The Effects of Combined Training (Aerobic Dance, Step Exercise and Resistance Training) on Body Fat Percents and Lipid Profiles in Sedentary Females of AL_ZAHRA University

Parastoo Ossanloo[1], Liza Najar[2] and Ardeshir Zafari[3]

[1]Department of Physical Education and Sport Sciences, AL_ZAHRA University, Tehran, Iran.
[2]Department of Physical Education and Sport Sciences, Odense University, Odense, Denmark.
[3]Department of Physical Education and Sport Sciences, Zanjan Branch, Islamic Azad University, Zanjan, Iran.

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ABSTRACT

Exercise training and physical activity modified body fat percents and serum lipid profiles, but the influences of different types of exercises and combination of them on body fat percents and serum lipid profiles has rarely been investigated. The aim of this study was to investigate the effects of 12 weeks combination training included aerobic dance, step exercise and resistance training on body fat percents and serum lipid profiles in sedentary females. Eighty subjects randomly selected from 100 volunteered healthy sedentary females (25-45 years) based on American College of Sports Medicine and Physical Activity Rating Questionnaire in AL-ZAHRA University (Tehran, Iran). This subjects randomly divided in two groups such as, Exercise (n= 40) and Control groups (n= 40). Subjects in exercise group were training for 12 weeks, 3 sessions in week, and 60 minute in sessions with 60-80 percent of Heart Rates Reserve (HRR). Combination training program include aerobic dance, aerobic step exercise and resistance training was performed based on progressive overload training principal. Total Cholesterol (TC), Triglyceride (TG), Low Density Lipoprotein Cholesterol (LDL_C), High Density Lipoprotein Cholesterol (HDL_C) and Body Fat percents (% BF) has been measured before and after 12 weeks training program. Data compared with two tailed paired and independent sample t test (p≤0.05). The results showed that levels of HDL_C and % BF significantly modified after 12 weeks training (p< 0.05). There were no significant changes in TC, TG and LDL_C. These results indicated that moderate intensity combined training included aerobic dance, step exercises and resistance training have positive effect on some serum lipid profiles and body fat percents in sedentary females.

Key Words: Aerobic Dance, Step Exercise, Resistance Training, Lipoproteins, % Body Fat, Cholesterol.
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INTRODUCTION

The prevalence of Cardio Vascular Disease (CVD), mortality and financial burden of those in world is growing [1, 2, 11, 15, 17, and 20]. Incidence and mortality from CVD in Iran is increasing [21]. Sedentary lifestyles, obesity and increment of cardiovascular diseases morbidity and mortality have been considered as important factors in the start of the 3rd millennium [1, 11, and 15]. Cardiovascular diseases are a number one killer in the world and peoples and governments have to pay a lot of expenses to control, prevention and treatment of them [15]. Cardio vascular disease risk factors are variables that appear to be associated with the development and progression of CVD. Study findings showed that factors such as serum levels of Total Cholesterol (TC), Triglyceride (TG), Low Density Lipoprotein Cholesterol (LDL_C), High Density Lipoprotein Cholesterol (HDL_C) and Body Fat Percents (%BF) are also associated with the development and progression of CVD [1, 2, 15, and 17]. Increment of age & gender related

1598

cardiovascular diseases risk factors such as lipids and lipoproteins disorder and obesity accompanied by decrement of physical activity levels in sedentary females [2, 15, 17, and 20].

On the other hand, increment of physical activity levels and exercise training modified obesity and cardiovascular disease risk factors and decrement of cardiovascular diseases morbidity and mortality and financial burden of those [2, 15, 21]. Creating an active lifestyle with physical activity is the best prevention of obesity and cardiovascular disease and its risk factors [2, 11, 15, and 17]. The results of previous study indicated that long-term physical activity and exercise training is the best way in primary and secondary prevention of chronic diseases, especially cardiovascular disease, obesity and lipid disorders in men and women with different age ranges [2, 11, 15, 17, and 20]. The results of previous study indicated that long-term physical activity and exercise training have beneficial effects and relationship with serum concentration of TC, TG, LDL_C, HDL_C and %BF [3-10, 12-14, 16].

