International Research Journal of Applied and Basic Sciences
© 2013 Available online at www.irjabs.com
ISSN 2251-838X / Vol, 4 (1): 91-95
Science Explorer Publication

IRJABS

Comparing walking and a selected aerobic exercise effect on cardiovascular risk factors in non-athletic postmenopausal women after twelve weeks of training

Asieh sadat Mousavian(M.S.C),Dr.Saeed Shakerian, Dr. Faride Namvar, Dr. Mohsen Ghanbarzadeh

Department of Physical Education and Sport Sciences, Shahid Chamran University of Ahvaz, Iran
Corresponding author: Asieh sadat Mousavian

corresponding author email: asieh.mousavian@gmail.com

ABSTRACT: Given the importance of physical activity in preventing cardiovascular disease, this study compares walking and a selected aerobic exercise effects on cardiovascular risk factors in non-athletic postmenopausal (50-60 year-old) women. In this study, 45 healthy postmenopausal women were randomly divided into three groups of 15 people, selected aerobic training, walking and control groups. First, blood pressure, heart rate, peak oxygen consumption and body dimensions including height, weight and body mass index were measured, then blood samples were collected from subjects in the fasting state before treatment and lipid levels (high density lipoprotein, low density lipoprotein, triglycerides) systolic pressure and fasting blood sugar were measured. Duration and intensity of exercise included intensity of 50-70% of maximum heart rate in 12 weeks, in 30 to 90 minutes, 5 times a week (30 minutes at 50% MHR intensity for the first week and 90 minutes, with 70% of MHR in the last week). After the training period, serum lipids, systolic blood pressure and blood glucose were measured again. The data were analyzed using Dependent t-test, MONOVA statistic test and TUKY tracking test. The results showed some significant difference between sports groups and the control group (P≤0.05). Based on the results, aerobic exercise effects was just significant on the mean change of low density lipoprotein(P≤0.05). Also, walking had a significant effect on the reduction of serum mean lipids(P≤0.05). After 12 weeks of training, there were no significant differences between serum lipids(P> 0.05). Aerobic exercises as walking or selected aerobic exercises caused plasma lipids reduction in postmenstrual women.

Keywords: Menopause, triglycerides, low-density and high-density lipoprotein

INTRODUCTION

Nowadays, mortality is increased because of cardiovascular diseases due to sedentary lifestyle, stress and poor dietary habits (Gaiini,2005). So that, cardiovascular disease is one of the most important factors in women death; it happens mostly in postmenopausal women due to decreased protective role of estrogen (Stangl et al,2002). In menopause, risk factors for cardiovascular diseases are equal to or greater than men (Rostami et al,2003). Study showed that hyperlipidemia is one of the most important factors in heart disease. Increase in total cholesterol and low density lipoprotein, characterized by metabolic syndromes of elevated triglycerides, low high-density lipoproteins, hypertension, obesity and high insulin resistance is associated with cardiovascular risks (Murtagh et al,2005. Bonaiuti et al,2002). On the other hand, the amount of body fat increases with age, particularly in women, while the low fat mass is decreased and BMI and WHR which are valid indicators for measuring body composition, rates of overweight and obesity will be increased. It is believed that risk of heart attack varies by changing these two parameters, depending greatly on the reduction of the amount of physical activity in the elderly (Vilmor et al,2007). On one hand, regardless of age, obesity, hypertension, and other factors menopause could be associated with the first signs of structural and functional heart disease (Rostami et al,2003). If menopause is also combined with the above, it can be more closely associated with cardiovascular diseases (Nelson et al,2005). Today, the positive effects of exercise and

physical activity for primary and secondary prevention of cardiovascular diseases is well established (De Bree et al,2001).

Leon and Sanchez review results showed that moderate and intense aerobic exercise for 12 weeks or more increased high-density lipoprotein and decreased low-density lipoprotein, cholesterol and triglyceride in adult men and women (Leon,2005).

The role and importance of aerobic exercise in reducing cardiovascular disease risk factors in postmenopausal women are widely studied in Iran. Knowing that in menopause estrogen production is decreased and cardiovascular diseases are increased (Gaiini,2005.Stangl et al,2002), changing lifestyle to more activity is useful to decrease obesity and cardiovascular diseases (Firooze et al,2011); totally, exercise is related to a healthy lifestyle, but since it is not possible for postmenopausal women to attend in intense physical activities, there is a need to plan an aerobic exercise with moderate intensity (Bani Talebi et al,2010).

