

# Efficacy of Varied Aerobic Training on Vital Capacity and Resting Heart Rate among Obese Women

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**S.Selvalakshmi** , Assistant Professor, Dept of Yoga, TamilNadu Physical Education and Sports University, Chennai and

**S .Mangayarkarasi**, Former Professor, Dept of Physical Education, Annamalai University.

## Abstract

Aerobic refers to a variety of exercises that stimulate heart and lung activity for a time period sufficiently long to produce beneficial changes in the body (**Cooper, 1970**) Aerobic is a system of exercises designed to promote the supply and use of oxygen in the body) in this study the investigator is interested to carry out to experiment varied aerobics training on two randomized groups of obese women and their effects on cardio respiratory functions. For this study thirty obese women grouped into three, control, aerobic and step aerobic were treated and results on vital capacity showed significant improvement due to varied exercises whereas no significant improvement in resting heart rate.

## Introduction

Physical fitness is a universally accepted and realized terminology. Physical fitness is a capacity to meet the present and potential physical challenges of life with success. The present concept of physical fitness is not only freedom from disease, but also to gain enough strength, agility, flexibility, endurance and skills to meet the demands of daily life and to build sufficient reserve energy to withstand stress and strain.

“Aerobics” basically means living or working with oxygen. Aerobics or endurance exercises are those in which large muscle groups are used in rhythmic repetitive fashion for prolonged periods of time.

Aerobic refers to a variety of exercises that stimulate heart and lung activity for a time period sufficiently long to produce beneficial changes in the body (**Cooper, 1970**) Aerobic is a system of exercises designed to promote the supply and use of oxygen in the body. Some of these exercises include running, dancing, rowing, skating and walking. Aerobic exercise increases cardio respiratory fitness, which is the heart’s ability to pump blood and deliver oxygen throughout the body. Some benefits of cardio respiratory fitness are increased endurance and energy, weight control, decreased blood pressure, decreased heart rate, decreased cholesterol levels, and an increased ability to manage stress.

The step aerobics, which was developed by Gin Miller while she was recovering from a knee injury, is a trend that took the aerobics industry by storm. This extremely popular style involves stepping up and down from a platform 15 to 30 centimeters (6 to 12 inches) high while performing different step combinations. In step aerobic exercises the heart rate increases substantially, but never reaches its maximum level. The heart is always able to deliver sufficient oxygen - rich blood to muscles so that they can derive energy from fat and glycogen aerobically. Aerobic exercises builds stamina for sports and it is also the most important form of exercise for health, since it increases the efficiency of heart, circulation and muscles.

“Obesity is a serious problem. Excess weight and long life are not well associated. Over weight persons are more susceptible than thin ones to many fatal diseases and tend to die. Younger than those of normal or less than normal weight. In addition, obesity detracts from one’s aesthetic appearance and hinders effective participation in sports and other physical activities.” (Clarke and Harrison, 1964)

Obesity leads to, a) Diabetes, b) Chronic heart diseases, c) Deterioration of brain functions, d) Acceleration of aging process and e) Deteriorated musculo-skeletal system. All exercise burns calories for they involve movements and energy is required for every movement made. The calorie burning ability of each exercise depends on the speed and/or force at which the exercise is performed. This proves the calorie burning potential of an exercise can be increased depending on an individual’s motivation for that movement.

Aerobic exercises are very popular for many trying to lose weight. They can be very effective in burning a large amount of total energy in a single session. However if a person is overweight and/or unfit the class may become too intense for proper fat burning, especially if the individual is highly motivated to keep up with other, fitter members of the class. For this individual breathing would become heavy and this will always result in carbohydrates becoming the predominant fuel, pushing the percentage of fat burning down as low as 30%.

### **Reasons for the Present Study**

It is proved fact that exercises, aerobics exercises reduce obesity among obese women and as a result affects blood lipids, body composition and cardio respiratory function. The investigator is interested to make a scientific research to assess the effect of varied aerobic, training Programme on vital capacity and resting heart rate among obese women in this study

### **Statement of the Problem**

In this study the investigator is interested to carry out to experiment varied aerobics training on two randomized groups of obese women and their effects on Vital Capacity and Resting Heart Rate.

