Journal of Research in Medical and Dental Sciences
2018, Volume 6, Issue 3, Page No: 189-197

Available Online at: www.jrmds.in
eISSN No. 2347-2367: pISSN No. 2347-2545

The Effect of 8 Weeks of Aerobic Training along with Controlled Diet on Body Composition and Cardiovascular Risk Factors in Obese Men

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DOI: 10.5455/jrmds.20186330

ABSTRACT

The alteration of food consumption patterns and mechanical life induced the obesity. Therefore, the prevalence of cardiovascular diseases have been increased. The aim of this study was determined the influence of controlled diet and aerobic exercise on weight loss and cardiovascular risk factors in fat men. Forty obese men were divided randomly into four groups of ten people, includes: training (n=10), diet (n=10), training along with diet (n=10), and controls (n=10). Blood samples, height, weight and thickness of subcutaneous fat measured, before, after 4 weeks and at the end of 8 weeks. For the data analyze, the repeated measures ANOVA test was used. The significance level in all tests was (p<0.05. This research showed that, 8 weeks of regular exercise and intervention in diet separately and combinational, caused impressive decreasing in amount of weight and body fat percentage of subjects in comparison with control group. Also 8 weeks of exercise and intervention in diet separately and combinational could decrease the risk of cardiovascular factors in obese men. Overall, the research findings are significant that the aerobic trainings with intervention in diet (combinational) caused the greatest decrease in amount of weight and body fat percentage of subjects and the risk of cardiovascular factors, improved very much, in comparison with using separately.

Key words: Aerobic Training, Diet, Body Composition, Cardio-Vascular risk factors, Obese Men

HOW TO CITE THIS ARTICLE: Faramarz Yazdani*, Alireza Ramazani, Khalil Allah Moomnikh, Sara Nasiri, The Effect of 8 Weeks of Aerobic Training along with Controlled Diet on Body Composition and Cardiovascular Risk Factors in Obese Men, J Res Med Dent Sci, 2018, 6 (3):189-197, DOI: 10.5455/jrmds.20186330

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Received: 20/02/2018
Accepted: 12/04/2018

INTRODUCTION

In recent years, the changes of the method of life caused the different societies problems that lead to new dimension of diet disorders, such as overweight and obesity [1]. So that, the obesity has been revealed as a serious problem of health. During the development of technology in 21th century and the spread of inactivity, the obesity has been separated in the developing countries. The prevalence of obesity is on process increasingly, and the age obesity has been decreased. The World Health Organization has estimated that there are more than one billion obese adults or having over weight (body mass higher than 27kg/m2) [2]. The metabolic syndrome is a series of metabolic and vascular factors that consists of hypoglycemic, dyslipidemia, high blood pressure and abdomen obesity. The central adiposity and resistance to insulin are two key components of metabolic syndrome that their prevalence increases by aging and having unhealthy lifestyle [3]. The obesity is associated with numerous physical complications such as cardiovascular disease, diabetes, high blood pressure, increases cholesterol and blood triglyceride, arthritis, asthma and the certain types of cancer. The obesity is one of the most

