

**EFFECT OF RAMADAN FASTING ON ANTHROPOMETRIC PARAMETERS****<sup>1</sup>Perveen Akhter, <sup>2\*</sup>Aradhna Sharma, <sup>3</sup>Tarun Sharma and <sup>4</sup>Anita Bodh**<sup>1</sup>Assistant Professor Physiology Slbsmc Nerchowk Mandi Hp 175008.<sup>2</sup>Assistant Professor Pharmacology Slbsmc Nerchowk Mandi HP 175008.<sup>3</sup>Assistant Professor Medicine Drpgmch Tanda Kangra HP 176001.<sup>4</sup>Associate Professor Pathology Slbsmc Nerchowk Mandi Hp 175008.**\*Corresponding Author: Dr. Aradhna Sharma**

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**ABSTRACT**

**Introduction:** Fasting during *Ramadan*, the holiest month in Islamic calendar, is one of the five pillars of Islam.<sup>[4]</sup> *Ramadan* is the ninth month in the lunar Islamic calendar and lasts for 29-30 days. It is mandatory for all adult individuals of the Islamic faith to fast during the holy month of *Ramadan*. During this period, healthy Muslims do not eat or drink (*i.e.*, total abstinence from food and fluids) and refrain from tobacco daily from pre-dawn until dusk. **Methods:** The effects of Ramadan fasting on weight, body mass index (BMI) and waist circumference were studied on healthy adult male muslim volunteers. All the parameters were recorded one week before the month of Ramadan and then in the last week of Ramadan and compared. **Results:** Body weight and BMI did not show any statistically significant effect, whereas waist circumference was significantly decreased. **Conclusion:** Our study showed that Ramadan fasting is beneficial as there is significant decrease in waist circumference.

**KEYWORDS:** Ramadan, Anthopometry, Fasting.**INTRODUCTION**

Fasting is primarily an act of willingly abstaining from some or all food, drink or both for a period of time. Throughout recorded history fasting has been advocated for spiritual purification and for promotion of health. Fasting was practiced by the ancient Egyptians, Greeks and Persians and is common to many world religions including Judiasm, Christianity, Hinduism, Islam and Baha'i Faith.<sup>[13]</sup>

In the equatorial region, Muslims typically fast for 13–14 hours daily (*i.e.*, from ~05:30 to 19:00) but the daily fast may last about 12-19 hours every day, depending on the season in which *Ramadan* falls and on the geographic location of the country.<sup>[33]</sup> Although free eating is allowed from sunset to dawn, traditionally two main meals are consumed daily, one before dawn and one just after sunset.

Fasting provides a moment of respite to the organism wherein different organs can recover, a reason that can prop-up this practice in the case of certain illnesses of metabolic nature. Also, we acknowledge its benefits in purifying the body from toxins and functions that were disturbed by overeating, malnutrition or a bad intake of nutrients. Furthermore, it is an efficient way of preventing certain diseases and assures a better hormonal balance.<sup>[2]</sup>

**AIM:** "To study the effects of *Ramadan* fasting on anthropometric parameters in healthy volunteers."

**METHOD:** The present study was undertaken to assess the "Effects of *Ramadan* fasting on anthropometric Parameters". It was carried out in the Postgraduate Department of Physiology, Government Medical College, Jammu.

For this study, 100 healthy adult male Muslim volunteers were taken from different mosques in and around Jammu city. The purpose and methodology of tests was explained to the subjects.

Obese subjects with BMI more than 30 and smokers were excluded from study. Subjects with known history of dyslipidemia, hypertension and diabetes mellitus were also excluded from the study.

All the eligible subjects were interviewed by the investigators regarding their age, marital status, personal habits, relevant recent or past medical history, smoking and dietary habits. At the end of the study period, two subjects dropped out because of personal reasons.

Age was recorded in years as per the statement of the subject.<sup>[28]</sup> Weight, waist circumference, height and body mass index, were recorded one week before the start of

month of Ramadan and then in the last week of Ramadan.

The parameters measured were as follows:

- 1. Weight:** Digital weighing scale (Prestige, New Delhi) was used to record the weight. The subjects wearing light clothing were asked to remove the shoes and stand on the centre of the platform. The reading was recorded in kilograms.<sup>[21]</sup>
- 2. Waist circumference:** The waist circumference was measured in centimeters by placing a non-elastic measuring tape at the narrowest point between the iliac crest and lower costal margin.
- 3. Height:** A vertical measuring rod was fixed to the wall and the subjects were asked to remove their shoes and stand on flat floor in front of the measuring rod with feet parallel and heels, buttocks, shoulders and back of head touching the vertical measuring rod. The head was held comfortably erect and the arms were hanging by the sides in natural manner. The horizontal bar of the measuring rod was lowered to touch the head. The height was recorded to the nearest centimeter.<sup>[21]</sup>
- 4. Body mass index (BMI):** Body mass index was calculated as per the standard formula by dividing weight in kilogram by square of height in meters *i.e.*

$$\text{BMI} = \frac{\text{Weight (kg)}}{\text{Height (m}^2\text{)}}$$

Regarding the classification of the subjects in overweight and obese categories, the BMI interpretation used is:-

- BMI <25 : Normal
- BMI 25-30 : Overweight
- BMI >30 : Obese<sup>[41]</sup>

### Statistical Analysis

Data was compiled using computer software MS Excel for Windows. Statistically significant differences among quantitative variables were evaluated using paired 't'-test by using SPSS software ver. 20. A 'p'-value of less than 0.05 was considered as statistically significant.

