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RAMADAN & DIABETES CARE



3rd Edition

Editors
Abdul H Zargar
Sanjay Kalra

JAYPEE

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10 CHAPTER

Physical Activity in Ramadan

Altamash Shaikh

Abstract

Despite being of a proven benefit in diabetes, exercise is one of the less implemented tools in clinical practice. The goal is to provide a simple regimen to accommodate the needs of fasting in Ramadan and to avoid hypoglycemia, hyperglycemia, and hypovolemia. Meals should be also planned accordingly. Risk of thrombosis in high-risk group patients such as laborers, elderly, and with other risk factors should be addressed specifically, to prevent dehydration and hyperviscosity. However, professional sports have been played and with their training in the late evening hours. Timing of exercise in others can be as per their change of schedule in Ramadan. Aerobic and resistance, both types of exercise can be prescribed in Ramadan.

INTRODUCTION

Despite being of a proven benefit in diabetes, exercise is one of the less implemented tools in clinical practice. Exercise in Ramadan represents a big challenge to the treating physician/endocrinologist. Regular physical activity is a must for all diabetic patients who desire the best glycemic control. Exercise improves glycosylated hemoglobin, (HbA1c) lipid profile (triglycerides), and also lowers cardiovascular risk. The need for doing physical activity and the risk involved in excessive exercise need not be over emphasized.

PATHOPHYSIOLOGY OF EXERCISE IN DIABETES AND RAMADAN

There is a defect in functional exercise capacity in both type 1 and 2 diabetes mellitus (T1DM and T2DM) patients. This is generally manifested as reduction in oxygen uptake, and also in maximal oxygen consumption peak. Apart from clinical signs, there is increase in hematocrit, hemoglobin, and plasma osmolarity as markers of dehydration during fasting in Ramadan.[1] Exercise in the postprandial period in Ramadan reduces the oxidative stress and carbonyl stress, and also

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decreases average glucose, mean amplitude of glycemic excursion (MAGE), and mean postprandial glycemic excursion (MPPGE).[2]

EXERCISE, SPORTSMANSHIP, AND RAMADAN

In several Muslim countries, the professional sports and the special Ramadan cup tournaments and matches are held 2–3 hours post-sunset meal (*Iftar*) or even in the late night.[3] In young collegiate wrestlers, Ramadan fasting had positive effects on body composition and lipid profile.[4] In the fasting state, there is a state of carbohydrate "stress", when the muscle promptly utilizes lipid as alternate sources of energy and spares glucose for the brain. The muscle gets adapted to this refeeding/fasting in Ramadan, utilizing lipids and is stronger if exercise is continued in Ramadan.[5]

Goals: Exercise and Ramadan

The simple goal of exercise in Ramadan is to provide a regimen suiting the daily needs as well as the metabolic demands of patient. Also, utmost care should be taken to avoid hypovolemia, hypoglycemia, and hyperglycemia to give a flexible adjustment of daily schedule for the patient in Ramadan. This will also help the treating doctor to continuously help the patients to understand and realize the importance of exercise in the management of diabetes.

Pre-exercise Evaluation and Ramadan

Every diabetic individual should undergo pre-exercise evaluation. This includes assessment of glucose control, enquiry of hypoglycemia (recurrent or unawareness), review of medications (oral or insulin regimen), and also evaluate for complications (cardiac, neuropathy, retinopathy, and/or nephropathy). Generally, stress test is done to document the safety, however, with the exception of young patient with low cardiovascular risk profile. The exercise prescription can be broadly divided as frequency, intensity, type, and timing of exercise during Ramadan.