important impact risk factors that leading to lipid disorders eventually [1]. The America Heart Association in 2008 reported that about 43% cause of death due to cardiovascular diseases. It seems that the exercise and regular physical activity can amend these risk factors [5]. The correct nutrition as one of the most important determinants of disease during life is considered. The prevalence of obesity and metabolic diseases related to obesity has grown increasingly in the last two decades and getting obese in the world reached to the critical condition. Plump and the mortality related with it, in the Asian countries is more than other countries [6]. Iran such as many other countries is passing out of the impotence through the malnutrition towards obesity through poor nutrition. The national surveys have been done in different provinces of country have shown that 34 percent of women and 10 percent of men and also more than 28 percent of city inhabitants and 23 percent of rural, have abdominal obesity. The prevalence of obesity and overweight is increasing in an alarming rate in Iran which has been appeared by developing urbanization, changing in lifestyle, food consumption patterns and reducing physical activity [7]. Some investigations show that there is much relationship between the cardiovascular disease and blood fat amount [8]. Lack of optimal health condition and having overweight is other reasons for having cardiovascular disease which by increasing the amount of fat deposits, cause to block the coronary arteries of heart and cause the complication of atherosclerosis eventually [9]. The results of some researches show that the regular physical activity along with proper nutrition, cause to decrease the complications of some risk factors of cardiovascular disease such as: total cholesterol, triglyceride, low-density lipoprotein and the percentage of subcutaneous fat. According to this, exercise and physical activity can cause modification of blood lipids effectively [10, 11]. This effect is done by increasing high-density lipoprotein that has preventer feature and decreasing very low-density lipoprotein, low-density lipoprotein and total cholesterol that cause the complications of atherosclerosis and the fragility of the coronary arteries [11]. Also physical activity cause to decrease the weight of body fat, by decreasing the weight ,the high-density lipoprotein of the blood has been increased, triglycerides and the blood pressure have been diminished and also the process of glucose metabolism towards lipolysis is decreased [12]. The researchers have examined the relationship between physical activity, diet, the aerobic power and the risk factors of the heart coronary for example, Demetrio and colleagues' studying, 9 months of endurance training with moderate intensity in 14 inactive men age 35-55, cause to increase the amount of HDL-C, maximum oxygen consumption (Vo_2max) and decrease LDL-C [13]. Cruise and colleagues showed that 24 weeks of exercising with intensity 50 and 80 percent, didn't create the maximum changes in blood lipid profile [14] and Siahkohian and colleagues showed the same results [15].

Many researches have been done for treatments of obesity. Although most experts of physical education and medical sciences have the same idea about controlling method of diet with along physical activity as the most consistent and scientific method for decreasing weight, but according to the results of researches have been done, it seems that there isn't still a general agreement about the amount of the role of exercise and diet on decreasing the weight [7, 15, 16]. On the other hand, the investigations have been done about the role of kind of nutrition (the same calorie) on the weight changes are very less. This investigation tried to use the FOOD PROCESSER software and 24-hour questionnaire which computed the diet, energy consumption and the energy expenditure of all participants' activities that in this way we can improve the accuracy and reliability of results of such as these investigations [17]. Therefore, this research was seek to find the answer to this question that type of nutrition along with doing regular exercise, what effect does it provide on weight changes and cardiovascular risk factors in obese patients? However, on prescribing the most effective intervention program (Lifestyle changes) and their mechanisms to reduce the risk of cardiovascular factors, the results aren't clear. On the other hand, decreasing the weight cause the diet, may cause to decrease the health risks related to the obesity, but calorie restriction especially in middle-aged and older people, is associated with analysis of skeletal muscle mass. Therefore, adding the physical activity with diet, may control this negative effect of diet. Also it seems that control and intervention in diet (improve its quality) as for Low- calorie diet from the effects of malnutrition has been away and is the most important. So the purpose of this study was examine the effect of 8weeks of selected exercise along with intervention in diet with the goal of improving in quality of Foodstuffs, without

decreasing its calorie, in body composition, risk of cardiovascular factors in obese people.

