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COMPARISON OF RISK FACTORS FOR CARDIO-VASCULAR CYCLIST ATHLETES AND BODYBUILDERS

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ABSTRACT

The aim of this study was to compare cardiovascular risk factors in athletes were cyclists and body builders. The subjects of this study were 15 male cyclists and 15 male bodybuilder, that were selected according to individual and health questionnaires. Fasting blood Sampling to measure research variables including c reactive protein, high density lipoprotein, low density lipoprotein was carried out as well as blood pressure, heart rate and body mass index of participants was measured. In this research, independent t test was used. The results of research showed that the blood pressure level of cyclists was less than bodybuilders, and significant differences were between the blood pressure level in both groups (p =0.042).There was significant differences in heart rate in both groups (p =0.002). Low-density lipoprotein in cyclists was more than body builders. And there was significant difference between two groups (p =0. 001). High-density lipoprotein in cyclists was more than body builders and there was significant difference between two groups (p =0. 515). C-reactive protein in bodybuilder group compared to the cyclists group showed a significant decrease (p =0.001). In general it can be concluded that biking and bodybuilding exercises have different effects on cardiovascular risk factors, but both of these exercises they can have beneficial effects on cardiovascular risk factors.

Keywords: Cardiovascular Risk Factors, Low Density Lipoprotein, High-Density Lipoprotein, C-Reactive Protein, Heart Rate, Blood Pressure, Body Mass Index, Bike, Cyclist, Bodybuilder

INTRODUCTION

Consistent with the industrial progress of societies, ways of human's life went off to the mechanical and inactive life and along with it the amount of physical activity declined and diseases related to such as Poverty movement like Cardiovascular disease, diabetes, osteoporosis and other expanded. The recent information presented show that physical inactivity caused 400,000 deaths in the United States in 2000, which is the second highest level of tobacco consumption and Possibly with more industrialized societies, lack of regular physical activity in the first place ranking climb **[1]**.

Cardiovascular disease is a disease that has increased in recent decades. Nowadays, the know cardiovascular disease as one of the main causes of death in the world. Almost half of all deaths in industrialized countries and 25 percent in developing countries is related to coronary heart disease. Various factors and mechanisms involved in the development of cardiovascular disease, the most important are the changes in inflammatory and coagulation factors, smoking, high blood pressure, mental stress, insulin resistance, waist to hip ratio among these are this kind of factors **[2]**.

Among the risk factors for cardiovascular disease, immobility with other risk factors such as high cholesterol and hypertension are associated. Physical activity by reduce blood pressure and improve inflammatory agents have a protective effect for heart disease **[3]**. In several studies of physical activity for the prevention of cardiovascular disease has been suggested. Favorable impression of training endurance in reducing the risk of cardiovascular disease has been demonstrated in numerous studies. In 1990, the American College of Sports Science was the first leader of the resistance training as a component key, presented in the preparation of all members of society at all ages. Nowadays The resistance training as a form of physical activity that is organized every 2 kind of cardiac rehabilitation programs and prevention of cardiovascular disease could be used in designing training programs **[1]**.

High blood pressure is the blood pressure in the arteries when the systolic blood pressure greater than 140 and diastolic blood pressure greater than 90 mmHg. Today, High blood pressure is the most important risk factor for development of cardiovascular disease, a growing problem in the international community is that different people from different ethnic groups with that. Researchers

around the world have reported that high blood pressure is out of control, So that in 20 years the number of patients has exceeded one billion people across the border. Cardiovascular disease is one of the leading causes of death in the world due to various factors such as high blood pressure and the manner in the life (and a healthy diet smoking). The findings of various studies have shown that lifestyle changes and reforms, including increased consumption of fruits and vegetables reduces cardiovascular risk factors and to reduce high blood pressure **[4]**.

Often the cause of hypertension in approximately 90% of cases is unknown, but it could be blood pressure with weight loss, diet and exercise effective control **[5]**. Sedentary and obesity are two main factors that are associated with risk of cardiovascular disease. It has been said that for every one unit increase in BMI, the risk of cardiovascular disease 8% increase in contrast, increased physical activity by one Matt can reduced 8%risk of cardiovascular diseases **[6]**.

