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EFFECT OF AEROBIC EXERCISES ON AEROBIC POWER PLASMA VOLUME AND HEMOGLOBIN

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ABSTRACT

The purpose of the study was to find out the effect aerobic exercise on aerobic power, plasma volume and hemoglobin. Twenty male students studying from Dr. Sivanthi Aditanar College of Education were selected randomly as subjects. The age of the subjects ranged from 20 to 30 years. The selected subjects were divided into two groups. Group I underwent aerobic training and Group II acted as control. The experimental group was subjected to the aerobic training for alternative three days and the number of session per day was confined to one. The aerobic training was selected as independent variable and the criterion variables aerobic power, hemoglobin and plasma volume were selected as dependent variables and the selected dependent variables were assessed by the standardized test items. Aerobic power was assessed by single stage sub maximal treadmill walking test and the unit of measurement in ml/kg/min, plasma volume was assessed by EDTA (Ethyl in Diamin Tetra Acid) test and the unit of measurement in mg/ml and hemoglobin was assessed by shali's method and the unit of measurement in mg/dl. The experimental design selected for this study was pre and post test randomized design. The data were collected from each subject before and after the training period and statistically analyzed by using dependent't' test and analysis of covariance (ANCOVA). It was found that there was a significant improvement and significant different exist due to the effect of aerobic exercises on aerobic power, plasma volume and hemoglobin.

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INTRODUCTION

The word aerobic meaning with oxygen to represent this idea. Even so, the dynamics of the idea are more complicated than implied by the definition. Aerobics can be viewed as an intricate system of bodily supply and demand. That is, the body needs energy for any type of activity, and the need is filled by burning off the food we eat. Oxygen is the spark the fuel needs to burn. Regardless, aerobics is the word in general use. The fact is that *cooper* codified and organized fitness to many people. He is generally credited with being one of the main fours of the current fitness craze. The majoring medical opinion is that aerobic programmes strengthen heart muscle, increase the efficiency of lungs and offer other wonderful benefits. **(Patricia patano & Nette Savages, 1985)**

Aerobic power corresponds to rate of working rather than the completion of a specified quantity of work. The aerobic capacity is the properly defined as the amount of aerobic effort that can be sustained over a specified period. For example, 30 min the physiological determinants of aerobic capacity differ somewhat from the factors limiting aerobic power. In general, aerobic power is better sustained in a fit than in an unfit individual. The fit person can operate to peak aerobic power than sedentary subject if exercise is required for a prolonged period. **(Susan K. Wilmoth, 1986)**

Plasma volume is one of the most significant changes that occur with endurance training. It is indicate that the increase in plasma volume is the major factor in the increase in stroke volume that results from training. As plasma volume increases so does blood volume. Consequently, more blood enters the heart, as more blood enters the heart, stroke volume increases. At maximal rate of work, HR max generally remains relatively stable, so on increase stroke volume allows maximal cardiac out put to increase. Increasing maximal cardiac out put makes more oxygen available to working muscles, thus allowing Vo_2 max to increase. The increase in blood volume following aerobic training is due to a large in the plasma volume and small increase in the red blood cells, both changes facilities the delivery of oxygen to activate muscles. **(Jack H. Wilmore & David L. Costill, 1999)**

Hemoglobin is composed of a protein (globin) and a pigment (home). Heme contains iron, which binds oxygen. Each red blood cells contain approximately 250 million hemoglobin molecules, each able to bind 4 oxygen molecules, so each red

blood cells can bind up to a billion molecules of oxygen. There is an average of 15g of hemoglobin per 100ml of whole blood. Each gram of hemoglobin combines with 1.33ml of oxygen. So as much as 20 ml of oxygen can be bound for each 100ml of blood. **(Jack H. Wilmore & David L. Costill, 1999)**

