ORIGINAL ARTICLE

Diabetic Patients Knowledge, Attitudes, and Practices during the Holy Month of Ramadan: A Cross-sectional Study Conducted in Northern Border Region of Saudi Arabia

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Abstract

Fasting during Ramadan is mandatory for all Muslims who are in excellent physical and mental health. During this month, Muslims refrain from eating and drinking from sunrise to sunset. These alterations are likely to result in lower glucose management for diabetic patients. Our objective is to evaluate diabetic patient knowledge, attitudes, and practices in the Holy month of Ramadan. This cross-sectional study was carried out on a random sample of 132 diabetes patients in the Northern Border Region of Saudi Arabia over the course of 2 months (April and May 2024). An Arabic-language online survey was used to gather the data. The Statistical Packages for the Social Sciences (SPSS) software was utilized to conduct descriptive statistical analysis. Among the included sample, there were 39% males and 61% females, 36% were in the age group (36–45 years) and 27% were in the age group (26–35 years). Participants with an university education or higher represented 82%. Those who are married represented 68%. The mean score of participants for the knowledge section was 66%. For the attitude section, it was 66% and for the practice section, it was 81%. In conclusion, there is a significant knowledge and practice gap among diabetes patients about several aspects of their illness that need to be addressed when fasting during the Holy month of Ramadan. Patients with diabetes must take part in pre-Ramadan training courses.

Key words: Cross-sectional study, diabetic patients, knowledge, practices, the holy month of Ramadan

INTRODUCTION

All Muslims who are in good bodily and mental health are required to fast during Ramadan. Muslims abstain from eating and drinking between the hours of sunrise and sunset this month.[1] The majority of Muslims plan to fast, including those who are exempt from fasting, such as children, elderly people, those who are ill, and pregnant.[2] Muslims believe that fasting has some positive impacts on the lipid profile, can help people adopt a healthier lifestyle, and can help people lose weight and quit smoking.[3] Hypoglycemia, hyperglycemia, dehydration, and acute metabolic problems including diabetic ketoacidosis are among the potential health risks associated with fasting.[2]

Muslims are being more and more encouraged to fast during Ramadan. Now, 24% of the world's population maintains a 29–30-day fast during this Holy month. According to some earlier studies, approximately 43% of Muslims with type 1 diabetes mellitus (T1DM) and 79% of Muslims with diabetes fast throughout the month of Ramadan.[4] Of those who fasted during Ramadan, 64% fasted daily and 94.2% fasted for at least

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15 days.[5] Medication schedules for these diabetics must be adjusted to include earlier morning and later evening doses.[6-8] Depending on the country's geographic location, the period of abstinence from foods and beverages varies from 12 to 20 h/day (from dawn to sunset). Over 95% of individuals with diabetes undergo significant lifestyle modifications during the Ramadan fast, such as alterations to meal plans (food consumption) and sleep patterns (duration and quality), which impact physical activity and circadian rhythm.[9,10] All of these alterations are likely to worsen glycemic control in patients with diabetes. An analysis of the pathophysiological changes that take place during Ramadan examined the immediate effects of fasting on biochemical and biometric indicators in diabetics before and throughout the fasting month.

There were significant differences in the treatment options for T2DM and T1DM between those who fasted during Ramadan and those who did not.[11] Of the 349 diabetes individuals who participated in the trial, there was a slight to moderate risk associated with fasting. The dangers associated with metabolism increased before, during, and after Ramadan. Some who had gained weight during Ramadan soon put it back on, if not beyond it. For most diabetics, fasting is associated with worse blood pressure, body weight, and glucose regulation. The second study the researchers conducted examined the effects of fasting on friction-A and glycemic management during Ramadan.

This glycoprotein affected insulin resistance in 37 T2DM patients in a prospective study.[12] Three times were conducted measurements of hemoglobin A1c (HbA1c), fasting blood glucose (FBG), fetuin-A levels, and anthropometric information: Before, during, and after the Ramadan fast. Fetuin-A levels were lower during Ramadan fasting than they were 4 weeks after the fast ended. Two weeks after Ramadan fasting, the authors noticed a small fall in body weight, body mass index, FBG, and HbA1c levels. However, these values rebounded to baseline levels and even surpassed them following Ramadan. Fetuin-A levels associated with fasting during Ramadan significantly decreased after the Holy month.[12]

Around the world, people with diabetes continue to have serious concerns about Ramadan. For this reason, throughout the month of Ramadan, diabetes patients must get education regarding food and medicine.[13] Patients with diabetes may experience severe repercussions if they do not receive the proper care. Pre-Ramadan adjustments as well as patient education are essential to execute self-management strategies that lead to an optimal glucose level.[14] Finding out what diabetic patients know, believe, and do about fasting during Ramadan is crucial to developing effective treatment plans and reducing challenges associated with fasting during the month of Ramadan.[15]

The objective of this study is to evaluate diabetic patient's knowledge, attitudes, and practices during the Holy month of Ramadan in Northern Border Region of Saudi Arabia.