Moreover, increased physical activity in sedentary individuals improves traditional and new cardiovascular risk factors. New studies show the impact of physical activity, especially aerobic exercise on cardiovascular risk factors. The common strategy for achieving weight loss and general health, is promoting physical activity, but most people, especially adults do not like to participate in sports programs (Lynch et al,2009). The onset of exercise in old age provides people with less risk of heart attacks and deaths. Sports activities can be very effective and useful in old age (Rostami et al,2003). On the other hand, research suggests that aerobic exercise and walking stops lipid disorder at menopause (Sugiura et al,2012). While few studies compared different types of aerobic exercises in this area, the researcher sought to examine whether walking and aerobic activity with heart rate of 50-70% effects some cardiovascular risk factors in non-athletic premenopausal women or not. Also, which of these aerobic exercises affect the above cases more.

METHODS AND MATERIALS

The present study was done on 45 healthy, sedentary postmenopausal Iranian women 50-60 years old who had past their last menstrual period for at least one year and were residing in Mashhad. They were invited by the call to participate in the study; the Call was at the local newspapers during the spring of 1391 and 70 volunteers were willing to cooperate. History of cardiovascular disease , high blood lipids, smoking and other drug use, medication use or change in diet and hormone therapy were not there in the subjects; After their health was confirmed by a physician , the subjects were included in the study with written volunteer consent. Subject exclusion criteria of the study were: diseases (diseases that require more than a week break at study time), travel (during practice) and absence (more than 2 practice sessions). Levels of physical activity were studied by assessment questionnaire of physical activity (Kaiser Physical Activity Survey: KPAS). Height, weight and waist-to-hip ratio of participants before and after the training period of twelve weeks was measured.

Volunteers been studied for 2 weeks to assess physical activity before exercise protocols. People were placed randomly in three groups of walking, aerobic activity and control. Walking and aerobic activity groups consisted of 15 people who attended in twelve-week exercise program. The control group consisted of 15 people who did not participate in sports programs. Among these subjects, 3 cases due to non-observance of fasting during the tests failed to continue the investigation. Training program included twelve weeks of walking and selected aerobic exercise (5 sessions per week with 50 to 70% heart rate) which first began with 30 minutes each session and then every week, 5 minutes was added to exercise time and it reached 90 minutes per session to the end of study. The program consisted of 5 minutes of stretching to warm up and 5 minutes for cool down at the end of the session. This research was performed Based on Firouze et.al(2011).

Table 1.General characteristics of subjects

Anthropometric indices		Age		weight			height
Statistical information Group	frequency	mean	Standard deviation	mean	Standard deviation	mean	Standard deviation
Walking	15	57.93	8.54	68.12	8.51	154.7	8.23
Selected aerobic activity	15	55.93	3.76	67.96	12.16	157.17	5.59
control	12	55.83	3.76	70.94	5.47	157.21	5.84
Total	42	56.61	5.88	68.87	9.22	156.7	6.72
Anthropometric indices		Heart Rate (per min)		BMI (kg/m^2)		VO_2 Max (ml/kg/min)	
Statistical information Group	frequency	mean	Standard deviation	mean	Standard deviation	mean	Standard deviation
Walking	15	79.85	9.87	28.48	1.77	22.87	
Selected aerobic activity	15	79.13	8.30	28.65	1.92	22.73	1.46
control	12	82.91	24.95	29.20	1.68	22.28	1.58
Total	42	80.47	15.4	28.74	1.78	22.65	1.38

Walking training was done in speed of approximately 6 mph which reached 7 mph in the last sessions. Continuous exercise intensity was controlled in the range through Polar BPM Detector.If necessary, to increase or reduce the exercise intensity feedback was given to the subjects. Maximum oxygen consumption (VO2max) was calculated by Rockport test and Caronen formula was used for heart rate reserve measurement (Silvia et al,2007). Before and at the end of the twelve week aerobic exercise program, subjects were taken 3-5 cc blood in the fasting state at 8 am. In the first step, people were advised not to participate in any physical activity 48 hours before sampling. After the serum separation, up to one hour after sampling by centrifugation and storing at the optimum temperature, the lipoprotein enzymatic analysis was performed.Anthropometric characteristics of the subjects are presented in Table1.

