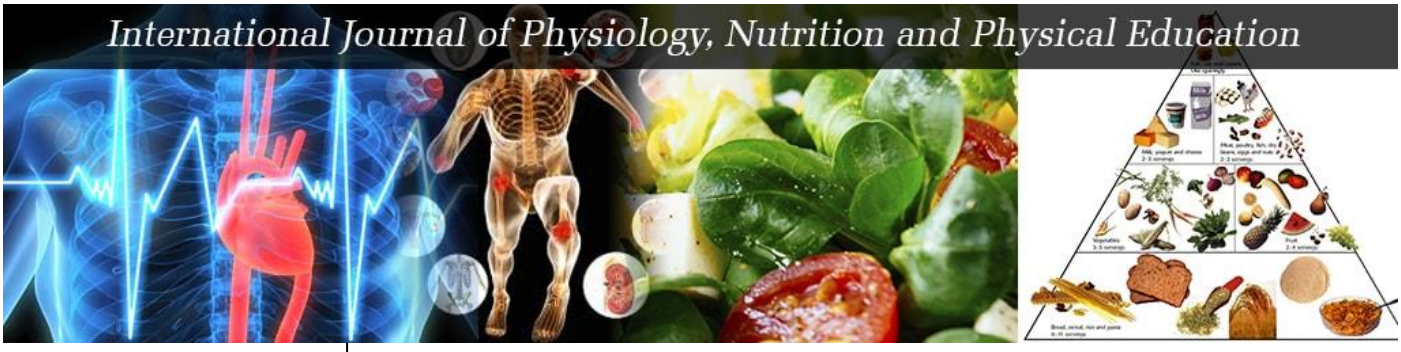

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Influence of aerobic training and asanas practice on coronary heart disease risk factors among obese men

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Abstract
The purpose of the study was influence of aerobic training and asanas practice on coronary heart disease (CHD) risk factors in obese men. Thirty six 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 three groups and twelve subjects (n=12) of each group. Group I underwent aerobic training, Group II underwent asanas practice and Group III act as control. The training program consisted of 12 week (4 day/ week) in 30 to 45 minutes per day. The biochemical analyses were triglycerides (TG), low density lipoproteins (LDL) and high density lipoproteins (HDL). Blood samples were collected prior to after the completion of 12 weeks training period. The pre and post-test means were collected from three groups for using by analysis of covariance (ANCOVA). The mean difference optioned 'f' ratio was significant fixed at 0.05 level of confidence. The results of study suggest that both training programs have found to be better than control group. However, it was concluded that aerobic training was improved better than asanas practice on blood lipids profile (LDL, HDL and TG) level among obese men. The result of study have aerobic training and asanas practice decreased in TG, LDL level and increased in HDL level in obese men associated with reduced coronary heart disease.

Keywords: Triglycerides, low density lipoproteins and high density lipoproteins

Introduction
Obesity is a growing global health problem. Obesity and malnutrition have been major public health problems for 21st centuries. In the past two decades, however, obesity has emerged as a prominent problem not only in developed nations but also in the developing world. 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 Abram of R, Apovian CM, 2006) [7].

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. The number of people, who die from CVDs, mainly from heart disease and stroke, will increase to reach 23.3 Million by 2030. 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 M *et al*, 2012) [6]

Physical exercise is any bodily activity that enhances or maintains physical fitness and overall health and wellness. It is performed for various reasons including strengthening muscles and the cardiovascular system, honing athletic skills, weight loss or maintenance, as well as for the purpose of enjoyment. Frequent and regular physical exercise boosts the immune system, and helps prevent the "diseases of affluence" such as heart disease, cardiovascular disease, Type 2 diabetes and obesity.

High density lipoprotein is considered to be the most powerful lipid parameter for predicting coronary heart disease in people of all ages. The primary function of HDL is to transport cholesterol from the tissues and blood to the liver for excretion from the body or synthesis into bile acids (Gordon, 1977) [3].

The fact is, elevated low-density lipoprotein, the bad cholesterol, is a major cause of heart

disease. LDL 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 LDL cholesterol reduces risk for coronary heart disease. Obesity is a leading preventable cause of death worldwide, with increasing prevalence in adults and children, and authorities view it as one of the most serious public health problems of the 21st century. (Barness LA *et al*, 2007) [1].

