

# Effect of Ramadan Fasting on Body Weight, (BP) and Biochemical Parameters in Middle Aged Hypertensive Subjects: An Observational Trial

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## ABSTRACT

**Introduction:** Ramadan fasting is a religious obligation which is practised by Muslim population all over the world. However, there is scarcity of scientific literature regarding its effects on health determinants in cardiovascular disturbances like hypertension.

**Objective:** The present study was done to assess the (BP), body weight and serum cholesterol changes over the period of Ramadan fasting in patients with hypertension.

**Materials and Methods:** This prospective observational trial was done on 15 hypertensive subjects who were in the age group of 35 to 65 years, who were determined to complete Ramadan fast. All subjects were on antihypertensive therapy. Outcome measures of (BP), body weight and serum cholesterol were assessed in all the subjects before and after Ramadan month.

**Results:** Mean age of subjects was 44.6±5.62 years. Systolic BP decreased from 148±19.6 to 132.5±17.9 mm of Hg. The decrease of 15.5 units (95% CI: 7.5 to 24.4) was statistically significant ( $p = 0.0009$ ). Diastolic BP decreased from 90.4±7.8 to 81.1±6.3 mm of Hg. The decrease of 9.3 units (95% CI: 5.7 to 13) was statistically significant ( $p < 0.0001$ ). There was statistically significant decrease in body weight from 66.6±13 to 65.2±12.7 kg ( $p < 0.0001$ ). There was no significant difference in serum cholesterol from 187.3±28.9 to 192.7±31.3 mg% ( $p = 0.37$ ).

**Conclusion:** Hypertensive patients with continuation of their medicines showed a decrease in blood pressure and reduction in body weight at the end of Ramadan fasting duration. However there was no change found in serum cholesterol levels.

**Keywords:** Cardiovascular abnormality, Muslim fasting

## INTRODUCTION

The Islamic month of Ramadan which is dedicated to fasting is strictly observed by millions of Muslims all over the world. With more than a billion people being followers of Islam, there are hundreds of millions of people who practise the Ramadan fast every year [1,2].

Fasting involves abstinence from any kind of food and drinks from sunrise to sunset. This leads to repeated fasting and refeeding cycles. Naturally, this alters normal feeding pattern, sleep and behaviour of the people who practise the Ramadan fasting. This becomes particularly important in people with hypertension or other cardiovascular diseases, who decide to fast during the month of Ramadan, as a religious obligation. The most common related question which is asked by a patient with known cardiovascular disease, including hypertension, to a physician, is regarding recommendations for fasting in the light of medical research. Several studies done on animals have shown that fasting and refeeding cycles can cause or aggravate hypertension [3-6]. However, Ramadan fasting presents a unique model which is different from experimental fasting. Apart from the feeding behaviour, factors affecting BP during Ramadan include changes in medication timing and possibly, salt intake. However, the effect of the fast on the BP in hypertensive subjects is an issue that has rarely been addressed [7,8].

Fasting in Ramadan has been shown to have some effects on the circulating levels of several biochemical markers which are known to be associated with vascular and metabolic disorders, including cholesterol [9-11]. There are conflicting reports on effect of Ramadan fasting on body weight, with some studies reporting significant decrease and others reporting no significant decrease in body weight [12-14]. The present study was done to evaluate the effect of Ramadan fasting on BP, body weight and serum cholesterol in hypertensive subjects.

## METHODS

**Study design:** A prospective, observational trial.

**Study site:** Department of Physiology, Government Medical College and Hospital, Aurangabad, India.

**Selection of subjects:** Fifteen hypertensive patients who were in the age group of 35 to 65 years, with no history of diabetes, tuberculosis or any other major disease and who were willing to be a part of the study were enrolled. Informed consent was taken from each of them. The patients continued their treatment with antihypertensive agents during the course of the study. All the subjects gave negative history of addictions like smoking or alcoholism.