Mora and colleagues(2006) research on the relationship between physical activity and body mass index as an indicator of new and traditional CVD in women, To the conclusion that lower levels of physical activity and body mass index (BMI), Low-density lipoprotein, and inflammatory markers (ICAM, reactive protein C, fibrinogen, ...) are related to each other. And regular physical activity are with good generally indicators of cardio - vascular communication **[6]**.

Protein C -Reaction, as a part of a group of immune serum glycoprotein's that are unrelated to each other in response to various factors, including: Infection, inflammation, injury, or other events, such as myocardial infarction and surgery of the liver. In the meantime, Protein C- reaction is one of the most abundant acute Phase Proteins that in response to a number of factors including the activity of the liver tissue damage and exercise **[7]**.

In the mid-1990s, with the development of methods for measuring Protein C-reaction. It was shown that increased levels of Protein C-reaction, Even in the past that were considered normal, strongly predicts future risk of coronary attack. Protein C-reaction, is a risk factor for cardiovascular disease and in the early stages of atherosclerosis in artery endothelial damage and the formation of fat in the blood vessel wall and plaque formation participates. Several tests of the relationship between high levels of protein C- reaction and risk of future attacks like infarction and sudden cardiac death have confirmed **[7]**.

During prolonged exercises, the major muscle groups can be used, But when doing resistance training, The more muscle mass involved and it seems that it is different effects. In total, according to information available, the different conclusions about the effects of endurance and resistance training on cardiovascular risk factors have been reported. The aim of this study was to compare the cardiovascular risk factors in cycling athletes and bodybuilders that two different series of aerobic and strength. Due to the different effects of the two strands in reducing cardiovascular risk factors and pleasant each of these disciplines in public, can introduced these two fields as the best sport in the reduction and prevention of risk factors for cardio – vascular to people of all ages.

METHODOLOGY

According to the study, which compared the cardiovascular risk factors in cycling athletes and bodybuilders, The research design of the study, data collection methods (non-demo) is for casual and functional purpose.

Subjects

The research for this project are all bicycle and body builders athletes aged 25-40 years. The subjects of male bodybuilders and cyclists aged 25 to 40 years were selected. Subjects were recruited from among athletes who exercise at least 4 years of experience in the field and regular exercise. The subjects were fasting before blood sampling. The sample of this project were 15 cyclists and 15 body builders that were selected on voluntary. According to the provisions demographic information, health and consent. Then the height, weight, blood pressure, heart rate and body mass index was measured in both groups, Finally, both blood samples taken for analysis and comparison between groups.

Design

The study subjects were asked to take a day without any exercise of independent variables are measured, Due to healthy subjects in terms of physical condition (like without damage muscles, and ligaments) and diseases (like colds, stomach ache and .....) was measured following requirements. Height: subject's Height without shoes and socks, as the subject was standing next to the wall so that the wall is behind the subject and the head is forward the tape was recorded in cm.

Weight: subject's weight As the subject of fasting and without clothes and only had shorts with a digital scale was recorded in kilograms.

Age: subject's age was recorded by the solar year.

Heart Rate: were recorded by the Doctor

Blood Pressure: By the Doctor using a mercury sphygmomanometer measurements were recorded.

Blood sampling: Subjects were asked to complete the prescribed period of fasting in laboratory trials and blood was performed by a Doctor.

Measuring instruments

Scales to measure the height of the subject.

Tape measure to measure the height of the subjects.

Manometer for measuring blood pressure of subjects.

Stethoscope to measure heart rate.

Kits for laboratory measurement of serum levels.

Implementation of data collection

To measure the amount of serum,, Low density lipoprotein, high density lipoprotein, Protein C-reaction On the appointed day, fasting venous blood from each subject's left hand was used to sitting and resting.

