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Fasting during Ramadan and Diabetes Management: A Community Based Survey

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Abstract

Background: Ramadan is a festival celebrated by Muslims. It involves fasting from sunrise to sunset, including avoidance of water. During Ramadan, the predawn and sunset meals are different from regular meals to include more carbohydrates leading to a rise in blood sugar levels. There is limited knowledge on the extent of care for patients with diabetes who fast during Ramadan. We aim to identify the patient's perspective on the care and management of their diabetes during Ramadan.

Methods: This is a cross-sectional study. 5-10 minute virtual anonymous surveys were completed by participants with diabetes and without diabetes who fast during Ramadan in Canada. Patients' perception of healthcare and comfort level for their management during Ramadan was evaluated.

Results: Results revealed a total of 21 participants with diabetes (42% males and 57% females) and 58 participants without diabetes (29% male and 71% female). 57.14% of diabetics and 76% of non-diabetics reported limited support from their physicians during Ramadan. 75% of diabetics and 67% of non-diabetics were satisfied with their physician's support. 35% of diabetics reported dietary changes and 5% reported insulin dose changes. Participants suggested certain modifications during Ramadan which included acknowledgement of fasting at the workplace (25% diabetes vs. 9% non-diabetics) and an increase in awareness of Ramadan and fasting (25% diabetics vs. 4% non-diabetics).

Conclusions: Ramadan is an important festival for Muslims. The shift in sleeping and eating patterns impacts their overall health and functioning especially for those who are diabetics. Our study revealed limited support for participants from the healthcare system for fasting during Ramadan. Further research is required for patients with diabetes who fast during Ramadan to implement more healthcare support, avoid healthcare adversities and provide tailored healthcare to patients. This study is a stepping stone to improving the quality of patient care provided in Canada.

MeSH Keywords

Ramadan, Diabetes

Introduction

There are more than 1 billion Muslims in the world, and the majority of them observe an absolute fast (no food or water) between dawn and sunset, one lunar month a year, called the Holy Month of Ramadan. Indeed, fasting is one of the five pillars of Islam. According to (Khojah, et al., 2023), fasting from dawn to sunset has a substantial impact on many common health disorders. As a result, many people visit the Emergency Department (ED) for treatment [1].

Thus, when fasting may significantly affect the health of a person, Islam exempts that person from fasting. However, a significant number of patients persist in fasting against the advice of their doctors and the permission of religious authorities [2]. As many as 42.8% of patients with type 1 diabetes and 78.7% of patients with type 2 diabetes reported fasting for at least 15 days during Ramadan.

According to SM Babineaux, et al. (2015), 8.8% of patients reported having at least one episode of hypoglycemia throughout Ramadan. The majority of the incidents necessitated help (51.4%), as well as breaking the fast (47.8%). Ramadan was an unusual time for hospitalization. Only seven of the total 15 patients (0.5%) who reported hospitalizations throughout the month had diabetes [3]. Continuous glucose monitoring (CGM) studies during Ramadan show stable blood glucose levels in healthy individuals without diabetes while fasting. At Iftar, a modest increase in interstitial glucose is observed in individuals with diabetes, possibly due to the response to a carbohydrate-rich meal and hormonal changes during Ramadan. Overall, there are no significant differences in markers of glycaemic control between Ramadan and non-Ramadan periods. For individuals on multiple antidiabetic medications, there may be an increase in the mean amplitude of glycaemic excursions in the early stages of Ramadan, but not in late-Ramadan and post-Ramadan periods. Hypoglycemia during daylight hours is a concern for fasting individuals on insulin or its secretagogues [4].

Materials and Methods

This was a cross-sectional online questionnaire-based survey conducted to investigate diabetes management during Ramadan among participants residing in Canada. The survey aimed to assess patients' perceptions of healthcare and their comfort level regarding diabetes management during Ramadan. Participants with a history of diabetes and those without diabetes who fast during Ramadan were invited to complete a 5-10 minute virtual anonymous survey. Recruitment of participants occurred through interaction with posters/flyers displayed at local clinics and mosques, as well as through social media platforms such as LinkedIn, Facebook, and Instagram. Participants were required to scan QR codes on the flyers or access survey links to complete the questionnaire on their cell phones.

Ethical approval was obtained from the relevant institutional review board (IRB) or ethics committee before the commencement of the study. Informed consent was obtained from all participants before they participated in the survey. Confidentiality and data protection measures were strictly adhered to throughout the study.

Separate surveys were provided to patients with diabetes and those without diabetes. Both male and female participants were included. Exclusion criteria included participants who did not observe fasting during Ramadan. The respondents were residents of Canada. Convenience sampling was employed, and participants were selected based on their willingness to participate in the study and those who met the inclusion criteria. Participants were given approximately 2-3 weeks to complete the survey.

Virtual and paper flyers were distributed in local mosques, clinics, and social media platforms. Participants were able to scan the QR code to access the 5-10-minute anonymous survey. Completion of the survey indicated informed consent.

The surveys were PIPEDA compliant and created using Qualtrics. The study ran from January 1, 2023, to February 28, 2023. Statistical analysis was performed using IBM SPSS Version 28. As no personal information is required from the participants, there was minimal risk involved in this study.

