

# Fasting in Ramaḍān

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## Abstract

*This article reviews research that has been done on fasting during the holy month of Ramaḍān. In certain instances conflicting results have been reported.*

**Key words:** *Fasting, Ramaḍān, metabolic effects*

Fasting was prescribed before Islam, by other religions and even atheists. In Islam, fasting in the holy month of Ramaḍān means abstinence from food, drink and sex from dawn to sunset. This averages about 15 hours daily for one lunar month. This is one of the five pillars of Islam. Exemption from fasting is allowed for travellers, the sick, for pregnant, menstruating, or lactating women, and youngsters before puberty. Travellers may fast when they return to their homes. The sick should consult their doctor to see if fasting could have an adverse effect on their condition.

Research about the effects of fasting in Ramaḍān is scanty and so controversy about the effects of fasting in Ramaḍān exists.

In 1961, Khaleque et al<sup>1</sup> studied the eosinophil count as an index of emotional stress, and showed that fasting in Ramaḍān, especially on the first day where the greatest change in life style occurs, is not associated with a significant change in the eosinophil count. They, therefore, concluded that fasting is not a form of stress with emotional disturbance.

Regarding the metabolic effects of fasting in

Ramaḍān, Gumaa et al<sup>2</sup> in 1978 reported an increase in uric acid and triglyceride. They attributed the increase in uric acid secondary to that of the lipid while there was a decrease in cholesterol. On the other hand, in 1982, Fedail et al<sup>3</sup> reported a significant increase in the levels of total serum cholesterol and uric acid, and significant fall in body weight without a significant change in total serum triglycerides. Shoukry<sup>4</sup> and Hazmi et al<sup>5</sup> also reported an increase in plasma cholesterol as well as cholesterol concentrations in the low density lipoproteins (LDL) and the very low density lipoprotein (VLDL).

Fluid and electrolyte balance were studied by Mustafa and his colleagues in 1978.<sup>6</sup> The study showed a decrease in total excretion of sodium, particularly during the day. Although energy deprivation leads to natriuresis,<sup>7</sup> they attributed this to the effect of ADH in dehydrated subjects described by Leaf et al.<sup>8</sup> They also found an insignificant change in the levels of serum osmolality in spite of an increase in the urine concentration, and a decrease in urine volume by day with the retention of salt.

The problem of diabetes mellitus has been studied more intensively. The studies in Birmingham have shown little change in a fasting Muslim's diabetic control, a low attendance to a diabetic clinic, and no increase in the incidence of admission to hospitals for uncontrolled diabetes during Ramaḍān.<sup>9</sup>

Khogeer et al<sup>10</sup> in 1987 studied 52 diabetics, 20 insulin dependents (IDD) and 32 non-insulin dependents (NIDD). Among the NIDD, 15 patients lost weight and their glucose levels were lower than prefasting levels. Among the IDD, one group had a

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10% reduction in insulin requirements, and, although seven of them lost weight, there was an elevation of the level of glucose for the whole group. They therefore advised special care for diabetics who fasted during the holy month of Ramaḍān.

In a comprehensive appraisal by Sulimani et al,<sup>11</sup> some precautions were made regarding those diabetics who should be advised not to fast. This included those who were:

1. prone to ketosis
2. brittle with wide swings in blood glucose
3. pregnant
4. young children with diabetes
5. having serious complications, eg., renal insufficiency or ischemic heart disease
6. having serious illnesses, eg., severe sepsis or congestive heart failure.

Patients on chronic hemodialysis were studied by Khader et al.<sup>12</sup> No significant changes were seen in plasma urea, creatinine, sodium, bicarbonate, phosphorus, and calcium, but there was a significant rise in potassium during Ramaḍān due to an excessive intake of potassium rich fluids after breaking the fast.

