

**RAMADAN FASTING: IMPACT ON METABOLIC PROFILE, GLYCEMIC CONTROL,
MEAL AND SLEEP PATTERN****Dr. Abdulazim A. Junaidi^{1*} and Dr. Mehraj Junedi²**¹Lecturer, Department of Biochemistry, Tata Memorial Hospital, Mumbai, Maharashtra, India.²Assistant Professor, Department of Biochemistry, Government Medical College, Jalgaon, Maharashtra, India.***Corresponding Author: Dr. Abdulazim A. Junaidi**

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ABSTRACT

Background: Ramadan is the 9th month of the lunar calendar. Fasting during the holy month of Ramadan is a religious obligation for all Muslims who represent 1.8 billion of the world population (24%). Ramadan fasting can be considered as a strategy for managing and improving the health of diabetic patients. Also, Ramadan fasting is not associated with any change in incidence of acute cardiac illness and the majority of cardiac patients can fast without any difficulty. Improvement in lipid profile, especially 30% to 40% increment in high-density lipoprotein.

KEYWORD: Ramadan, fasting, HbA1C, Glycemic control, lifestyle, diet.

INTRODUCTION

Ramadan is a holy month in the Islamic calendar during which Muslims all over the world observe a fast between dawn and sunset.^[1] Indeed, fasting is one of the five pillars of Islam. However, when fasting may significantly affect the health of the faster or when a subject is sick, Islam exempts that person from fasting. It has been estimated that 40–50 million individuals with diabetes fast during the month of Ramadan.^[2] Ramadan fasting entails major changes in dietary patterns and frequency. These changes could potentially induce metabolic alterations in both healthy and diseased Muslims.^[3] Despite taking fewer meals, this practice is usually compensated by ingesting large amounts of sugary food and drinks that are high in carbohydrates and fats, especially when breaking the fast.^[4] Education regarding medications, risks of fasting, indications to break fasting, meal plans, and exercise were not provided in the majority. Therapeutic changes were made in 50% and 46% of insulin and oral medication users, respectively. Excessive thirst was the most commonly reported symptom. The overall frequency of hypoglycemia and hyperglycemia was low. Among diabetic patients whose doses of oral hypoglycemic agents (OHA) were modified during Ramadan, 58% had changed the timings of the administration of their medications.^[5]

Effect on HbA1C^[6]

HbA1c is an important marker for long term control of Diabetes mellitus. It reflects glycemic control in Muslim patients during Ramadan. It gives a more reliable reflection of the average plasma glucose concentration

over 8–12 weeks. A significant reduction of 0.3% in mean HbA1c was observed during Ramadan fasting. A larger reduction in HbA1c among those with adjustments to their dose of antidiabetic agents.

Dose Adjustment in relation to Glucose Control

People who received adjustments to antidiabetic drug doses during Ramadan achieved better glucose control.^[7] Those with adjustments to their dose of OHA experienced a larger reduction in their level of fructosamine ($\mu\text{mol/L}$) than those with no adjustment to their OHA dose ($\mu\text{mol/L}$) during Ramadan.^[8] A larger reduction in HbA1c among those with adjustments to their dose of antidiabetic agents. Indeed, the attempt to mimic the physiological secretion of insulin by adjusting the dose during Ramadan may have contributed to the improvement in glycemia.

Diet and Physical Activity in relation to Glucose Control

During Ramadan, dietary intakes are reduced but this surprisingly does not contribute to a reduction in glycemia. One possible reason could be that there is a reduction in dietary intakes due to the reduction in meal frequency but that daily caloric intakes may have remained the same throughout Ramadan. Overall caloric consumption remained unchanged even though the number of meals was reduced to twice daily during the fasting month.^[9] In addition, there are no change in physical activities during Ramadan; hence, the effect of physical activity on glycemia may be very small in this population.

Influence of fasting on body weight and tissue masses.^[10]

At the end of Ramadan, has been associated with a loss of body fat with significant decrease of fat mass, both in the middle and towards the end of the month of fasting, without statistical changes in body muscular and water masses. This influence of Ramadan could be attributed to a diurnal mobilization of reserves, following the strictly nocturnal meals timing.

Impact of Ramadan on timing of meals and sleep patterns

Regarding the impact of Ramadan on the lifestyle of fasting, there is reduction in the number of meals. This reduction had no impact on daily energy intake which remained unchanged. This finding supports the stability of body weight.^[11] The regularity in the timing of strictly nocturnal meals could increase the synchronization between the rhythm of food intake, on one hand and those of other related endogenous functions. The sleep rhythm was significantly delayed with a reduction in sleep duration. However, the rhythm of sleep had a great importance in the stability of endogenous functions rhythms.^[12] It is important to note that these changes in both styles of sleep and food intake had no significant effects on the circadian rhythm of cortisol and biomarkers of endogenous periodicity.^[13] Hence, the changes induced by the Ramadan lifestyle had no effect on endogenous spontaneous "biological-clock".

Effect on Glycemic control

During Ramadan fasting, the decrease in blood glucose levels triggers compensatory mechanisms in the body of healthy individuals which cause a reduction in insulin secretion or the breakdown of stored glycogen to prevent hypoglycemia.^[14] However, in patients with diabetes, this regulation is compromised due to either a dysfunction of insulin secretion or sensitivity or occasionally both.^[15] Fasts may influence the body's homeostatic rhythms and in those taking chronic medications, fasts may upset established pharmacokinetic and pharmacodynamics disposition patterns of medications. Fasting has the potential to affect glucose control of patients who have diabetes mellitus and it can disrupt the actions of antidiabetic medications. The large proportion of both type 1 and type 2 diabetic subjects who fast during Ramadan represent a challenge to their physicians. There is a need to provide more intensive education before fasting, to disseminate guidelines, and to propose further studies assessing the impact of fasting on morbidity and mortality. Fasting people usually have a post-fast meal (Iftar) after sunset and a pre-fast meal before sunrise (spelt varying in English as Sohour, Suhoor, Suhur, or Sehri).

Influence of Ramadan fasting on Lipid level

Ramadan is capable of reducing the index of atherogenicity in fasters. Therefore, this model of intermittent fasting, characterized by strictly nocturnal

food intake, could provide an opportunity to reduce the risk of cardio-vascular disease by increasing the fraction of "good" cholesterol HDL-C against a decrease in "bad" cholesterol LDL-C.^[16]

CONCLUSION

Ramadan fasting improve glycemic control among population with minimal hypoglycemic events. The improvement in HbA1c is more notable in patients whose medications are adjusted in an attempt to mimic the physiological secretion of insulin throughout the fasting period. During Ramadan, clinicians should individualize the dosing of antidiabetic agents especially in person who intend to fast. Diabetic patients can fast after consultation with their physicians. Indeed, Ramadan fasting can be considered as a strategy for managing and improving the health of diabetic patients. Strictly nocturnal food intake can cause, before adaptation, some significant changes in the studied biological variables. Indeed, the observed changes during the first week could be attributed to the desynchronization between the rhythm of Ramadan and food bio-periodicity endogenous. As for the attenuation in the amplitudes of the detected variations between the beginning and the end of the month, this supports the hypothesis of adaptation of these functions, each characterized by a spontaneous circadian rhythm. This adjustment will result in better mobilization of reserves and adjustment responses of body to reverse the rate of food intake. Besides, all variations induced by the diurnal fasting remain in biologic norm limits. In addition, it is important to note that some of the consequences of these, especially food intake rhythm, are beneficial, particularly the improvement in the assessment of plasma lipid levels.

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