MATERIALS AND METHODS

Study design, duration, and setting

This is a cross-sectional study conducted during a period of 2 months (April and May 2024) in Northern Border region of Saudi Arabia.

Study population

Random sample of 132 diabetic patients.

Inclusion criteria

- Muslim type 1 and type 2 diabetic patients
- Willing to respond to the study questionnaire.

The exclusion criteria

- Non-Muslims
- Patients who are not willing to respond to the questionnaire.

Data collection and data collection tool

The data were collected using a self-administered online questionnaire in Arabic language specially designed for the research purpose.

The questionnaire was divided into three sections:

- First section: To collect participant demographic data
- Second section: To assess patients' understanding of diabetics' fasting during the Holy month of Ramadan
- Third section: To evaluate attitudes about fasting of diabetic patients during the Holy month of Ramadan.

Ethical consideration

The patient's participation and completion of the survey were regarded to be informed consent to the study.

Statistical analysis

All the data in the filled questionnaire were analyzed. Using the SPSS software, descriptive statistical analysis was carried out utilizing frequency and percentages. All data are represented by tables and figures.

RESULTS

Demographic characteristics of participants

39% of the sample included were men and 61% were women. Of the sample, 27% belonged to the 26–35 age group and 36% to the 36–45 age group. Individuals who have completed

college or more represented 82% of the participants, while married individuals represented 68% [Table 1].

Distribution of participants according to their knowledge regarding fasting during the Holy month of Ramadan

As shown in Figure 1a, the majority of participants (84%) knew that Islamic religion allows people with diabetes to fast; 60% knew that receiving an insulin injection during fasting does not break the fast; 82% knew that diabetic patients are not allowed to skip the Suhoor meal during Ramadan; and 71% knew that breaking the fast is advised if blood sugar levels are above 70 mg/dL in the early hours of fasting. 60% knew that fasting is optional for diabetic and pregnant women.

48% knew that mothers with diabetes should not fast when they breastfeed their children. 86% of respondents knew that patients should eat breakfast if they exhibit any noticeable or felt signs of hypoglycemia. 54% of respondents knew that physically demanding activities and fasting should be avoided, 46% knew that Tarawih prayer can be used in place of exercise during Ramadan, and 41% knew that consuming more food at Suhoor would improve blood sugar regulation throughout the day [Figure 1b].

79% of respondents knew that testing blood sugar levels during a fast is permitted, 74% knew that taking medication during Iftar is the best option for diabetics, 86% knew that changing medication dosage and timing is advised for diabetics on a fast, and 38% knew that diabetics are more likely to get bacterial and fungal infections during Ramadan [Figure 1c]. The mean score of participants for the knowledge section was 66% [Figure 1d].

Table 1: Demographic characteristics of participants (*n*=132)

Variable	Categories	Frequency	Percentage
Sex	Male	51	39
	Female	81	61
Age (years)	17–25	21	15
	26–35	36	27
	36–45	48	36
	46–55	22	17
	More than 55	5	4
Education	Master/doctorate	12	9
	University	97	73
	Secondary	21	16
	Intermediate	2	2
Occupation	Governmental	91	69
	Student	19	14
	Private	10	8
	Retired	5	4
	Jobless	7	5
Social status	Married	90	68
	Not married	42	32

Distribution of participants according to their attitudes regarding fasting during the Holy month of Ramadan

According to the attitudes section [Figure 2a], 92% of participants had a positive attitude toward routinely checking their blood sugar during Ramadan, 61% had a positive attitude toward their ability to control their blood sugar, 51% had a positive attitude toward their ability to fast even in the presence of medication, 73% had a positive attitude toward the role that fasting plays in managing diabetes, 79% had a positive attitude toward their ability to fast for the entire month of Ramadan, and 41% had a positive attitude regarding their ability to carry out their regular activities during fasting. The participants' mean score was 87 (66%) [Figure 2b].

Distribution of participants according to their practices in the Holy month of Ramadan

The majority of the participants (96%) changed the timing of taking medication as per the advice of doctor. 60% reduced dose or frequency of medication during Ramadan. 97% regularly have the predawn meal (Suhoor) before starting the fast. 67% knew that their meal at the time of breaking the fast includes carbohydrates and 86% regularly have dinner during Ramadan [Figure 3a]. The mean score of participants for the practice section was 107 (81%) [Figure 3b].