A significant increase in serum thyroxine was reported by Fedail et al<sup>13</sup> during fasting while Sulimani<sup>13</sup> showed that there were no significant differences in the thyroid function tests, including plasma T<sub>4</sub>, T<sub>3</sub>, free T<sub>4</sub>, and TSH) between the morning and evening (after 14 hours' fast). Also, there were no significant changes in these tests done before and at the end of Ramaḍān.

Abbas et al<sup>14</sup> in 1986, studied the effects of a Ramaḍān fast on male fertility. They showed there was an improvement in sperm count, gonadotrophic hormone levels and testosterone in healthy men, while the seminal quality of azoospermic stayed the same. There was a significant rise in LH during the fast among normozoospermics and a fall after the fast. No significant change was seen in LH levels among oligozoospermics. In the azoospermics, there was a significant reduction in LH during )fast.

As for prolactin, it increased during fasting in normozoospermics, oligozoospermics, and azoospermics although the prefasting levels for prolactin were 75 + 43, 109 + 79, and 310 + 42 in the normozoospermics, oligozoospermics, and azoospermics, respectively, showing a high level of prolactin in the oligozoospermics and azoospermics before starting the fast. Testosterone showed a nonsignificant elevation during the fasting month in all groups.

Prentice<sup>15</sup> in 1983, studied the effect of fasting during Ramaḍān in pregnant and lactating women, even though such women are exempted from fasting. The study was carried out in a rural West African village. It showed that Ramaḍān fasting glucose concentrations for lactating women were not lower than pre Ramaḍān. Free fatty acids were found paradoxically

lower than in nonpregnant, nonlactating controls. They attributed this to physical effort spent by the nonlactators while working in the farm during the Ramaḍān fast. Fasting pregnant women showed lower glucose concentrations and higher free fatty acids in late compared to early pregnancy. The outcome of these pregnancies was poor. Abortion and still birth and the phenomenon of "accelerated starvation"<sup>16</sup> was stressed. The conclusion was that fasting during pregnancy is highly undesirable.

Aslam and Healy<sup>17</sup> have shown that drug regimens may be affected during fasting the holy month of Ramaḍān.

Husain et al<sup>18</sup> studied anthropometric variables in fasting Malaysian Muslims. They found that fasting during the holy month of Ramaḍān led to a decrease in body mass and a reduction in energy intake. Females had greater reductions than males, in body weight and subcutaneous fat. On the other hand, males experienced a greater reduction than females in the resting heart rate. Unlike Mustafa et al,<sup>6</sup> this study did not show a negative fluid balance initially and attributed this to perhaps a more humid atmosphere than in Sudan.

From this review of the literature the following may be concluded:

1. The metabolic and clinical effects of fasting in Ramaḍān have not been well studied, and most studies have been conducted without adequate controls.
2. Dietary composition and overeating:  
What happens after breaking the fast has not been fully stressed. Fasting is associated with an adaptive response in circulating substrates and hormones. A reduced sympathetic activity<sup>19</sup> permits the body to adapt to the low intake of energy. Refeeding may lead to a reduction, at least temporarily, in the capacity of the cells to utilize lipids from the circulating lipoproteins.<sup>20</sup> Therefore, the elevation in lipids seen during fasting<sup>4,5</sup> may be due to overeating after breaking the fast. Again, the controversial results of thyroid function tests could well be explained as being the result of variation in dietary composition.<sup>13</sup>
3. While fasting is more or less standard, what people eat after breaking their fast has to be investigated.
4. It has also been noticed that environmental factors such as the degree of humidity may effect the results and/or the interpretation. We have seen that in Sudan a negative fluid balance was observed initially,<sup>6</sup> while in Malaysia this did not take place.<sup>13</sup>
5. Regarding the effect of fasting on pregnancy and lactation, one ought to know that women who are pregnant on lactating are exempted, no matter how the social environment encourages them.

Perhaps the sad outcome of pregnancy in the West African village<sup>15</sup> reflects the wisdom the Islamic teaching, especially at later stages of pregnancy.