Information collected by the researcher was examined with SPSS software series 17 in descriptive and inferential statistics.

First, the KS test was used to see normal distribution of data in each group. T-test was used in each group for dependent and independent data analysis in order to compare pre-test and post-test in a way that descriptive statistics were used to show the raw data, central indices computation, distribution, drawing diagrams and tables. Independent T-test was used to compare the mean scores of each of the training groups at pre-test and post-test. MANOVA test was used for homogeneity of pre-test and post- test; at the end, TUKEY track test was used to compare different variables used in all three groups.

RESULTS

The results showed that in the walking group, mean and LDL are decreased and triglycerides and HDL are increased significantly. In selected aerobic exercise group LDL had a significant decrease ($P \leq 0.05$), although the average HDL levels increased and triglycerides decreased, the changes are not significant, whereas in controls, the difference was not significant (Table 2).

Table2. M ± SD and significance level of some cardiovascular risk factors in the experimental and control groups compared before and after the test.

Group	walking			Selected aerobic activity			control		
Test steps Variable	First session M±SD	Last session M±SD	P	First session M±SD	Last session M±SD	P	First session M±SD	Last session M±SD	P
HDL	45.86±3.12	60.47±8.54	0.001	51.46±8.13	56.40±8.19	0.553	52.91±8.94	52.66±9.87	0.750
LDL	150.66±13.51	114.02±3.76	0.001	136.13±29.42	112.40±28.68	0.001	124.67±28.68	126.83±18.30	0.631
Triglyceride	163.93±14.13	112.0±15.84	0.001	135.6±25.10	158.67±23.56	0.116	167.33±1.46	17.167±9.34	0.799

Comparing the two aerobic groups in TUKEY, mean HDL, LDL and triglycerides had no significant difference ($P > 0.05$) (Table 3).

Table 3.TUKEY test to evaluate differences status among the three groups

Variable dependence	Groups		Mean difference	Standard deviation	P significance
HDL	walking	Aerobic activity	4.6	3.92	0.290
		control	7.80	1.22	0.048
	Aerobic activity	control	3.73	3.22	0.257
LDL	walking	Aerobic activity	1.80	4.78	0.345
		control	-12.63	3.42	0.035
	Aerobic activity	control	-14.43	3.28	0.017
Triglyceride	walking	Aerobic activity	-23.6	8.99	0.065
		control	-55.16	5.46	0.024
	Aerobic activity	control	-32.10	7.46	0.058

DISCUSSION

The results of this study showed that exercise, either walking or aerobic exercise increases blood HDL-c levels. This generally is significant in walking, but it was not significant in the aerobic activity, despite the meandifferences.

According to some results, training mainly does not change plasma lipoproteins, although the lipoprotein changes as quantitative particles (College of Education, Department of ExerciseScience,1999).

Aerobic exercise increases HDL-C to reduce cardiovascular disease. The least activity to increase HDL-C level is consumption of 900 kcal or approximately 120 minutes training a week. It has been said that every 10 minutes of aerobic activity causes 4/1 milligram per deciliter increase in high density lipoprotein

(Kodama et al,2007) and also physical exercise causes an increase in high-density lipoprotein particle size (Wooten et al,2009).

Studies have shown that elevated high-density lipoprotein can be seen in people with body mass index less than 28 and cholesterol equal to or greater than 200. However, in some studies, the strong association between physical activity and HDL-C was not found (Kodama et al,2007). In order to collect cholesterol, HDL is removed from liver and small intestine and links with cholesterol and save it in its center. {Lysolecithin + Astro cholesterol → lecithin + cholesterol} the process is catalyzed by lecithin cholesterol acyl transferase. Exercise causes the activity and increases the enzyme and nurture and increase HDL particles. In addition, increased energy level of 1200 kcal per week causes increased HDL levels (Kolifa et al,2004).

