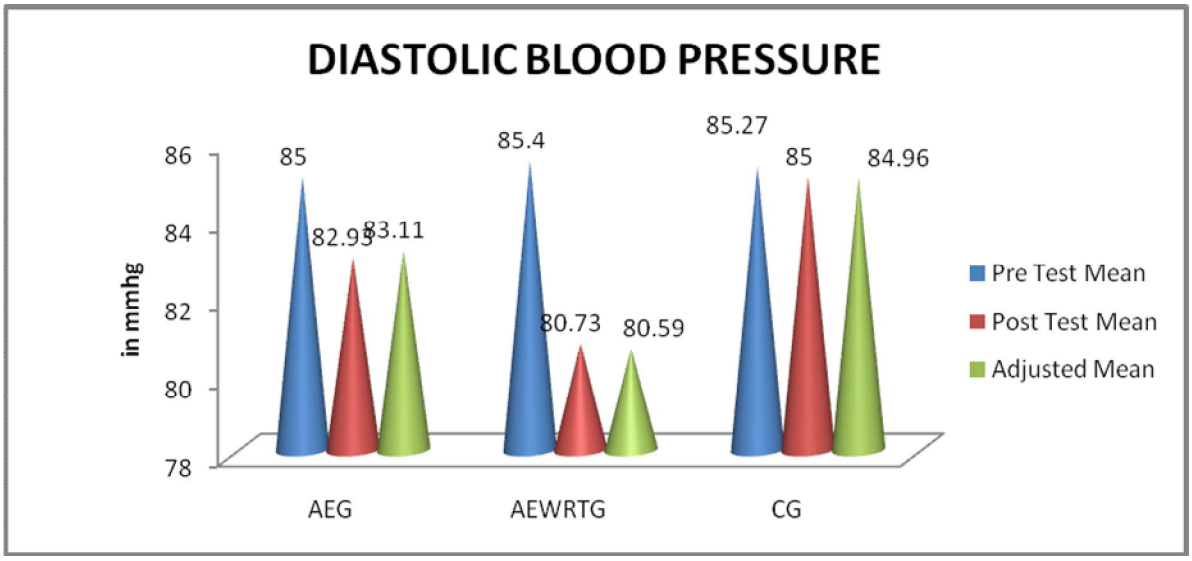


Figure I1: Shows the mean values of Diastolic Blood Pressure on both the experimental and Control Groups



CONCLUSIONS

1. There was a significant difference between aerobic exercise group, aerobic exercise with resistance training group and control group on systolic blood pressure and diastolic blood pressure.
2. The aerobic exercise with resistance exercise group had significantly reduced systolic blood pressure and diastolic blood pressure than the aerobic exercise group and control group.

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