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EFFECT OF AEROBIC TRAINING ON METABOLIC PROFILE AND CRP IN NON-ATHLETIC ADULT FEMALE

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Abstract

Purpose . The purpose of this study, aerobic training effect on metabolic profile and CRP in women were adult non-athletes.

Methods . For this purpose, 20 healthy women and disabled adults as volunteers were selected . they randomly divided into two groups of ten : aerobic exercise group (mean age 34.2 ±4.91 years, height 158.4 ± 1.95 cm, weight 62.3±4.47 kg , BMI 22.48±1.96 kg m and fat 12.97± 2.16 percent) And control group (mean age 32.8 ± 3.25 years, height 162.4± 3.43 cm , weight 63.42± 6.60 kg , BMI 22.7 ± 2.28 kg m square and fat 13.3±2.32 percent) subgroups.From all subjects after fasting for 12 hours in two stages (before and after exercise) and in the same conditions, were bled . Experimental group and 12 weeks of aerobic training three sessions per week were . Aerobic training program included running 60 to 80 percent of the maximum heart rate .

Results . Data analysis using T test showed no significant effect on aerobic exercise variables BMI and triglycerides does not , However, this exercise significantly reduced weight variables, total cholesterol , LDL-C , HDl-C , CRP and percentage body fat is.

Conclusions . Aerobic exercise can be said to have helped improve the metabolic profile And also reduce inflammation and indices Perhaps the risk of future cardiovascular events in non-athletic adult women decreased.

Keywords : exercise , metabolic profile , CRP.

Introduction

The modern extensive progresses in technology have affected life style in many societies.

This impact is more observable in various dimensions due to machinism of life and overall advancements in technology and manufacturing several equipment.

At present, the low mobility and little activities life style have affected those countries and the side effects of this life style are seen in prevalence of coronary heart disease (CHD) that cause pre-term death in those societies. (S.H. Sohaily, 2010)

The coronary heart disease (Atherosclerosis) is not caused by a single factor and there are several factors that independently and in a complex that act as risk factor in this complication .

Factors that play roles in coronary heart diseases could be divided into two classes of adjustable and non-adjustable.

Among adjustable factors, cigarette smoking , lack of sufficient physical activities and unhealthy diet has more effects in CHD.

Various studies show that physical activities and aerobic pollution lower risks of cardiovascular diseases. There is a reverse relationship between degree of physical activities and CHD (H. Gohlk, 2004); therefore, inactive people are more in risk of CHD .(K.M. Anderson, 1991)

In the past decade, it has been known that inflammatory indexes play important role in the pathogenic processes of several chronic diseases including CHD. (G.K.Hanson,2005)

Studies show that those indexes are important as predicting signs of CHD independent from traditional pathogenic factors. (P.M.Ridker, 2003)

Among those indexes, one may note C-Reactive Protein (CRP), C-serum, as included among the acute phase reactive. (B.G. Niklas, 2005) Increase in amount of CRP increases the risk of cardiovascular incidents 2 to 5 times. CRP is an inflammatory respond and is no specific index of CHD infliction; however, it shows infection and unhealthiness .(N.F. Chu, 2003)

Thus, it could be said that any intervention such as exercise activities could lower inflammatory indexes and contribute in decreasing the cardio-vascular incidents. (L. Zgraggen, 2005)

The impact of exercise on CRP level has been studied in various researches .(E.S. Rawson, 2003)

In some researches, there has been reverse relationship between CRP and degree of proportion of cardiac respiratory in men and women . (T.S. Church, 2002)

In addition, results of research show that the relationship between exercise differs by variation in CRP blood circulation levels. (J.J. Varo, 2003)

The recent studies show that resistance exercise decreases CRP .(E.Goldhammer,2005)

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Okita et al showed that eight weeks resistance exercise significantly reduces inflammatory indexes in older women. (K.H.Okita,2004)

Kelley et al showed that resistance exercises did not did not change the CRP of blood circulation significantly. (G.A.Kelley,2006)

Those researches provide evidences regarding reduction of inflammatory indexes due to resistance exercises; however, results of some of them differ and in addition, there have been limitations in terms of weight adjustment, actual amount of regular physical activities….Therefore, determining resistance exercise with specific intensity and duration is of special importance in providing a suitable model for non-athlete women.