Results

Demographics

There were 21 participants in the study. The study was conducted among Canadian Muslims. The results indicated that 42% of individuals with diabetes were males, while 57% were females. Among individuals without diabetes, 29% were males, and 71% were females. Age group analysis showed that the majority of individuals with diabetes (33.33%) and without diabetes (35%) were between 41-50 years-old. In both groups, a greater percentage of individuals were aged above 60 years (28.57% with diabetes, 11% without diabetes).

Country of origin analysis indicated that 47.62% of individuals with diabetes were originally from India, followed by 23.81% from Pakistan, 4.76% from Sri Lanka, and 23.81% from other countries. Among individuals without diabetes, 73% were from India, 2% from Bangladesh, and 25% from other countries.

Regarding healthcare support during fasting, 42.86% of individuals with diabetes reported receiving support, while 57.14% did not. In contrast, only 24% of individuals without diabetes reported receiving healthcare support during fasting, with the majority (76%) not receiving any support. Refer to Table 1.

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Duration of diabetes

100% of patients had type 2 diabetes. Approximately 33% had diabetes < five years, 28% had diabetes for 5-10 years, 14% had diabetes for 10-15 years, and 23% had diabetes for > 15 years.

Insulin

14.29% of patients were on insulin, out of which 9.52% had to adjust their insulin dose, and 4.76% did not adjust their insulin dose.

Complications of diabetes

75% of participants in the study did not experience any diabetic complications associated with Ramadan fasting. Those who experienced foot complications, neuropathy, and gum/mouth disease were 5% each. 5% of the participants had

Table 1: Demographics of participants.

Demographics	Diabetes (N= 21)	No Diabetes (N = 58)
Gender	42% males; 57% females	29% male; 71% female
Age Group	9.52% between 31-40 years 33.33% between 41-50 years 28.57% between 51-60 years 28.57% > 60 years	2% between 15-20 years 13% between 21-30 years 35% between 31-40 years 29% between 41-50 years 11% between 51-60 years 11% > 60 years
Country of Origin	47.62%- India 23.81%- Pakistan 4.76% -Sri Lanka 23.81%- Other country	73% -India 2%- Bangladesh 25%- Other Country
Healthcare Support During Fasting	57.14%- No 42.86%- Yes	76%- No 24%- Yes

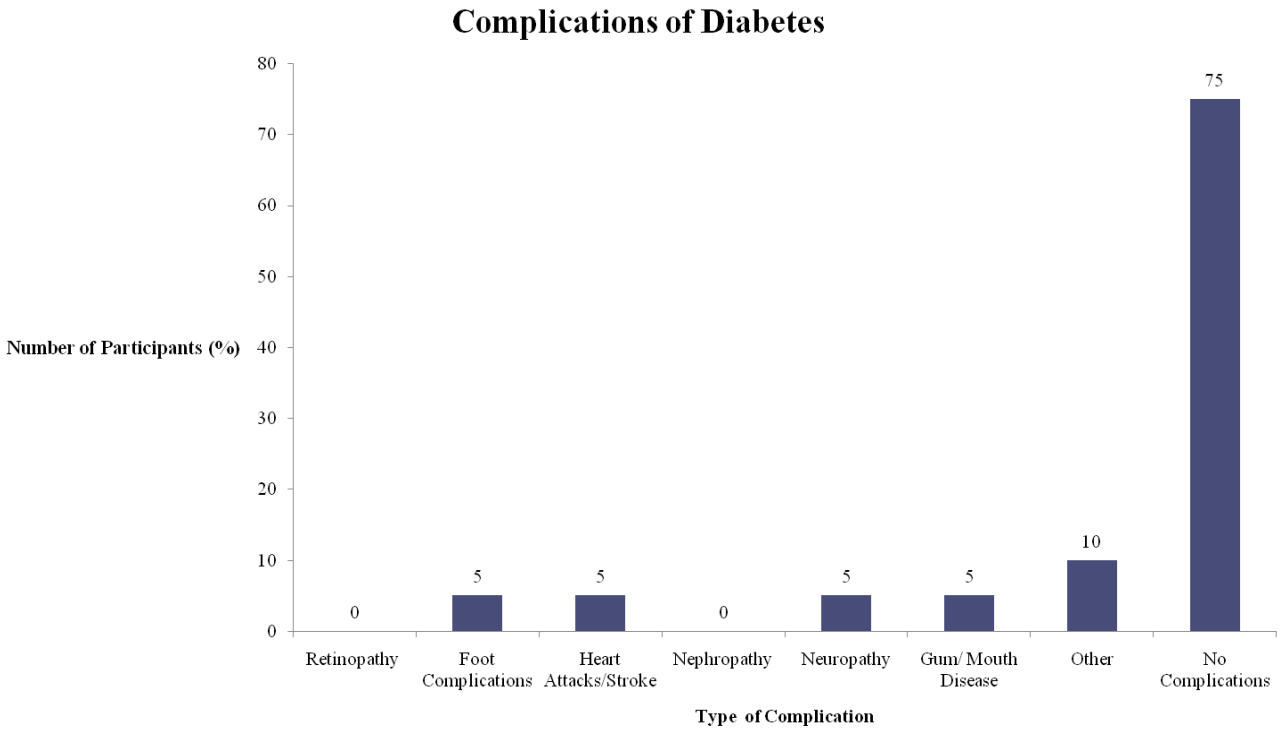

Figure 1: Types of complications in Diabetes.

more severe complications such as myocardial infarction and cerebrovascular accidents. 10% of the subjects experienced other complications related to diabetes. However, none of the participants had retinopathy or nephropathy associated with diabetes. Refer to Figure 1 for a graphical version of the complications of diabetes.