METHODOLOGY

To achieve the purpose, twenty male student studying from Dr. Sivanthi Aditanar College of Education, Tiruchendur were selected randomly as subjects. The age of the subjects ranged from 20 to 30 years. They were assigned randomly into two groups (group I) underwent aerobic exercises and (group II) acted as control of ten subjects each. The experimental group was subjected to the training during morning hours for three days and group II acted as control. The aerobic exercises was selected as independent variable and the criterion variables aerobic power, plasma volume and hemoglobin were selected as dependent variables and the selected dependent variable were assessed by the standardized test items. Aerobic power was assessed by single stage sub maximal treadmill walking test and the unit of measurement in ml/kg/min, plasma volume was assessed by EDTA (Ethyl in Diamin Tetra Acid) test and the unit of measurement in mg/ml and hemoglobin was assessed by shali's method and the unit of measurement in mg/dl. The experimental design selected for this study was pre and post test randomized design. The data were collected from each subject before and after the training period and statistically analyzed by using dependent 't' test and analysis of covariance (ANCOVA).

RESULTS AND DISCUSSIONS

The data pertaining to the variables in this study were examined by using dependent 't' test to find out the significant improvement and analysis of covariance (ANCOVA) for each variables separately in order to determine the difference and tested at .05 level of significance. The analysis of dependent 't' test on data obtained for aerobic power, plasma volume and hemoglobin of the pre test and post test means of experimental and control group have been analyzed and presented in Table I.

TABLE- I

MEAN AND DEPENDENT 't' TEST OF EXPERIMENTAL AND CONTROL GROUPS ON SELECTED VARIABLES

Variables	Mean	Aerobic Exercises Group	Control Group
Aerobic Power	Pre test Mean	54.38	53.02
	Post test Mean	54.80	53.85
	't' test	**0.734**	**1.67**
Plasma Volume	Pre test Mean	0.4550	0.4670
	Post test Mean	0.4770	0.4660
	't' test	**5.66***	**0.26**
Hemoglobin	Pre test Mean	13.24	12.82
	Post test Mean	13.14	12.95
	"t" test	**2.12**	**0.83**

*Significant at 0.05 level of confidence (9) = 2.26

The obtained 't' ratio value on plasma volume of experimental group is higher than the table value, it is understood that the three days aerobic exercise had made significant changes on plasma volume, it is also understood that the three days aerobic exercises had not made any significant changes in aerobic power and hemoglobin . However, the control group has not made significant changes as the obtained 't' value is less than the table value; because it was not subjected to any specific training. The analysis of covariance on the data obtained on aerobic power, plasma volume and hemoglobin due to the effect of aerobic exercises and control groups have been analysed and presented in Table II.

TABLE- II

ANALYSIS OF COVARIANCE OF EXPERIMENTAL AND CONTROL GROUPS ON SELECTED VARIABLES

Variables	Adjusted Post Test Means		Source of Variance	SS	df	Mean Squares	'F'-Ratio
	Aerobic Exercises Group	Control Group					
Aerobic Power	54.23	54.43	Between	0.191	1	0.191	0.791*
			Within	44.76	21	2.63	
Plasma Volume	0.482	0.461	Between	0.0022	1	0.0022	14.94*
			Within	0.0024	17	0.00014	
Hemoglobin	12.95	12.94	Between	0.0003	1	0.0003	0.006
			Within	0.792	21	0.045	

*Significant at .05 level of confidence, df (1, 17) = 4.45

Table II shows that the obtained 'F' ratio value is 14.94 which is higher than the table value 4.45 with df 1 and 17 required to be significant at 0.05 level. Since the obtained value of 'F' ratio is higher than the table value, it indicates that there is significant changes has made among the adjusted post- test means of aerobic exercises group and control group on plasma volume. It is also shows that the obtained 'F' ratio value are 0.791 and 0.006 which are lesser than the table value 4.45 with df 1 and 17 required to be significant at 0.05level. since the obtained 'F' ratio values are lesser than the table value, it indicates that there is no significant changes have been made among the adjusted post – test means of aerobic exercises and control group on aerobic power and hemoglobin

The tree days aerobic exercises may affect the plasma volume, but it may not affect the aerobic power and hemoglobin.

CONCLUSIONS

1. The aerobic exercises had made significant changes on plasma volume.
2. There was significant difference among the adjusted post – test means of aerobic exercises and control group on plasma volume.
3. The aerobic exercise has not made any changes on aerobic power and hemoglobin.
4. There was no significant difference found between aerobic exercises group and control group on aerobic power and hemoglobin.

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