Statistical

The study analyzed data from two descriptive and inferential statistics were used. The descriptive statistics of variables, mean, median, etc. used for charts and tables. Inferential statistics for the variables in the research groups of t-body builders and cyclists.18 SPSS statistical software results in a significant level $p<0.05$ was calculated.

RESULTS

According to the t-test results in **Table (1)** There were no significant differences in blood pressure cyclists and bodybuilders.

According to the results of independent t-test **(Table 2)**. There were no significant differences in heart rate cyclists and bodybuilders.

Low-density lipoprotein cyclists and body builder shows that the t-test results in **Table (3)**, the difference between low-density lipoprotein cyclists and athletes there.

High-density lipoprotein mean cyclists and body builders shows that the t-test results in **Table 4**, high-density lipoprotein difference between cyclists and athletes there.

protein C-reactive cyclists and athletes shows that the t-test results in **Table (5)**, the difference between C-reactive protein are cyclists and bodybuilders.

Table 1: Results of t-test (blood pressure cyclists and bodybuilders)

Statistics Group		Mean ± SD	Number	Levine test		t	DF	Sig
				F	Sig			
Cyclist	Blood Pressure	120.33±1.172	15	0.692	0.412	2.130	28	0.042
Bodybuilders	Blood Pressure	130±13.09	15					

Table 2: Results of t-test (heart rate cyclists and bodybuilders)

Statistics Group		Mean ± SD	Number	Levine test		t	DF	Sig
				F	Sig			
Cyclist	Heart rate	62.66±7.037	15	0.193	0.664	3.412	28	0.002
Bodybuilders	Heart rate	72.06±8.021	15					

Table 3: Results of t-test (low-density lipoprotein in cyclists and bodybuilders)

Group	Statistics	Mean ± SD	Number	Levine test		t	DF	Sig
				F	Sig			
Cyclist	Low-density lipoprotein	138.23±2.682	15	0.144	0.707	3.751	28	0.001
Bodybuilders	Low-density lipoprotein	104.20±2.269	15					

Table 4: Results of t-test (HDL-C in cyclists and bodybuilders)

Group	Statistics	Mean ± SD	Number	Levine test		t	DF	Sig
				F	Sig			
Cyclist	Full-density lipoprotein	40.47±1.016	15	0.013	0.910	0.660	28	0.515
Bodybuilders	Full-density lipoprotein	38.20±8.637	15					

Table 5: Results of t-test (c reactive protein in cyclists and bodybuilders)

Statistics Group		Mean ± SD	Number	Levine test		t	DF	Sig
				F	Sig			
Cyclist	protein C reactive	3.00±1.239	15	5.693	0.024	3.569	28	0.001
Bodybuilders	protein C reactive	1.73±0.593	15					

DISCUSSION

According to the results of t-tests in **Table (1)** in blood pressure of the Cyclist group compared to body builder group, a significant reduction was observed (P=0.042). **Arazi and colleagues (2012)** in a study entitled Comparison of the effect of combined training (resistance - aerobic) and aerobic exercise on maximal oxygen uptake, Lipid profile, blood sugar and blood pressure in middle-aged men with cardiovascular risk factors to the conclusion that both types of exercise can reduce the risk factors, which is consistent with our results. The cause of this consistent is doing Aerobic exercise **[3]**. **Rahimian and colleagues (2010)** observed the reduction of cardiovascular risk factors and blood pressure after aerobic exercise

program and diet, that these results are consistent with the results of the present investigation. Cause of this consistent can be to the due to age and use of aerobic exercise **[4]**. The results of research with **Stoni and colleagues (1991)** that reduce blood pressure after 8 weeks of resistance training **[8]**, **Kely and Colleagues (2001)** The effect of moderate-intensity aerobic exercise for 40 to 60% of maximal oxygen uptake for 30 to 45 minutes **[9]**, and also, body building with Moderate-intensity exercise bodybuilding circles in reducing and preventing the incidence of high blood pressure and **Asmltzr and colleagues (2004)**, systolic and diastolic blood pressure in patients with hypertension was observed consistent because this match could be the test **[10]**.

