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Study of some CVD intensifying lipids over a period of aerobic exercise in the open and closed environment

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ABSTRACT

Regarding the importance of physical activity in preventing lipids disorders, this study was done with the goal of comparing one type of aerobic exercise in open and closed place on some lipids intensify CVD disorders, In this study, 45 healthy middle aged postmenopausal women were randomly divided into 3 groups of 15, tow earobic exercise and control. First, the heart rate was measured (04/15 ±47/80), then maximal oxygen consumption (22.65 ±1.46) and the body dimensions, including height (156.7 ±6.72) weight (68.87 ±9.22) and body mass i ndex (28.74 ±1.78), then, cholesterol, VLDL and triglycerides values were studied in Laboratory. Time and intensity of exercise were identical for two groups. Increasing intensity of 50-70% of maximum heart rate was in 12 weeks, 30 to 90 minutes, and 5 times a week (30 minutes at 50% MHR intensity for the first week and 90 minutes of 70 percent MHR in the last week). After the training period, cholesterol, VLDL and triglycerides values were measured again and the data were analyzed with the dependent T-test, MANOVA and TUKY follow-up test. The results indicate that differences between exercise groups and control group were significant. Accordingly, the results of exercise group in open place had significant effects on reducing mean cholesterol, VLDL and triglycerides (P≤0.05). And aerobic exercise in closed place had significant effects on reducing mean cholesterol, VLDL but had not significant effects on reducing mean triglycerides and there was significant difference in VLDL values between two groups after 12 weeks (P≤0.05) as the open place group showed higher mean. As the exercise group in open place showed higher mean, this study showed that aerobic exercise, either exercise group in open place or in the exercise group in closed place causes decrease in the mean of some blood lipids like cholesterol, VLDL and triglycerides in postmenopausal women, among which exercise group in open place maby because of more exciting time indicates greater effectiveness.

Keywords: aerobic exercise, lipids, open and closed environment

INTRODUCTION

Nowadays, mortality is increased because of cardiovascular diseases due to sedentary lifestyle, stress and poor dietary habits [1]. So that, cardiovascular disease (CVD) is one of the most important factors in women death; it happens mostly in postmenopausal women due to decreased protective role of estrogen [2]. In menopause, risk factors for cardiovascular diseases are equal to or greater than men [3]. Study showed that 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 [4,5]. 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 [6]. 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 [3]. If menopause is also combined with the above, it can be more closely associated with cardiovascular diseases [7]. Today, the positive effects of exercise and physical activity for primary and secondary prevention of cardiovascular diseases is well established [8].

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 [9]. 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 [1,2], changing lifestyle to more activity is useful to decrease obesity and cardiovascular diseases [10]; 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 [11].

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 [12]. 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 [3]. On the other hand, research suggests that aerobic exercise stops lipid disorder at menopause [13]. While few studies compared different types of aerobic exercises in this area, the researcher sought to examine exercise group in open place and in the exercise group in closed place with heart rate of 50-70% effects total cholesterol and Very low density lipoprotein, triglycerides, in non-athletic premenopausal women or not. Also, which of these aerobic exercises affect the above cases more.

MATERIALS AND METHODS

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 exercise group in open place and exercise group in closed place and control. Aerobic activities 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 exercise group in open place and exercise group in closed place (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).

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 [14]. 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 Table 1.

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

Table 1.General characteristics of subjects

Anthropometric indices		Age		weight			height
Statistical information Group	frequency	mean	Standard deviation	mean	Standard deviation	mean	Standard deviation
Open place exercise	15	57.93	8.54	68.12	8.51	154.7	8.23
Closed place exercise	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)		Max VO (ml/kg/min)	
Statistical information Group	frequency	mean	Standard deviation	mean	Standard deviation	mean	Standard deviation
Open place exercise	15	79.85	9.87	28.48	1.77	22.87	
Closed place exercise	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

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 indicate that differences between tow exercises and control groups were significant. Accordingly, the results of walking had significant effects on reducing mean cholestrol, VLDL and triglycerides ($P \leq 0.05$). Open place exercise and closed place exercise significant effects on reducing mean cholestrol, VLDL but had not significant effects on reducing mean triglycerides (Table 2).

Table2. M ± SD and significance level of some blood lipids in the experimental and control groups compared before and after the test.

Group	*Open place exercise*			*closed place exercise*			*control*		
Test steps	First session	Last session	P	First session	Last session	P	First session	Last session	P
Variable	M±SD	M±SD		M±SD	M±SD		M±SD	M±SD	
VLDL	32.80±3.22	22.40±8.14	0.001	33.46±8.19	26.34±8.13	0.049	22.91±4.94	25.51±9.57	0.332
total cholesterol	226.60±18.06	190.86±11.18	0.001	229.46±16.23	191.20±15.40	0.001	213.75±14.45	214.55±12.18	0.257
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 there was significant difference in VLDL values between two groups after 12 weeks ($P \leq 0.05$). (Table 3).

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

Variable dependence	Groups		Mean difference	Standard deviation	P significance
VLDL	*Open place exercise*	*closed place exercise*	-3.94	1.02	0.035
	Open place exercise	control	-3.11	1.28	0.041
	closed place exercise	control	-0.83	1.30	0.724
total cholesterol	*Open place exercise*	*closed place exercise*	-.33	4.29	0.999
	Open place exercise	control	-23.88	3.91	0.001
	closed place exercise	control	-23.55	4.91	0.001
Triglyceride	*Open place exercise*	*closed place exercise*	-23.6	8.99	0.065
	Open place exercise	control	-55.16	5.46	0.024
	closed place exercise	control	-32.10	7.46	0.058

DISCUSSION

The results of this study showed that exercise, either exercise group in open place or exercise group in closed place decreases blood cholesterol and Very low density lipoprotein, triglycerides levels. This generally is significant in exercise group in open place, but it was not significant in the exercise group in closed place just in Triglyceride factor, despite the mean differences According to some results, training mainly does not change plasma lipoproteins, although the lipoprotein changes as quantitative particles [15].