Exercise Type/Time in Diabetes and Ramadan

In Ramadan, there is tendency toward decreased physical activity both in T1DM and T2DM patients, as shown in Epidemiology of Diabetes and Ramadan (EPIDIAR) study.[6] American Diabetes Association recommends aerobic and resistance exercise for diabetes. Although, it should be individualized, certain principles need to be followed. It is important to monitor the patient during start of a new exercise plan including blood glucose monitoring. Aerobic exercise should focus on large muscle and non-weight bearing, e.g., walking or cycling. This improves glycemic control and insulin sensitivity. If type of exercise chosen is accessible and does not alter the daily schedule in Ramadan, patients' adherence to exercise also improves. This should also be done, keeping in mind the attitude of patients and family members towards diabetes and exercise.[7]

In general, patients can do moderate intensity exercise depending on their changed pattern of eating, working, and sleeping. This can be post-sunset meal (*Iftar*), or post-*Tarawih* prayers, or even after midnight (*Tahajjud*) prayers [prior to sunrise

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meal (*Suhoor*)]. Exercise time should be adjusted also in polar regions as the duration of fast may be too long or short.

Exercise, Hypoglycemia, and Ramadan

Prevention of hypoglycemia is the mainstay of treatment in diabetic patients in Ramadan. Extreme care must be taken while advising any form of physical activity to prevent hypoglycemia. It is noted in clinical practice that intense or excessive exercise leads to high chances of hypoglycemia. Also, in patients with severe hypoglycemia, physical activity changes were the important factors in EPIDIAR study. At all levels of prescription, exercise should not be advocated in the hours before sunset meal (*Iftar*) irrespective of patients on diet, oral, or insulin regimen. Should hypoglycemia be detected or impending, fast should be broken (see chapter "Insulin in Type 2 Diabetes Mellitus" for detail).

Exercise, Diet-controlled Diabetes, and Ramadan

This group of diabetic patients would always want to fast in Ramadan as they feel just diet restriction will not hamper the glycemic control. In them, their normal physical activity should be maintained as part of exercise prescription. Nevertheless, if they indulge in overeating their meals should be divided in smaller frequent portions post-sunset meal (*Iftar*) to avoid hyperglycemia. This can be accomplished by rescheduling the frequency and intensity of exercise regimen.

Exercise, *Tarawih* Prayer, and Ramadan

Prayer (*Namaz*) involves movements such as bending, bowing, kneeling, and rising in repeated cycles. One to two hours after sunset meal (*Iftar*) is the daily night (*Isha*) prayer immediately followed by special Ramadan prayer called as *Tarawih* prayer. If performed, this is considered as a part of daily exercise program for the individual.[8] However, depending on other comorbidities, this may not suffice for the daily exercise program.

Exercise in the form of *Tarawih* prayer can mitigate the harmful effects of hyperglycemia. In a recent study, prayer movements were shown to reduce the MPPGE due to its effect on glucose transporter type 4 and hence, glucose transport.[2]

The mean blood glucose at fasting was lower even in pregnant patients those had less calories as a part of fasting and who performed *Tarawih* prayer, as a part of daily exercise in Ramadan.[9]

Exercise, Hyperglycemia, and Ramadan

Not only in some poorly controlled T1DM, but also in some T2DM patients, there can be exercise induced hyperglycemia. High intensity exercise in T2DM can inflict a hyperglycemic response due to intense counterregulatory response of glucagon and epinephrine, whereas with long duration of T2DM, the insulin response is reduced, thus also leading to exercise induced hyperglycemia. So, when initiating a new exercise plan during Ramadan, the blood glucose should be checked before, during,

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and post exercise. The management plan must be highly individualized, to watch for any exercise-induced hyperglycemia and avoid iatrogenic complications.

ROLE OF PHYSICAL ACTIVITY, WEIGHT, AND RAMADAN

Diabetes patients report weight gain in Ramadan attributable to physical inactivity,[10] this is generally due to fear of hypoglycemia, that the patient wants to avoid and becomes inactive. However, there is beneficial effect on weight and body composition in body builders whether they do exercise while fasting or post-sunset meal (*Iftar*).[11]

Exercise, Physical Labor, and Ramadan

Patients with diabetes who are physical laborers and fast during Ramadan belong to very high-risk group. Fluid restriction at the time of fast, especially in hot climatic conditions and in regions of extreme summer season increases the risk of dehydration and is more in patient who do laborious work.