MATERIALS AND THE METHODS

This study was semi empirical that has been done experimental and laboratory and it suitable for applied. The subjects for this study was obese men. According to initial call, 57 obese and non-athletes and sedentary men, referred to gym and clubs under surveillance of Physical Education Organization, have been volunteered to take part in this study. Therefore, to omit the suspicious cases (illness and so on), establish the caloric balance between consumption energy and required energy of basic metabolic subjects, to determine health, the level of physical activity and 24-hour survey have been given questionnaires. Then, achieve the information about the amount of consumption energy and determine the level of physical activity of the volunteers, we asked them fill in the 24-hour survey of diet and the level of physical activity every day for a week. It should be noted that before spreading the questionnaires, we hold up an orientation class about how to fill in the questionnaires and definition of consumable food units. after collecting and scrutinizing the completed questionnaires, the suspected cases (illness and so on) have been omitted and the samples, the number of 40 healthy obese men (BMI>30) who nearly they were inactive, among the eligible people have been selected by chance and divided into 4 groups: the selected aerobic training (10), controlled diet (10) the selected aerobic training along with controlled diet (10) and control group (10). Before intervention, in order to Homogenization, 4 groups have been compared based on age, height, weight, body mass index (BMI), body fat percentage that there isn't significant differences between them Statistically (Table1). Also after gathering the questionnaire, 24-hour of diet and questionnaire of determining the level of physical activity, all subjects of all groups, at least for one week, for catching the information about the amount of consumption energy, their diet have been analyzed by (2011-food processor) software. The company of this software manufacture with officially licensed by the Ministry of Culture and Islamic Guidance, with the registration number (39196) in 2010/12/12 was formalized and also this software registries in Australia with this brand: Sadaf diet (Ip:64/130). Then between the amount of consumption energy and based energy of all people of groups, the Caloric balance was set. It means that, the amount of extra consumption energy of each person due to their BMI, by reducing the quantity, some of their consumption food were minimized. The low-calorie consumption dessert, consist of: Yogurt, cucumbers, vegetables, raisins, ground walnuts that instead of high calorie food had been replaced. Amount of 500 kilo calorie have been used in two snacks daily (in two groups, diet and exercising along with diet).

It should be noted that all subjects of each four groups of this research, during the eight-week protocol, were in caloric balance as much as possible. For this purpose, all subjects during the research, every week on non-consecutive day, they filled in the 24-hour questionnaires. Also the exercise (in two groups, exercising and exercising along with diet) for eight weeks (every week, 3sessions and each session, 60-70 min) from easy training to difficult training with an intensity of 65-70% of maximum heart rate, have been done. Every training session contains 5 minutes stretching exercises, 10 minutes dynamic warm-up, 40-45 minutes the main training includes: running, periodic varied exercises and circuit training and at the end 5minutes cool down and returning to the initial state was considered. The heart rate was used by the POLAR Rate monitor. To measure the thickness of subcutaneous from KALIPERLAFAYET, and to compute the body fat percentage from seven point formula (Jackson Pollock) chest, abdomen, thighs, triceps, under the scapular, iliac crest and armpits by the percentage of body fat calculator software that made in America LINEAR software company were used. For measuring the cardiovascular risk factors (HDL, TC, TG, LDL) and its possible changes from volunteers, each time the amount of 5 cc blood 48 hours before and 48 hours after the last training session of 4th week and 48 hours after the last training of eighth week were taken. And also for determining the amount of these factors of each blood sample ROCHE kit and COBA INTEGRA 400 device in enzymatic method were used. Statistical Methods: After ensuring the correct distribution data by the Kolmogorov and Smirnov test, for statistics test, from One-way analysis of variance test with repeated measures in the different level of research and for comparing Intergroup, from ANOVA test and if you see the meaningful results from BONFERRONI follow up test were used. The analysis of data at a significance level (P<05/0) with use of SPSS 19 and EXCEL was done.

