

Effect of Ramadan fasting on body weight and lipid profile

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ABSTRACT

The present study was undertaken to evaluate the effect of Ramadan fasting, in adult males of Marathwada region, on some physiological and biochemical parameters, which included following aims:

1. To determine the difference in weight in pre- & post-Ramadan subjects.
2. To determine the lipid profile levels (TC, HDL-c, LDL-c, VLDL-c, & TG) in pre- & post-Ramadan subjects.

The study included 30 adult male subjects of age group 25-35 years and was carried out in the month of Ramadan. Biochemical parameters were estimated via biochromic analyzer whereas the physiological parameter (weight) was recorded by usual weighing machine (kgs), which was estimated one day prior to beginning of the month of Ramadan (pre-fasting) and one day after the month of Ramadan (post-fasting).

The mean \pm SD weight & TC, LDL-c, VLDL-c, & TG of the subjects before and after the Ramadan fasting was found to be decreased from 61.90 ± 11.39 to 60.56 ± 10.74 ($p < 0.001$); 194.76 ± 28.01 to 181.80 ± 31.29 ($p < 0.001$); 125.90 ± 25.59 to 111.33 ± 23.91 ($p < 0.01$); 17.80 ± 3.48 to 16.4 ± 3.17 ($p < 0.001$); & 89.00 ± 17.43 to 82.00 ± 15.89 ($p < 0.001$), respectively. Whereas a highly significant ($p < 0.001$) increase in serum HDL-c level was noted (mean \pm SD = 50.63 ± 2.35 to 59.80 ± 3.47) in the present study. Thus to conclude Ramadan fasting can be considered beneficial to health.

Keywords: Total Cholesterol; High-density lipoprotein cholesterol; Triglyceride; Low-density lipoprotein cholesterol; Very low density lipoprotein cholesterol; Ramadan fasting.

INTRODUCTION

Ramadan fast affects the human body in diverse ways. The effect on lipid profile with variation in body weight is particularly observed in this study. Apart from the religious and spiritual consideration, it is often subject of discussion whether or not Ramadan fasting confers any beneficial effect on the body. High blood cholesterol is a risk factor for developing cardiovascular disorders, peripheral vascular diseases, hypertension, obesity, stroke, and many other diseases. As different studies exhibited variable results considering weight & lipid profile, this study was undertaken to find out the effect of Ramadan fast on these parameters in adult males of Marathwada region.

Aims & Objectives

The present study was undertaken to

evaluate the effect of Ramadan fasting on some physiological and biochemical parameters, which included the following aims:

- To determine the difference in weight in pre- & post-Ramadan subjects.
- To determine the lipid profile levels (TC, HDL-c, LDL-c, VLDL-c, & TG) in pre- & post-Ramadan subjects.

MATERIAL AND METHODS

Clinical material

The present work on, "Effect of Ramadan fasting on body weight and lipid profile", was done in the Department of Physiology, in association with Medical Biochemistry, Government Medical College, Aurangabad, Maharashtra, India. The study comprised of 30 adult male subjects of age group 25-35 years, belonging to middle-class families. The

study was carried out in the month of Ramadan (Oct-Nov).

Inclusion criteria

Male subjects, which were fasting on an average 12 hrs a day for the whole month of Ramadan (30 days).

Exclusion criteria

Females and patients suffering from diabetes, hypertension, tuberculosis or hypercholesterolemia.

Methods

Biochemical parameters, which included serum TC, HDL-c, LDL-c, VLDL-c, & TG, were estimated via biochromic analyzer using appropriate wavelength filters. The physiological parameter included weight (recorded by usual weighing machine in kilograms), which was estimated one day prior to beginning of the month of Ramadan (pre-fasting) and one day after the month of Ramadan (post-fasting). The 12 hr fasting samples of pre- & post-fasting subjects were collected. For invitro quantitative determination of activity of lipid fractions in serum following kit methods were implemented. The data were statistically analyzed using paired 't-test'. The methods employed are shown in table 3.

RESULTS AND DISCUSSION

The mean \pm SD weight of the subjects before & after Ramadan fasting was found to be decreased from 61.90 ± 11.39 to 60.56 ± 10.74 respectively, which was found to be statistically highly significant ($p < 0.001$) (table 1). Similar results were found by Hussein R, *et al.*, (1987), Nomani M.Z. (1988), & Kraemer F.B., *et al.*, (1994).^{2,12,5} They found an approximately 50 % decrease in the adipose cell size after two days of fasting. Reduction of weight may be because even though the tissues preferentially use carbohydrate for energy, the quantity of carbohydrate normally stored in the entire body is only a few hundred grams (mainly glycogen in liver & muscles) & it can supply the energy required for body function for perhaps half a day. During fasting insulin levels are decreased whereas glucagons, adrenalins, corticosteroids, & growth hormones are increased. These changes

lead to increased activity of hormone-sensitive lipase & hence lipolysis is increased. Increased free fatty acids that are released act as energy substrate⁵. The fat depots are depleted progressively during the whole month leading to reduction in the body weight. Body weight 20 % above desirable increases the risk of diabetes, hypertension, & cardiovascular diseases whereas body weight 40-50 % above the desirable level increases risk of death. The accumulation of fat in abdominal & particularly visceral depots confers especially high risk⁸.

