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Effect of six weeks training of aerobic exercises on selected physiological variables

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Abstract
Purpose: The Purpose of the study was to find out the effect of aerobic training on selected physiological variables.
Selection of Subjects: For the present study 30 male students from Post Graduate Government College, Sector-11, Chandigarh were selected randomly as the subjects for the study. The age of the subjects ranged between 18 - 21 years.
Selection of Variables: The variables selected for the present study were aerobic training (independent variable), Resting Heart Rate (RHR) and Vital Capacity (VC).
Methodology: For the study pre test – post test randomized group design, which consists of control group (15 students) and experimental group (15 students) was used. The data were collected through the pre test, before training and post test, after six weeks of aerobic exercises training.
Statistical Technique: For comparing pre and post test means of experimental and control groups of selected physiological variables, descriptive analysis and Analysis of Co-Variance (ANCOVA) were used, the data analyzed with the help of SPSS (16.0 version) software and the level of significance was set at 0.05 level of confidence.
Result: The result of the study showed that there was significant difference between pre and post test (experimental group) of Resting Heart Rate (RHR) and Vital Capacity (VC), Another hand there was insignificant difference between pre and post test (control group) of Resting Heart Rate (RHR) and Vital Capacity (VC).
Conclusion: On the basis of the findings it was concluded that the aerobic training might be responsible for the improvement of selected physiological variables like Resting Heart Rate (RHR), Vital Capacity (VC).

Keywords: Aerobic Training, Physiological Variables, Resting Heart Rate, Vital Capacity.

1. Introduction
Aerobic exercise (also known as cardio) is physical exercise of relatively low intensity that depends primarily on the aerobic energy-generating process. Aerobic literally means "living in air", and refers to the use of oxygen to adequately meet energy demands during exercise via aerobic metabolism. Generally, light-to-moderate intensity activities that are sufficiently supported by aerobic metabolism can be performed for extended periods of time [19]. Aerobic exercises are a wonderful way to burn your fat and tone your body muscles, leaving you healthy and in a good shape. Finding the perfect Workout Routines takes time and effort. These best workout routines is a great place to start if a person is interested in flat abs.
All these activities are healthy, easier to perform and inexpensive. Aerobic exercises are beneficial in so many ways like strengthening the respiratory muscles, strengthening and enlarge the heart muscle and improve its pumping, improving blood circulation and red blood cells, reducing stress and depression, increasing your stamina and endurance of your muscles, In short it reduces the risk of heart attacks.

1.1 Objectives of the Study
To find out the effect of six weeks aerobic exercises training on selected physiological variables i.e. resting heart rate (RHR), Vital capacity (VC).

2. Methodology
2.1 Selection of Subjects
For the present study, 30 male students from Department of Physical Education, Post Graduate

Government College, Sec-11, Chandigarh were selected as subject.

The age of the subjects ranged from 18-21 years. The subjects were divided into two groups i.e. one experimental (Aerobic exercise group, 15 students) and one control group (15 students).

2.2 Selection of Variables

Keeping the feasibility criterion in mind, the researcher selected the following variables for the present study:

1. Aerobic exercise training (Independent variables)
2. Physiological variables (Dependent variables)
   - Resting heart rate (RHR)
   - Vital capacity (VC)

2.3 Criterion Measures

- Vital capacity was measured by Dry Spirometer and recorded in milliliters.
- Heart rate was measured by gently pressing over the radial artery and recorded in numbers for one minute by using stop watch.

2.4 Experimental Design

For the study pre test & post test randomized group design, which consists of one control group (n=15) and one experimental group (n=15) was used. Equal numbers of subjects were assigned randomly to the group. One group served as experimental group (Aerobic exercises training group) on which treatment was assigned and the second group served as the control group.

Table 1: Pre Test & Post Test Randomized Group Design

Aerobic exercise training group	**O_1**	**T**	**O_2**
Control group	**O_1**		**O_2**

Where- O_1 = Pre Observation, O_2= Post Observation and T= Treatment (training).

2.5 Collection of data

Before the administration of aerobic training, the selected tests for selected physiological variables were administered on both the experimental and control groups to collect pre test data. After the completion of six weeks of aerobic exercises training again the same tests were conducted to collect the post training data. Necessary instructions were given to the subjects before administration of the tests.

2.6 Administration of training

The training for experimental group was administered at P.G.G.C, Sec-11, Chandigarh. Selected aerobic exercises (Walking, Jogging, Running, Jumping, Stair Running, Rhythmic Exercises, Slow Stretching etc,) were given to experimental group on five days i.e. (Monday to Friday) sessions per week for Six Weeks. Each training session consisted of 60-90 minutes included 10-15 minutes of warming up and 10-15 minutes for cooling down. Remaining minutes allotted for aerobic exercise training programme.