RESULTS

The results of this research showed that, the controlled diet (Yogurt-cucumber dessert replacement instead of saturated fats, bread and rice) and selected aerobic training (Individually or in combination) caused significantly reduced weight values, mass body index, subcutaneous fat, LDL cholesterol, total cholesterol, triglyceride (TG) and increased the amount of HDL cholesterol, the obese people after 4th week and 48 hours after the exercise (eighth week) rely on pretest became p<05/0. But no significant change was observed on any of these variables in the control group. According to test results intergroup of this research, among the changing of body mass index, body fat percentage, total cholesterol (TC), triglyceride (TG) of different groups of research, there was significant change. So that, according to results of follow up test, in comparison of two groups, there was significant change among all of them. The group which had been done the aerobic training along with controlled diet (in combination) the most decreasing and after that the aerobic training group and at the end the controlled diet group, the least decreasing, they had in body mass, body fat percentage, total cholesterol, triglyceride rely on two different groups (p<05/0). Also, the results of intergroup of this research showed that, between different, LDL cholesterol and HDL cholesterol, there is significant change in obese men in different groups of this research. So that according to the results of follow up test, in comparison of two groups among all of them, except training group with the controlled diet, the significant change was seen. Also here in aerobic training along with controlled diet (in combination) the most change and after that in aerobic group and then in controlled diet rely on two other groups, the least decreasing in above factors (LDL cholesterol, HDL cholesterol) was seen.

Table 1: Comparison of changes in variables after training interventions

Variables	Groups	Pretest	After 4weeks	After 8weeks	p
Weight	control	±10/9193/4	93/31±10/91	93/44±10/88	0/05
	training	93/ 05±9/6	92/27±9/28	91/04±9/58	0/000
	Diet	93±4/75	92/15±4/79	91/81±5/05	0/000
	Training and diet	93/45±11/55	91/88±11/34	89/32±11/11	0/000
BMI	control	3/51±32/16	32/15±3/51	3/51±32/17	0/6
	Training	3/2632/19±	3/2231/92±	31/50±3/34	0/000
	Diet	32/17±0/94	31/88±0/95	31/76±1/02	0/000
	Training and diet	32/18±3/42	31/79±3/37	30/9±3/28	0/000
BFP	Control	32/41±2/84	32/39±2/84	32/41±2/84	0/4
	Training	3/3132/8±	31/27±2/66	29/44±2/65	0/000
	Diet	32/34±0/92	31/16±0/92	30/74±0/91	0/000
	Training and diet	32/43±2/87	30/5±3/77	27/4±4/9	0/000
LDL	Control	135/6±19	134±19/33	136/20±18/97	0/2
	Training	137/3±48/56	130/1±52/35	119/7±60/25	0/000
	Diet	134±11/47	128/4±10/44	120/5±11/72	0/000
	Training and diet	136±16/54	123/2±18/05	103/4±23/5	0/000
HDL	Control	41/30±1/94	40/70±1/88	41/20±2/04	0/2
	Training	41/5±1/17	43/2±1/17	46/4±1/33	0/000
	Diet	41/35±4/81	42/8±3/42	45/7±3/68	0/000
	Training and diet	40/8±1/81	44/5±2/14	48/2±3/33	0/000
TC	Control	218/6±14/44	216/30±14/44	219/50±14/3	0/05
	Training	221/7±30/43	36/85209/3±	186/1±45/42	0/000
	Diet	216/3±18/22	205/4±12/62	199/5±12/3	0/000
	Training and diet	220/8±14/88	195/6±18/16	162/3±18/18	0/000
TG	Control	252/8±43/17	250/7±43/4	253/2±43/37	0/3
	Training	254/2±98/68	242/3±91/6	181/1±78/39	0/000
	Diet	249/1±14/4	238±12/22	227/4±6/18	0/000
	Training and diet	253/8±44/82	221/2±31/7	155±28/5	0/000

Table 2: Pretest and posttest variables difference in different groups

Variables/group	Training and diet	diet	training	P
Weight	-4/13	-1/2	-1/19	0/000
BMI	-1/28	-0/12	-0/69	0/000
BFP	-5/03	-1/16	-3/36	0/000
LDL	-32/6	-13/5	-17/6	0/000
HDL	7/4	4/35	4/9	0/000
TC	-58/5	-16/8	-35/6	0/000
TG	-16/32	-21/7	-73/1	0/000