6. As for those Muslims who fast during the holy month of Ramaḍān and who are taking medicines, the importance of sticking to the medicine with a sympathetic understanding by the physician, probably helps them to perform a religious duty. Also, finding alternatives for them in spreading their medicines after they break their fast could possibly be arranged.
7. Collaborative efforts from fasters, Muslim scholars and physicians (Muslim and non-Muslim) are required for patients who are at risk.

Fasting disciplines the physical and moral injunctions and it develops tolerance and patience; therefore, the moral and physical benefits require accurate and controlled studies. Moreover, Islamic teaching from the Holy Qur'ān and the Sunnah should not to be tested.

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#### References:

1. Khaleque KA, Muazzam MG, Chowdhury RI. Stress in Ramaḍān fasting. *J Trop Med Hyg* 1961; 64:277-279.
2. Gumaa KA, Mustafa KY, Mahmoud NA, Gader AMA. The effects of fasting in Ramaḍān. *Br J Nutr* 1978; 40:573.
3. Fedail SS, Murphy D, Salih SY, et al. Changes in certain blood constituents during Ramaḍān. *The Am J Clin Nutr* 1982; 36: 350-353.
4. Shoukry MI. Effects of fasting in Ramaḍān on plasma lipoproteins and apoproteins. *Saudi Med J* 1986; 7(6): 561-565.
5. Hazmi MAF, El Faleh F, Al Mofleh I. Effect of Ramaḍān fasting on the values of haematological and biochemical parameters. *Saudi Med J* 1987; 8 (2): 171-176.
6. Mustafa KY, Mahmoud NA, Gumaa KA, Gader

- AMA. The effects of fasting in Ramaḍān. *Br J Nutr* 1978; 40: 583.
7. Chinn RH, Brown JJ, Fraser R, et al. *Clin Sci* 1970; 39:437.
8. Leaf A, Batter FC, Santos RF, Wrong O. *J Clin Invest* 1953; 32:868.
9. Barber SG, Sebastian Fairweather, Wright AD, et al. Muslims, Ramaḍān and diabetes mellitus. *BMJ* 1979; 7: 4647.
10. Khogeer Y, Sulaiman MI, Al Fayez SF Ramaḍān fasting and diabetic safety, and state of control. *Annals of Saudi Medicine* 1987; 7: 56.
11. Sulimani RA, Famuyiwa FO, Laajam MA. Diabetes mellitus and Ramaḍān fasting: The need for critical appraisal. *Diabetic Medicine* 1988; 5: 589-591.
12. Khader AA, Al Ghamdi A, Hasoni MK, Al Dhar JM. Implications of fasting in Ramaḍān in patients on chronic hemodialysis. *Annals of Saudi Medicine* 1988; 8 (6): 518A.
13. Sulimani RA. The effects of Ramaḍān fasting on thyroid functions in healthy male subjects. *Nutr Res* 1988; 8: 549-552.
14. Abbas SM, Basalamah AH. Effects of Ramaḍān fast on male fertility. *Archives of Andrology* 1986; 16 (2); 161-166.
15. Prentice AM, Lamb WH, Lunn PG, Austin S. Metabolic consequences of fasting during Ramaḍān in pregnant and lactating women. *Human Nutr: Clinical Nutrition* 1986; 37C: 283-294.
16. Metzger BE, Ravnika V, Vileisis RA, Freinkel N. Accelerated starvation and the skipped breakfast in late normal pregnancy. *Lancet* 1982; 1: 588-592.
17. Aslam M, Healy MA. Compliance and drug therapy in fasting Muslim patients. *Hosp Pharm* 1986; 11: 321-325.
18. Husain R, Duncan MT, Cheah SH, Ching SL. Effects of fasting in Ramaḍān on tropical Asiatic Muslims. *Brit Nutr* 1987; 58: 41-48.
19. Young JB, Landsbert L. Suppression of the sympathetic nervous system during fasting. *Science* 1977; 196: 1473-1475.
20. Recent Advance in Obesity Research: III Proceedings of the 3rd International Congress on Obesity. October, 1980, Rome, Italy.