The Effect of Regular Aerobic Exercise on Some Parameters of Oxidative Stress in Obese Men

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ABSTRACT

Given the widespread prevalence of obesity, and its related diseases and disorders, to identify effective methods that can reduce risk factors and complications in obese patients, can be clinically very important. The present study examined the effects of 8 weeks of aerobic exercise training on malondialdehyde concentration in obese men. 30 obese young men (BMI ≥ 30) 30-20 years old were selected from volunteers in two groups (experimental group, n=15) and (control group, n=15. The experimental group experienced includes running the treadmill aerobic exercise program for 8 weeks, a program three sessions a week at 65% heart rate reserve, 16 minutes in the first week to 30 minutes at 80% heart rate reserve in the 8th week. Amounts of malondialdehyde were measured before and after 8 weeks in both groups. data analysis was done using dependent t test and independent t test. The findings of this study showed that Regular aerobic exercise resulted in a significant reduction in the concentration of malondialdehyde (P=0/033) in experimental group compared to control. Therefore, It can be used as an effective, low-cost treatment strategy for the control of inflammatory and oxidative stress in obese young men.

Key words: Regular aerobic exercise, Obese men, Malondialdehyde.

Introduction

Sedentary lifestyle and obesity, are two main factors for cardiovascular is associated. the prevalence of obesity is increasing worldwide. Obesity with, chronic lung disease, colon cancer and depression has been identified as a risk factor for heart disease-vascular and coronary artery disease [1,2,3]. Cardiovascular disease is a life-threatening illness. Cardiovascular events can sometimes occur in people with no background risk, so it is possible that risk factors exist. It has been noted that traditional risk factors for cardiovascular disease include high blood pressure, elevated blood lipids and lipoproteins, smoking, inactivity, and diabetes, and new risk factors include certain cytokine such as IL-6, C-reactive protein, Homocysteine and lipoprotein a. recently, considerable attention to potential factors involved in the early stages of cardiovascular disease is advanced and may be an important target of this investigation [3,4,5,6,7,8]. Arteriosclerosis disease, is the main reason cause of more than 19 million deaths annually worldwide. New findings in medicine, have emphasized the role of inflammation in the early stages to advanced arteriosclerosis and thrombosis problems. Today, arteriosclerosis not only from the perspective of the atherosclerotic disease of lipid accumulation but also as a chronic inflammatory process [9,10,11]. Recently, the relationship is studied between inflammation and atherosclerosis has been found in several studies. Development of cardiovascular disease, is caused by inflammation, and inflammation plays a major role in the development and progression of atherosclerosis. Inflammation increases the circulating levels of several inflammatory markers such as IL-6, C-reactive protein. Sedentary lifestyle and inactivity increases the risk of these conditions [2,12,13,14]. Another source of inflammation, is oxidative stress which is involved in the development of arteriosclerosis. Increased production of reactive oxygen may increase the inflammatory response. It is believed that obesity is a state of oxidative stress and inflammation which is one of the cardiovascular disease risk factors. Stress increases inflammation and is important for the prevention of obesity. Moderate weight loss is accompanied by a reduction in IL-6 and C-reactive protein levels associated [16,17]. Oxidative stress is an imbalance between
oxidant and antioxidant pathways that result in the accumulation of lipid oxidation products such as lipid hydroperoxides and malondialdehyde. These materials are toxic and cause increased risk of arteriosclerosis in the blood by other lipoproteins. In addition, increased oxidative stress in adults after exercise increases. It has been shown that aerobic exercise reduces oxidative stress in obese men [8,18]. Regular exercise reduces metabolic and cardiovascular respiratory disease. These effects are likely to be responsible for stopping the infection. Anti-inflammatory effect of regular exercise may be indirectly associated with reduced visceral fat mass and caused by regular exercise [2]. Diagnosis of cardiovascular risk factors is very important in the treatment and prevention of disease progression and reducing healthcare costs. Lack of appropriate physical activity is one of the risk factors of coronary disease which has been physiologists, doctors and experts has attracted. No doubt the good habit of physical exercise and fitness can be an important factor in preventing and reducing the severity of disease among the people all over the world. Aerobic exercise reduces the risk of cardiovascular disease and risk factors will change. It has been shown that these factors affect weight control by increasing calorie expenditure, reduced body mass and resting metabolic rate [3,19]. Therefore, in this study the effects of 8 weeks of aerobic exercise training on Malondialdehyde concentration, a parameter of oxidative stress in obese men were examined.

Material and Methods

The subjects were, 30 young men 30-20 years old and voluntarily participated in this study. The subjects were selected according to age, health, and not smoking, lack of exercise and not taking medicine. The physical characteristics of the subjects are presented in table [1]. Subjects were divided into two experimental groups and the control group randomly. Experimental group did aerobic exercise during the study and control group continued their daily activities without intervention. Participants height and weight were recorded Using a medical scale with stadiometer (seca: 220, Made in Germany). Percent body fat and body composition were measured using a body composition analyzer (In body 3.0, South Korea).

Table 1: Distribution of participants’ physical and fitness characteristics.