Table 3: Bonferroni test results to compare the variables changes between groups

variable	group	Compared groups	Mean difference	significant
weight	Training	Diet group	0/82	0/026
		Diet and training group	-2/120	0/000
		Control group	1/970	0/000
	diet	Diet and training group	-2/940	0/000
		Control group	1/150	0/000
	Training and diet	Control group	4/090	0/000
BMI	Training	Diet group	0/28	0/043
		Diet and training group	-0/59	0/023
		Control group	0/67	0/003
	diet	Diet and training group	-0/87	0/015
		Control group	0/39	0/012
	Training and diet	Control group	1/26	0/000
BFP	Training	Diet group	1/76	0/000
		Diet and training group	-1/76	0/015
		Control group	3/35	0/000
	diet	Diet and training group	-3/43	0/000
		Control group	1/59	0/025
	Training and diet	Control group	5/02	0/000
LDL	Training	Diet group	4	0/334
		Diet and training group	-15	0/006
		Control group	17	0/003
	diet	Diet and training group	-19/1	0/000
		Control group	12/9	0/046
	Training and diet	Control group	32	0/000
HDL	Training	Diet group	0/55	0/831
		Diet and training group	-2/5	0/004
		Control group	4/8	0/000
	diet	Diet and training group	-3/05	0/000
		Control group	4/25	0/002
	Training and diet	Control group	7/3	0/000
TC	Training	Diet group	18/8	0/003
		Diet and training group	-22/9	0/002
		Control group	34/7	0/000
	diet	Diet and training group	-41/7	0/000
		Control group	15/9	0/000
	Training and diet	Control group	57/6	0/000
TG	Training	Diet group	51/4	0/013
		Diet and training group	-25/7	0/025
		Control group	72/7	0/000
	diet	Diet and training group	-77/1	0/001
		Control group	21/3	0/000
	Training and diet	Control group	98/4	0/000

DISCUSSION

The present study aimed to investigate the effects of "selected aerobic training", "controlled diet" and "aerobic training with controlled diet" in body composition changes, TC, HDL, LDL, BFP, BMI, TG and cardiovascular risk factors in obese men. First, we studied the effect of each of the three methods: "aerobic training", "controlled diet" and the simultaneous combination of the two, on the weight loss criteria and in the following evaluate the effect of the blood lipid profiles changes will be referred. The results showed that selected aerobic training, reduces a significant amount of weight, BMI and subcutaneous fat in obese subjects after 4 weeks of exercise and 48 hours after exercise than it was before the start of exercise. The results of the present study were consistent with Gharouni et al [14], Dehghanpoor et al [7]. Gokee-LaRose et al [9], Wing et al [17], and Munoz et al [18] to reduce weight, body mass index and body fat percentage, followed by aerobic exercise. Many community-based studies showed a positive association between physical activity or diet alone and weight loss [19]. Mikelsen et al mentioned in their study that the 6 months period of exercise resulted in a decrease in 6.1 kg total body mass. This reduction results in a 6.2 kg reduction in body fat and increase in 1kilogram muscle mass [20]. Various studies show

that use the appropriate training program in overweight people for losing weight in the long term, better than programs that rely only on diet. So the proper use of the scientific method and facilitate adjustment and maintain proper levels of physical activity in weight control is critical. On the other hand, results of this study did not consistent with the results of the Jakicic et al. It seems that the reason is related to the duration and intensity of exercise. Jakicic et la suggest that although 30 minutes of moderate-intensity physical activity has many benefits for people's health but this amount of activity is not enough to control and weight loss [21]. In the past, the main cause of obesity and overweight were poor nutritional habits but recent evidence shows that physical inactivity compared to feeding is a more important factor for obesity [22]. Intra-abdominal adipose tissue is a most active storage despite the high rate of intra-abdominal fat lipolysis activity; it is unlikely which an important contribution to provide fatty acids for muscle oxidation during exercise. So often fatty acids into the bloodstream that are derived from subcutaneous adipose tissue [23]. During low to moderate-intensity aerobic exercise at 25-65 Vo_2max, plasma epinephrine concentration is 50- 300 pg/ml, this concentration of catecholamine's stimulate beta-adrenergic receptors in skeletal muscle and vascular of adipose tissue. Thus, increases blood flow of these tissues [20]. But in concentrations of more than 300 pg/ml of epinephrine, which is due to higher intensity aerobic activity decreases fatty acids release into the blood, correlate with the vasoconstriction caused by alpha-adrenergic receptor stimulating in fat cells which is related to in high concentrations of plasma catecholamine.