### RESULT

The study was undertaken on 100 healthy male Muslim volunteers to assess the effects of *Ramadan* fasting on their anthropometric parameters.

Physical parameters studied included: weight, height, body mass index and waist circumference.

- There was statistically insignificant decrease ( $p=0.073$ ) in mean body weight after fasting.
- Waist circumference showed a decrease after fasting as compared to prefasting measurements and it was statistically significant ( $p=0.013$ ).
- BMI showed a minimal decrease after *Ramadan* fasting which was statistically non-significant ( $p=0.054$ ).

The data thus collected was compiled and is presented in the tabulated form as follows:

Table 1 depicts that age of the subjects ranged from 20 years to 74 years. Majority of the subjects belonged to the age group of 20-35 years.

In our study, weight of most of the subjects was in the range of 39 kg to 90.5 kg. The table2 depicts that mean value of weight before fasting was  $65.27 \pm 12.59$  kg and after fasting it was  $62.51 \pm 12.48$  kg. An average weight loss of 2 to 3 kg was observed after one month of fasting.

Although there was a decrease in overall mean weight of subjects after fasting but this decrease was not statistically significant ( $p=0.073$ ).

A waist circumference in the range of 53.5 to 101.5 cm was observed in subjects before fasting in this study. Two subjects had waist circumference of 106.5 cm, one 109 cm and another 112 cm. An overall decrease of about 4 to 8 cm was observed post *Ramadan* fasting.

Table 2 depicts mean value of waist circumference. Before fasting the mean waist circumference was  $82.45 \pm 14.02$  cm and it came down to  $77.95 \pm 13.63$  cm after fasting. An overall decrease of about 4 to 8 cm was observed post *Ramadan* fasting.

This difference in the overall mean waist circumference is statistically significant ( $p=0.013$ ).

In our study, BMI varied between  $14.67 \text{ kg/m}^2$  to  $30.44 \text{ kg/m}^2$ . There was not much change in these values after one month of fasting.

Table2 depicts overall mean body mass index of subjects. Before fasting it was  $24.23 \pm 4.20 \text{ kg/m}^2$  and after fasting it was  $23.25 \pm 4.20 \text{ kg/m}^2$ .

Apparently, the values after fasting are slightly on lower side but the difference in the overall mean body mass index is statistically not significant ( $p=0.054$ ).

**Table1: Age Distribution of Subjects (N = 100).**

Age group (in years)	Subjects No. (%)
20 – 35	56 (56.00)
36 – 50	28 (28.00)
51 – 74	16 (16.00)
<b>Total</b>	<b>100 (100.00)</b>

**Table 2: Showing Parameters Studied and Their Significance.**

Pparameter	Bbefore fasting	Aafter fasting	P p value
Wweight	65.27+-12.59	62.51+-12.48	0.073
Wwaist circumference cm	82.45+-14.02	77.95+-13.63	0.013
BBMI Kg/m <sup>2</sup>	24.23+-4.20	23.25+-4.20	0.054

## DISCUSSION

Fasting during the holy month of *Ramadan* is mandatory for all healthy, adult Muslims. It is regarded as an act of worship which confers great blessings and health. As per the religious canons, this fast entails abstention from all substances entering the body from sunrise to sunset and it lasts for one lunar month. Fluid and food intake becomes exclusively nocturnal during the month of *Ramadan* and the dietary pattern changes to one large meal at sunset and one light meal before dawn.<sup>[6]</sup>

During our study period, the average length of fast was about ten and a half to eleven hours daily. In Islamic fasting, there is no malnutrition or inadequate calorie intake. The only difference between *Ramadan* fasting and total fasting is the timing of food: during *Ramadan* those who observe fast miss a lunch, take early breakfast and do not eat until sunset. In other words, *Ramadan* fasting is controlled, partial type of fast.

Depending on socio-economic status, personal choices and climate, the patterns of eating differ. Some people increase their carbohydrate intake while some eat a high calorie snack immediately after breaking their fast, with a large meal an hour or two later and small tit-bits throughout the night.<sup>[13]</sup>

Long lasting modification in the circadian distribution of the eating and sleeping schedule result in various metabolic changes. The *Ramadan* model of fasting is abundantly available but not extensively studied and the physiological changes induced by *Ramadan* fasting are not well known. Although there have been reports on metabolic changes during and after *Ramadan* in healthy subjects<sup>[16]</sup>, the majority of health-specific findings related to *Ramadan* fasting are mixed.<sup>[37]</sup>

The variability in the results is probably attributed to several confounding variables like ethnicity, hours of fasting, climatic conditions, cultural influences, physical activity and most commonly dietary patterns.<sup>[7]</sup> It is often said that the beneficial effects of fasting during *Ramadan* will occur only in people who maintain a diet that is appropriate to them.<sup>[8]</sup>

Our study showed a decrease in weight after fasting. But the observed difference in mean body weight was not found to be statistically significant ( $p > 0.05$ ) when analysed by applying t-test.