Physician support for diabetes management during fasting

The results indicate that approximately 5% of patients were advised to modify their insulin dose, while none were instructed to monitor their HbA1C levels. 35% of patients received dietary advice, emphasizing the role of nutrition in managing diabetes during fasting. Additionally, 20% were advised on physical activity, 10% on self-monitoring glucose levels, and another 20% on changing the timing of their medication. Furthermore, 50% of patients did not receive any advice, and a minority (5%) were given other forms of dietary health advice (see Figure 2).

Patient perceived changes during fasting in diabetics

40% of diabetic patients reported dietary changes, and 40% reported changes in physical activity. Sleep changes were reported by half of the diabetic subjects (50%) in the study, making it the change perceived by the maximum number of patients in this survey. 20% of patients reported changes in daily routine during fasting, while 25% reported perceiving changes in all these lifestyle factors (see Figure 3).

Physical activity during fasting

Approximately 55% of the participants with Diabetes and 53% of the participants without Diabetes engaged in Physical activity. 43% of diabetics and 47% of those without diabetes did not engage in any kind of physical activity during Ramadan. These findings further indicate the need for individualized care depending on the level of physical activity of the patient when giving necessary advice regarding treatment modifications and dose adjustments (see Figure 4).

Perception of support received from physicians during fasting

Overall, the majority of the participants were satisfied with the support they received from physicians during Ramadan fasting. While 75% of diabetic and 67% of nondiabetic participants rated the support as “satisfied”, 10% of diabetic and 5% of nondiabetic participants rated it as “very satisfied” with their physician's support during fasting. However, 10% of diabetics and 24% of nondiabetics reported their support from physicians as unsatisfactory. Around 5% of both groups found the physician support “very unsatisfactory” during the fasting period (see Figure 5).

Modifications preferred by patients during fasting

About 30% of diabetics and 18% of nondiabetics

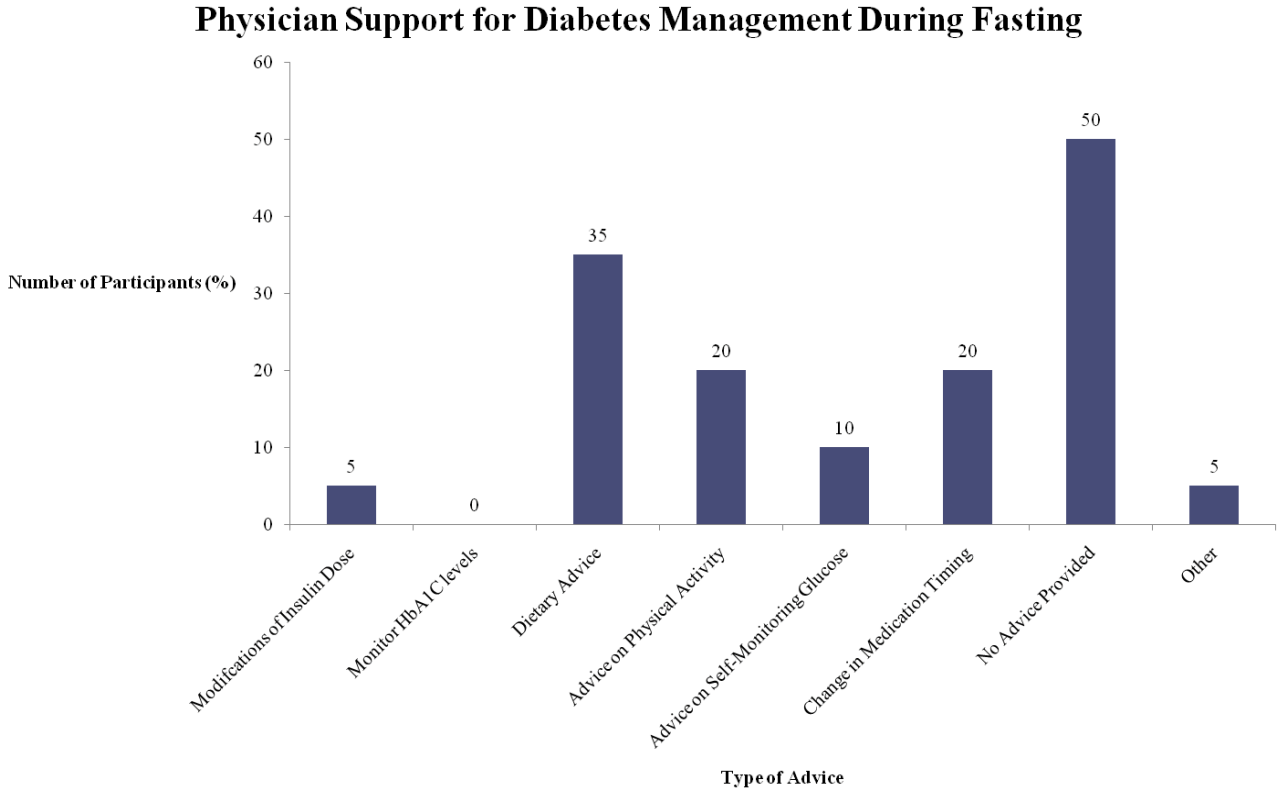

Figure 2: Physician support for diabetes management during fasting, focusing on the advice given to patients.

