

## Effect of One Month of Fasting and Jogging on Fasting Blood Glucose and Cardiovascular Risk Factors in Trained People

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### Abstract:

*The aim of this study was to evaluate one month of fasting and exercise on blood sugar, cholesterol, triglycerides, HDL and LDL of trained Muslim men.*

*Methods: In this study, 24 healthy young trained men randomly were selected in two groups, experimental ( $n = 12$ , age  $25/42 \pm 2/35$ ) and control ( $n = 12$ , age  $26/45 \pm 3/01$ ). Blood samples were taken two times before the start of fasting and after 4 weeks of Ramadan fasting. The Jogging program for the experimental group was three times a week for four weeks. The dependent and independent *t*-test was used for evaluation.*

*Results: Results showed that blood sugar levels in the experimental and control group after fasting have faced a decrease due to the fasting but there was more decreased level of sugar in the experimental group than in the control group due to Jogging. The results also showed that one month of fasting and Jogging could decrease triglyceride levels in experimental group in comparison with the control group. Also results indicate significant increase in the levels of HDL in the experimental group as compared with the control group and a greatest reduction on blood LDL in the experimental group than in the control group.*

*Conclusion: It seems that the metabolic response to exercise and fasting during Ramadan has a strongly positive effect on the blood sugar and on TG, LDL, HDL.*

**Key words:** Jogging exercise, fasting, triglycerides, HDL, LDL

## Introduction

Ramadan is the holiest month in Islam. On the basis of this, all Muslims fast during the month of Ramadan. Muslims abstain from eating and drinking from morning to evening, and usually they take two main meals: the morning meal (prior to the call to Morning Prayer) and the evening meal (after the call to evening prayers). The various causes can be seen in different studies. [1] Changes in temperature and changes in physiological variables during sleep and wakefulness can be effective for an easy fast [2].

The effect of Ramadan fasting on lipid profile shown that serum cholesterol was reduced on the first day and the last day of Ramadan [3]. Some studies have shown that weight reduction is associated with reduced fasting blood cholesterol [4]. Others have shown no change on weight [5, 4]. The results of some studies show decreased high-density lipoprotein [6] After fasting during Ramadan, the results of other studies show an increase [7, 4] or no change in the seventh day and the last day of Ramadan [8]. Based on the findings of studies of low density lipoprotein in Ramadan, triglyceride levels increased but some other studies do not show a change [6]. The difference in these results could be due to differences in lifestyle, including diet and exercise [9]. There is evidence that exercise and physical activity increase high density lipoprotein and decrease low density lipoprotein [10]. Also studies have shown that dietary habits may also influence the level of lipids and lipoproteins [11].

Recently a study has showed that triglycerides and cholesterol levels have decreased after fasting but after the Ramadan month, these values go back to the initial state [12].

The most feared complications for doing exercise among fasting months is the lowering energy resources during various activities or working. So they try not to fast or reduce the

severity and duration of exercise especially among professional as this leads to loss.

Considering the important role of cardiovascular and blood risk factors in many professional athletes that continue to exercise during fasting and lack of studies on the effect of the training program with fasting Ramadan, the present study investigated the effects of Jogging exercise on the level of glucose, LDL, HDL and triglyceride in people who fast during Ramadan.

## **Materials and Methods**

The quasi-experimental study has been done in the summer of 2013 on people who regularly participate in Borujerd public sports. The subjects were 24 healthy male volunteers; participants were randomly assigned to two groups: group 1 (n = 12), which combined exercise with fasting and group 2 (n = 12) – control, only fasting. All the subjects consented to participate in jogging activities during the month of Ramadan.

Height, weight and blood sample data (HDL, LDL, cholesterol, triglycerides, fasting glucose) of subjects were collected before the start of the study and after the twenty-ninth day of holy month of Ramadan. The present research was conducted under supervision and the training sessions included five minute warm up, 3200 meters run and ten minutes cool down. Exercise training program lasted four weeks, three times per week, training time of one hour before sunset (Iftar meal).

For the analysis of the statistical results SPSS version 16 has been used. T-test was used to compare differences between the two groups.

## Results

Age, height and weight of subjects in both groups were compared using independent t-test; there was no difference between the two groups, as shown in Table 1.

Post test	Pre test		Variable
mean and standard deviation	mean and standard deviation		
2/01±68/15	2/18±72/35	Experimental	Weight (kg)
2/16±70/25	2/25±73/25	Control	
2/35±42/25	2/35±42/25	Experimental	Age(year)
3/01±45/6	3/01±45/6	Control	
2/87±175/33	2/87±175/33	Experimental	Height (cm)
2/93±175/06	2/93±175/06	Control	

**Table 1**

Changes in fasting blood sugar, triglycerides, total cholesterol, HDL and LDL were measured two times (one day before the start of Ramadan and the twenty-ninth day of the Ramadan month) and are shown in Table 2.

Post test	Pre test	Group	Variable
1/0±85	8/8±90	Experimental	Fasting blood glucose
4/0±86	5/0±88	Control	
2/0±145	16/0±185	Experimental	Triglyceride
3/0±163	2/0±190	Control	
8/8±192	2/0±180	Experimental	Total cholesterol
2/0±184	3/0±781	Control	
3/0±62	3/0±48	Experimental	HDL
2/0±60	2/0±58	Control	
3/3±89	3/0±98	Experimental	LDL
5/0±90	5/0±94	Control	

**Table 2**

Comparison of the experimental and control groups showed that fasting glucose levels in both experimental and control groups are lower and the loss is due to the intervention in the experimental group as compared to the control group. The results also show that the one month of fasting and Jogging exercise decreased triglycerides in both groups but more

effective in the experimental group than in the control group. The HDL levels also increased in the two groups but these were more affected in the experimental group than in the control group, at the end of a month of fasting and exercise. The blood LDL levels decreased more in the experimental group compared with the control group.

## **Discussion and Conclusion**

According to the Islamic law, from sunrise to sunset, during Ramadan, Muslims abstain from eating, drinking and smoking. Eating, drinking and smoking are not allowed under any circumstances. Many of the Muslim population feel low energy during this month and would prefer to rest all time, yet a few of them like to continue their exercise during Ramadan. This study showed that physical activity was associated with reduced blood sugar, lowering LDL, lowering triglycerides and increase in HDL levels. Physical activity during Ramadan may reduce the proportion of low density lipoprotein LDL. Probably decrease in blood glucose could reduce triglyceride levels by the decreased release of Glycerol and also the decrease of glycolysis and finally the reduction of acetyl-Co.A and fatty acid that both can reduce triglycerides, therefore the results of the study showing a low density lipoprotein. The increase in glucose metabolism during exercise also could deplete stored glycogen by more glycogenesis and increased lipolysis and decreased fatty acid. In general, the mechanism of interaction between exercise and fasting can increase more the effect of Ramadan fasting. These changes are more pronounced in the experimental group than in the control group, and metabolic responses to fasting seems close the interactive responses to exercise and fasting.

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