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The Effect of High-Intensity Interval Training Program Along with Consumption of *Achillia millefolium* on Blood Triglyceride on Non-Athlete Women

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Abstract

High levels of triglyceride in the body lead to increased triglyceride levels in the blood and fat storage and therefore cause obesity. This state, also known as "hypertriglyceridemia," is also associated with an increased risk of other diseases such as cardiovascular disease. Medicinal plants such as Achillia and aerobic exercise, each had desirable effects on reducing levels of harmful blood lipids. It seems that exercise in sync with Achillia can have more effect on reducing harmful blood lipids. In this study, subjects were randomly divided into four groups of 5 people: 1-control group 2-Achillia 3-HIIT group, 4-Achillia group simultaneously with HIIT. The Achillia plant was prepared by the researcher and given to each participant in a separate 4-gram packet for 24 times. Group 2 and 4 boil their medicinal plants in 150 ccs of water for 15-20 minutes and drink three times a week. Group 3 and group 4 were obliged to perform 4-6 replications of the 30-second Wingate test on the cycling Ergometer with maximum effort. The number of Wingate test performances increased during each training week and if the subjects could perform three replications in two consecutive sessions with the specified speed and load, 10% of the load would be added. Recovery between each replication was considered four minutes of passive rest. The total activity time for this training protocol was considered 20 to 40 minutes. In this study, Achiliia consumption had not a significant effect on blood triglyceride levels. Similar results were also observed in HIIT and Achillia+ HIIT groups.

Keywords: *Achillia millefolium*; Atherosclerotic risk factors; Blood triglyceride; HIIT; Non-athlete Women

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Introduction

Triglyceride is the most common type of fat that digests in the body. This type of fat can enter the body through food, or it can be produced by the body. Typically, triglycerides provide energy for the body's cells by circulating blood flow and are stored as an emergency source of energy in the body as a fat source of energy. If there is a very high level of triglyceride in the body, the amount of triglyceride in the blood and fat storage increases and therefore causes obesity. This state, also known as "hypertriglyceridemia," is also associated with an increased risk of other diseases such as cardiovascular disease [1]. Triglycerides are chemical compounds that provide the energy needed for body metabolism. Triglycerides are the most common form of digested fat in the body. These fats are the main elements in vegetable oils and animal fats. High triglyceride levels put the individual at risk of atherosclerosis. Triglyceride levels and cholesterol levels in the blood are measured to perform screening for this risk. Normal triglyceride levels in the blood are less than 150 mg/dl (mg/dL). The boundary level is between 150-200 mg/dL. High levels of triglyceride (more than 200 mg/dL) are associated with increased risk of atherosclerosis and coronary artery disease and therefore associated with myocardial infarction risk [2].

Increased triglyceride levels in the blood are known in the medical term as "hypertriglyceridemia." Diseases that can lead to increased triglyceride levels include uncontrolled diabetes, renal disease, alcoholism, hypo-thyroidism, liver diseases such as obesity, some drugs (e.g., contraceptive pills, estrogen, beta-blockers, immunosuppressive drugs), genetic disorders of fat metabolism. Returning triglyceride levels to normal can reduce the risk of heart attack, stroke, and peripheral vascular disease. Controlling High triglyceride and high cholesterol is a lifelong challenge for individuals. Healthy lifestyles include proper nutrition, regular exercise, smoking cessation, and weight loss. This may be the only thing needed, but some people, besides, need medication to reduce triglyceride levels in the blood [1].

Exercise, avoiding alcohol consumption, fatty foods, and limiting calories is the main treatment for high blood triglyceride levels. If blood triglyceride levels are higher than 400 mg/dl, triglyceride reducing drugs are used [3].

It has been observed that endurance training significantly increased high-density lipoprotein and decreased low-density lipoprotein and triglyceride in both men and women after one period of training and also lipid profile in endurance athletes was 20-30% lower than in the inactive individual group [2].