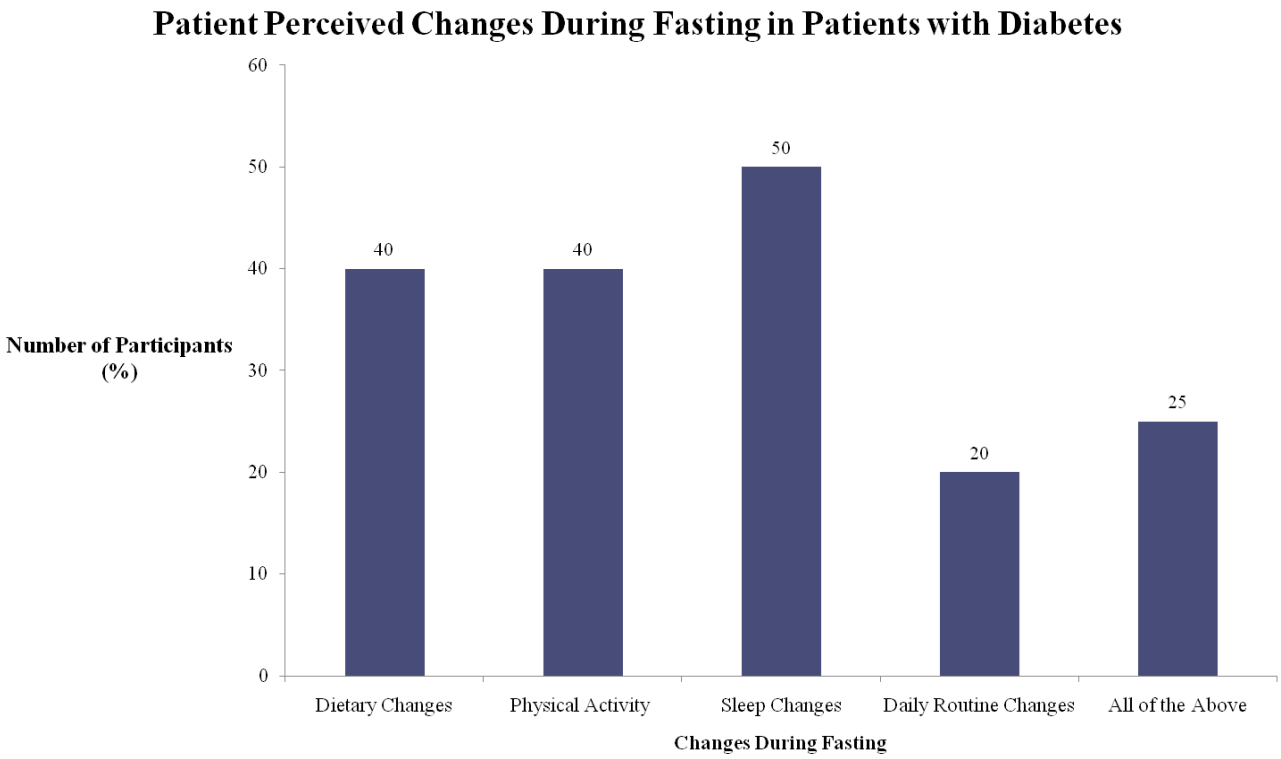

Figure 3: Changes perceived by diabetic patients in their lifestyle during fasting.

