

Potential of the Month of Ramadan as a Non-Pharmacological Strategy for Preventing, Managing, and Reversing Type 2 diabetes

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Diabetes Mellitus (DM) is a chronic metabolic disorder characterised by an absence of insulin or a deficiency in its production, and/or decrease in the sensitivity of cells to insulin [1]. In 2019, it was estimated that 463 million adults (aged 20-79 years) had diabetes worldwide, and it is expected to reach 700 million by 2045 [2]. According to the American Diabetes Association [1], DM is classified into four types, and type 2 diabetes mellitus (T2DM) is the most predominant type, which is estimated to account for 90% of all individuals with diabetes [2]. T2DM is associated with serious medical complications if left untreated, such as increased risk of cardiovascular diseases, macrovascular disease, microvascular disease, mortality and amputation [3-6]. There are risk factors that contribute to the development of T2DM or cause prediabetes, which is a condition indicating people with blood glucose levels that are bordering on a diabetes diagnosis (higher than normal levels, but low for a diabetes diagnosis). Prediabetic individuals have a 5 to 10 % higher risk of incidence of developing T2DM in the future compared to normoglycemic people [7]. These risk factors include weight gain and obesity [8], unhealthy diet [9], physical inactivity [10] and poor sleeping patterns [11], all of which are modifiable.

Non-pharmacological approaches such as intermittent fasting (IF) and improved lifestyle have been found to be effective in the management of T2DM [12]. IF refers to eating on a restricted schedule, or totally abstaining from food, drinks, and calories for a period, which is sometimes practised as a religious ritual. The lifestyle intervention in the Diabetes Prevention Programme (DPP) study, indicated a delayed incidence of developing T2DM in people at high risk [13]. The lifestyle intervention in this study included a reduction in weight by at least 7% with a low calorie diet, and regular physical activity for a minimum of 150 minutes per week [13]; the diet of the intervention group was replaced with a formula diet compromised of 825 - 853 kilo Calories per day for 3 - 5 months. In addition, Lean et al. [14] investigated the possibility of intensive weight management on remission of

T2DM, and reported that nearly half of participants returned to a non-diabetic state and were able to completely discontinue their antidiabetic medications. Therefore, it can be said that better control or even remission of T2DM through a low calorie diets or IF is feasible.

The month of Ramadan, the ninth month of the Islamic calendar, involves a type of IF when Muslims abstain from eating, drinking, smoking and sexual interaction from dawn to dusk each day for 29 or 30 days. Fasting during the month of Ramadan is an obligation for every healthy Muslim, but there are exceptions for people with serious existing medical conditions. Islam encourages people to do their best to maintain a healthy lifestyle, including a safe, and well-balanced diet. One of the purposes of Ramadan fasting is to urge Muslims to be conscious of their wellbeing by providing an excellent opportunity for Muslims to concentrate on returning to a lifestyle that is balanced and stable. Worldwide, Ramadan fasting is observed by more than 1.8 billion Muslims annually, as estimated in 2015 [15], and 148 million of them are diagnosed with DM [16].

IF during Ramadan has been reported to have a positive impact on fasting blood glucose [17], and on HbA1c levels of individuals with diabetes [18,19]. Educational programmes for individuals with T2DM prior to Ramadan fasting have previously generated positive impacts. Individual education programmes before Ramadan fasting that address the roles of diet, physical activity, medications adjustment, diabetes complications, and blood glucose monitoring were assessed in 774 individuals with T2DM from four different countries [20]. In this study, two-thirds of individuals received an individualized education program, while the other third received their usual diabetes care. The group that received the education programme reported improved glycaemic management, reduced incidences of hypoglycaemia during Ramadan, and a reduction in weight. In addition, their HbA1c levels reduced compared to those who did not receive an individual education and just received normal care [20].

Fasting during the month of Ramadan acts in a positive way on T2DM even though there are some negative habits during this month, such as low physical activity and poor sleeping patterns [21]. If these negative habits are reduced, then Ramadan fasting will likely have even better outcomes for health. However, there are some attendant risk factors that alert health practitioners and individuals with diabetes before Ramadan to avoid, or refrain from fasting if those risks threaten the health of diabetics. The most common serious complication during Ramadan fasting in individuals with T2DM is hypoglycaemia [22].

Since IF and restricted calory diets have proved successful in reversing T2DM in some cases, and Ramadan fasting has been reported to have a positive impact on T2DM biomarkers in several studies, the hypoglycaemia reported as a complication during Ramadan may be due to a synergetic effect caused by fasting and use of medication. Despite the positive impacts of fasting during the month of Ramadan on T2DM and the apparent success of treating T2DM through IF, possible exploitation of Ramadan fasting for treating or reversing T2DM is rarely discussed. Such interventions may at least help in delay or stop the risk of developing T2DM in prediabetics, which would enhance the final outcomes of T2DM treatment and prevalence. Therefore, it is suggested that public health bodies should use Ramadan as a vehicle for preventing, managing, and reversing different disease, including diabetes and prediabetes.

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