The result of this test with research of **Mortagh and colleagues (2005)** to the effect of 12 weeks of walking,3 times per week for 20 minutes on BMI, obesity, blood pressure and waist and hip circumference and blood lipids were assessed in 48 women studied, doesn't coincide, The reason for this difference may be the case, the age and sex of the subjects **[11**.

Although the effects of regular exercise in improving blood pressure is still not clear, But there are several reasons for this decrease in blood pressure: Improved heart function, hormonal changes, such as reduced plasma nor epinephrine, blood viscosity changes, increased kidney function, blood vessel expansion is one of the reasons for the decrease in blood pressure. However, it is understood that a program of aerobic exercise can reduce systolic and diastolic blood pressure levels. The exact mechanism of the effect of exercise on blood pressure is not known, although perhaps this is due to catecholamine's produced by exercise. This reaction reduces peripheral resistance to blood flow and subsequent loss of blood pressure is involved. Also, exercise can facilitate excretion of sodium by the kidneys, resulting in reduced fluid volume and blood pressure.

Resistance exercise with a high pressure, peripheral arterial system compacted that it brought a dramatic and rapid increase in resistance to blood flow. In patients with cardiovascular disease, especially those who are not prepared for this type of exercise is harmful to the people, more harmonious forms of moderate exercise, would be desirable **[12**. According to the evidence suggests that regular exercise may also impact on sport bike riders, and decreased blood pressure and balancing it desirable to keep, and heavy weight training with regard to its effects on blood pressure, increased blood

pressure in the athletes. Based on the results of this research to the athletes, coaches, and people with high blood pressure is recommended To control blood pressure, regular exercise bike and body building of low intensity as the first line of defense is often considered treatment programs and in more serious cases, blood pressure, diet composition, weight loss, exercise and drug treatment is necessary.

The results of t-tests in **Table (2)**, in the heart of cyclists group compared to body builders group a significant reduction (p=0.002). **Sardar and colleagues (2009)** in a study of the impact of physical activity as 8 weeks on blood sugar, body fat percentage, maximum oxygen consumption and cardiovascular risk factors in type 1 diabetes patients **[13]**, **Shabani and Colleagues (2013)** after a cardiac rehabilitation program after performing coronary artery bypass graft, a significant decrease in heart rate were observed. Which is consistent with the present study, because it can not match the performance of subjects and regular exercise. Due to the effects of exercise on heart volume increases, increasing the volume of blood plasma and increase cardiac contractility, resulting in compatibility Body caused by exercise such as aerobic exercise, heart rate can be justified in athletes than non-athletes.

Given the evidence suggests that regular exercise may Cycling and body building also impact on the athletes of this field, and decreased heart rate and keep it in optimum balance. Based on the results of this research recommended to athletes and coaches to reduce the heart rate and obtain better performance. As a result of the decrease in heart rate can benefit from regular exercise bike and body building.

According to the independent t-test **(Table 3)**, the low-density lipoprotein bodybuilder group compared to the group of cyclists is a significant reduction (p= 0.001). **Beh Zare and colleagues (1390)** in a study entitled Comparison of two methods of continuous and intermittent aerobic exercise on C-reactive protein and lipid lowering Low-density lipoproteins were significantly observed in the present study are consistent with. Similar effects may be due to the different types of aerobic exercises is consistent **[14]**.

Banz and Colleagues (2003) a significant decrease in plasma cholesterol, TG, low density lipoprotein, in both Groups of moderate and vigorous intensity aerobic resistance of 60 to 85% of maximal oxygen consumption were observed for 10 weeks, three times, The present study is consistent with a reduction in low-density lipoprotein,

This can be due to inconsistent implementation of aerobic and resistance exercises that work the same types of training **(15)**.

The research results with **Michel (2006)** that a significant change in the level of high-density lipoprotein, Triglycerides, low-density lipoprotein subsequent running at 70% of maximal oxygen intake to 500 calories observed border conflicts, this discrepancy could be due to the severity and type of test used **[16]**.