This paper plans to answer following questions: How resistance exercises with specific intensity and duration could affect CRP and pathogenic risk factors in cardio-vascular diseases in non-athlete women?

Method

This study is an empirical type based on classic tests method. The statistical society was non-athlete adult females in Islamic Azad University Parand Branch with no specific sports activities.

In order to select statistical samples, first a public call was announced and approximately 50 candidates informed their preparation to participate in the research.

Public health questionnaires were distributed among them and were completed. Individuals with history of illness, regular drug use and non-conformity with the time of research performance were omitted and ultimately 20 subjects were selected to participate in research program.

The subjects were divided into two groups (exercise and control) groups and the anthropometric and physiologic measurements were performed.

The blood sample with 12 hours fasting was taken from subjects one day before starting the exercise.

The exercise group participated in a sport program 12 weeks, three sessions per weeks for a specific time. After exercises, those measurements with the same conditions prior to exercise performance were repeated.

Blood sampling and tests

In order to specify the initial levels of CRP of subjects and traditional pathogenic factors of CHD after minimum 12 hours fasting in two stages (before exercises and after twelve weeks exercise) and in specific time, 5 ml of the arm vein blood sample was taken from subjects.

The collected samples were immediately centrifuged (3000 rpm for 15 minutes in 4 centigrade degree).

The CRP measurement was performed by using special kit and using ultra-sensitive Elisa. The cholesterol and tri-glycoside were measured in enzyme method; LDL was measured by testing its deposit by sulfate polyvinyl and HDL by testing the sediments by magnesium chloride.The measurements were repeated 24 hours after exercises.

Exercise protocol

The aerobic exercises included twelve weeks sessions, 3 sessions per week. Each exercise session consisted 15 minutes warming up by using stretches for 5 minutes and 10 minutes jogging.

The subjects then had to run with 60-80 percent heart bits. The previous heartbeat was calculated by age -220 formula.

The program was run in a way that the first session consisted 10 minutes running and 1 minute was added to the exercise time in next session.

At the end of session, the cool out was performed for five minutes. The stretching, jogging and cooling were fixed in each session.

The descriptive statistical indexes (mean average, standard deviation, and percentage) were used to describe measurement factors.

The “t” test was used for comparing the post-test results of the control and test groups for research hypothesis testing.

The hypotheses were tested in $P<0.05$ significant level.

Calculations were performed by using s.p.s.s. v16 statistical software.

Results

The descriptive data of the subjects is listed in table 1 based on age and height variables prior to the exercises.

The results of independent T statistical tests in all indexes between the two aerobic exercise and control groups prior to exercises showed significant differences between the groups based on indexes subject of study.

Those results show homogeneity of groups in terms of characteristics subject of study and homogeny and random distribution of individuals in groups.

The physical, physiological and biochemical indexes of the test and control groups prior to sports exercises are listed in table 2.

The results of independent T- test on triglyceride variables ($P=0.191$) and body mass index ($P=0.375$) showed no significant differences between the two groups; that is, the aerobic exercises did not significant effects in reducing the

mentioned variables and both the test and control groups acquired almost similar results in both factors.

The physical, physiological and biochemical indexes of test and control groups after exercises are listed in table number 3.

The results of independent T- test on differences in pathogenic and risk factors of CHD due to aerobic exercises in both test and control groups showed that they had significant differences in terms of weight, cholesterol, HDL, LDL, CRP and body fat percents.

Discussion and conclusion

The main findings of the research were that, performing aerobic exercises significantly reduced some cardiovascular risk factors in inactive adult females including impacts on their cholesterol, LDL, CRP, fat percentage and weight. By making comparisons among above-mentioned indexes in pre and post tests in test group, it was shown that there has been 26.4 percent reduction in cholesterol, 22 percent in LDL, 25 percent in CRP and 13 percent in fat mass.

Those findings agrees with the results of researches conducted by Mattusch et al .(F.D.Mattusch, 2000)

They claimed that 9 months of marathon exercise in 12 male athletes caused 31 percent reduction in CRP. Kohut et al (D.A.Kohot,2006) stated that three session aerobic exercises per week, 45 minutes per session with 50 to 60 percent maximum aerobic power in 10 months might cause significant reduction of CRP in +64 year old male and females. Huffman (K. Huffman, 2006) in his research on 193 men and women in various ages claimed that 6 months aerobic exercises did not cause significant changes in CRP unless through making major changes in diet. In another word, Huffman believes the aerobic exercises have impacts on CRP lowering through food diet; while in the present research, no particular food diet had been considered for subjects.