In recent decades, sports science researchers have coined a new method of exercise selected by combining speed exercises and rotational exercises called intense rotational exercises that improve both aerobic and anaerobic systems. High-Intensity Interval Training (HIIT) is called relatively short periods of intensity with the close intensity of the VO2 peak. Due to the intensity of exercises, a HIIT effort may take several seconds to several minutes, when different stages are separated by a few minutes of rest or low-intensity activity [4]. The mechanism of these exercises is that a HIIT method increases the concentration of energy substrate and enzyme activity associated with anaerobic metabolism and then by increasing the severe repetitions and its implementation to Intermittent face with recovery between the exercise stages changed the need for muscle cell and metabolic pathways in a way that simultaneously involved aerobic and anaerobic energy generation devices in the regeneration of adenosine Triphosphate does. Therefore, using these exercises, a wide range of metabolic and functional adaptations can be expected [5].

Pieces of evidence show that if recovery time decreases between severe parts, the use of glucose for energy supply decreases, and therefore aerobic metabolism increases to compensate for this energy reduction. There is little recognition about the effects of HIIT, but the evidence is increasing, this type of exercise, compared to the continuous exercises with moderate intensity, despite less time and less overall volume of exercise, causes more physiological stimulation [6]. Although high volumes of traditional aerobic exercise reduce the risk of cardiovascular disease and blood triglyceride levels, they need more time to do so. Studies showed that in adults, six weeks of HIIT compared to traditional endurance training led to similar metabolic adjustment. Recent research showed that, compared to moderate-intensity continuous exercise, HIIT can help improve more or equal physical health and cardiovascular health [7].

On the other hand, it is possible that the simultaneous use of some medicinal plants along with physical activity can have a positive effect on decreasing blood lipid levels [8].

Achillia is a multi-year plant. This plant is native to Asia, Europe, and North America and is cultivated in many parts of the world with temperate climates. In Iran, the cultivation of this plant has been reported in Alborz, Damavand, Polour, Gachsar, Azerbaijan Candovan, Urmia, and Neyriz. The confirmed applications of this plant include removing dyspepsia problems such as mild gastrointestinal spasms, analgating for liver diseases, and wound healing. According to the researches, this plant is used for hemorrhoid bleeding, menstrual problems, and fixation of sweats [9].

This plant is also a part of some combination drugs used to solve gall bladder and its channels. Aemothers are used in combination with other plants as laxatives and cough fixers and relieve heart problems and varicose veins. It seems that these plants have antioxidant and anti-inflammatory effects. In this study, the effects of hypolipidemia in Aemoetic plants return to flavonoids and sesquiterpenes in alcoholic aqueous extract of this plant [8]. Considering the importance of reducing blood triglyceride levels in the prevention of diseases leading to mortality and increasing life expectancy and quality of life of females and due to the decreasing trend of useful time that girls have for physical activity and increasing. They spend their health level for different reasons, and also intending to achieve natural compounds that can regulate lipid abnormalities such as triglycerides and have fewer side effects and with. This study was conducted to determine the effect of HIIT and achillea plant consumption on women's increased triglyceride levels simultaneously to determine the effect of HIIT and medicinal plant on women.

Method

The volunteers were 40 non-athlete women with blood triglyceride above 200 mg/dl with a mean age of 35-50 years. Among these volunteers, 20 patients were randomly selected and participated in this study. The inclusion criteria were: having triglyceride above 200 mg/dl, not having a history of continuous exercise in the past year, not taking specific supplements or medicines in the past three months, smoking, and no heart disease (or Familial history of heart disease), thyroid, diabetes, and gastrointestinal disorders. For this purpose, participants completed the medical records form and the PAR_Q physical activity questionnaire for screening and all subjects were ranked low risk based on the ACSM ranking of the American Sports Medicine.

During a briefing, the research objectives and programs were explained by mentioning the possible risks to the participants and all participants signed the consent of the participants. All points related to herbal medicine and physical activity that subjects should have observed during the study period were provided to them. All subjects were given the same cups for preparing and drinking herbal medicine.

Blood samples were collected from the left-hand vein of each case 48 hours before the exercise and 48 hours after the last training session, in a sitting position, and resting after twelve hours of fasting. All samples were collected from 7:30 am to 9 am in a medical laboratory.

Triglyceride was measured by the enzyme method using Pars Azmoon company kit. All measurements were done automatically by AKyon30 Abbott USA. Truca IU standards were used for calibration and TrulabP and TrurabN kit of the Pars Azmoon Company were used for calibration [10]. Therefore, the use of these formulas was not prevented because all subjects had triglyceride levels of less than 400 mg/dl [2]. Achillia was prepared from one of the farms of medicinal plants in Urmia and distributed among the subjects and the instructions for preparing them were provided to the subjects in printed form. Each subject was obliged to use Achillia three times a week, which informed the researcher through the message.