Aerobic activity is any repetitive, rhythmic exercise involving large muscle groups such as the legs, shoulders and arms. Aerobic activities include brisk walking, cycling, and swimming, jogging, dancing or aerobic exercise programs. Aerobic activity maximizes oxygen uptake and associated cardiopulmonary Variables and modifies cardiovascular risk factors.

Obesity was highly preventable through proper diet, exercise and lifestyle change. The Yoga principle on Healthy Diet and the practice of the Asana were help balance the endocrine system, tone the abdominal organs, stimulate both the nervous and Circulatory System, and reduce stress. Asana also helps one to gain a better understanding of leading to acceptance and appreciation which help eliminate the psychological reasons for Obesity.

Asana also increase the flexibility of the ligaments and various muscle groups. The increased flexibility also results in core strengthening of these muscles. They play a vital role in increasing blood circulation to various parts of the body. Different asana are responsible for increasing blood circulation and flexibility in different parts of the body. Asana are especially useful to reduce the fats in various parts, especially forward bending, twisting and backward bending asana help reduce the fats near abdomen, hips and other areas. Also the practice of asana improves functioning of internal organs, strengthening heart, lungs, kidneys, excretory & reproductive organs. Regular practice builds strength in muscles.

Methodology

The investigation of study was aerobic training and selected asanas practice on coronary heart disease risk factors such TG, LDL and HDL among obese men. To achieve for the purpose of this study, thirty six obese men (BMI ≥ 30 kg/m2) were randomly selected subjects from working in various faculties of Annamalai University, Tamil Nadu, India. The selected subjects were age, height and weight ranged was 33 ± 3 years, 167 ± 9 cm and 189 ± 14 kg respectively, who have given their willingness for the study.

The Selected subjects were divided into three groups and each group contained twelve subjects. Group-I underwent aerobic training, Group-II asanas practice and Group-III act as control group did not participate in any specific training other than regular activities.

The training program consisted of 12 week (4 day/ week) in 30 to 45 minutes per day. Aerobic training program consisted such as; jogging, stepping, stationary run, jumping jacks. Asana practice included as; Dhanurasana, Bhujangasana, Halasana and Shavasana.

The biochemical analyses for study were triglycerides, low density lipoprotein, very low density lipoprotein and high density lipoprotein. The biochemical analyses were measured Acetyl-acetone method. Biochemical analyses were done in the Department of Biochemistry, Raja Muthiah Medical College and Hospital, Annamalai University, India.

Blood samples were collected prior to after the completion of training periods. The pre and post test means values were collected from three 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. Are very much aware of these concentrations on the development of basic physical fitness variables and related aspects. They start training a child concentrating on those fitness factors which are supposed to play a significant role in the future performance of a players such as

Results

The analysis of covariance for pre and post test data on triglycerides of aerobic, asana and control groups were analyzed presented in Table I.

Table I: The analysis of covariance for pre and post test data on triglycerides of aerobic, asana and control groups were analyzed presented

Test	Aerobic Group	Asana Group	Control Group	Source of Variance	Sum of Squares	df	Mean Squares	'f' ratio
Pre Test								
Mean	169.33	168.44	168.35	Between	6.95	2	3.48	2.04
S.D.	0.89	1.6	1.34	Within	56.33	33	1.71	
Post Test								
Mean	153.46	164.51	168.33	Between	1430.31	2	715.15	326.4*
S.D.	1.23	1.45	1.72	Within	72.31	33	2.19	
Adjusted Post Test								
Mean	153.51	164.48	168.31	Between	1265.09	2	632.54	281.05*
				Within	72.02	32	2.25	

*****Significant at 0.05 level of confidence**.** (The table value for significance at 0.05 level of confidence for df 2 and 33, 2 and 32 are 3.29, 3.3 respectively)

The table I show that the adjusted post-test mean values on triglycerides of aerobic, asana and control groups were 153.51, 164.48 and 168.31 respectively. The obtained 'f' ratio was 281.05, its value greater than table value of 3.3 for significance with degree of freedom 2 and 32 at 0.05 levels.

Hence, it was concluded from the pre, adjusted post-test mean values of the study showed that aerobic training and asana training were 9.34% and 2.35% respectively reduced on triglycerides level in obese men.

The analysis of covariance for pre and post test data on LDL of aerobic, asana and control groups were analyzed presented in Table-II.