Reducing the level of low density lipoprotein in research of **Plank and colleagues (1990)**, The effects of walking on a golf tournament on the ratio of total cholesterol to total cholesterol and low density lipoprotein **[17]** and **Whitehursut's research (1991)** The effects of a walking program with 70 to 80 percent of maximum heart rate for 8 weeks and 2 days a week and is consistent with the present study. This can be due to age-matched subjects similar impact aerobic activity is different **[18]**.

People with endurance activities of the refinement (erasure) in plasma Triacylglycerol Lipolysis greater the refinery to increase muscle activity and muscle capillary density is the result of practice. You can expect to increase the filtration rate increases blood low-density lipoprotein-triacylglycerol **[19]**.

Given the evidence suggests that regular exercise of Cycling and Body building may also impact on bodybuilders with cyclist and decreased low-density lipoprotein score is desirable to keep it. Based on the results of this research to the athletes, coaches, and those with low high-density lipoprotein recommended that in order to control and reduce cardiovascular risk factors for cardiovascular disease than regular exercise on biking and body building can be used.

Independent t-test results in **Table (5)** showed no significant difference between the cycling and bodybuilding exercise on full density lipoprotein variable in competition with no strings.

Banz and colleagues (2003), a significant increase in high density lipoprotein in the aerobic exercise group with 60 to 85% of maximal oxygen uptake was observed in 10 weeks 3 meetings, The present study is consistent with increased high-density lipoprotein, Because of this consistency can perform aerobic exercise, which can be as effective as other aerobic exercises **[15]**.

Wallace and colleagues (1991) showed significant changes in levels of high-density lipoproteins after a single session of resistance exercise in trained men with low

and high volume **[20]** and **Welsman and colleagues (1997)** after 8 weeks of exercise at 80% of maximum heart rate observed that this study is not consistent with the present study. This difference could be due to the type and severity of the test **[21]**.

Nash (2001), increased levels of high density lipoprotein after resistance exercise **[22]**, **Hinkleman and colleagues (1993)**, after a 15-week aerobic exercise program that includes walking, 5 days per week with a maximum intensity of 62% oxygen consumption has been showed by them **[23]**, Which is consistent with that of the present study is consistent aerobic and resistance exercises **[23]**.

Paie (1992) increase high-density lipoprotein after walking on a treadmill at 30% of consume **Oxygen(24), Zoppini and Colleagues (2006)**. After 6 months, 2 sessions per week of moderate-intensity aerobic exercise [**25**] and Hardman and colleagues (1994) following an exercise program of walking speed 76/1 meters per second observation that is consistent with the present study **[26]**. This match could be the subject of a regular exercise program.

Do more exercise, especially aerobic exercise leads to fat metabolism, As a result of additional fat is used for energy. People with aerobic activity of the refinement (erasure) in plasma Triacylglycerol greater since the rate of decomposition of high-density lipoprotein triacylglycerol synthesis rates are quite closely related, Therefore, any increase in fuel capacity for triacylglycerol metabolism, can be more dense lipoprotein values in practice justify maple **[19]**.

Given the evidence suggests that regular exercise of biking and Body building may also impact on cycling and body builder athletes, And increased high-density lipoprotein. Based on the results of this research to the athletes, coaches, and those with low high-density lipoprotein recommended to control and reduce cardiovascular risk factors for cardiovascular disease than regular exercise of biking and body building can be used. The results of t-tests in **Table (4-8)** in the c-reactive protein of body building group compared to the group of cyclists will be a significant reduction.

Abedi (1391) in a study of 12 weeks as a result of the combination (aerobic- resistance) on serum C- reactive protein and interleukin -6 (IL-6) plasma inactive men concluded that The combination of exercise and decreased serum C- reactive protein is deactivated in men. May reduce serum C- reactive protein was associated with improvements in body fat

in men. so Physical activity should be considers as an essential part of every adult's life style **[28]**.

