The Influence of Ramaḍān Fasting on Plasma Lipids and Body Weight in Normal Men

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Abstract

This investigation was designed to study the influence of Ramaḍān fasting on body weight and plasma lipid concentrations in young healthy Saudi Arabian men. The experimental subjects were 33 male college students, ages 18-22. Body weight and plasma lipid were measured on days 1 (baseline), 8, and 14 of Ramaḍān. Fasting in Ramaḍān reduced the mean body weight and plasma cholesterol level slightly, but the reductions were not significant. Plasma triglyceride had increased significantly by day 14 of Ramaḍān. The elevation in the concentration of plasma triglyceride was explained by the massive amount of sucrose intake. The present data contribute useful information regarding the control of body weight, plasma cholesterol, and triglyceride during fasting in the month of Ramaḍān.

Key Words: Ramaḍān, fasting, plasma lipids, body weight.

Ramaḍān is the ninth month of the Islamic calendar. Fasting during Ramaḍān is the fourth pillar of Islam, and fasting is obligatory for millions of Muslims worldwide above the age of puberty. Allah says:

> *"Ye who believe! Fasting is prescribed to you as it was prescribed to those before you, that ye may learn self-restraint."*[1]

> *"But if any of you is ill, or on a journey, the prescribed number (should be made up) from days later."*[2]

Ramaḍān fasting consists of periodic food and water deprivation daily from dawn until sunset.[3] The eating pattern during the month of Ramaḍān changes from three meals in the day to two meals, one before dawn and the other after sunset. Fasting is a form of discipline used to control normal desires and serves to improve the health. Prophet Mohammad [PBUH] recommended that fasting and moderate food intake would lead to better health.[4] Fasting during Ramaḍān provides an excellent opportunity to study the lipid metabolism in underweight, overweight, and normal weight subjects.[5,6]

Some reports in the literature concern the physiological significance of this type of fasting.[7-22] A Muslim-like fasting scheme modulates blood glucose and hepatic glycogen levels in rats.[23] Physicians working in Muslim countries should be aware that fasting during Ramaḍān causes alterations in some laboratory findings.[24] The present report describes the effect of Ramaḍān fasting on body weight

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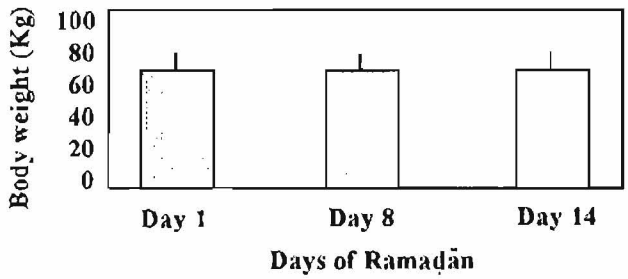

Figure 1. Influence of Ramaḍān fasting on body weight.

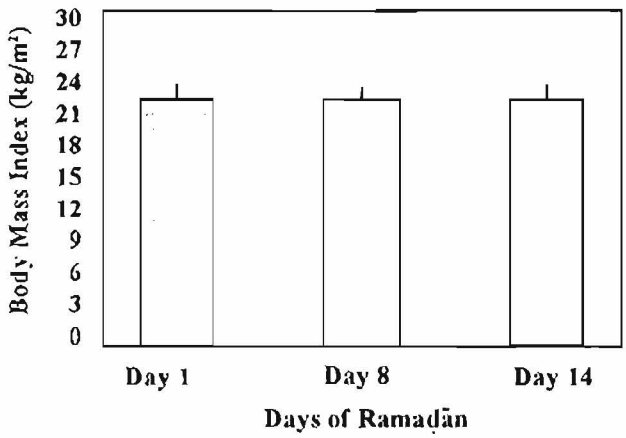

Figure 2. Influence of Ramaḍān fasting on BMI.

and plasma lipids (total cholesterol and triglycerides) on day 1, day 8, and day 14 of Ramaḍān fasting in healthy male Saudi Arabian college students.

Materials and Methods

Subjects:

Thirty-three male college student volunteers participated in this study. The subjects, ranging in age from 18 to 22, had a mean body weight of 68.5 kg. The study was conducted for two weeks because a review of the literature indicated that 15 days are enough to evaluate the influence of Islamic fasting on body weight and some plasma parameters.[5,25] In addition, the participants were not available after day 18 of Ramaḍān because the school was closed for vacation. All students lived in the university housing complex. The subjects were free to eat from typical Middle Eastern food provided by the university. The subjects' total energy intake was 2,250 ± 276 Kcal/day (mean ± standard deviation) and the percentages of their total energy from carbohydrates, fat, and protein were 57, 28, and 15%, respectively.