Our results are supported by other studies wherein *Ramadan* fasting was seen to have no significant effect on body weight of the subjects and it was concluded that there is no clear effect of *Ramadan* fasting on body

weight. This may be due to short duration of fasting (30 days) and does not inflict any significant change on body weight.<sup>[3,18,27]</sup> It was also reported that overweight persons loose more weight than normal or underweight subjects during *Ramadan* fasting.<sup>[35]</sup>

Our results are in disagreement with some studies, in which a significant decrease in body weight of the fasting subjects was observed.<sup>[38,36]</sup>

The relatively small weight loss found in our study may be explained in part by a mild dehydration due to fluid restriction during *Ramadan* fasting.<sup>[25]</sup>

Alterations in stable weight by forced overfeeding or food deprivation induce physiological changes that resist these perturbations: with weight loss, appetite increases and energy expenditure falls; with overfeeding, appetite falls and energy expenditure increases.<sup>[14]</sup>

In a study by that covered 117 school children comprising 51 boys and 66 girls from Malayasia it was found that estimates of energy intake were significantly lower during fasting compared with non-fasting, while overall activity pattern remained relatively similar. This results in negative energy balance, hence weight loss.<sup>[29]</sup>

Waist circumference is a reflection of abdominal adiposity. It is an important component of the diagnostic criteria for the metabolic syndrome.

In our study, mean waist circumference after fasting was significantly reduced. The reason for this reduction in waist circumference may be due to reduction in energy intake and loss of body fat.<sup>[5]</sup>

Similar observations have been made in other studies and it was reported that both in males and females waist circumference was decreased significantly concluding that the decrease in waist circumference and body weight could be attributed to efficient utilisation of body fat largely from abdominal fat during fasting.<sup>[33,10,32]</sup>

Our results are in agreement previous studies which reported a significant decrease in waist circumference after *Ramadan* fasting and concluded that *Ramadan* fasting is a healthy method for improving chronic heart disease risk profile. They observed that it caused a significant reduction in weight and BMI in men and waist circumference in women.<sup>[17,34,11]</sup>

Waist circumference is a more accurate reflection of visceral obesity, which is more strongly associated with insulin resistance, hypertension and dyslipidemia and is a

better predictor than body mass index of vascular events such as stroke.<sup>[15,40,31]</sup>

Obesity is becoming a major nutritional problem. It is generally agreed that obesity is associated with significant morbidity and reduced life expectancy due to co-morbid conditions such as hypertension, hyperlipidaemia and type-2 diabetes. Obesity, in addition to heredity, emerges from over-eating and sedentary lifestyle. Islamic fasting could be a safe approach for prevention and treatment of obesity.<sup>[23]</sup>

Obesity has been recognized as a serious risk factor for mortality and morbidity of cardiovascular diseases in general population and it has been demonstrated that cardiovascular disease related morbidity and mortality might be affected not only by the total amount of fat but also by the regional distribution of body fat.<sup>[19,22,39]</sup>

Subsequent epidemiological reports have established that abdominal fat accumulation increases the incidence of cardiovascular disease and death.<sup>[9]</sup> Hence, the reduction in waist circumference observed after fasting may translate into a significant health benefit for those who fast.<sup>[33]</sup> The body has regulatory mechanisms that get activated during fasting. There is efficient utilization of body fat.<sup>[10]</sup> Basal metabolism slows down during *Ramadan* fasting.<sup>[20]</sup>

BMI is the most widely used method to gauge generalised obesity. In our study, there was a decrease in BMI after fasting but the difference was not statistically significant ( $p=0.054$ ).

In general, any loss in body mass is relatively small and it may be attributed to a decrease of glycogen bound water stores, extracellular volume contraction secondary to a lower sodium intake and a moderate degree of hypohydration with little loss of body tissue.<sup>[25]</sup>

In a study in Israel it was observed that the caloric content and distribution of nutrients of food consumed before and during *Ramadan* was not significantly different, hence unchanged BMI.<sup>[26]</sup>

Our results are in agreement with various studies conducted in which the subjects showed no significant loss of body mass.<sup>[24,1,30,12]</sup>

## CONCLUSION

During the month of *Ramadan*, the pattern of food and water intake is altered. There are some known medical benefits of fasting. Fasting in general has been used in medicine for reasons including weight management, for providing rest to the digestive tract and for lowering lipids. Decrease in waist circumference results in decrease in obesity which can be beneficial in preventing various ailments like metabolic syndrome, cardiovascular diseases and needs further investigation.

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