Conroy (2007) showed in a 10 years period study about role of sports and physical activity in prevention of cardiovascular diseases risk factor that increased physical activity levels would lead to decrease these risk factor (which means they have a direct relation). Active women also have a healthier life, lower body fat and better risk factors pattern compared to inactive women. Low density lipoprotein cholesterol, total cholesterol and body fat are lower in active women compared to inactive women and they also have a higher high density lipoprotein cholesterol levels in blood serum [7]. Some researchers studied aerobic, power and parallel (resistance - power) training on body composition, physical fitness and health related metabolic factors such as blood lipids levels in women. Results showed that decrement of body fat percent in aerobic groups was significant, but body fat percent changes in parallel and power training groups weren't significant. On the other hand, waist circumference only decreased significantly in resistance and parallel training groups. Additionally, there were a significantly decreased in low density lipoprotein cholesterol, total cholesterol levels in all groups. There was a significantly increased of high density lipoprotein cholesterol levels in all groups'; but these differences were not significant between training groups. They concluded that aerobic training, power and parallel training had positive effects on fitness, body fat percent and lipids profiles related to cardio vascular diseases in females [3-10, 12-14].

Aerobic step exercise is aerobic training methods which have a great role in improvement of aerobic fitness, physical health, cardiovascular fitness and body composition profiles. Aerobic step exercise includes a series of dance movements in step by step form which are repeated frequently by music. Aerobic step exercise trainings would cause decrease in cardiovascular risk factors such as low density lipoprotein cholesterol, total cholesterol, body fat percent and waist circumference [3, 14]. Hallage (2010) studied the effect of 12 weeks combining power and aerobic step exercises on women's health profiles. Aerobic step exercises were executed in 80-90 percent of maximum heart rate. Lower body part power exercises were done before aerobic step exercises and upper body part power exercises were done after aerobic step exercises. Aerobic step exercises would lead to significant decreased in body fat percent, sub skin folds fat and lipids profiles [14]. Cornelissen (2005) showed that aerobic dance training would lead to significant changes in cardiovascular fitness, body fat percent in women. Aerobic dance training would lead to significant decreased in body fat percent, waist circumference and sub skin folds fat [8].

Therefore, according to the previous studies results, it seems that combination training included aerobic dance, step exercise and resistance training have a better effects on cardiovascular fitness, aerobic fitness and body composition. These training are also more interesting and easier for women compared to other sports and exercise training methods. On the other hand, exercise training and physical activity modified cardiovascular disease risk factors, but the influences of different types of exercises and combination of them on cardio vascular disease risk factors has rarely been investigated. There was no study executed considering combination of aerobic dance, step exercise and resistance training effects on cardiovascular disease risk factors. Therefore, the purpose of this study was determined and compared of effects of 12 weeks combination training included aerobic dance, step exercise and resistance training on cardiovascular disease risk factors in sedentary females. Whether, the 12 weeks combination training included aerobic dance, step exercises and resistance training have any effects on cardiovascular disease risk factors? Whether, the 12 weeks combination training included aerobic dance, step exercises and resistance training have any effects on serum concentration of Total Cholesterol, Triglyceride, Low Density Lipoprotein Cholesterol, High Density Lipoprotein Cholesterol and Body Fat percent in sedentary females? Whether, an active lifestyle can be reducing the cardiovascular disease risk factors in females?

MATERIALS AND METHODS

The purpose of this semi quasi study was to determined and compared of the effects of combination training included aerobic dance, step exercise and resistance training on cardiovascular disease risk factors (serum concentration of total cholesterol, triglyceride, low density lipoprotein cholesterol, high density lipoprotein cholesterol and body fat percent) in sedentary females. Eighty subjects randomly selected from 100 volunteered

1599

healthy sedentary females (25-45 years) based on American College of Sports Medicine and Physical Activity Rating Questionnaire in AL-ZAHRA University (Tehran, Iran). This subjects randomly divided in two groups such as, Exercise (BMI: 26.4 ± 5.2; n= 40) and Control groups (BMI: 28.6 ± 5.6; n= 40). All the subjects were informed of their rights to anonymity and confidentiality. The Institutional Review Board for Human Subjects at the university approved this study. In order to participate in the study 80 the subjects signed an informed consent form. At the onset of the study, the subjects were informed about the purpose of the study. They were told that the results would help trainers to develop better strategies for improving methods of training. The research study was conducted at a local indoor aerobic club in the university.

