



## The Effect of Ramadan Fast on Serum liver Enzyme Levels in Iranian Adults

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### Abstract

**Background & Aims:** Ramadan fasting has numerous health benefits. Nevertheless, its beneficial role on liver function was evaluated by limited studies and different findings were recorded. So, this study aimed to define the effect of Ramadan Fasting on liver enzyme levels in Iranian healthy individuals.

**Materials & Methods:** Seventy healthy adult men without history of liver diseases and current usage of any medication affecting the liver were involved in the present survey. Anthropometric parameters and liver function tests were measured before and after Ramadan. The biochemical parameters including liver enzymes Aspartate aminotransferase (ALT), Alanine Aminotransferase (ALT) and Alkaline Phosphatase (ALP) were evaluated before and after Ramadan by the standard enzymatic method.

**Results:** A decrease was observed in mean level of all liver enzymes. Indeed, the significant mean decrease in the ALT values in the post-Ramadan analyses was observed in the pre-Ramadan ( $p < 0.01$ ). The values of ALP and AST decreased at the end of the study in the post-Ramadan group versus pre-Ramadan, but mean of the changes did not reach a significant level.

**Conclusion:** The changes in the concentrations of liver enzymes showed remarkable differences between groups. These data confirmed that Ramadan Fasting improved liver function in healthy adults and might be valuable in the management of liver function.

**Keywords:** Ramadan, Aspartate aminotransferase, Alanine Aminotransferase, Alkaline Phosphatase, Iran

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### Introduction

The Ramadan fast is a religious obligation which is practiced by numerous healthy Muslims. The holy

month of Ramadan is the ninth month of the Islamic hegira calendar. Meanwhile, the lunar year comprises 354 days, Ramadan initiates 11 or sporadically 12 days

before each solar year and is positioned in all of the seasons. This religious fasting has a diverse physiological impact on the body health (1, 2).

Throughout this lunar-based month, healthy Muslims as a religious duty refrain from eating or drinking from predawn to sunset. These individuals will eat after sunset and again before dawn (3). Numerous investigations have exhibited advantages of Ramadan fasting toward various disorders (4). It has been reported that fasting during Ramadan has been associated with some beneficial effects on the health-related parameters including many biochemical indicators that are related to metabolic disorders (5-8).

Certainly, Ramadan may provide an opportunity to reduce the frequency and quantity of food-intake and might be related to probable health benefits comprising favorable metabolic changes (9, 10).

Restricting Calorie has a favorable effect on cardiovascular health, glucose regulatory function, and weight loss and helps reduce oxidative stress. In a previous study, the role of fasting therapy on liver enzymes, among healthy persons was verified (11).

In this regard, liver function tests were evaluated by limited studies and different findings were recorded. Certain investigations have exhibited no change in aspartate transaminase (AST) and alanine transaminase (ALT), but others have shown a reduction in AST and ALT levels (2, 10). Since a large number of Muslims fast during the holy month of Ramadan every year, this study was designed and aimed to assess the effect of Ramadan fast on the liver function in Iranian healthy adults.

## Materials & methods

The present study was performed during the holy month Ramadan in 2012 (July-August). Healthy male adults without a history of liver diseases and current usage of any medication affecting the liver were involved in the present survey. The exclusion criteria comprised of any liver diseases including

hyperbilirubinemia, high levels of Aspartate aminotransferase, alanine aminotransferase, and alkaline phosphatase, diabetes mellitus, cardiovascular diseases, obesity (BMI>30), and any other known disease. All the participants were interviewed and the demographic characteristics and their medical history were collected. All of the subjects fasted for at least 25 days in Ramadan and had Iftar and sahur meals. Of 97 healthy participants, only 70 subjects completed the study procedures and examinations.

Blood samples were taken from each subject after about 12 hours of fasting, one day before Ramadan at baseline and also at 2-3 days left to the end of the Ramadan. Serum was stored at  $-20^{\circ}\text{C}$  after separation by centrifuge at 3000 rpm for 10 min. All serums were thawed at the examination day and were tested in the same run. Total serum ALT, AST, and ALP concentrations were measured using the standard enzymatic method on an automatic analyzer (Pars Azmun Kits, Iran).