Thus, high concentrations of catecholamine reduce blood flow of adipose tissue and the release of fatty acids into blood circulation [24]. The results showed that controlled diet (replace dessert yogurt- cucumber instead of saturated fats, rice), significantly reduced weight, BMI and subcutaneous fat in obese subjects after the 4 weeks of physical activity and 48 hours after exercise than before the exercise. Mirmiran et al 2005) (223 men and 239 healthy women), showed that BMI was higher in men and women who ate less dairy products [23]. Zemel et al investigate the effects of dairy foods on body composition in obese subjects. In this study, 34 obese subjects consumed low calcium regimes that contain low dairy (less than one serving per day) and high dairy (three servings per day or 1200 mg of calcium per day) for 24 weeks without changes in other nutrients [25], in another study 29 obese person divided into two groups: first group low dairy diet (500- calorie, less than one serving per day), second group high dairy (500- calorie, three servings per day or 1200 mg of calcium per day). In firs experiment results showed that people who consumed more dairy products lost 16.2 kg more fat this change wasn't observed in the group who had less dairy. In the second experiment, both groups showed weight loss but those who consume more dairy products had been twice [26]. The results of this study showed that isocaloric diets but different dairy (calcium) can show different weight loss effects. Other studies show that only by increasing calcium diet in obese patients for a year we will be able reduce their body weight about 5 kg [4]. Other studies also have proven long-term consumption of high calcium diets to lose weight and fat mass [27]. The results also confirmed the validity of the findings, as dietary intervention (replacement of dessert cucumbers) in the group "diet" - by balancing caloric result in a significant reduction in weight, BMI and percentage of subcutaneous fat of this group. It seems that calcium has important role in regulating energy metabolism and obesity. During the period in which energy intake is high, high-calcium diets will prevent the accumulation of body fat. Calcium in energy-restricted diet involved in fat degradation and thus plays an important role in reducing body fat and weight control. Calcium in dairy foods has more effect in preventing the accumulation of body fat and weight gain compared with the pharmaceutical calcium [28]. Studies show that animal protein compared to carbohydrates and vegetable protein, increase 24-hour energy consumption by 2- 3 % [24]. Thus it is possible weight loss in "diet" group is due to consumption of animal proteins (yogurt protein). Among the food, dairy (especially yogurt) is a rich source of calcium and animal protein that contain these substances is equivalent to medicine complementary. According to the study, "aerobic training with controlled diet" had most effective weight loss (4.08 kg), BMI (1.32 kg / m^4) and body fat percentage (5.03 percent). The results suggest that modifying diet and increasing moderate intensity of physical activity are key role in reducing the weight and consequently the efficient management of diseases related to obesity. Base on the our findings "aerobic training" Compared with the control group, improves blood fat effectively so that the amount of TC, HDL, TG had a significant decrease and HDL

levels increased significantly in the experimental group than the control group. Dimitriou et al (2007), similarly reported a significant reduction in TC, LDL and TG plasma and a significant increase in HDL levels after moderate intensity exercise in 35 - 55 years-inactivity old men [13]. Boardley et al (2001), examined the effect of 20 weeks of aerobic exercise at 75% Vo2max on blood lipoprotein levels in 17 -65 years old men and women and represent a significant reduction in LDL and TG blood levels [22]. Kim et al (2006) showed a significant reduction in body weight and significantly increased of HDL and LDL levels and Plasma TG levels also unchanged after regularly aerobic and muscle endurance exercises [28]. It was found that changes in lipids and lipoproteins are dependent on lipoprotein lipase activity, is a key enzyme in the catabolism of triglyceride-rich lipoproteins, It is thought that the enzyme accelerates transfer of lipids of chylomicrons and VLDL to HDL. LPL activity will be determined by reducing serum TG levels after a workout. This reduction can increase the amount of HDL [27]. Other mechanisms could be to increase HDL production through increased in LCAT activity and lower HDL by reducing hepatic lipase activity induced by exercise [29].

