

Effects of Ramadan Fasting on Lipid Profile: A Narrative Review

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ABSTRACT

Introduction: Fasting during the month of Ramadan is a religious obligation, practiced by millions of people around the world. Ramadan fasting is essentially a fundamental change in lifestyle for one lunar month. This type of fasting may have significant effects on lipid profile. Although there is no scientific consensus about the effects of fasting on cardiovascular risks such as changes in lipid profile, some studies have revealed the positive effects of Ramadan fasting (and similar religious fasting) on lipid profile and cardiovascular diseases (CVDs) such as atherosclerosis and coronary artery disease. These effects may be related to factors such as different fasting durations (season-dependent), diets, and physical activities during Ramadan. An overall improvement in cardiovascular risk profile is noted during Ramadan fasting. Majority of studies have reported an increment in high-density lipoprotein (HDL) level, decreased triglyceride level, and no change or decline in total cholesterol or low-density lipoprotein (LDL) levels. Therefore, given the lack of comprehensive literature in this field, we reviewed some related studies in order to describe the impact of Ramadan fasting on lipid profile.

Conclusion: It can be inferred that Ramadan fasting alters lipid profile by improving HDL-cholesterol and reducing LDL-cholesterol in some cases. However, changes in triglyceride and total cholesterol during Ramadan are not uniform or similar. Moreover, Ramadan fasting is not associated with any changes in the prevalence of CVD or frequency of hospitalization.

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Introduction

Ramadan is considered a holy month for Muslim populations and occurs in different seasons every year (1). In Ramadan, healthy adults refrain from eating, drinking, smoking, and sexual intercourse during daylight hours from dawn to sunset (2, 3). Physiological impacts of Ramadan fasting include weight loss, fat-free mass reduction, and reduction of systolic blood pressure (SBP), blood sugar, and cholesterol (C) (4-6).

The common practice is to eat one large meal after sunset and a non-compulsory, lighter meal before dawn (7). Islamic fasting, considering its specific nature, may induce metabolic and hormonal changes in the body, which are different from those observed in regular fasting (1). Fasting in Ramadan has been shown to have

some effects on circulating levels of several biochemical indicators (e.g., lipid profile), which are known to be linked with vascular and metabolic disorders (8-10). Therefore, given the significance of these effects, we reviewed some related studies to describe the impact of Ramadan fasting on lipid profile.

Imtiaz Salim et al. performed a systematic review to evaluate changes in the incidence of acute cardiac diseases in Ramadan and the effects of Ramadan fasting on the clinical status of patients with stable cardiac diseases (11). This study was performed by reviewing previous literature in Medline database from January 1980 to September 2012. The results of the conducted studies revealed that the incidence of acute cardiac diseases during

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Table 1. Effect of Ramadan fasting on lipid profile in patients with cardiovascular diseases

Authors	Date	Fasting duration (hour)	Subjects (n)	Parameters evaluated (lipid profile)	Effect of Ramadan on parameters	Reference
Hassan Chamsi-Pasha et al.	2004		86	TG, LDL, HDL, PB, TC	TG: ↑, LDL: NS LDL: NS, BP: NS TC: NS	13
Nizal Sarraf-Zadegan et al.	2000		50	Apo B, Lp(a), LDL-C/ HDL-C ratio, TC, TG, LDL-C, HDL-C	Apo B: ↓, Lp(a): ↓ LDL-C/ HDL-C: ↓ TC: NS, TG: NS LDL-C: NS, HDL-C: NS	17
Durdi Qujeq et al.	2002		83	LDL-C, HDL-C	LDL-C: ↓, HDL-C: ↑	18
Abdullah Shehab et al.	2012	12	65	SBP, TC, TG, HDL-C, LDL-C	HDL-C: ↑, LDL-C: ↓ SBP: ↓, TC: ↓ TG: ↓	19
Sondos Pirsheh et al.	2013	-	160	SBP, DBP, LDL, HDL, TG	SBP: ↑, DBP: ↓, LDL: ↑, HDL: ↑ TC: ↑, TG: ↓	20
Maislos M et al.	1993		24	TG, TC, LDL-C, VLDL-C, HDL-C, Apo- A1, TC/HDL-C, LDL-C/HDL-C	TG: NS, TC: NS, LDL-C: NS VLDL-C: NS, HDL-C: ↑, Apo-A1: ↑, TC/HDL-C: ↓ LDL-C/HDL-C: ↓	7
Salhamoud AS et al.	2005	12	60	SBP, DBP, TC, LDL-C HDL-C, TG	SBP: ↑, DBP: ↓, TC: ↑ LDL-C: ↑, HDL-C: ↑ TG: ↓	21