The results are represented as the mean  $\pm$  SD. We utilized Student's t-test to compare the means between parameters. For determining the relationship between the studied parameters, Pearson's correlation coefficient was calculated. P-value less than 0.01 was considered to be significant. All statistical analyses were carried out by Statistical Package for the Social Sciences (SPSS) version 12.0 (SPSS Inc., Chicago, IL, USA).

## Results

Ninety-seven subjects entered the study. Merely 70 subjects completed the entire study procedures and biochemical examinations.

After evaluating the biochemical parameters, data indicated that by the end of Ramadan there were significant improvements in the mean level of liver enzymes. The mean  $\pm$ SD values of ALT, AST, and ALP in the pre and post-Ramadan assessment are presented in Table 1.

**Table 1:** Comparison of Mean AST, ALT and ALP levels, before Ramadan (pre-Ramadan), during Ramadan, and after Ramadan (post-Ramadan) (n=70).

Biochemical parameters	Mean $\pm$ Std. Deviation U/L	p-value
ALT(after Ramadan fasting)	14.74 $\pm$ 7.5	p<0.01
ALT(before Ramadan fasting)	25.51 $\pm$ 16.0	
AST(after Ramadan fasting)	23.6 $\pm$ 10.2	P>0.01
AST(before Ramadan fasting)	24.80 $\pm$ 10.4	
ALP(after Ramadan fasting)	126.95 $\pm$ 61.8	P>0.01
ALP(before Ramadan fasting)	178.04 $\pm$ 54.72	

Based on our results, there were reduced significant levels of ALT in post-Ramadan analysis compared to pre-Ramadan. Also, Serum ALP and AST levels decreased during Ramadan (Table 1), but these changes

were not significant. As presented in Table 2, there were positive correlations between ALT and AST, AST and ALP, ALT, and ALP after Ramadan fasting analysis (p<0.01).

**Table 2:** Pearson Correlations analysis of ALT, AST, and ALP

		man.AST	man.ALT	man.ALP
man.AST	Pearson Correlation	1	.868**	.366**
	Sig. (2-tailed)		.000	.002
	N	70	70	70
man.ALT	Pearson Correlation	.868**	1	.338**
	Sig. (2-tailed)	.000		.004
	N	70	70	70
man.ALP	Pearson Correlation	.366**	.338**	1
	Sig. (2-tailed)	.002	.004	
	N	70	70	70

\*\* . Correlation is significant at the 0.01 level (2-tailed).

## Discussion

Ramadan model of intermittent fasting varies from other intermittent fasting models. In healthy subjects, Ramadan fasting had favorable impacts on body weight and body metabolism (12). Data shows that body composition changes that are associated with Ramadan fasting vary depending on demographic variables (13). Though the Ramadan metabolic model is complex, there is potential for using this month as an altered body metabolism model which provided the fasting as a regulator of metabolism (14). Related studies showed the altered levels of liver enzymes after Ramadan fasting (1,2). Since the Ramadan fasting has diverse

physiological effects on the body and regarding this issue that numerous Muslims fast every year, this study was conducted to evaluate the impacts of the Ramadan fasting on liver enzymes(1). So in this survey, we evaluated the AST, ALT, and ALP levels in post-Ramadan status in comparison to pre-Ramadan. Our findings showed the decreased levels of studied enzymes after Ramadan fasting.

A similar research which was conducted by Nasiri et al. (1) showed a decrease in the level of ALT and ALP after Ramadan fasting in healthy subjects in comparison to baseline levels. This report was in accordance with our findings. Also, another study (15), stated a decrease

in ALT, AST, and ALP in cirrhotic patients after Ramadan fasting, and their findings were similar to results of the present survey.

The altered levels of liver enzymes may be associated with variations in cytokine levels and alterations in circadian rhythms of hormones as a result of Ramadan fasting (1).

We found that Ramadan fasting had a significant effect on the liver function in healthy subjects.

### Conflict of interest

The authors have no conflict of interest in this study.

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