Selvin et al in their research showed that lowering weight leads to lowered CRP. With respect to the significant lowering o CRP and weight due to aerobic exercises, the possible relationship, by considering the results of research of Selvin et al, is that, aerobic exercises cause lowering weight and that in turn leads decrease in CRP.

Those findings agree with the results of research performed by Soheili et al .

They found out that in resistance exercises, the lowering weight and body mass index was not significant; however, the percent of fat mass and weight of body fat significantly showed reduction, associated with significant lowering of CRP.

They related that situation to increase in muscle mass of subjects due to sports exercises as a result of which, no significant decrease was found in weight and body mass index.

Haqiqi et al (A.Haghighi,2010) claimed that resistance exercises decrease full cholesterol, triglyceride and LDL and increases serum HDL.

To justify those results, they stated that resistance exercises in the research were circle and the intensity of exercise, resting distance between stations and circles were in a form that in addition to reinforcing resistance, improved the aerobic capacity of subjects as well . (K.A.Harris,1987 and M.A.Williams,2007)

In present research, a significant decrease was found in cholesterol and HDL and in turn, an increase in serum HDL was recorded.

On the other hand, triglyceride did not decrease significantly which could be due to the difference in length, intensity, duration of exercises or even small size of samples.

Those findings agree with the results of Hanckola (A.Honkola,1997) and Wallace .

In general, different researches might give different results on this matter and the reasons could be attributed to variety of exercise methods (resistance, marathon…), using food diet as a sole factor associated with exercise methods, using mixed exercises, type of subjects (ill, healthy…) and time table of measuring research indexes after the last stage of exercise (that might exhibit an exercise free respond). (E.T.Poehlman, 2000 and B. Rice,1999).

Reduction in LDL and increase in HDL in this research agrees with the results of research conducted by Suanami et al .(Y.Sunami,1999)

They claimed that aerobic exercises in low intensity increases HDL in aged people and the duration of exercise should be particularly noted.

Referring to this view, one may explain in this paper the reason of increase in HDL in subjects during their exercises.

In conclusion, one may claim that aerobic exercise is an effective and suitable method for improving risk factors in cardiovascular diseases and lowering risk factors to weight-associated long term symptoms. This indicates the anti CRP characteristics of exercises that could lead to inflammatory reduction in exercise.

table 1 . The descriptive data of the subjects

control	exercise	Index / GROUP
162.4 ± 3.43	158.4 ± 1.95	Hiegh (cm)
32.8 ± 3.25	34.2 ± 4.91	age

Table 2 . The physical, physiological and biochemical indexes of the test and control groups prior to sports exercises

Indexes	exercise	control	P
Weight (kg)	62.3 ± 4.47	63.42 ± 6.60	0.209
Percentage fat	12.97 ± 2.16	13.3 ± 2.32	0.269
BMI (kg/m^2)	22.48 ± 1.96	22.7 ± 2.28	0.516
Cholesterol (mg/dl)	208.82 ± 32.82	205.48 ± 26.7	0.362
Triglyceride (mg/dl)	125.28 ± 73.8	124.8 ± 28.66	0.287
LDL (mg/dl)	103 ± 20.15	105.4 ± 15.85	0.771
HDL (mg/dl)	47.14 ± 11.04	48.8 ± 10.88	0.472
CRP(mg/l)	4 ± 0.87	3.94 ±1.06	0.892

Table 3 . The physical, physiological and biochemical indexes of the test and control groups after sports exercises

Indexes	exercise	control	P
Weight (kg)	60.2±4.37	63.92±6.05	0.044
Percentage fat	11.22±1.82	13.63±2.65	0.019
BMI (kg/m^2)	22.06±1.62	23.2±2.45	0.375
Cholesterol (mg/dl)	153.4±21.03	198.6±34.21	0.003
Triglyceride (mg/dl)	88.06±28.12	116±16.79	0.191
LDL (mg/dl)	80.44±17.63	114.8±18	0.004
HDL (mg/dl)	57.5±9.26	47.2±4.13	0.035
CRP(mg/l)	2.96±0.732	4.28±0.518	0.001

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