### **Hypothesis**

It was hypothesized that there would be no significant difference between the pre test and post test of the cardio respiratory function assessed through vital capacity and resting heart rate due to aerobics and step aerobics training.

### **Significance of the Study**

The present investigation will contribute significantly to the field of physical education, sports and the sedentary persons in the following ways:

1. The findings of the study would emphasize the .impact of aerobic exercise in the improvement of vital capacity and resting heart rate.
2. The findings will create significant awareness among obese women.
3. The findings of the study will motivate the sedentary people especially women to take part in some type of aerobic exercises to keep them physically fit.

### **Review of Related Research**

Wallman K et.al., ( 2006) Examined the effects of an 8-week exercise intervention on aerobic fitness, android and gynoid fat mass, and blood lipids in overweight and obese participants. Twenty-four sedentary participants (average BMI = 30 +/- 2 kg/m<sup>2</sup>); 18 females, 6 males) were randomized into either interval training and diet education (INT group), continuous aerobic exercise and diet education (CON group), or diet education only (DIET group). Durations of exercise sessions were similar ( approximately 30 minutes), with both exercise groups completing the same amount of work. The INT and CON groups demonstrated significant improvements over time for VO<sub>2</sub> peak (p < 0.01 and p < 0.05, ES = 1.1 and 1.2, respectively) and time to exhaustion on a graded exercise test (p < 0.01 and ES = 0.8 for both groups). Further, a large effect size (0.7) was recorded for the loss in android fat mass over time in the INT group only.

Saxena Y et.al., (2008) The study was undertaken to assess the dynamic pulmonary function tests in obese and non obese young adults of Gharwal (Uttrakhand, India) of 20-40 years age group, randomly selected from the employees of Himalayan institute of medical sciences, attendants of the patients at the hospital and also from the nearby community at Jolly grant, Dehradun. The volunteers representing mixed socioeconomic group were categorized into obese cases and non-obese controls as per the standard criteria for Body mass index (BMI). Dynamic pulmonary function tests were carried out with all the standard protocols. Statistical analysis comprised student's "t" test and linear correlation analysis. The result indicated a significantly lower value of (FVC) forced vital capacity (2.89 +/- 0.29) and (FEV1) Forced expiratory volume in 1st sec (2.59 +/- 0.25) in obese females. The FVC and FEV1 in the females correlated negatively to the BMI (r = -0.376, P < 0.05 and r = -0.359 and P < 0.05) and were significant. Dynamic pulmonary function values in males showed a negative correlation but were not statistically significant. This concludes that obesity person has less effect on the dynamic function tests in obese young adults except in females, but obese individuals presenting with greater morbidity may be more susceptible to altered dynamic pulmonary function test in this age group.

### **Methodology**

Total of thirty obese women who are members of the "Adult Fitness Programme" of the YMCA College of Physical Education were selected at random for this study. Care was taken to ensure that they did not undergo any training beforehand. They belonged to the age group of 25 to 35 years. The subjects were assigned to three groups (Group A, B, and C)

with each group comprising of ten subjects. Group A was exposed to aerobic exercise training, Group B to step aerobic exercise training and Group C served as control group and was restricted from participating in the training Programme. The subjects were locally available and health consciousness and the investigator has not perceived any difference in their life pattern and food habits. Hence the three groups were considered as homogeneous groups.

The experimental design used in this study is pre test, post test randomized group design. Here, the groups are randomly formed but both groups are given a pre test as well as post test. To assess the effect of 12 weeks varied aerobics training Programme, dependent variables cardio respiratory functions vital capacity and resting pulse rates were chosen for this study. Before the commencement of training Programme, the investigator explained to the subjects, the purpose of the training Programme and their role in the investigation.