The independent variable was 12 weeks combination training included aerobic dance, step exercises and resistance training based on progressive overload training principal. Training program was based on Association of Sport Sciences guidelines and it was adjusted by subject's physical condition, gender and age. Training program was performed for 12 weeks, 3 days/week and 60 min/ days. Total time of training program divided as warming up (15 min), main training program (40 min) and cooling down (5 min) at the morning of days (8 – 9 am). Training program was started at 60% of Heart Rates Reserve (HRR) at the beginning week and 80% of Heart Rates Reserve (HRR) at last week. Subjects eating habits and other daily physical activity in groups didn't change. Dependent variables included cardiovascular disease risk factors such as Total Cholesterol (TC), Triglyceride (TG), Low Density Lipoprotein Cholesterol (LDL_C), High Density Lipoprotein Cholesterol (HDL_C) and % Body Fat measured at beginning and the end of training program in two groups. Fasting blood sample was taken for measuring serum concentration of TC, TG, LDL_C and HDL_C with ELISA method (Pars Azmoon kits, Iran) after 9 to 12 hours of fasting, 7-8 am, from left Antecubital vein at medical diagnosis laboratory. Body fat percent was calculated by Jackson and Polack skin folds equation (three point methods included; chest, abdomen and thigh skin folds) by used Caliper (Lafaite, USA) [17]. In order to determine whether there were any statistically significant differences in the cardiovascular disease risk factors of subjects during training program, a two-tailed independent samples t test was used for comparing of cardiovascular disease risk factors means between the exercise and control groups. The cardiovascular disease risk factors means in pre test and post test of each group compared with a two-tailed paired samples t test. The normality of the distribution and homogeneity of variances tested with Kolmogorov–Smirnov and Levene's tests respectively. Significant levels in all tests were P≤0.05.

RESULTS AND DISCUSSION

IN table 1, Means (M) ± Standard Deviation (SD) of the variables and the results of statistical tests in pre test and post test of groups are presented. Mean differences of serum concentration of Total Cholesterol (Exercise: 195.3±40.0 vs. Control: 204.0±78.7 mg/dl) between groups in post test were not significant. Decrement of serum concentration of Total Cholesterol in pre test (202.9±43.8) and post test (195.3±40.0) of exercise group were not significant (p=0.250). Increment of serum concentration of Total Cholesterol in pre test (185.1±35.7) and post test (204.0±78.7) of control group were not significant. Mean differences of serum concentration of Triglyceride (Exercise: 204.0±78.7 vs. Control: 265.8±51.8 mg/dl) between groups in post test were not significant. Increment of serum concentration of Triglyceride in pre test (195.7±86.8) and post test (204.0±78.7) of exercise group were not significant (p=0.472). Increment of serum concentration of Triglyceride in pre test (245.3±51.6) and post test (265.8±51.8) of control group were not significant. Mean differences of serum concentration of Low Density Lipoprotein Cholesterol (Exercise: 116.7±22.2 vs. Control: 129.6±34.1 mg/dl) between groups in post test were not significant. Decrement of serum concentration of Low Density Lipoprotein Cholesterol in pre test (125.5±30.4) and post test (116.7±22.2) of exercise group were not significant (p=0.250). Decrement of serum concentration of Low Density Lipoprotein Cholesterol in pre test (135.3±37.9) and post test (129.6±34.1) of control group were not significant. Mean differences of serum concentration of High Density Lipoprotein Cholesterol (Exercise: 44.7±7.8 vs. Control: 35.7±6.6 mg/dl) between groups in post test were significant. Increment of serum concentration of high density lipoprotein cholesterol in pre test (37.8±4.7) and post test (44.7±7.8) of exercise group were significant (p=0.003*). Increment of serum concentration of high density lipoprotein cholesterol in pre test (33.9±6.5) and post test (35.7±6.6) of control group were not significant. Mean differences of body fat percent (T: 22.0±6.2 vs. C: 24.5±3.9 %) between groups in post test were significant. Decrement of body fat percent in pre test (24.3±5.7 %) and post test (22.0±6.2 %) of training group were significant (p =0.003*). Mean differences of body fat percent in pre test (24.6±4.2 %) and post test (24.5±3.9 %) of control group were not significant.