<table>
<thead>
<tr>
<th>Variable</th>
<th>experimental group</th>
<th>control group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>24/64±3/04</td>
<td>24/66±3/06</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>171/97±8/96</td>
<td>172/41±9/38</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>99/5±7/29</td>
<td>102/3±5/20</td>
</tr>
<tr>
<td>Body fat (percent)</td>
<td>25/71±2/62</td>
<td>25/29±2/93</td>
</tr>
<tr>
<td>BMI (kilograms per meter squared)</td>
<td>35/65±13/18</td>
<td>33/19±1/68</td>
</tr>
</tbody>
</table>

Experimental group program was running on a treadmill for 8 weeks, 3 sessions per week, respectively. The training session includes a 20-minute warm-up by all types of running jumping. Then running with 65% heart rate reserve for 16 minutes was started in the first week and continued 30 minutes at 80% heart rate reserve in sth week. Exercise duration was increased 2 minutes every week and exercise intensity was increased 5% every two weeks. The subjects were advised not to participate in any other sport during the 8-week training program. Heart rate was controlled by using beats Polar gauge. At the end of each session, the cooling down was done by soft running, stretching for 10 minutes.

Measurement of Malondialdehyde:

After 12 hours fasting blood samples were collected in pre-test and at 48 h after the last training session. Blood samples were collected in sitting position from vein ass. For measuring Malondialdehyde blood samples for 10 minutes at 2000 to 3000 rpm speed were centrifuged to separate the serum, the serum was transferred to a laboratory blood. 2 ml blood, were kept temperatures of - 80 °C to be used if needed. Malondialdehyde were measured by using kits (TBARS, Inc. Cayman Chemical, MI, USA).

Statistical Methods:

We used Kolmogorov-Smirnov test to verify data homogeneity and normality. We used t-test to determine significant differences within the group (experimental and control group) and Paired t test to determine significant differences between experimental and control groups, independent t-test was used.(p= 0.05)

Results:

Comparison of the mean variables are reported in Table 2. According to the research findings, Malondialdehyde decreases before and after aerobic exercise in control group which was not significant statistically(p= 0.091). Malondialdehyde was significantly decreased after 8 weeks of aerobic exercise in experimental group(p=0.18). Table 3 shows the results of the comparison of Malondialdehyde between groups after 8 weeks of aerobic exercise. Malondialdehyde levels were significantly lower in the experimental group compared to than the control group.(p=0.033)
In this study, the effect of 8 weeks of treadmill running were investigated on the amounts Malondialdehyde in obese youth. Results of statistical analysis showed that Malondialdehyde levels had a significant decrease after 8 weeks of aerobic activity in the experimental group compared to the control group. The results of the study was not consistent with study(19). However, such contradictions can be related to nutritional status, exercise intensity levels of exercise, physical fitness, and methods used to measure oxidative stress. The results of this research agrees study(20,21). Aerobic activity requires 15-10 times more oxygen than resting. Following the increase in oxygen uptake by the cells, the electron transport chain and thus release ROS, especially in muscle and red blood cells also increased. This is likely to lead to oxidative stress (22). Antioxidant system capacity and efficiency of the system are two different categories. For example, it has been shown that regular exercise increases, activity of antioxidant enzymes superoxide dismutase such as glutathione peroxidase and This provides a protective factor against oxidative stress (8). Second, it is possible that the concentrations of some antioxidants (enzymatic and non-enzymatic) change without affecting the total antioxidant capacity (15). So maybe beneficial adaptations in the oxidation system and restore the body’s oxidation has been able to prevent subsequent increasing free radicals and oxidative stress. It seems that the adaptability of two antioxidant defense system of the body is also the result of regular exercise and can occur due to the repeated exposure of cells to ROS are produced by exercise (16). Regardless of the limitations of this study, including small sample size in each group, the lack of emotional control and anxiety during exercise and also reported lack of physical activity outside training period, the results of this study showed that regular aerobic exercise reduces levels of IL-6, CRP and Malondialdehyde. Hence, recommended that this exercise is an effective alternative therapy in the treatment of obese young men. Accordingly, obese young men are advised to perform regular aerobic treatments.

Conclusion:

Table 2: Comparison of Malondialdehyde between the two groups before and after 8 weeks of aerobic exercise

<table>
<thead>
<tr>
<th>Variable</th>
<th>group</th>
<th>Before</th>
<th>After the test</th>
<th>t</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDA (μmol/L)</td>
<td>Control</td>
<td>2/55±0/68</td>
<td>2/89±0/78</td>
<td>-1/81</td>
<td>0/091</td>
</tr>
<tr>
<td>Experimental</td>
<td>2/52±0/53</td>
<td>2/33±0/65</td>
<td>2/66</td>
<td>0/018</td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Comparison of Malondialdehyde in experimental and control group.

<table>
<thead>
<tr>
<th>Variable</th>
<th>control group</th>
<th>experimental group</th>
<th>t</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDA (μmol/L)</td>
<td>2/89±0/78</td>
<td>2/33±0/65</td>
<td>-2/24</td>
<td>0/033</td>
</tr>
</tbody>
</table>

References