Soheylie and Colleagues (2010) and Akbar pour (2013) has showed a significant decrease of effects of resistance training on serum C-reactive protein and concluded that regular exercise reduces inflammatory markers of resistance and possibly reduce the risk of cardiovascular events and it can be used as an effective drug therapy used to prevent the disease **[29-30]**. The results of these studies are consistent with the present study.

White and colleagues (2006) due to a research of the effect of resistance training on patients with coronary heart disease risk **[31]**, and **Brooks and colleagues (2007)** during 16 weeks of resistance training combined with standard care in the treatment of elderly people with type II diabetes, a significant decrease in serum C-reactive protein **[32]**, which is consistent with the present study.

Martins and Colleagues (2010) a significant reduction in C-reactive protein in both aerobic and resistance training in older men and women, **Goldhammer and Colleagues (2005)** after 12 weeks of aerobic exercise with 70 to 80 percent of HR max, 3 days per week for 12 weeks on the activity of inflammatory markers in patients with coronary artery disease are observed in the present study that are consistent with **[33-34]**.

Ryan and Colleagues (2004) C-reactive protein concentration after a 6 month training program combined (aerobic- resistance) in obese postmenopausal women, **Geffken and Colleagues (2001)** with increase of the amount of calories consumed per week of physical activity and **Olsan and Colleagues (2007)** A year after resistance exercise in obese women found that the concentration is consistent with the present study **[35-37]**.

No change in C-reactive protein in the research program of aerobic of **Gray and Colleagues (2007)**. The Effect of aerobic exercise, Campbell and Colleagues (2009) as 12 months with alternating aerobic exercise 60 minutes a day, 6 days a week with 60 to 85% of maximum heart rate, **Lakka and Colleagues (2004)** in a 20-week training program, consisting of 30 to 50 minutes 3 times a week cycling and **Verdaet and Colleagues (2004)**. After leisure time physical activity can be seen that the present study is not in conformity with the type **[38-41]**, severity and duration of the test is used and the age and sex of the subjects.

C-reactive protein did not change in the resistance program research of **Nicklas and Colleagues (2004) under** the effects of

resistance training on cardiovascular risk factors and **Hosseini khak and Colleagues (2012)** Under the effect of resistance training on and Cyst tin C-reactive protein levels in obese girls can be seen, The present study is the lack of consistency with the type **[42-43]**, severity and duration of the test is used, and the age and gender of the subjects.

C reactive protein is one of the sensitive of inflammation and is one of the most powerful predictors of cardiovascular events that by the increase in the C-reactive Protein is the reason of cardiovascular diseases. while doing Aerobic exercises, increases endocrine system inside of body, hormones, epinephrine, nor epinephrine, GH and Cortisol oxidation of fat (lipolysis) increase and to increase recruitment and use of free fatty acids for energy production during exercise, muscles need energy supplied, And decreased fat mass, which is a mechanism for reducing inflammatory markers and cardiovascular disease is the result of a decrease **[14]**.

According to the Evidence suggests that regular exercise of Biking and body building may also impact these kind on Cyclist and body builder Athletes and is the cause of Balance of C reactive Protein. Based on the results of this research to the athletes, coaches, and C reactive protein levels recommended to control and reduce cardiovascular risk factors for cardiovascular disease than regular exercise on biking and body building can be used.

The results of the study can be of different types, intensity and duration of exercise, age, and type of the subject and dietary changes. In addition to the human health benefits of aerobic exercise, increase metabolism, more fat and more fat for energy use, And reducing risk factors for cardiovascular and resistance training are very important in the long-term effects on body composition, muscle mass, fat tissue, bone tissue in men and women. This increase of muscle mass can increase resting metabolic rate and may result reduce multiple risk factors for cardiovascular disease. In general, the main benefits of resistance training in addition to cardiovascular health are weight management and prevention of disability, and high levels of resistance training programs for primary and secondary prevention of cardiovascular disease applications **[43]**.

Due to the impact of physical inactivity on the risk of cardiovascular disease and results, Showed that the cardiovascular risk factors in normal cycling and body building training, The public can take to improve health and prevent disease cardiovascular by using of biking and body building field exercises.

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