TC: total cholesterol, TG: triglyceride, SBP: systolic blood pressure, DBP: diastolic blood pressure, HDL-C: high-density lipoprotein cholesterol, LDL-C: low-density lipoprotein cholesterol, VLDL-C: very-low-density lipoprotein cholesterol, BP: blood pressure, NS: Non-Significant.

Ramadan fasting was similar to that of non-fasting days, although the timing of symptoms onset was dissimilar.

Moreover, as the mentioned study indicated, the majority of patients with stable cardiac diseases could undertake Ramadan fasting without any clinical deterioration. Also, body mass index (BMI), lipid profile, and blood pressure showed significant advances in the normal healthy group and patients with stable cardiac diseases, metabolic syndrome, dyslipidemia, and hypertension (13, 17-21). Some of these studies are summarized in Table 1.

Bener A et al. retrospectively reviewed a 13-year stroke database and evaluated the records of Muslim patients, who were hospitalized due to stroke over a 13-year period (from January

1991 to December 2003) (12). Finally, this study demonstrated no substantial difference in the frequency of hospitalization for stroke between the fasting month of Ramadan and non-fasting months.

Hassan Chamsi-Pasha et al. carried out a study to evaluate the clinical and biochemical effects of fasting during Ramadan on patients with cardiac diseases (13). In this study, 86 outpatients with cardiac diseases, who were fasting during the month of Ramadan, were evaluated at King Fahd Armed Forces Hospital, Jeddah, Saudi Arabia, in 1996. They finally revealed no significant alterations in any of hematological or biochemical markers during Ramadan. Moreover, they concluded that the effects of Ramadan fasting on stable patients

with cardiac diseases are minimal.

Akhan G. et al. carried out a study to determine whether stroke prevalence during Ramadan varies from other months of the year. They included all patients with stroke, admitted to the hospitals in Isparta province in Turkey in years 1991-1995. They finally pronounced that fasting during Ramadan has no impact on stroke rate in Isparta province (14).

Al Suwaidi J. et al. examined whether Ramadan fasting has an adverse effect on the prevalence of acute coronary syndromes (ACSs) such as acute myocardial infarction (AMI) and unstable angina (UA). Their database included the information collected from all patients, admitted to the cardiology department of Hamad General Hospital since January 1991. All patients presenting with ACS from 1991 to 2001 were identified by reviewing the database. Age, sex, risk factors (including smoking, hypertension, hypercholesterolemia, and diabetes), medical history of CADs, in-hospital death, morbidity, and acute medical care were evaluated. They finally revealed no significant differences between Ramadan and other months of the year in terms of the incidence of AMI or UA (15).

Moreover, Al Suwaidi J. et al. conducted a retrospective review of the clinical data of 8,446 Qatari patients, who were hospitalized with heart failure (5,095 males and 3,351 females) for a period of 10 years (January 1991-December 2001) in Qatar. In this study they indicated no significant change in the frequency of hospitalization due to heart failure between Ramadan and other non-fasting months (16).