The results of this study indicate that selective aerobic exercise and walking will cause a significant increase in low-density lipoprotein. Although one of the most important lipid risk factors is for arterial production of low-density lipoprotein, but exercise reduces low-density lipoprotein in mass slightly which is prone to oxidize low-density lipoprotein and ultimately leads to increased levels of high density lipoprotein (College of Education, Department of Exercise Science,1999). Also, exercise with normal lipid profile is leading to a reduction in low-density lipoprotein (Ferguson et al,2004); the low-density lipoprotein oxidation depends on lipid composition and plasma antioxidant status (Byars et al,2003). Normally, high level of LDL and cells not requiring them, there is the absence of LDL receptors on cell surfaces; but while physical activity, LDL enters cells by endocytosis and is degraded using degrading enzymes to be used in cells composition. Weight loss occurs with physical activity and subsequently there will be a decline in LDL levels, in other words, this factor is related to the weight (Kolifa et al,2004). The results of this study showed that exercise, either walking or aerobic activity of choice, reduce serum triglycerides. Overall, the results were significant in walking, but not significant in selected aerobic activities. Physical activity is effective to reduce triglycerides and increase HDL-C. These changes in blood lipids and lipoproteins may change the size of them (Wooten et al,2009). It is said that the level of DNA or paired chromosomes, were significantly associated with total cholesterol, low-density lipoprotein and triglycerides (Byars et al,2003). Reduction in triglyceride levels right after exercise is well known to remain stable for up to three days (Kodama et al,2007). Reports show that those who hold more than 6,000 steps per day compared to those who hold less than 2,000 steps per day, have on average 3 mg dl higher density lipoprotein and 10mg dl lower triglycerides. In addition, exercise like swimming and jugging which causes the total energy intake of 300 kcal per exercise session reduces mg dl triglycerides and increases 5mg dl blood HDL-C (Kodama et al,2007). As mentioned previously, lipids in the body are analyzes in the form of triacylglycerol and fatty acid and enter the blood. The fatty acid is transported by lipoproteins and it is used as a substrate for the activity, it is stimulated primarily by HDL which is stimulated by catecholamines.

After circulating, fatty acids enter the active muscle and are used (Sereny et al,1978). During physical activity, levels of lipoprotein lipase are increased in muscle capillaries, which cause the reduction in plasma triglyceride levels.

In addition, reduction in triglyceride levels is related to body weight in physical activity and weight loss is occurred, subsequently. Increased HDL reduces triglyceride concentration. The reduction is caused by the accumulation of triglycerides and it is related to the transfer of the vessel (Kolifa,2004). However, the differences in glyceride, HDL, LDL is there in the research and its implications can be exercise duration, age range of subjects, varying the intensity of the workout.

The results showed that there was no significant difference between the effect of two twelve-week aerobic exercise and walking training program on cardiovascular risk factors in postmenopausal women HDL-c, LDL and triglycerides. In a study conducted by Gilt et.al. (2000), a four-month exercise training effects were studied on serum lipids and lipoproteins in obese women 49-59 years of age. Two types of aerobic activity were compared a) Experimental group I: 68 people under the training program of general physical health and physical exercise groups, b) experimental group II: 63 people only underwent fitness training and public health; c) control group: 26 people without any exercises as controls.

In the final analysis, the following results were obtained: the desired effect and significance of serum cholesterol levels and the CT / HDL ratio in the experimental group II compared with the other two groups were observed. Exercise and physical activity have a favorable effect on HDL levels in both experimental groups I and II. This study showed that there is no significant difference between the influences of aerobic activity on cardiovascular risk factors (Giilet et al,2000). So that, Shely relates Limping pattern changes only to age, hormonal conditions, volume of exercise and dietary type.

Also, according to the America Heart Association, minimum physical activity to protect women from cardiovascular disease is at least 30 minutes in most days of the week. In this study, postmenopausal women could do two aerobic activities up to 90 minutes, 5 days a week advance.

CONCLUSIONS

In this study, the effect of two physical activities is evaluated on cardiovascular disease risk factors in 50-60 years old non-athlete postmenopausal women. In general, aerobic activity is comparable with walking.

Increased free fatty acids in the blood shows increased lipolysis and conversion of energy which occurs in activities such as walking and aerobic. Thus, these two activities can be compared (Janbozorgi,2010). In addition, if the activity of walking is done correctly and with the mobility of the upper body and arms, adjusts the deduction.

The present study investigates regular physical activity in the form of walking and aerobic exercise. Both of these activities are good means for the reduction of LDL and triglycerides. The results generally indicate that this type of aerobic activity helps these blood materials and prevents their increase. According to the survey results, it is recommended to permanently take advantage of low impact aerobic exercises in order to positively impact cardiovascular disease in postmenopausal women.

ACKNOWLEDGEMENT

The authors wish to thank all the students who helped the fulfillment of the present investigation, through their kind participation in the current research.