Table II: The analysis of covariance for pre and post test data on LDL of aerobic, asana and control groups were analyzed presented

Test	Aerobic Group	Asana Group	Control Group	Source of Variance	Sum of Squares	df	Mean Squares	'f' ratio
Pre Test								
Mean	166.75	167.33	167.67	Between	5.17	2	2.58	1.04

S.D.	0.87	1.88	1.78	Within	81.67	33	2.48	
Post Test								
Mean	154.92	160.3	167.51	Between	956.72	2	478.36	228.32*
S.D.	1.73	0.86	1.52	Within	65.96	33	1.99	
Adjusted Post Test								
Mean	154.98	160.29	167.45	Between	887.59	2	443.79	209.24*
				Within	64.78	32	2.02	

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

The table- II show that the adjusted post-test mean values on LDL of aerobic, asana and control groups have 154.98, 160.29 and 167.45 respectively. The obtained 'f' ratio was 209.24, its value greater than table value of 3.3 for significance with degree of freedom 2 and 32 at 0.05 levels.

Hence, it was concluded from the pre, adjusted post-test mean values of the study showed that aerobic training and asana training were 22.22% and 10.78% respectively reduced on triglycerides level in obese men.

The analysis of covariance for pre and post test data on HDL of aerobic, asana and control groups were analyzed presented in Table-III.

Table III: The analysis of covariance for pre and post test data on HDL of aerobic, asana and control groups were analyzed presented

Test	Aerobic Group	Asana Group	Control Group	Source of Variance	Sum of Squares	df	Mean Squares	'f' ratio
Pre Test								
Mean	40.26	39.69	39.74	Between	2.41	2	1.21	1.43
S.D.	1.06	1.06	0.95	Within	27.8	33	0.84	
Post Test								
Mean	46.75	42.75	40.42	Between	246.222	2	123.11	85.68*
S.D.	0.87	1.77	0.67	Within	47.42	33	1.44	
Adjusted Post Test								
Mean	46.89	42.67	40.36	Between	245.94	2	122.97	90.62*
				Within	43.42	32	1.36	

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

The table- III show that the adjusted post-test mean values on HDL of aerobic, asana and control groups have 46.89, 42.67 and 40.36 respectively. The obtained 'f' ratio was 90.62, its value greater than table value of 3.3 for significance with degree of freedom 2 and 32 at 0.05 levels.

Hence, it was concluded from the pre, adjusted post-test mean values of the study showed that aerobic training and asana training were 16.47% and 7.51% level respectively increased on high density lipoprotein in obese men.

Discussion

U. Narayani *et al* (2010) [8] have find out the aerobic training on lipid profiles, he was analyses data, and results showed that there were significant changes in Percentage of Body Fat, TC and HDL. It was concluded that the aerobic training is widely believed to induce changes in the lipid profiles and Percentage of Body Fat of women.

Physically active individuals generally show a reduced risk of coronary heart disease 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. Therefore, from a practical standpoint, although a 1 hr daily walk may not have marked effects on cardio respiratory fitness, it probably represents an exercise prescription that is likely to substantially improve 'metabolic fitness', thereby reducing the risk of CHD. (JP Despres and B Lamarche, 1994) [2].

High density lipoprotein cholesterol concentrations have been shown to increase with regular endurance exercise and, therefore, can contribute to a lower risk of coronary heart disease in physically active individuals compared with sedentary subjects. Multiple regression analyses revealed that the exercise-induced change in abdominal subcutaneous adipose tissue was the only significant correlate of the increase in plasma HDL cholesterol and reduce in triglyceride with training in men. Results of the present study suggest that regular endurance exercise training may be particularly helpful in men with abdominal obesity. (Charles Couillard *et al*, 2001) [2].

John Skoumas *et al* (2003) [4] we have associated with reduced risk of coronary heart disease (CHD). We evaluated the effect of physical activity on lipid levels, in a sample of cardiovascular disease free people. Substantial independent increases in HDL concentrations were observed in women.

Conclusion

The result of study revealed aerobic training and asanas practice reduced have LDL, TG level and increased in HDL level among obese men associated with reduced CHD risk. It was concluded that aerobic training and asanas training in obese subjects seemed to increase fat oxidation. Low intensity exercise was associated with significant improvement in the blood lipids profile (LDL, HDL and TG) among obese men, associated with reduced in coronary heart diseases.

The results of study suggest that both training programs have found to be better than control group. However, it was concluded that aerobic training was improved better than asanas practice on blood lipids profile level among obese men.

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