Analyses:

Ten hours after Saḥūr, 1 ml of blood from each subject was collected on days 1 (baseline), 8, and 14. The total

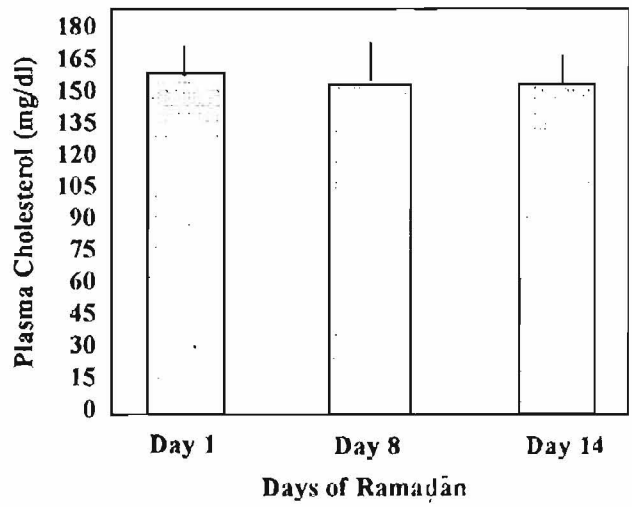

Figure 3. Influence of Ramaḍān fasting on plasma cholesterol.

cholesterol and triglyceride of the plasma were measured by using Reflotron.[26]

Body weight and body mass index:

Each subject was weighed at the same time of day (3:30 p.m.) in light clothing and without shoes. The reading was taken to the nearest 0.1 kg. The height of each subject was taken without shoes. The body mass index (BMI) was calculated by dividing the weight in kilograms by the square of the height in meters.

Statistics:

Results are expressed as mean ±S.D. The differences among the means of the baseline day, day 8, and day 14 were obtained by one-way analysis of the variance.[27] A p-value of 0.05% was considered significant.

Results

A reduction of 1.55 kg in body weight was observed in volunteers after two weeks of fasting. The differences in weight were not significant (Figure 1). BMI was relatively unchanged by Ramaḍān fasting (Figure 2). Total plasma cholesterol concentrations tended to be lower on days 8 and 14 of fasting compared to the baseline (day 1); the reductions were not significant (Figure 3). The values of plasma triglyceride levels increased significantly in day 14 compared to day 1 (Figure 4). Triglyceride concentrations, however, were only slightly elevated at day 8 (Figure 4). Table 1 summarizes those data.

Discussion

This study was initiated to examine the influence of fasting in Ramaḍān on body weight and the concentrations of plasma cholesterol and triglyceride in healthy male Saudi

Table 1. Influence of Ramadān fasting on body weight, body mass index, and the levels of plasma cholesterol and triglyceride.

	Day 1 (base line)	Day 8	Day 14	P value+
Body Weight	67.9 ± 8.8*	67.3 ± 9.2	66.4 ± 8.3	NS*
Body Mass Index	23.4 ± 2.7	23.1 ± 2.6	23.1 ± 2.3	NS
Cholesterol (mg/dl)	155 ± 16	152 ±17	150 ± 12	NS
Triglyceride (mg/dl)	74.3 ± 8.7[a]	81.7 ± 14[a,b]	87.0 ± 4.5[b]	<0.05

* Means ± SD.

+ One way analysis of variance (ANOVA).

** NS = not significant.

Note: Means not sharing the same superscript are significantly different.

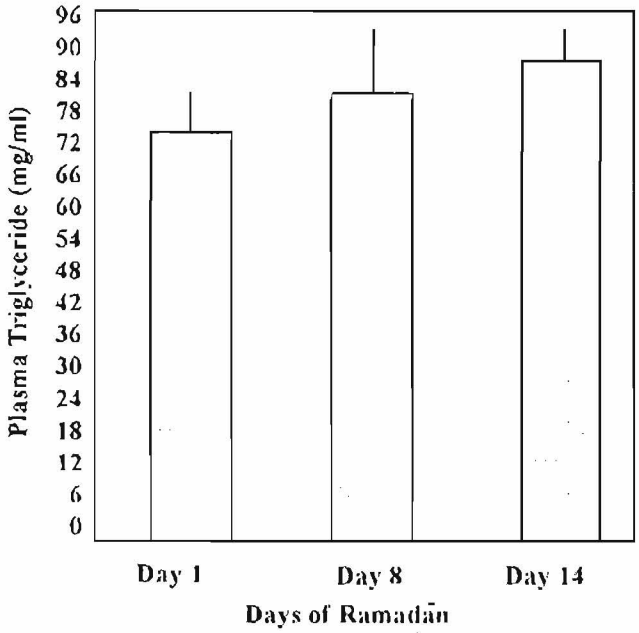

Figure 4. Influence of Ramadān fasting on plasma triglyceride.

college students. The mean body weight remained virtually unchanged; the greatest difference from the beginning to the end of the study was 1.55 kg. This finding is in agreement with previous studies.[24,25,28] The slight reduction in mean body weight could be contributed to a reduction in energy intake and an increase in physical activity during the night. A reduction in energy intake was observed during Ramadān fasting.[29,30] Other studies noted a significant increase in body weight during Ramadān compared to its beginning.[4,31]

The present data indicate that fasting in Ramadān may tend to reduce the level of plasma cholesterol. Despite the lower values noted on days 8 and 14, total cholesterol levels were not significantly different from the baseline (Figure 3). This result is consistent with earlier studies.[5,24,30,32] Data from previous studies are in contradiction, showing an elevation of blood cholesterol during Ramadān.[6,33]

Blood triglyceride levels were significantly higher than baseline-only levels only on day 14. While the level of mean triglyceride on day 8 was higher, this elevation was not statistically significant. It has been reported that a high intake of disaccharide could cause an elevation in plasma triglycerides.[34] In addition, the consumption of sugar increased during Ramadān.[24,31,32] In Saudi Arabia, one of the habits in breaking the fast during Ramadān is the consumption of massive amounts of homemade sweet drinks. The sweetener in the drinks is sucrose. The gradual increases in the concentration of triglyceride observed in the present study were in agreement with previous reports.[24,32]

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2. Holy Qur'ān, Chapter 2, Verse 184.
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