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Effect of Aerobic Training on Coronary Heart Disease Risk Factors in Obese Men

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Abstract

The purpose of the study was to find out the effect of aerobic training on coronary heart disease risk factors in obese men. Twenty four (N = 24) obese men (BMI ≥ 30 kg/m^2) were randomly selected subjects from working in various faculties of Annamalai University, India. The selected subjects were age, height and weight ranged was 38 ± 3 years, 167 ± 9 cm and 89 ± 14 kg respectively. Selected subjects were divided into two groups with twelve subjects (n=12) of each group. Group I acted as control group and Group II underwent aerobic training group. The aerobic training program consisted of 12 week (4 day/ week) in about from 30 to 45 minutes per day. The biochemical analyses were very low density lipoproteins and triglycerides. Blood samples were collected prior to after the completion of 12 weeks training. The pre, post and adjusted post-test means were collected from two groups for using by analysis of covariance (ANCOVA). The mean difference if the optioned 'f' ratio was significant level of fixed at 0.5 was confidence. The result of study was aerobic training decreased in VLDL and TG level in obese men associated with reduced CHD risk. It was concluded; the aerobic training was 5.02% and 3.88% decreased on VLDL and TG (P <0.05) level *respectively in obese men.*

Keywords: Aerobic, Obesity, Very Low Density Lipoprotein, Triglyceride.

Introduction

An estimated 17.3 million people died from cardiovascular diseases in 2008, representing 30% of all global deaths. Of these deaths, an estimated 7.3 million were due to coronary heart disease and 6.2 million were due to stroke (**WHO, 2011**). The number of people, who die from CVDs, mainly from heart disease and stroke, will increase to reach 23.3 Million by 2030 (**Mathers & Loncar, 2006**). Coronary heart disease is the leading cause of death for both men and women and accounts for approximately 600,000 deaths in the United States every year (**Kivimaki, et al., 2012**).

Coronary heart disease has a number of well determined risk factors. The most common risk factors include smoking, obesity, and lack of exercise. Smoking is associated with about 54% of cases and obesity 20%. Lack of exercise has been linked to 7–12% of cases (**Shiroma, et al., 2012**).

Most cardiovascular diseases can be prevented by addressing risk factors such as tobacco use, unhealthy diet and obesity, physical inactivity, high blood pressure, diabetes and raised lipids. A sedentary lifestyle plays a significant role in obesity. Worldwide there has been a large shift towards less physically demanding work, and currently at least 30% of the world's population gets insufficient exercise. (**Ness Abramof & Apovian, 2006**).

The fact is, elevated low-density lipoprotein, the bad cholesterol, is a major cause of heart disease. VLDL causes the build-up of fatty deposits within arteries, reducing or blocking the flow of blood and oxygen in heart needs. In addition, studies show that lowering VLDL cholesterol reduces risk for coronary heart disease. (**Barness, et al., 2007**)

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Methodology

Objective

This study under investigation was aerobic training on coronary heart disease risk factors such as very low density lipoproteins and triglycerides in obese men.

Selection of Subjects

To achieve for the purpose of this study, twenty four (N = 24) obese men (BMI ≥ 30 kg/m^2) were randomly selected subjects from working in various faculties of Annamalai University, India. The selected subjects were age, height and weight ranged was 38 ± 3 years, 167 ± 9 cm and 89 ± 14 kg respectively, who have given their willingness.

Experimental Design

Selected subjects were divided into two groups with twelve subjects (N=12) of each group. Group I acted as control group was not given participate in any

special training other than regular activities and group II underwent aerobic training. The training program was conducted in the department of Physical Education and Sports Sciences, Annamalai University.

Training Program

Duration of the aerobic training program was 12 weeks (4 day/week). The workouts for given from about 45 to 60 minutes per day. The target exercise intensity was set at a level that raised subjects' about from 40% to 54% of maximum heart rate. Heart rate was about from 90 to 110 beats per minute in duration of training. The training session first at low level and gradually increased to the training zone. Each workout included warm-up and cool-down phases (2 to 4 min each) during which slow stretching and walking exercises were performed to prevent injury. The training program consisted of 12 week (4 day/ week) in 30 to 45 minutes per day was applied to subjects and training consisted of brisk walking, jogging and aerobic exercise.

The Karvonen formula is mathematical formulas that determine target heart rate (HR) training zone. The formula uses maximum and resting heart rate with the desired training intensity to get a target heart rate. (**Karvonen, et al., 1957**)

Testing Variables

Biochemical analyses were done level on Very Low Density Lipoproteins and Triglycerides. The above biochemical variables were measured using appropriate Boehringer Manheim and other high graded biochemical analytical kit methods. Biochemical analysis was done in the Department of Biochemistry, Raja Muthiah Medical College and Hospital, Annamalai University, India by the concerned Biochemist and the results were produced.