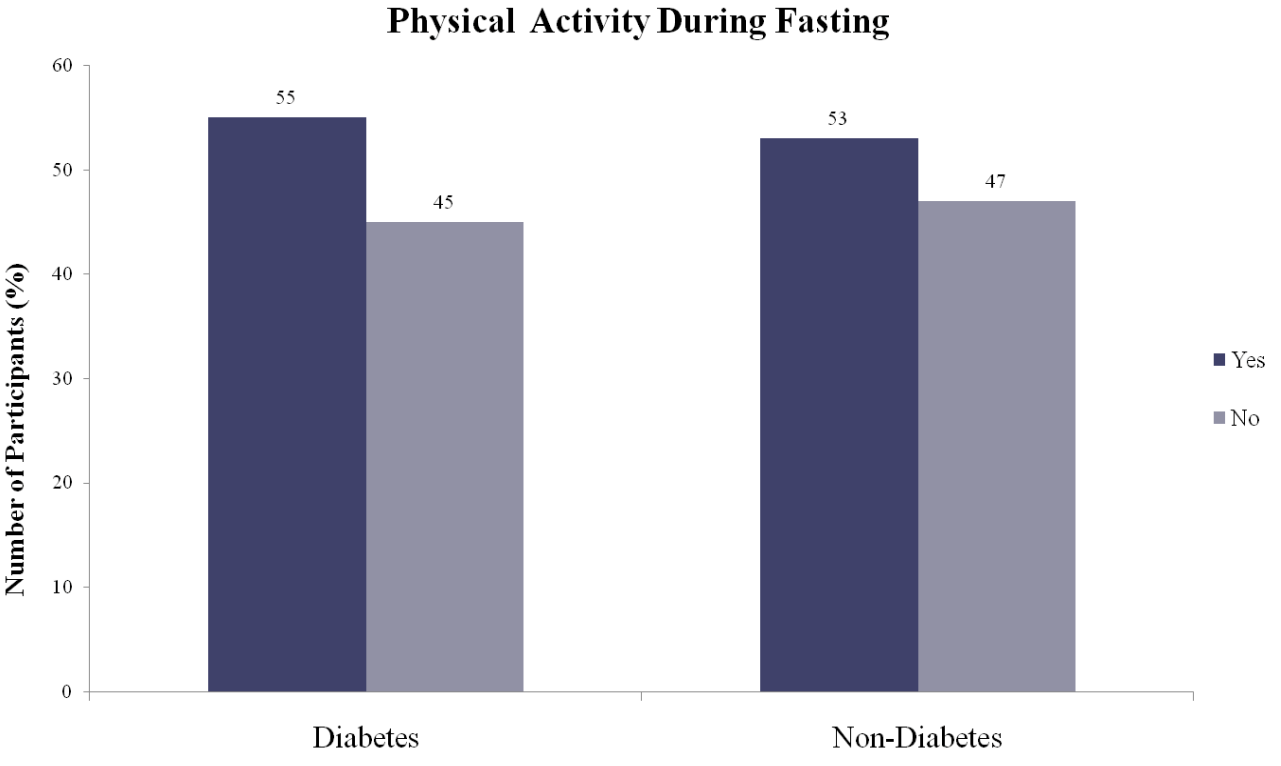

Figure 4: Comparison of physical activity by both diabetics and nondiabetics during the period of Ramadan.

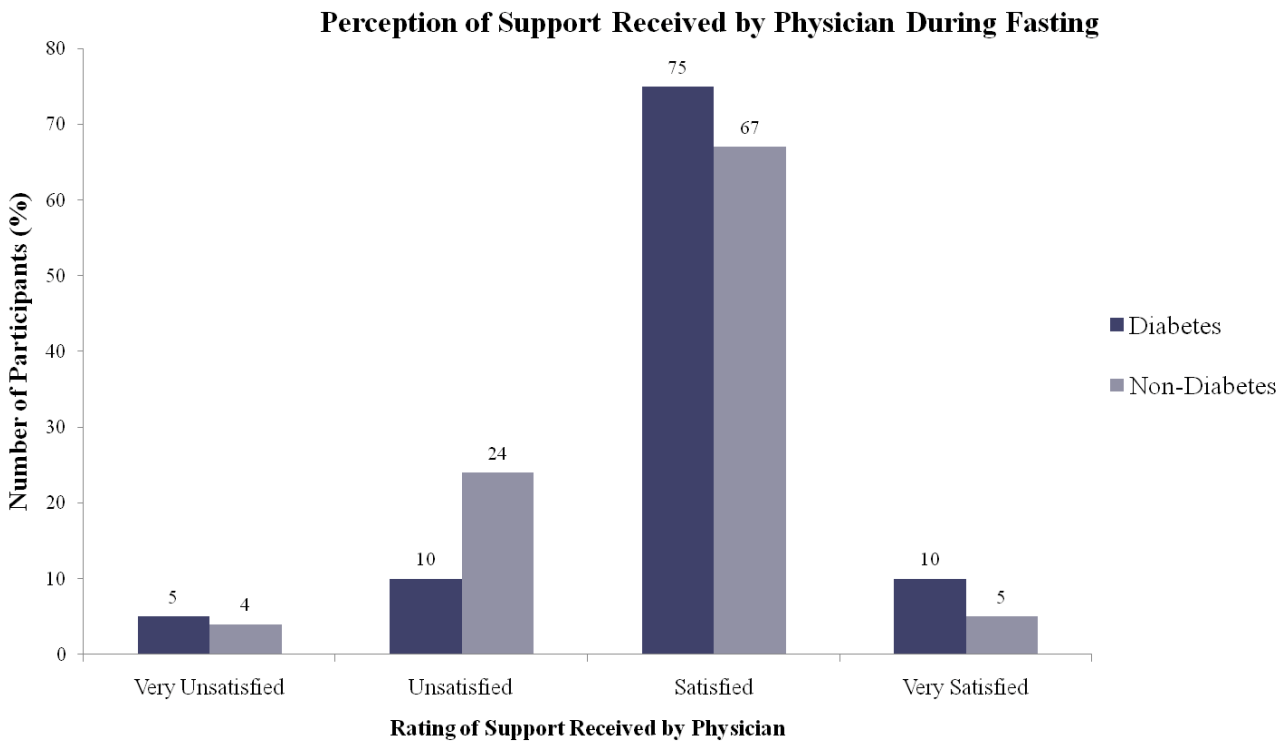

Figure 5: Rating of the perception of physician support received by patients during fasting.