2.7 Statistical Procedure

The data were analyzed by applying descriptive statistical and Analysis of Co-Variance (ANCOVA). The data analyzed with the help of SPSS (16.0 version) software and the level of significance was set at 0.05 level of confidence.

3. Result and Findings of the Study

Table 2: Analysis of co-variance of the mean of experimental group and control group in relation to RHR and VC

Variables	Test	Mean & SD		ANCOVA table					
		Experimental	Control	Source of variance	SS	df	MS	F	Sig.
RHR	Pre	74.33±4.70	75.73±7.87	B	14.700	1	14.700	.350	.559
				W	1176.267	28	42.010		
	Post	69.33±4.15	74.80±6.37	B	224.133	1	224.133	7.750*	.010
				W	809.733	28	28.919		
	Adjusted	69.83	74.31	B	148.785	1	148.785	17.655*	.000
				W	227.543	27	8.428		
VC	Pre	3.7640±.3878	3.469± .6113	B	.651	1	.651	2.485	.126
				W	7.338	28	.262		
	Post	4.2920±.4863	3.482± .6192	B	4.921	1	4.921	15.875*	.000
				W	8.679	28	.310		
	Adjusted	4.147	3.627	B	1.868	1	1.868	31.410*	.000
				W	1.605	27	.059		

*significant at 0.05 level, $F_{0.05}(1,28)=4.20$, $F_{0.05}(1,27)=4.21$
B=between group variance, W= within group variance.

The analysis of co-variance indicated that the resultant F-ratio of RHR (.350) and VC (2.485) were insignificant in case of pre-test means from which it is clear that the pre-test mean does not differ significantly and that the random assignment of subjects to the experimental groups was quite successful. The post-test means of all the two groups yielded an F-ratio of RHR (7.750) and VC (15.875) which were significant at 0.05 level of significance. The F-ratio needed for significance is 4.20 at 0.05 level of significance with 1, 28 degree of freedom. The difference between the adjusted posts means were found significant as the obtained F-ratio were 17.655 and 31.410 of RHR and VC respectively. The F-ratio needed for significance is 4.21 at 0.05 level of significance with 1, 27 degree of freedom. Thus, mean significant difference exits between experimental and control group in relation to RHR and VC.

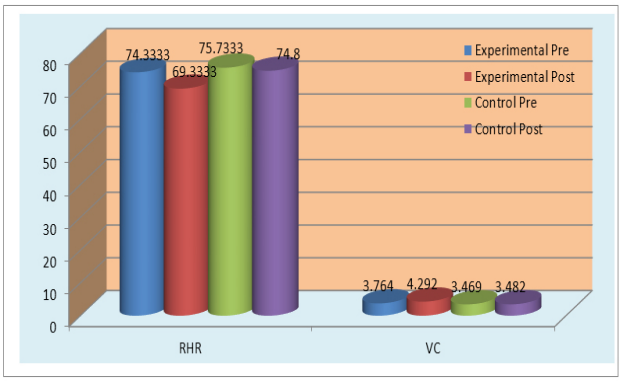

Fig 1: Graphical representation of mean values of experimental and control groups, pre and post test of selected physiological variables

4. Discussion of Findings

The literature thoroughly supports the evidence that exercise intensity is directly related to the change in VO2max [11]. Higher doses of aerobic exercise produce greater increases in VO2max, although these improvements are not proportionately greater. Regular participation in aerobic exercise often results in a decrease in resting heart rate [14, 20]. Similar study conducted by M. Muralikrishna and P.V. Shelvam [15] in 2014 on Effect of different intensities of aerobic training on vital capacity of middle aged obese men; The results showed that High intensity aerobic training positively influences the cardiopulmonary (vital capacity).

R. Muthu Eleckuvan [10] also conducted a study on "Effectiveness of Fartlek Training on Maximum Oxygen Consumption and Resting Pulse Rate". He found that the twelve weeks of fartlek training programme significantly improved maximum oxygen consumption and resting pulse rate.

These studies are supporting to the result of this study in the relation of aerobic training.

5. Conclusions

On the basis of findings of the study, the following conclusions may be drawn:

- The results of the study indicate that the significant difference was found in pre and post test of (experimental group) resting heart rate (RHR), ($p<0.05$).
- The results of the study indicate that the insignificant difference was found in pre and post test of (control group) resting heart rate (RHR), ($p>0.05$).
- The results of the study indicate that the significant difference was found in pre and post test of (experimental group) vital capacity (VC), ($p<0.05$).
- The results of the study indicate that the insignificant difference was found in pre and post test of (control group) vital capacity (VC), ($p>0.05$).

On the basis of the findings it was concluded that the six weeks aerobic training is responsible for the improvement of selected physiological variables like Resting Heart Rate (RHR), Vital Capacity (VC).

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