### Statistical Analysis

The collected data on the cardio respiratory parameters prior to and after 12 weeks of varied aerobics training were statistically analyzed using Analysis of Covariance (ANACOVA) as recommended by Clarke and Clarke (1972) and Best and Khan (1986). In all the cases 0.05 level was fixed as level of significance which was considered as appropriate.

### Results

The obtained results on vital capacity of the obese women due to varied aerobic exercises are presented in Table I.

**Tab I: Computation of Analysis of Variance of Pre and Post Test Scores on Vital Capacity**

Source of Variance	df	SSx	SSy	MSx(vx)	MSy(vy)
Between Sets	2	0.5	3.3	0.3	1.7
Within Sets	27	3.1	3.2	0.1	0.1

Table Value (2,27) (0.05) = 3.35;  $F_x = 2.4$  ;  $F_y = 14.1^*$

The table value of df's 2 and 27 for the F-ratio for significance at 0.05 level is 3.35. The F-ratio for the initial means falls short of significance at 0.05 level. So it is demonstrated that the random assignment of the subjects for the three groups (control, aerobics and step aerobics training groups) was successful.

The F-ratio for the final means was significant at 0.05 level.

The adjusted mean scores to test the significant differences among the three groups (control, aerobics and step aerobics training groups) was determined using ANCOVA.

**Tab II: Computation of Analysis of Covariance of Pre and Post Test Scores on Vital Capacity**

Source of Variance	Df	SSx	SSy	SSxy	MSy.x	SDy.x	F-ratio
Between Sets	2	0.5	3.3	1.6	0.8	0.2	18.9*
Within Sets	26	3.1	3.2	1.1	0.042		

Table Value (2,26) (0.05) = 3.37

As mentioned in Table II the obtained F-ratio of 18.9 was higher than the required table value of 3.37 at 0.05 level of significance. Hence the null hypothesis was rejected at 0.05 level of significance.

The adjusted mean values of three groups (control, aerobic and step aerobic training groups) and the required mean difference as calculated by Scheffe's test are presented in Table III.

**Tab III: Ordered Adjusted Means for Vital Capacity tested for Significance using Scheffe's Test**

Step Aerobics Group	Aerobics Group	Control Group	MD
3.1	3.0		0.1*
	3.0	2.6	0.4*
3.1		2.6	0.5*

Scheffe's Value = 0.08

As presented in Table III all the three groups' (control, aerobics and step aerobics training groups) adjusted mean differences were significantly different at 0.05 level.

The adjusted mean scores to test the significant differences among the three groups (control, aerobics and step aerobics training groups) was determined using ANCOVA.

**Tab IV: Computation of Analysis of Covariance of Pre and Post Test Scores on Resting Heart Rate**

Source of Variance	Df	SSx	SSy	SSxy	MSy.x	SDy.x	F-ratio
Between Sets	2	2.1	2.6	1.7	0.8	0.8	1.2
Within Sets	26	125.4	86.1	18.6	0.7		

Table Value (2,26) (0.05) = 3.37

As mentioned in Table IV the obtained F-ratio of 1.2 was less than the required table value of 3.37 at 0.05 level of significance. Hence the null hypothesis was accepted at 0.05 level of significance.

## Discussions

In the all the treatments of varied aerobics exercises, the results presented through Table I to III showed that significant improvement in vital capacity among obese women. However there was no significant improvement due to varied aerobic exercises on resting heart rate as shown in Table IV.

Previous studies show that aerobic is a system of exercises designed to promote the supply and use of oxygen in the body. Aerobic exercise increases cardio respiratory fitness, which is the heart's ability to pump blood and deliver oxygen throughout the body. Some benefits of cardio respiratory fitness are increased endurance and energy, weight control, decreased blood pressure, decreased heart rate, decreased cholesterol levels. The results of this study are in agreement with these findings as far as cardio respiratory function, vital capacity. However, this study does not show agreement with the findings that it would give decreased heart rate.

## Conclusions

The findings of this study show that the varied aerobic exercises, namely aerobic and step aerobic exercises significantly improved the vital capacity of the obese women where as there is no significant decrease in their resting heart rate.

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