Nizal Sarraf-Zadegan et al. carried out a study in order to screen the concentration of diverse plasma lipoproteins, lipoprotein (a), apolipoproteins A1 and B, fibrinogen, factor VII activity, and some specific hematological markers in 50 healthy subjects, aged 30-45 years (17). Their results indicated that the amounts of apolipoprotein B, lipoprotein (a), and low-density lipoprotein cholesterol (LDL-C)/high-density lipoprotein cholesterol (HDL-C) ratio were considerably reduced during Ramadan, whereas total cholesterol (TC), triglycerides (TG), LDL-C, HDL-C, and fasting blood glucose did not alter during Ramadan.

Durdi Qujeq et al. conducted a study to define the status of LDL-C and HDL-C in a

healthy group during Ramadan (18). In this survey, the study group included 83 volunteers, comprising of 57 males (aged 21-55, mean of 34.25 ± 9.81 years) and 26 females (aged 20-58, mean of 34.58 ± 8.94 years). They assessed individuals one week before Ramadan fasting (pre-RF), two weeks after the start of fasting (mid-RF), and the fourth week of Ramadan fasting (end-RF). Finally, the results indicated a more significant decrease in LDL-C level in the mid-RF and end-RF periods, compared to the pre-RF level. Also, the results revealed a more substantial elevation in HDL-C concentration in mid-RF and end-RF periods, compared to the pre-RF level.

Abdullah Shehab et al. performed an investigation about the effect of Ramadan fasting on blood pressure, body weight, plasma lipid, and lipoprotein variables among healthy individuals (19). This study was carried out on 102 (68% male) multi-ethnic volunteers with the mean age of 38.7 ± 10.5 years in order to evaluate the variables before Ramadan, one day after the end of Ramadan, and four weeks after Ramadan. They reported significant alterations in SBP, body weight, waist circumference, TG, HDL-C, and LDL-C at the end of Ramadan; however, no difference was observed in TC.

Furthermore, there was a gradual and significant increase in HDL-C and a significant decrease in LDL-C level four weeks after Ramadan. Finally, they showed significant improvements in HDL-C and LDL-C levels, even four weeks after Ramadan. Therefore, Ramadan-like fasting may be used for more efficient lipid and lipoprotein management.

Maximo Maislos et al. conducted a study to examine the effects of Ramadan fasting on plasma lipids and lipoproteins in normal healthy subjects (7). Twenty-four healthy subjects were evaluated before the end of Ramadan and one month after it. Finally, the results indicated that Plasma TC, TG, LDL-C, and very-low-density-lipoprotein cholesterol (VLDL-C) did not alter. Moreover, HDL-C was 30% higher at the end of Ramadan; apolipoprotein A-I also increased.

Sondos Pirsahab et al. carried out a research in order to evaluate the effects of Ramadan fasting on lifestyle and lipid profile (20). This interventional cohort study was conducted on 160 subjects, who were fasting during Ramadan. The results revealed a significant rise in TC,

LDL-C, HDL-C, and blood urea nitrogen after Ramadan. Furthermore, TG level decreased during Ramadan, although it returned to the normal level one month later.

Salhamoud Abdelfatah Saleh et al. conducted a study about the effects of Ramadan fasting on waist circumference, lipid profile, blood pressure, and blood glucose. Overall, 60 healthy Kuwaiti volunteers, including 41 males and 19 females, were evaluated (21). In this study, age of the subjects ranged from 24 to 56 years in the male group, and 23 to 33 years in the female group. They finally concluded that Ramadan fasting positively affects waist circumference and lipid profile of individuals in this sample of Kuwaiti population. Moreover, the benefits were mostly observed in the male group, compared to the female subjects.

Conclusion

It can be concluded that Ramadan fasting can improve HDL-C and reduce LDL-C in some cases. However, in terms of TG and TC levels, no consistence was observed in the studies. Moreover, Ramadan fasting was not associated with any changes in the prevalence of cardiovascular diseases or frequency of hospitalization in patients with previous history of cardiovascular diseases.

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