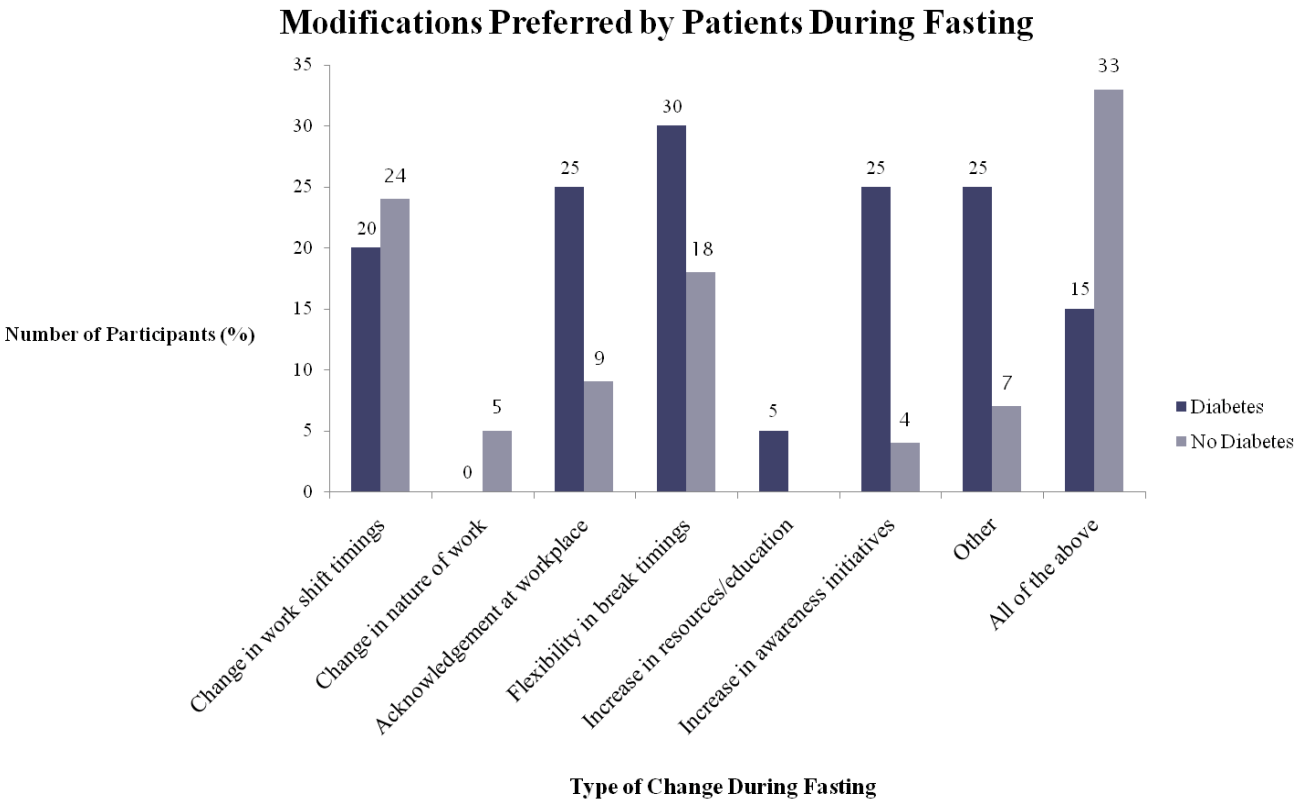

Figure 6: Modifications subjects of the study preferred in day-to-day activities during fasting.

preferred to have flexibility in break timings during fasting. 25% of diabetics and 9% of nondiabetics felt the need for acknowledgement at the workplace. 25% of diabetics and 4% of nondiabetic subjects acknowledged the need for increased awareness initiatives. 5% of diabetics felt that more resources and education were needed. 5% of nondiabetics preferred a change in the nature of work, while 20% of diabetics and 24% of nondiabetics preferred a change in work shift timings. 25% of diabetics and 7% of non-diabetics preferred changes other than the ones mentioned in this survey, while 15% of diabetics and 33% of nondiabetics felt that all the changes mentioned were needed (see Figure 6).

Resources for ramadan fasting

Around 59% of the non-diabetic population and 25% of the diabetic population used online media as a resource. 43% of the non-diabetics and 25% of the diabetics depend on their peers for information. Out of the total number of non-diabetic participants, 31% of individuals rely on social media, 14% rely on all of the above, and 10% rely on others. Out of the total number of diabetics, 20% depend on social media, whereas approximately 25% use all of the above and 20% rely on others as their resource. However, only 5% of the total non-diabetics consult physicians as a reliable resource for fasting. None of the diabetics consult their physicians for information (see Figure 7).

Discussion

This study examines fasting practices during the holy month of Ramadan among Muslims. Consumption of food and water is permitted before dawn and after sunset, resulting in fasting periods lasting 12 to 18 hours [5]. While fasting beyond 24 hours can pose physiological hazards for diabetics, several studies endorse intermittent fasting (around 14-18 hours) as beneficial for diabetes management [6,7].

Research involving religious fasting indicates significant reductions in weight, LDL, and TG levels, along with diminished HbA1c and pro-inflammatory mediators such as TNF-α and IL-6. High compliance rates were observed, particularly among individuals accustomed to religious fasting [8]. Erdem, et al., 2018, reported decreased stress, anxiety, and depression levels during Ramadan fasting. Although such fasting can offer advantages, improper guidance and monitoring may heighten the risk of diabetic complications [9]. Our study reveals that 75% of participants encountered no diabetes-related complications during Ramadan fasting, whereas 5% experienced severe complications, including myocardial infarction and cerebrovascular accidents.

