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Effect of Aerobic Training on Percentage of Body Fat, Total Cholesterol and HDL-C among Obese Women

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Abstract: The aim of the present research was to determine the effect of aerobic training on Percentage of Body Fat, total Cholesterol (TC) and High Density Lipoprotein Cholesterol (HDL-C) among obese women. For this purpose, 20 female obese women (age17-25) were selected. The subjects received endurance training only one session in the morning between 6-7 am for three alternate days a week for six weeks. To analyse the collected data,'t'-ratio was used at 0.05 level of confidence. The results showed that there were significant changes in Percentage of Body Fat, TC and HDL-C. It was concluded that the aerobic training is widely believed to induce changes in the lipid profiles and Percentage of Body Fat of women.

Key words: Aerobic training % Percentage of Body Fat % BMI % TC % HDL-C % Obesity

INTRODUCTION

Exercise is most important for every living being; in other words, we can also say that physical inactivity results in several types of diseases in the body. It mostly causes Cardio-vascular diseases. So, if we maintain and keep balance between our diets and regular exercise, it will result the best. Morning walk is often suggested by the doctors. It is also suggested by the experts that a human body needs a five day exercise in a week, irrespective of what age he/she belongs.

Regular exercise not only keeps our body fit but it also helps in maintaining our mind fresh for a longer period of time. Our mind will not feel tired if we do the regular exercises. It also increases the blood circulation of the body and prepares us for the hard work, all day long. Regular exercise also can prevent chronic diseases and other health problems related to lungs and heart. Regular exercises help to strengthen the heart. The muscle mass can increase and the weight can be controlled [1].

Having high cholesterol can cause life-threatening diseases. However, it can be controlled through diet and exercise. When there is high cholesterol, the HDL and LDL cholesterol levels are reversed making LDL level higher than HDL level. It is also important to consult a physician before starting any diet or exercise routine. He/she will monitor the progress to determine if medication will be needed to control the high cholesterol. [2].

Over the past four decades, obesity has been on the rise. Obesity is a chronic disease with a strong genetic component. Obesity can also have a major impact on a woman's fertility. In addition, obese women face major health risks during pregnancy [3].

Female Obesity may be broadly categorized into Type I Obesity, BMI of 30-34.9, Type II Obesity, BMI of 35-39.9, Type III Obesity, BMI of 40 and higher. The Type I Female Obesity is mostly a result of excessive eating habits apart from a lack of physical activity that should compliment one’s eating habits. The Type II Female Obesity accounts for less than 1% of the obesity cases registered and it is a result of health related problems. In such cases, the patient experiences abnormal weight gain in spite of a regular lifestyle [4].

High-density lipoprotein makes up HDL cholesterol levels and is also known as the good cholesterol. HDL fights against plaque buildup in arteries, so promoting the increase of HDL and can help improve blood circulation [5]. HDL cholesterol restricts the growth of LDL cholesterol and moves the LDL from the arteries to the livers. This reduces the chances of blockage of arteries, which causes strokes or heart diseases. The recommended level of HDL cholesterol is 40mg/dl, which should be present in the body, but it should not exceed 60gm/dl, as it would give boost to the chances of heart attacks [6].

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High level of blood cholesterol is a contributory factor of atherosclerosis and many lipid associated ailments like obesity, heart attacks and stroke and kidney failure. Recent studies have shown that lipid associated disorders are not only attributed to the total serum cholesterol, but also to its distribution among different lipoproteins. The low-density lipoproteins (LDLs) are the major carriers of cholesterol towards tissue having atherogenic potential, while the high density lipoproteins (HDLs) carry cholesterol from peripheral tissues to the liver. The HDLs thus give protection against many cardiac problems and obesity. Although genetic factor recline behind these lipid disorder, in most cases it is allied with diets high in saturated fats or Trans fat [7].

MATERIALS AND METHODS

Subjects: Twenty obese female students from various department of Annamalai University volunteered to participate in the study. Before participation, all subjects read and signed an informed consent form (this form was consistent with the guidelines established by ethics committee of university of Annamalai). Exclusion criteria were the presence of chronic medical conditions such as asthma, heart disease, or any other condition that would put the subjects at risk when performing the experimental tests. The subjects were free of smoking, alcohol and caffeine consumption, antioxidant supplementation and drugs during the course of the study. They completed an informed consent document to participate in the study. The age, height, weight, body fat percentage and maximal aerobic capacity of all subjects were measured in sports physiology laboratory. All twenty subjects acted as experimental group for endurance training with no control group.

Endurance Training: The Endurance Training Programme was scheduled for only one session in the morning between 6-7 am for three alternate days a week for six weeks. The investigator with the help of the guide designed an isolated walking training programme for obese women for 45 minutes a day.