Statistical Analysis

Blood samples were collected prior to after the completion of 12 weeks training. The biochemical analyses were Very Low Density Lipoproteins and Triglycerides level were assessed prior to after the completion of training programs. The pre, post and adjusted post-test means were collected from two groups for using by analysis of covariance (ANCOVA). The mean difference if the optioned 'f' ratio was significant of fixed at 0.05 *(P <0.05)* level confidence.

Results

The influence of aerobic training and asana training on each biochemical variables were analyzed and presented below,

Table I. shows the mean and 'F' ratio on VLDL of control group and aerobic training group.

Test	Control Group	Training Group	Source of Variance	Sum of Squares	df	Mean Squares	Obtained 'F' Ratio
Pre Test							
Mean	39.68	39.79	Between	2.97	1	2.97	2.73
S.D.	1.58	0.9	Within	23.88	22	1.09	
Post Test							
Mean	39.5	35.49	Between	242.19	1	121.095	118.27*
S.D.	1.06	1.24	Within	26.56	22	1.14	
Adjusted Post Test							
Mean	39.49	35.51	Between	238.53	1	119.27	115.73*
			Within	22.18	21	1.12	

*__Significant at 0.05 level of confidence__.

The table values required for significance at .05 level of confidence for 2 and 22 & 2 and 21 are 3.44 and 3.47 respectively. Table I shows that the adjusted post-test mean values of VLDL for were control group and training group 39.49 and 35.51 mg/dl respectively. The obtained 'F' ratio value of 115.73 for adjusted post-test means on VLDL was greater than the table value of 3.47 for significance with df 2 and 41 at 0.05 level of confidence. The results of the study showed that the pre and adjusted post-test means value of the study showed that aerobic training was 10.78% reduced on VLDL level in obese men.

Table II. shows the mean and 'F' ratio on triglycerides of control group and aerobic training group.

Test	Control Group	Training Group	Source of Variance	Sum of Squares	df	Mean Squares	Obtained 'F' Ratio
Pre Test							
Mean	165.65	164.95	Between	2.97	1	2.97	2.73
S.D.	1.38	0.52	Within	23.88	22	1.09	
Post Test							
Mean	164.76	158.64	Between	224.36	1	224.36	225.8*
S.D.	0.59	1.28	Within	21.86	22	0.99	
Adjusted Post Test							
Mean	164.84	158.55	Between	211.01	1	211.01	217.04*
			Within	20.42	21	0.97	

***Significant at 0.05 level of confidence**.

The table II shows that the adjusted post-test mean values on Triglycerides of control and training groups were 164.84 and 158.55 mg/dl respectively. The obtained 'F' ratio of 217.04 for pre-test means on TG was greater than the table value of 3.47 for significance with df 2 and 21 at 0.05 level. The results of the study showed that the pre and adjusted post-test means value of the study showed that aerobic training was 3.88% decreased on triglycerides level in obese men. The results of the current study suggest that aerobic training program was found to be better than control group.

Discussions

The results of the study revealed aerobic training program have significantly decreased in coronary heart disease (CHD) risk. The result of study was aerobic training decreased in very low density lipoproteins, triglycerides and Apolipoprotein B_{100} level in obese men.

Exercise on producing a substantial increase in daily energy expenditure that will eventually lead to weight loss and related improvements in carbohydrate and lipid metabolism. JP Despres and B Lamarche (1994) we examined physically active individuals generally show a reduced risk of CHD compared to the sedentary population. The concept of metabolic fitness has several implications for the prescription of exercise and for the primary and secondary prevention of CHD.

The exercise induced changes in basal whole-body fat oxidation, VLDL - TG, and VLDL-Apolipoprotein B-100 metabolism during the late phase of recovery from exercise are related to the duration of the exercise. Magkos F et al (2007) we investigated the effect of a single, shorter-duration exercise 1 hr cycling at 60% of peak oxygen consumption on basal FFA, VLDL-TG, and VLDL-apoB-100 kinetics in seven untrained, healthy, lean men by using stable isotope-labeled tracer techniques.

However, in this study aerobic training is widely believed to induce changes in the lipid profiles and Percentage of Body Fat. U. Narayani et al (2010) have find out the aerobic training on lipid profiles, he was analyses data, and results showed that there were significant changes in Percentage of lipid profiles.

In undertaken many studies that examined the physical training in obesity have documented decreased effect on lipids profile and reduced coronary heart disease risk in obese men.

Conclusion

The results of the study revealed aerobic training program have significantly decreased in coronary heart disease risk in obese men. The result of study was aerobic training decreased in very low density lipoproteins and triglycerides and level in obese men associated with reduced CHD risk. Since, it was concluded that; the aerobic training was significantly reduced on coronary heart disease risk factor, VLDL and TG and ($P < 0.05$) level in obese men.

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