Considering above factors reduction in weight is beneficial to health in most of the cases.

The mean \pm SD serum TC before fasting was 194.76 ± 28.01 & after fasting was decreased to 181.80 ± 31.29 (table 2) which was statistically highly significant ($p < 0.001$). The results were in accordance with studies by Siddiqui IP, *et al.*, (1992) & J el Ati, *et al.*, (1995)^{11,6}.

Highly significant increase in serum HDL-c levels were noted (mean \pm SD = 50.63 ± 2.35 & 59.80 ± 3.47) in the present study. The increase was in consistent with study by M. Maislos, *etal* (1993) & Dowod THAM (2004)^{7,24}.

Obesity, inactivity, & smoking are associated with diminished HDL-c levels. During Ramadan the weight was reduced, physical activity in the form of prayer is increased & smoking is prohibited in fasting hours. These factors might be responsible for increase in HDL-c levels. HDL-c removes cholesterol particles from tissues. Since excessive cholesterol accumulation is associated with CAD, there removal is beneficial, therefore HDL-c have a cardio-protective effect³.

Table 1: Mean values \pm SD of weight in pre- & post-Ramadan fasting subjects

Subjects	Mean \pm SD (kgs)
Pre-Ramadan	61.90 ± 11.39
Post-Ramadan	$60.56 \pm 10.74^*$

* $p < 0.001$ (highly significant when pre-Ramadan subjects were compared to post-Ramadan subjects)

Significant decrease ($p < 0.01$) in serum LDL-c levels was noted (mean \pm SD = 125.90 ± 25.59 & 111.33 ± 23.91) in the present study. Similar findings were noted in studies conducted by S. A. Nagra, et al (1998), Nomani M.Z.A. (1990), & Dowod THAM (2004).^{10, 9, 4} The significant reduction occurs in LDL-c despite the fact that tendency to consume fried food was increased during Ramadan. Consumption of fried food indicates higher intake of fat as compared to non-Ramadan days. When energy is limited, increase dietary fat level favors reduced breakdown of body

proteins, including labile proteins.

Highly significant reduction ($p < 0.001$) in serum VLDL-c & TG levels was noted (mean \pm SD = 17.80 ± 3.48 & 16.4 ± 3.17 ; 89.00 ± 17.43 & 82.00 ± 15.89) in the present study. Similar findings were noted in study conducted by Angel J. F., et al (1975).¹

Finally in Ramadan decrease was observed in weight, TC, HDL-c, LDL-c, VLDL-c, & TG whereas HDL-c was increased. Following may

Table 2: Mean values \pm SD of lipid profile in pre & post-Ramadan subjects

Biochemical Parameter	Mean \pm SD (Pre-Ramadan – mg %)	Mean \pm SD (Post-Ramadan – mg %)
TC	194.76 ± 28.01	$181.80 \pm 31.29^*$
HDL-c	50.63 ± 2.35	$59.80 \pm 3.47^*$
LDL-c	125.90 ± 25.59	$111.33 \pm 23.91^{**}$
VLDL-c	17.80 ± 3.48	$16.4 \pm 3.17^*$
TG	89.00 ± 17.43	$82.00 \pm 15.89^*$

* $p < 0.001$ (highly significant); ** $p < 0.01$ (significant); [when pre-Ramadan subjects were compared with post-Ramadan subjects].

Table 3: Methods employed

Lipid Parameter	Method	Wavelength (nms)	Formula	Normal Value (mgs/dL)
TC	Modified Roeschlau's method	505 (green)	A (T) \cdot 200 A (S)	140 – 250
HDL-c	PTA Precipitation [Burstein etal]	505 (green)	A (T) \cdot 75 A (S)	30 – 70 [Males = 30 – 65]
TG	Wako and modification by McGowen and Fossati, etal	510	A (T) \cdot 200 A (S)	65 – 160
LDL-c	Friedewald's Formula	-	TC – HDL-c – TG/5 (mg %)	Upto 110
VLDL-c	-	-	TG/5	< 40

be the causes for these changes:

- There is a control on frequent & excessive eating with more intake of fruits.
- There are changes in behavior and addiction eg, prohibition of smoking & alcohol intake.
- "Taraweeh", the special prayer in Ramadan is performed after 8:00 pm for approximately one hour. Hence there is more physical exercise in this prayer, which causes tranquility & stress relaxation to the person performing it.

CONCLUSION

Weight loss was observed in post-fasting Ramadan male subjects of Marathwada region, as compared to pre-fasting ones, with all other parameters decreased which included serum TC, LDL-c, VLDL-c, & TG. Serum HDL-c level was found to be increased in post-fasting male subjects. Thus it can be concluded that Ramadan fasting is beneficial to health as it leads to decrease in total cholesterol level, which is considered to be a significant risk factor for coronary artery diseases, strokes, etc.

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