Collection and Analysis of Blood Samples: To examine the biochemical variables, blood samples were collected from the subjects one day before the beginning of training and one day after the training in fasting condition. Five ml of blood was obtained from each subject's left arm vein in sitting and resting position with the help of trained nurse. Blood was collected in a dry test tube and allowed to coagulate at ambient temperature for 40 minutes. Serum was separated by centrifugation at 2000 rpm for 10 minutes and used for lipid profile estimations. Serum total cholesterol and high density lipoprotein-cholesterol were estimated by the methods of Allain *et al*. (1974) [8] and Izzo *et al*. [9] respectively.

Body Fat Percentage: The main method to assess body composition is the skin fold thickness method (ST) which stands out, as it is easy to apply, is of low operational cost, provide validity and reliability. ST method is considered to be doubly indirect, as it is structured from the assumptions of hydrostatic weigh (HW), which, in spite of being an indirect method, which has been considered a golden standard for the study of body composition in humans.

Subjects' subcutane fat was measured using slim guide black skin fold caliper using three sites: triceps, abdominal, suprailliac of the right side of the body. Body Composition Equation was used for calculation purpose. Percent body fat =. 41563 (sum of three skin folds) -. 00112 (sum of three skin folds) ^{2} +. 03661 (age) - 4.03653. Robert. V. Hockey (1989) [10].

Statistical Analysis: Statistical technique used for analyzing the collected data in the study was 't' ratio.

RESULTS

All subjects were tested for percentage of body fat, TC and HDL-C. The collected data were analyzed by 't' ratio with the level of significance set at 0.05.

The mean, standard deviation and 't' ratio values analyzed each dependent variable separately.

Percentage of Body Fat: The data obtained before and after endurance training on percentage of body fat were analyzed by 't' ratio and presented in Table 1.

Table 1 shows that mean of body fat percentage was 23.3835 and 20.5015 before and after training respectively. The't' ratio shows that there was a significant decrease in body fat percentage after the endurance training.

Total Cholesterol: The data obtained before and after endurance training on total cholesterol were analyzed by't' ratio and presented in Table 2.

Table 1: Analysis of body fat percentage before and after training

Stages	Mean	No	SD	S.E of DM	df	't'
Before training Test	23.3835	20	2.2194	0.7059	19	4.083*
After training Test	20.5015	20	2.3167			

*Significant at 0.05 level.

*required table value for significance at df of 19 is 2.09.

Table 2: Analysis of total cholesterol before and after training

Stages	Mean	N	SD	S.E of DM	df	't'
Before training Test	293.0800	20	25.2963	6.2309	19	10.515*
After training Test	227.5625	20	39.2210			

*Significant at 0.05 level

*Required table value for significance at df of 19 is 2.09

Table 3: Analysis of data on HDL-Cholesterol before and after training

Stages	Mean	N	SD	S.E of DM	df	't'
Before training Test	17.3470	20	4.8301	1.0781	19	21.940*
After training Test	41.0000	20	2.2711			

*significant at 0.05 level

*required table value for significance at df of 19 is 2.09.

Table 2 shows that mean of total cholesterol before endurance training was 293.0800 and after endurance training was 227.5625. The‘t’ ratio shows that there was a significant decrease in total cholesterol after the endurance Training.

High-density Lipoprotein-cholesterol: The data obtained before and after endurance training on HDL-cholesterol were analyzed by‘t’ ratio and presented in Table 3.

Table 3 shows that mean of HDL-cholesterol before endurance training was 17.3470 and after endurance training was 41.0000. The 't' ratio shows that there was a significant increase in HDL-cholesterol after the endurance Training.

DISCUSSION

The decrease in body fat percentage after the endurance training is in conformity with the studies of Fathi *et al.* [11] who concluded that the physical activity can influence body composition. This result is also supported by Dowling [12] and Hamedinia *et al*., [13].

The intake of saturated fat have a distinct serum cholesterol-raising effect regardless of the cholesterol content of the diet and regular exercise aid in lowering effect regardless of the cholesterol content of the diet. Conversely, poly saturated fatty cholesterol.

Significant fall in cholesterol was observed by Dange *et al.* [14] during yoga treatment on 25 obese patients over a period of 4-5 months. Khare *et al.* [15] also determines that running have definite value in lowering total cholesterol. Physical activity appeared to have an indirect association with serum lipid and lipoprotein values through its relationship with higher and lower level of fatness. The result of the present study is also in conformity with a study of Durant *et al*. [16] and Khare *et al.* [15].

Exercise is widely believed to induce favorable changes in the lipid profiles of women, particularly to increase cardio protective high-density lipoprotein cholesterol (HDL-C) fraction. Cross sectional study by Taylor and Ward [17] has confirmed that active women have higher HDL-C levels in younger women. In the present study also the six weeks of walking programme increased HDL-C level. Therefore, exercise program with moderate intensity appear to modify the HDL-C lowering effects of a hypo caloric, fat restricted diet. The present study is also supported by the studies of Angelopoulos *et al*. [18], Suter and Hames [19] and Khare *et al.* [15].

CONCLUSION

It may be concluded that the result of the present study indicate that the body fat percentage and total cholesterol decreases and increase high density lipoprotein cholesterol in obese women after six weeks of endurance training.

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