**Data collection and blood sampling:** Subjects came at study site after 10-12 hours of fasting, in the morning hours, for data collection. Before the beginning of Ramadan month, the data was collected between 7 days and 2 days before start of Ramadan month and from the 3<sup>rd</sup> to 6<sup>th</sup> day after the end of Ramadan month. Five millimetres of fasting blood sample was collected from the median cubital vein by vacuum sampling method and it was then sent to laboratory for the analysis. The systolic and diastolic blood pressures were estimated twice by using sphygmomanometers (Omron Corporation, Netherlands). If there was a difference of more than 5% in between two measurements, then a third reading was repeated and the average of the two near readings were recorded as the mean BP. Body weight was measured to the nearest 100 g, with subjects wearing light clothing. Serum cholesterol was estimated by the CHOD-PAP method [15].

## DATA ANALYSIS

Quantitative data was expressed in the form of mean±standard deviation. Paired t-test for two tailed hypothesis was used to

compare the observations before and after fasting. A p-value of less than 0.05 was considered to be statistically significant.

## RESULTS

Mean age of subjects was 44.6±5.62 years. [Table/Fig-1] summarizes the results which were obtained from the study.

Parameter	Before Ramadan	After Ramadan	Difference in means	p-value
Systolic Pressure (millimetres of mercury)	148±19.6	132.5 ± 17.9	15.5 units (95% CI: 7.5 to 24.4)	0.0009*
Diastolic Pressure (millimetres of mercury)	90.4±7.8	81.1±6.3	9.3 units (95% CI: 5.7 to 13)	<0.0001*
Body weight (kilograms)	66.6±13	65.2 ± 12.7	1.4 units (95% CI: 0.86 to 2)	<0.0001*
Serum cholesterol (milligram %)	187.3 ± 28.9	192.7 ± 31.3	-5.3 units (95% CI: -17.9 to 7.2)	0.37 **

**[Table/Fig-1]:** Blood pressure, body weight and serum cholesterol before and after ramadan fasting  
SD: Standard deviation\* indicates statistically significant\*\* indicates statistically not significant

## DISCUSSION

Significant reductions in both systolic and diastolic BP were found in the present study. There was also a significant reduction in body weight. However, there was no significant change in serum cholesterol levels.

Lifestyle related factors like high consumption of see mss which are rich in saturated fats and refined carbohydrates, combined with lack of physical activity, is found to be a causative factor for hypertension, obesity, diabetes and dyslipidaemia. Thus, maintaining a healthy lifestyle, which includes consuming a balanced diet and having regular physical activity, plays an important role in the prevention and management of health disturbances like hypertension, obesity, diabetes and dyslipidaemia [16].

Ramadan fasting in Islam provides an opportunity to decrease the intake of food while increasing physical activity. Although food intake reduction may not be uniform and though it may differ from person to person, extra congregational prayers are more widely mismatch with mss. The extra congregational prayers called 'Tarawih', which are performed around 1–2 hours after sunset, along with increased tendency to offer non-obligatory 'Nafil' prayers, lead to increase in physical activity [17].

Fasting may have a protective effect, as hunger has been associated with catecholamine inhibition and a reduced venous return, which cause a decrease in the sympathetic tone leading to a fall in blood pressure, heart rate and cardiac output [2].

Salim I et al., concluded in their systematic review of related literature, that Ramadan fasting significantly improved the lipid profile, (BMI) and BP in normal healthy people, in patients with stable cardiac illnesses, metabolic syndrome, dyslipidaemia and hypertension [18].

Body weight decreased significantly in the present study. Most studies have shown similar results [19,20]. However, some studies have shown no significant changes in body weight [21,22] after Ramadan fasting.

We found no significant change in serum cholesterol values. Some researchers have reported increased concentrations of serum cholesterol, which may have been related to loss of weight during Ramadan fasting. However, some researchers have found either no change or decreased values of serum cholesterol during Ramadan fasting [23–27].

## LIMITATIONS

Study was done on a single group which practised Ramadan fasting and blood pressure reading was evaluated over single time points before and after fasting.

## RECOMMENDATION

Doing further studies with large sample sizes and with comparative groups, along with assessment of more parameters of cardiovascular health, may help in better understanding of the subject.

## CONCLUSION

Hypertensive patients with continuation of their medicines showed a decrease in blood pressure and reduction in body weight at the end of Ramadan fasting duration. However there was no change found in serum cholesterol levels.

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