Support and resources for fasting diabetics fluctuate across countries due to factors like dominant religion, demographics, and healthcare provisions. Flexibility in working hours during Ramadan is more prevalent for Muslims residing in Muslim-majority nations compared to Canada, where accommodations are scarcer, intensifying fasting challenges, especially for diabetics. Diabetes Canada offers guidelines outlining increased risks of complications (dehydration, hypoglycemia, and hyperglycemia) for fasting diabetics [10]. A position statement endorsed by Diabetes Canada provides

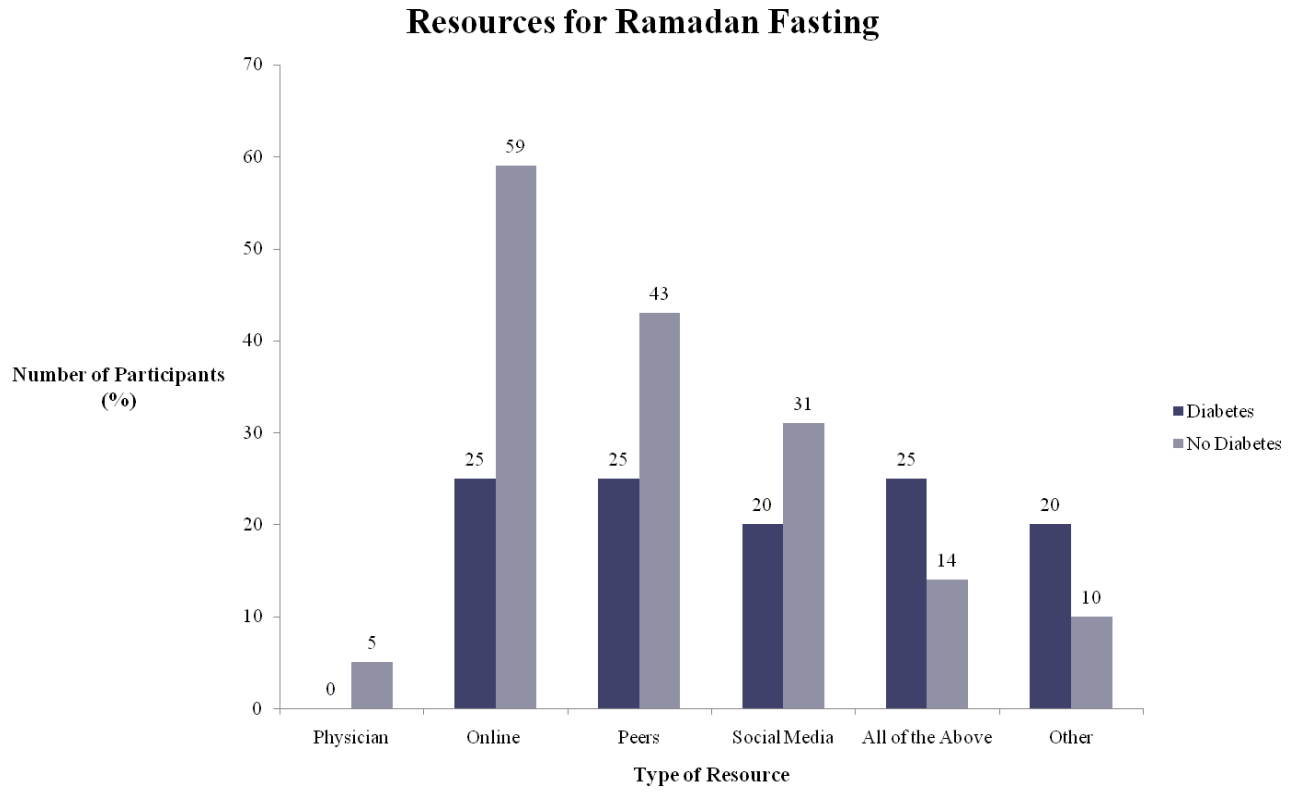

Figure 7: Participants relied on different kinds of resources during fasting.

evidence-based recommendations for pharmacotherapy and glucose monitoring, assisting Canadian Muslims with diabetes in observing safe fasting practices during Ramadan. However, knowledge gaps persist, necessitating further research, especially within Canada [11].

Our study reveals disparities in healthcare support during fasting, influenced by diabetes presence and demographics. Individuals with diabetes exhibit higher reliance on healthcare support during fasting. This underscores the need for tailored support systems for fasting diabetics. The age distribution indicates elevated support needs among middle-aged individuals. The diverse country of origin emphasizes the cultural context's role in healthcare support. Sleep disturbances during fasting were reported by 50% of participants, thus impacting physical and cognitive performance [12].

Diabetes UK outlines guidance, advice, and a helpline, while the International Diabetes Federation (IDF) and Diabetes and Ramadan (DaR) International Alliance have comprehensive guidelines for diabetes management during fasting [13,14]. These guidelines cater to health professionals and fasting individuals, categorizing patients into risk groups with tailored recommendations [4]. The IDF-DAR guidelines offer direction for fasting Type 1 and Type 2 diabetics, including advice on blood glucose monitoring and insulin modification [15].