DISCUSSION

The objective of this study was to determine diabetic patients' knowledge, attitudes, and practices regarding fasting during the Holy Month of Ramadan. In this study, there were more female diabetic patients than male diabetic patients. These results are consistent with other research demonstrating a greater prevalence of diabetes in women than in men.[9,16]

Similarly to the current study, Abbasi *et al*., and Elliott *et al*., found that females are more likely than males to develop diabetes.[17,18] In addition, Hassanein *et al*., reported a higher percentage of females (54.4%) with diabetes than males (45.6%).[19] Furthermore, Almalki *et al*., found that 68.1% of females have diabetes, compared to 31.9% of males.[20] Mansour *et al*., reported similar findings that males (34.6%) are less affected as compared to females (65.4%).[21] According to Zainudin and Hussain, from Singapore, females have the highest percentage of diabetes (85.2%) compared to males (14.8%).[22] Similar results indicating that female patients are more affected than male patients were reported by Ba-Essa *et al*., from Saudi Arabia.[23]

Figure 1: (a) Distribution of participants according to their knowledge regarding fasting during the Holy month of Ramadan. (b) Distribution of participants according to their knowledge regarding fasting during the Holy month of Ramadan. (c) Distribution of participants according to their knowledge regarding fasting during the Holy month of Ramadan. (d) The mean score of participants for the knowledge section

According to the results of the current study, those between the ages of 17 and 55 have a 96% higher chance of developing diabetes than those beyond the age of 55 (4%). Consistent with the current findings, Almalki *et al*., (2018), found that younger people are more susceptible to older age groups.[20] On the other hand, Elliott *et al*., reported that 46.6% of individuals are between the ages of 18 and 55 and 53.4% of those over 55 have diabetes.[18]

The mean score of participants for the knowledge section was 66% which is similar to the study of Alsunni *et al*., who reported a mean score of 61% for participants in the knowledge section.[24] The study's participants exhibited a moderate knowledge on Ramadan-specific knowledge questions. However, many of them had misconceptions regarding fasting during the Holy month that should not be overlooked. More than two thirds (62%) of participants thought that frequent bacterial and fungal infections are common among people with diabetes during the month of Ramadan.

The right attitude is very important in the successful management of T2DM as it influences an individual's choice of action and responses to challenges. The mean score of our subjects for attitude was 66%. Similarly, Alsunni *et al*., reported a mean score of 66% for participants in the attitude section. The participant score in practice section (81%) is higher than in knowledge and attitude sections. This score is higher when compared to the mean score for practice questions (55%) in the study conducted by Alsunni *et al*.[24]

Ninety-two percent of diabetes patients checked their blood sugar during the fasting month of Ramadan. According to Almalki *et al*., (2018), 61% of diabetic patients keep an eye on their blood sugar levels during fasting.[20] Blood glucose levels must be checked throughout the Ramadan fast to identify, avoid, and manage hypoglycemia. A Bangladeshi study found that when signs of acute hypoglycemia appeared, 23% of toddlers interrupted their fast. However, young people should break their fast, especially if hypoglycemia occurs near sunset.[25]

Another study found that regardless of fasting time, a greater number of adolescents and children were willing to stop fasting after developing hypoglycemia.[26] In a recent study, 73.3% of diabetes individuals felt hypoglycemia and decided to break their fast. According to Almalki *et al*., (2018), most