The results of this study on the impact of "dietary intervention" (replacement of our desserts cucumber instead of saturated fat and rice) showed that the amount of TC, LDL and TG of control diet group significantly decreased than the control group conversely, HDL levels showed a significant increase. The effect of the nutritional quality on the blood lipid profile not examine in lot of researches. The findings of studies have shown that lifestyle modification such as eating more fruits and vegetables reduces the cardiovascular risk factors. In this regard Burke et al (2007), randomized controlled trial in 241 patients concluded that the diet is low in sodium and high value of fruits, vegetables and fish is along with increased physical activity reduce the risk factors of cardiovascular disease [4]. In most studies that substitute walnuts as part of a reduced fat diet, total cholesterol and LDL reduction has been reported. Munoz et al (2000) [18], Zambon et al (2001) [19], Showed walnut hypercholesterolemia effect in men and women with high cholesterol and consume 48 and 50 gr walnut respectively. In the present study, the amount of HDL in "diet" group increased significantly may be related to added walnuts to dietary. Walnut fatty acid composition shows that the possibility of reducing serum cholesterol by eating. About 58% of walnut weight consists of fat and with a high unsaturated than saturated fat. 12% of walnut fat is linoleic acid, so Walnut has omega-3 fatty acid that does not add cholesterol to dietary [30]. It seems that ALA acid found in walnuts inhibit the synthesis of hepatic LDL, avoid turning VLDL to LDL, increase the activity of LDL receptors and reducing the synthesis of LDL, increase particle LDL binding affinity to LDL receptor in G2 liver cells reduces LDL levels in the blood [25]. On the other hand a diet that is poor in fiber stays in the gut longer time and raises enzymes effect on fat absorption. Insoluble fiber, fruit and vegetable intake increases the excretion of fat along with stool. Vegetable fiber intake changes the absorption of dietary fat and of total energy, monounsaturated fatty acids which ultimately leads to lower levels of cholesterol and other blood lipids.According to the composition of our desserts cucumber vegetables, cucumber and walnut powder is used and the importance of vegetables, fiber and monounsaturated fatty acids and yogurt, subjects in "controlled diet" group expected changes in weight and blood lipid profile of this group, is resulting from the use of desserts and cucumbers. According to the study, the largest decrease in TC, LDL and TG was in "exercise with controlled diet" group respectively 4.48, 9.32and 8.89 mg/dl, and the greatest increase in HDL is also related to this group 96.7mg/dl). Clinical and epidemiological research suggest, using a balanced low-calorie diet and increased physical activity in obesity management [29]. On the other hand, diet-induced weight loss may cause health risks associated with obesity as calorie restriction, especially in middle-aged and older accompanied by atrophy of skeletal muscle mass. So adding a physical activity with diet may inhibit this negative effect.

CONCLUSION

The results show that with lifestyle modification through improved nutritional quality and replacing polyunsaturated fats instead of saturated fats, consumption of low-fat dairy products and vegetables in the diet along with regular aerobic exercise can be brought to ideal weight and effectively improves blood lipid levels and prevented the occurrence of cardiovascular risk factors in obese men. Generally, this research can recommend, regular exercise programs with proper nutritional guidelines to health centers community.

Acknowledgements
We really appreciate the Faculty of Physical Education, University of Shahid Rajaee which provides the possibility of carrying out this thesis and students whom helped us as subjects in this study.

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