In Ontario, which houses 55.2% of Canada's Muslim population, comprising 4.6% of the province's total population, our study evaluated subjects' perceptions of physician support during fasting [16]. While the majority found physician support satisfactory, 10% of diabetics and 24% of non-diabetics rated it as unsatisfactory. Additionally, 5% of both groups deemed physician support very unsatisfactory. Only 50% of patients received advice, and a minority (5%) received dietary counselling. Subjects expressed a need for work flexibility and modifications during fasting. Despite the limitations, this study underscores the necessity for expanded support, guidelines, and further investigation into diabetes management during Ramadan fasting. This study may serve as a foundational step for larger-scale future research.

Prospective studies

The implementation of long-term follow-up studies is a significant area for future research. These studies would allow individuals to be followed across several Ramadan cycles, enabling the evaluation of the long-term impact of fasting on diabetes control, complications, and healthcare assistance. Researchers can better understand the changing requirements and challenges faced by people managing diabetes throughout Ramadan by looking at trends across time.

Additionally, conducting comparative studies between different regions or countries with varying healthcare systems and cultural contexts would provide a broader perspective. It may be possible to understand the effects of healthcare support on diabetes treatment during Ramadan by comparing the experiences and results of patients in various settings. Such studies would identify best practices and potential areas for improvement in healthcare interventions and support systems.

A different direction for future research is represented by interventional investigations. The application of treatments, such as the distribution of educational materials, nutritional recommendations, or individualized care plans, would enable the assessment of their efficacy in enhancing patient outcomes throughout Ramadan. It would be helpful to gather data on how these interventions affected diabetes control, self-management, and patient satisfaction in order to determine how to best support patients during fasting periods.

Limitations

The current study had several limitations that should be acknowledged. First, the sample size was relatively small, limiting the generalizability of the findings to larger populations. Future studies should aim for larger and more diverse samples to enhance external validity and provide a more representative understanding of diabetes management during Ramadan.

Another limitation was the reliance on self-reported data, which may introduce recall bias or social desirability bias. Participants might have overestimated or underestimated their healthcare support, satisfaction, or adherence to recommended practices. Combining self-reported data with objective measures, such as medical records or glucose monitoring, would enhance the accuracy and reliability of the findings.

The cross-sectional design of the study also posed limitations, as it restricted the ability to establish causality or assess changes over time. Longitudinal studies would enable a more comprehensive understanding of the dynamic nature of diabetes management during Ramadan and allow for the evaluation of temporal relationships.

Cultural and regional variations were not extensively explored in the current study, as it focused on a specific population in Canada. Future research should consider including participants from diverse cultural backgrounds and geographical locations to account for variations in practices, healthcare systems, and patient perspectives.

Lastly, self-selection bias might have influenced the study's results since participants who chose to participate might have had a higher level of motivation or interest in their diabetes management during Ramadan. Employing recruitment strategies that minimize self-selection bias, such as random sampling or participant quotas, would enhance the validity and representativeness of the findings.

Conclusion

This cross-sectional study shed light on patients' perspectives regarding the management of diabetes during Ramadan fasting. The findings highlighted the limited support received by patients from healthcare systems during this important religious period. The study included participants

with and without diabetes who observed fasting during Ramadan in Canada, and their perceptions were evaluated through virtual surveys.

The demographic analysis revealed a diverse participant pool, with a higher representation of females in both the diabetes and non-diabetes groups. The majority of participants fell into the age range of 41-50 years, emphasizing the significance of healthcare support for middle-aged individuals during fasting. Additionally, participants from India constituted a significant portion, emphasizing the need for culturally sensitive healthcare interventions.

The results demonstrated that a considerable proportion of participants, both with and without diabetes, reported limited support from their physicians during Ramadan. However, despite this limitation, the majority expressed satisfaction with the support they received. Notably, a small percentage of patients were advised to modify their insulin doses, while dietary advice was the most commonly provided recommendation. These findings underscore the importance of acknowledging the specific needs of patients with diabetes during fasting and providing tailored support to ensure their well-being.

While the study identified areas for improvement in healthcare support, it serves as a crucial stepping stone for enhancing the quality of patient care in Canada during Ramadan. The findings highlight the necessity of further research to implement additional healthcare support, prevent adversities, and ensure the provision of individualized care to patients with diabetes who fast during Ramadan. By addressing these gaps, healthcare providers can better assist patients in managing their diabetes and promote their overall health and well-being during this religious occasion.

In conclusion, this study underscores the significance of recognizing the unique challenges faced by individuals with diabetes during Ramadan and the need for improved healthcare support. By increasing awareness, involving physicians more actively, and implementing tailored interventions, healthcare systems can better serve patients with diabetes during this significant religious event.

Looking ahead, conducting longitudinal follow-up studies, comparative studies across different regions, and interventional studies can provide further insights into the long-term effects of fasting, regional variations in healthcare support, and the effectiveness of specific interventions. It is crucial to address the limitations of sample size, self-report bias, cross-sectional design, cultural/regional variations, self-selection bias, and single-method data collection in future research to enhance our understanding and improve the quality of care provided to individuals with diabetes during Ramadan. By addressing these considerations, we can continue to advance patient care and ensure optimal outcomes for patients managing diabetes during this important time.

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Competing Interests

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Author Contributions

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