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Table 1. Means (M) ± Standard Deviation (SD) of the variables and the results of statistical tests in pre test and post test of groups (P≤0.05).

Variables	Groups	Pre test	Post test	% diff	sig
TC (mg/dl)	T	202.9±43.8	195.3±40.0	-3.74	0.250
	C	185.1±35.7	204.0±78.7	0.48	
TG (mg/dl)	T	195.7±86.8	204.0±78.7	4.25	0.472
	C	245.3±51.6	265.8±51.8	8.37	
LDL_C (mg/dl)	T	125.5±30.4	116.7±22.2	-7.01	0.250
	C	135.3±37.9	129.6±34.1	-4.21	
HDL_C (mg/dl)	T	37.8±4.7	44.7±7.8	18.25	0.003*
	C	33.9±6.5	35.7±6.6	5.30	
Body Fat (%)	T	24.3±5.7	22.0±6.2	-2.3	0. 003**
	C	24.6±4.2	24.5±3.9	-0.1	

The results of this study indicated that 12 weeks of combined training included aerobic dance, step exercise and resistance training based on progressive overload training principal were significantly increased high density lipoprotein cholesterol levels, and decreased body fat percent levels. These results indicated that 12 weeks of combined training included aerobic dance, step exercises and resistance training modified some cardiovascular disease risk factors and corrected the pattern of these risk factors in sedentary females. The results of previous studies indicated that increment of physical activity levels and exercise training modified cardiovascular disease risk factors and decrement of cardiovascular diseases morbidity and mortality. These results indicated that long-term physical activity and exercise training have beneficial effects on serum concentration of high density lipoprotein cholesterol and body fat percent [3-10, 12-14, 18, 19]. Increment of high density lipoprotein cholesterol in sedentary females in this study resulted from aerobic dance, step exercise training or combination of them. Primary levels of lipoproteins and intensity, duration and types of physical activity and exercise training are important factors that affect cardiovascular disease risk factors. It seems that differences responses of high density lipoprotein cholesterol in sedentary females in this study were due to primary levels of this lipoprotein and combination of training. Decrement of body fat percent in sedentary females in this study resulted from aerobic dance, step exercise and resistance training or combination of them. Primary levels of body fat percent and intensity, duration and types of physical activity and exercise training are important factors that affect body composition factors. Endurance training such as aerobic dance and step exercise increase maximum oxygen consumption, number, size and density of mitochondria and oxidative enzymes. On the other hand, strength and resistance training increased myofibrils proteins and muscle mass [21]. Therefore, endurance training such as aerobic dance and step exercise increase the rate of fat aerobic catabolism and strength and resistance training increase the amounts and duration of fat aerobic catabolism (increased the muscles fiber and fatigue threshold). These structural and functional changes in body systems resulted to increased aerobic energy expenditure and fat born. Therefore, the amounts of body fat, body size and body mass were decreased.

Some previous studies results indicated that serum levels of total cholesterol, triglyceride and low density lipoprotein cholesterol were decreased after aerobic training in sedentary females [3-10, 12-14, 18, 19]; but the results of this study were not supported of them results. The results of this study indicated that serum levels of total cholesterol, triglyceride and low density lipoprotein cholesterol were decreased in sedentary females in exercise group; but these decrements were not significant.

CONCLUSION

Therefore, the results of this study indicated that 12 weeks of combined training included aerobic dance, step exercise and resistance training based on progressive overload training principal were significantly modified some risk factors of cardiovascular diseases in sedentary females. Combined training included aerobic dance, step exercise and resistance training in this study have beneficial effects on serum concentration of high density lipoprotein cholesterol and body fat percent in sedentary females; but were not significant effects on total cholesterol, triglyceride and low density lipoprotein cholesterol. Therefore, more studies need to be done to show the optimum levels of intensity, duration and type of combination training for desirable effects on these risk factors levels.

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1601

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