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 [16] 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 [17].

The results of this study indicate that exercise group in open place and exercise group in closed place will cause a significant decrease in very low-density lipoprotein(1/5 triglyceride). 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 [15].

The results of this study showed that exercise, either exercise group in open place and exercise group in closed place of choice, reduce serum triglycerides. Overall, the results were significant in exercise group in open place, but not significant in exercise group in closed place. Physical activity is effective to reduce triglycerides. These changes in blood lipids and lipoproteins may change the size of them [16]. It is said that the level of DNA or paired chromosomes, were significantly associated with total cholesterol, low-density lipoprotein and triglycerides [17]. Reduction in triglyceride levels right after exercise is well known to remain stable for up to three days. 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 dI higher density lipoprotein and 10mg dI lower triglycerides. In addition, exercise like swimming and jugging which causes the total energy intake of 300 kcal per exercise session reduces mg dI triglycerides and increases 5mg dI blood HDL-C [17]. 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 [21]. 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 and therewith VLDL levels is related to body weight in physical activity and weight loss is occurred, subsequently. The reduction is caused by the accumulation of triglycerides and it is related to the transfer of the vessel [18]. However, the differences in glyceride and VLDL 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 effects of two twelve-week exercise group in closed place program on blood lipids in postmenopausal women except VLDL factor as the walking group showed higher mean. In a study conducted by Gillt et.al (2000), a four-month exercise training effects were studied on serum lipids and lipoproteins in obese women 49-59 years of age[22]. 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 cholesterol 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 [22]. 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.

In this study, the effect of two physical activities is evaluated on some blood lipids in 50-60 years old non-athlete postmenopausal women. . As the exercise group in open place showed higher mean, this study showed that aerobic exercise, either exercise group in open place or in the exercise group in closed place causes decrease in the mean of some blood lipids like cholesterol, VLDL and triglycerides in postmenopausal women, among which exercise group in open place maby because of more exciting time indicates greater effectiveness.

The present study investigates regular physical activity in the form exercise group in open place or in the exercise group in closed place, both of these activities are good means for the reduction of VLDL, Cholesterol 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 blood lipids in postmenopausal women.

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REFERENCES

[1] Gaiini A. [Physical readiness]. Translate by Rajabi H. 3rd. Tehran: Samt Publication. 2005; pp: 80-130. [Persian]
[2] Stangl V, Baumann G, Stangl K. Coronary atherogenic risk factors in women. Eur Heart J. 2002;23:1738-1752
[3] Rostami N. health heart, health woman: guide for woman to have a health heart 2003; ISBN 978-964-6651-80-7: 1-89 (Persian).
[4] Murtagh, E.M., 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.
[5] 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.
[6] Vilmor H, Kastil L. Physiology of sport and exercise, sixth edition: Pishrovan Issu 2007; 1-593 (Persian).
[7] Nelson H D, Haney E, Humphrey L, Miller J, Nedro A, Bougatsos C, et al. Healthcare Research and Quality, Management of Menopause- Related Symptoms 2005; 5: 1-6.
[8] De Bree A, Verschuren W, Blom H, Kromhout D. Lifestyle factors and plasma homocysteineconcentrations in a general population sample. Am J Epidemiology 2001; 152: 150-154.
[9] Leon S, Robert H, Nathan G. Clinical gynecologic endocrinology and infertility. 7th ed. Lippincott: Williams &Wilkins; 2005.
[10] Firooze,Zeinab et al.(2011) Effect of walking on estrogen hormon & som cardoivascular risk factors on sedentary postmenopuasal women, Journal of Medicine :Daneshvar,90,33-40
[11] 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
[12] Lynch KB; Corbin CB, Sidman CL (2009). Testing composition: does recreational baskesball impact adult activity levels. J Phys Act Health;6(3);321-6.
[13] H. Sugiura 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
[14] Silvia et al,(2007), Role of Exercise Training in Cardiovascular Autonomic Dysfunction and Mortality in Diabetic Ovariectomized Rats, Hypertension 2007, 50:786-791
[15] College of Education, Department of Exercise Science,Physical Education, and Recreation, Norfolk, VA 23529-0196, USA. Br J Sports Med (1999);33:190–195
[16] Kodama Saturo et al (2007) Effect of earobic exercise on high density lipoprotein cholestrol,WWW.ARCHINTEENMED.COM,167,MAY28

[17] 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
[18] Kolifa, M., Petridou, A. and Mougios, V. (2004). Effects of prior exercise on lipemia after a meal of moderate fat content. European Journa of Clinical Nutrition 58(10), 1327-35.
[19] Ferguson, M. A., White, L. J., McCoy, S., Kim, H. W., Petty, T & ,.Wilsey, J. (2004). Plasma adiponectin response to acute exercise in healthy subjects. European Journal of Applied Physiology, 91, 324–329.
[20] 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.
[21] Sereny G, Endrenyi L. Mechanisms and significance of carbohydrate intolerance in chronic alcoholism. Metabolism 1978;27:1041–6.
[22] Giilet-p.Caserta-M (2000) respons of 19-50 years old oweweight women to 4 month of exercise,J-Activity Adaptation 19(4):13-32
[23] Janbozorgi,Maryam,(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.