REFERENCES

1-593 (Persian).
Bani Talebi. et al.2010.Effect of a period exercise on some cardiovascular risk factor on given,Ofogh Journal of Medicin Sceince of gonabad university,15(4):16-23
Bonaiuti D, Shea B, Iovine R, Negrini S, Robinson V, Kemper HC, et al. .2002. Exercise for preventing and treating osteoporosis in postmenopausal women. Cochrane Database of Syst Rev; (3):CD000333.
Byars A , Greenwood M , Greenwood L , Simpson W. .2003. The effect of alternating steady-state walking technique on estimated VO2max values of the Rockport fitness walking test in college students. Journal of Exercise Physiologyonline. 6; 21-25.
College of Education, Department of Exercise Science,Physical Education, and Recreation, Norfolk, VA 23529-0196, USA. Br J Sports Med .1999. 33:190–195
De Bree A, Verschuren W, Blom H, Kromhout D. 2001.Lifestyle factors and plasma homocysteineconcentrations in a general population sample. Am J Epidemiology; 152: 150-154.
Ferguson M A, White LJ, McCoy S, Kim HW, Petty T, Wilsey J. 2004. Plasma adiponectin response to acute exercise in healthy subjects. European Journal of Applied Physiology, 91, 324–329.
Firooze, Zeinab, et al.2011. Effect of walking on estrogen hormon & som cardoivascular risk factors on sedentary postmenopuasal women, Journal of Medicine :Daneshvar,90,۳۳-۴۰
Gaiini A. (Physical readiness). Translate by Rajabi H. 3rd. Tehran: Samt Publication. 2005.pp: 80-130. (Persian)
Giilet-p.Caserta-M. et al .2000. respons of 19-50 years old oweweight women to 4 month of exercise,J-Activity Adaptation 19(4):13-32
ISBN 978-964-6651-80-7: 1-89 (Persian).
Janbozorgi M. 2010.effect of two type of exercise COMPULSORY & SOCIAL sport on profile of blood lipoproteins of sedentary collegian girl ofshahid chamran university of Ahwaz, Thesis,university of shahid chamran of ahwaz.
Journa of Clinical Nutrition 58(10), 1327-35.
Kodama S. et al. 2007. Effect of earobic exercise on high density lipoprotein cholestrol,WWW.ARCHINTEENMED.COM,167,MAY28
Kolifa M, Petridou A, Mougios V. 2004.Effects of prior exercise
Leon S, Robert H, Nathan G. 2005.Clinical gynecologic endocrinology and infertility. 7th ed. Lippincott: Williams &Wilkins;
Lynch KB, Corbin CB, Sidman CL .2009. Testing composition: does recreational baskesball impact adult activity levels?. J Phys Act Health;6(3);321-6.
Murtagh EM, Boreham C, Nevill A, Davison G, Trinick T, Duly E. et al. 2005. Acute responses of inflammatory markers of cardiovascular disease risk to a single walking session. Journal of Physical Activity and Health, 3, 324 – 332.
Nelson H D, Haney E, Humphrey L, Miller J, Nedro A, Bougatsos C. et al. 2005.Healthcare
on lipemia after a meal of moderate fat content. European
Research and Quality, Management of Menopause- Related Symptoms; 5: 1-6.
Rostami N, health h, health woman.2003. guide for woman to have a health heart;
Sereny G, Endrenyi L. 1978.Mechanisms and significance of carbohydrate intolerance in chronic alcoholism. Metabolism;27:1041–6.
Silvia. et al.2007. Role of Exercise Training in Cardiovascular Autonomic Dysfunction and Mortality in Diabetic Ovariectomized Rats, Hypertension .2007. 50:786-791
Stangl V, Baumann G, Stangl K.2002. Coronary atherogenic risk factors in women. Eur Heart J.;23:1738-1752
Sugiura H. et al. Effect of long term moderate exercise and incraes in nomber of daly steps on serum lipids in women randomized controlled. 2012. 1472-6874/2/3
Vilmor H, Kastil L. 2007.Physiology of sport and exercise, sixth edition: Pishrovan Issu;
Wooten Joshua S, Kyle D. biggerstaff,and vic ben ezra .2009. responses of LDL and HDL partcle size and distribution to omega-3 fatty acid supplementation and earobice exercise , Exercise physiology laboratory, Department o Kinesiology, texas Women's University, denton , texas , J spply physiology