After each training session, data were recorded by the researcher and collected for final evaluation. The training program lasted eight weeks. The exercise consisted of 4-6 replications of a 30-second Vingit test on the cycling Ergometer with maximum effort. The number of Wingate test performances increased every week and if the subjects could perform three replications in two consecutive sessions at the specified speed and load, 10% of the load would be added. Recovery time between each replicate was considered four minutes of passive rest. The total activity time was considered 20-40 minutes for this

Table 1: The results of descriptive information about the four groups, including mean, standard deviation, median.

Group	Control	Achillia	HIIT	HIIT+Achillia
SD±mean	277.80±28.20	286.20±35.67	282±54.36	298.80±48.30
Middle	282 (54.50)	294 (50.50)	264 (92)	302 (70)
P-Value	0.783	0.873	0.873	0.873

Table 2: The results of the subjects for blood triglyceride levels after training and Achillia consumption.

Group	Control	Achillia	HIIT	HIIT+Achillia
SD±mean	272.60±29.05	278±32.33	276±55.06	290.80±49.32
Middle	280 (56.50)	290 (44)	262 (91)	293 (71.50)

Table 3: Comparison table of triglyceride blood level in control group with other groups in post-test.

Group	B	SE	90%CI	P-Value
LDL-C_before	0.99	0.02	0.95, 1.04	0.001>
Control_Achillia	-2.97	2.28	-7.82, 1.88	0.212
Control_HIIT	-0.97	2.27	-5.63, 4.06	0.734
Control_Achillia+ HIIT	-2.73	2.31	-7.66, 2.20	0.2560

B= Unstandardized coefficient; SE= Standard Error; CI= Confidence Interval.

Table 4: Containing two-by-two group comparison with triglyceride levels.

Group	B	SE	95%CI	P-Value
Achillia_HIIT	2.19	2.27	-2.66, 7.03	0.3510
Achillia_HIIT+Achillia	0.24	2.29	-4.63, 5.11	0.917
HIIT_HIIT+Achillia	2.97	2.28	-1.88, 7.82	0.212

training method. In this method, subjects were asked to perform the maximum effort. At the end of each training session, subjects were asked to cool their body for 5 minutes by stretching and walking [3].

24 packets of 4 g Achillia plants were prepared by the researcher. Each person was obliged to boil and drink a packet of Achillia plant in 150 ccs of water 3 times a week for 6 weeks [9].

To interpret the results of the study, in quantitative variables, the mean and median were used to describe the data center and standard deviation and inter-chart range were used to describe the data distribution. Wilcoxon, Chromitdal-Wallis, and ANOVA tests were used for data analysis. The normality of data was done using the Shapirvillek test and Q-Q chart. Covariance analysis was used to analyze the data in a multivariate way (to compare the groups with control of variables before treatment). All analysis was performed using SPSS version 22.

Results

Demographic characteristics of the subjects were assessed for antriglyceride level. As can be seen in pre-test stage, none of the groups were significant at *P*-Value=0.05, which is addressed in Table 1.

The results of the subjects are presented for triglyceride level after training and Achillia consumption in the Table 2.

As can be seen in Table 3, in post-test stage, the three groups did not show any significant difference compared to the blood levels of triglyceride in the groups. The significance level was considered to be 0.05.

As can be observed in Table 4, covariance analysis was used in post-test compared to blood levels of triglyceride in the groups and covariance analysis was used and at the significant level of 0.05, all three groups did not show any significant difference.

Conclusion

The aim of this study was to investigate the effect of Achillia plant consumption simultaneously with HIIT exercise on increased triglyceride levels in middle-aged women. During the studies, 4 g Achillia alone 3 times a week for 8 weeks had no significant effect on blood triglyceride above 200 mg/dL compared to its blood levels in pre-test. Also, HIIT for 8 weeks, according to protocol did not significantly reduce blood triglyceride levels above 200 and finally, statistical studies on the results of this study, Achillia plant consumption along with HIIT had no significant effect on blood triglyceride above 200 mg/dL.

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