Exercise, Dehydration, and Ramadan

Diabetic patients who fast in Ramadan are at increased risk of developing thrombosis due to fluid restriction, consequent to volume depletion during the fasting hours; and the excessive perspiration.[12] This could lead to thrombotic events in diabetic patients with risk factors, hence antiplatelet drugs may be started in such patients. If blood glucose is uncontrolled, it may further add to electrolyte imbalance and osmotic disturbances. Thus, extreme climate, physical labor, and prolonged fasting hours must be specifically looked into while managing such patients. Adequate hydration must be assessed and addressed at each visit whether pre-Ramadan or if need be during Ramadan. Dose and/or the type of antihypertensive medication must be adjusted to avoid hypervolemia and hypotension, especially in summer season. With specific avoidance of diuretics in Ramadan for some patients, others may be used in Ramadan.

BENEFITS OF PHYSICAL ACTIVITY AND RAMADAN

- Provides a dialect between patients and physician
- Better chance of diabetes education
- Improves insulin sensitivity
- Improvement in blood glucose and HbA1c
- Improvement in MAGE and MPPGE
- Lipid utilization while exercise training, better lipid profile
- Body weight and composition improve
- Improved mobility

RECOMMENDATIONS FOR PHYSICAL ACTIVITY IN RAMADAN

The recommendations for physical activity in Ramadan are given in **Table 1**.

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TABLE 1: Physical activity recommendations during Ramadan.

Before Ramadan	During Ramadan
On diet and exercise control	Modifying frequency and intensity of physical activity, e.g., 2 hours post-sunset meal (*Iftar*); ensure adequate fluid intake
Type 2 diabetes mellitus: Oral or insulin regimen	Avoid exercise pre-sunset meal (*Iftar*); ensure adequate fluid intake
Type 1 diabetes mellitus	Highly individualized; avoid intense exercise
Glucose monitoring	Pre and postexercise in susceptible patients
Fluid intake timing	Plenty of fluids during and after sunset meal (*Iftar*) to avoid dehydration and its consequences
Preferable mode of exercise	• Maintain normal daily routine, walking, stationary cycling • If performed *Tarawih* prayers
Exercise timing (depending on the work pattern during Ramadan)	• After sunset meal (*Iftar*) • After night (*Isha*) prayer • After midnight (*Tahajjud*) prayer
Dehydration and Ramadan	• Reduce dose/adjust antihypertensives • Avoid diuretics • May consider antiplatelets

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CONCLUSION

Physical activity, exercise, and sports can be practiced, albeit in moderation, during the month of Ramadan, strenuous activity should be avoided in the fasting period, especially during the latter half. Exercise may be done after the *Iftar* meal. The *Tarawih* prayers are a useful way of ensuring both spiritual and physical health. Offering the complete set of prayers is equivalent to practising moderate intensity exercise for roughly 80–90 minutes. People who exercise during Ramadan must be mindful of their fluid, electrolyte, and caloric intake.

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Key Features

- The third edition of "Ramadan and Diabetes Care" offers in-depth explanations of how fasting affects diabetics' physiology and the complexities of managing diabetes during Ramadan
- The success of the first and second editions served as inspiration for the third version, which contains the most recent clinical knowledge and recommendations for diabetics fasting throughout Ramadan
- Additional chapters on using technology for safe fasting and diabetic-friendly Ramadan recipes
- Includes diabetes treatment for specific populations such as children, adolescents, women, and the elderly during Ramadan
- Diabetes management in the presence of comorbid conditions during the holy month of Ramadan is also elaborated upon
- Written by professionals from around the world with experience in handling person living with diabetes during the holy month of Ramadan
- A valuable resource for diabetologists, physicians, and postgraduate students

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