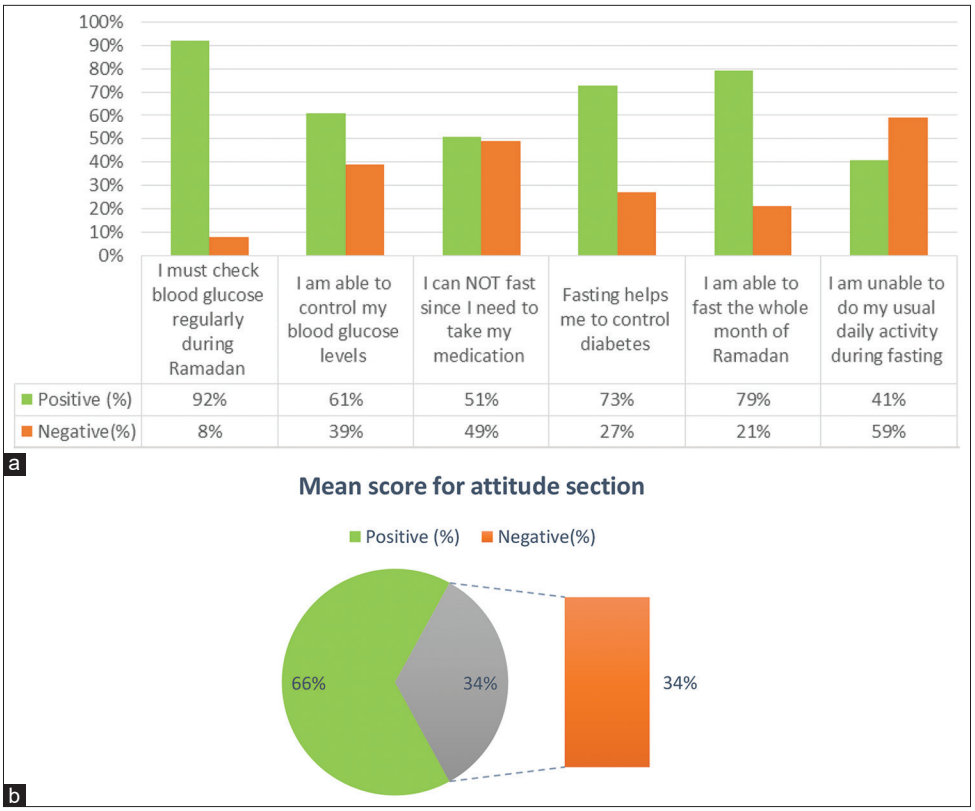

Figure 2: (a) Distribution of participants according to their attitudes regarding fasting during the Holy month of Ramadan. (b) The mean score of participants for the attitude section

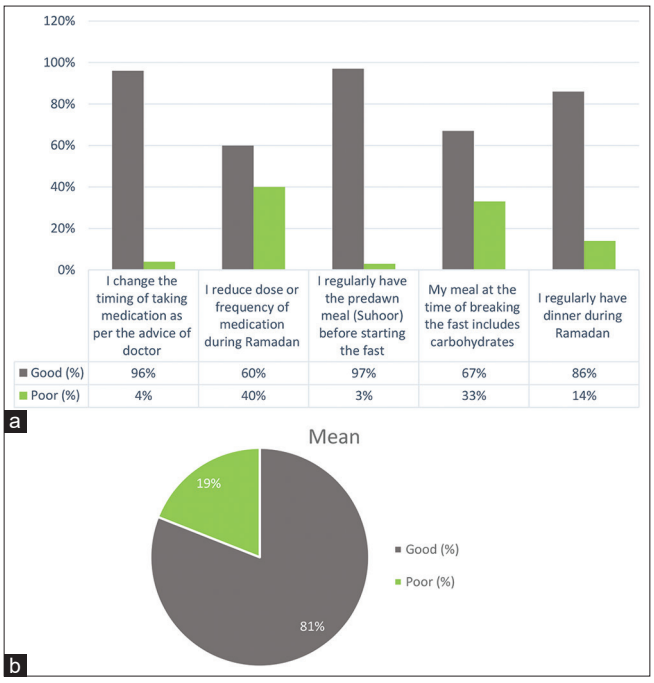

Figure 3: (a) Distribution of participants according to their practices during the Holy month of Ramadan. (b) The mean score of participants for the practice section

patients gave up fasting when they developed symptoms of hypoglycemia.[20] It is advised to break the Ramadan fast as soon as hypoglycemia is identified, regardless of when the fasting period began. This recommendation applies to hypoglycemia with blood sugar levels <3.9 mmoL/L (70 mg/dL) in both symptomatic and asymptomatic cases.[27]

Limitation of the study

This study has some limitations, including the fact that it was conducted on small sample size. Furthermore, there is a risk of self-reporting bias because patients may be reluctant to reveal any flaws, and such data is suspect.

CONCLUSION

It should be noted that diabetic patients have a significant knowledge and practice gap on a number of elements of their disease, including fasting during the Holy month of Ramadan. Patients with diabetes are required to take part in pre-Ramadan training programs. Both type I and type II diabetics require pre-Ramadan counseling to cover insulin type, glucose monitoring, physical activity, nutrition, sick days, and hypoglycemia and hyperglycemia symptoms.

Strict Islamic rules about fasting and illness must be adhered to. Safe Ramadan fasting practices require yearly educational training for medical professionals and people with diabetes. Public health initiatives for diabetes management should also

be developed and implemented. By encouraging a healthy Ramadan fast, these initiatives lessen and even eliminate the risks associated with diabetes. Multicenter studies with bigger sample sizes are necessary to completely understand the safe management of diabetes patients throughout the fasting month of Ramadan.

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