

Fasting Influence on Diabetic Emergency Visits in a Tertiary Care Hospital Throughout Ramadan and other Lunar Months

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ABSTRACT

Background: The ninth month of the Islamic calendar is Ramadan, during which Muslims fast from dawn till sunset. This extended fasting period may affect the management of diabetes in diabetic people. This study aimed to compare the number of visitors to the diabetic Emergency Room (ER) of a private tertiary care hospital in FB Area, Karachi, Pakistan, throughout Ramadan and other lunar months, with diabetes emergencies.

Methodology: A retrospective cross-sectional study was conducted utilizing an electronic medical record review of patients with diabetes emergency who visited the ER of a tertiary care hospital between the ninth and eleventh lunar months during the previous two years. Patients with diabetes who visited the ER and were more than 18 years old were included. It established the frequency of ER visits, sociodemographic parameters, and clinical features. The relationships between variables were evaluated using the SPSS Software.

Results: During the selected study period, the ER reported a total of 32,134 admissions. There were just 0.61 % of diabetes emergency visits. According to the inclusion criteria, 123 participants were included in the study (64.2% men and 35.7% women). The majority (51.2%) took oral hypoglycemic agents, and more than half (60.97%) had type 2 diabetes. There was a substantial variation in the prevalence of diabetes emergency visits between Shaban, Ramadan, and Shawal, 0.55, 0.32, and 0.27 %, respectively. However, the peak incidence did not occur during Ramadan. Despite identifying specific associations, the study showed no significant differences between the frequency of ER visits during Ramadan and the prior and subsequent lunar months regarding demographic and clinical variables and diabetes profile.

Practical Implication: The following investigation will help in designing a plan with suitable diet and antidiabetic agents that will help in balancing the blood sugar levels as well as the glycemic index.

Conclusion: In contrast to earlier studies, a decreasing prevalence trend was observed from Shaban to Ramadan to Shawal. This demonstrated that fasting throughout Ramadan has no negative effect on the occurrence of diabetes emergencies compared to other months. During the three-month study period, type 2 diabetes and insulin-treated patients with hyperglycemia were the leading cause of diabetic emergency room visits, with no significant variations across the months. These findings underscore the necessity for primary care physicians to thoroughly evaluate type 2 and insulin-treated individuals and provide comprehensive health education and counseling.

Keywords: Ramadan, Diabetes, Fasting, Emergency visit, Antidiabetic agents, Diabetic Ketoacidosis, Hypoglycemia.

INTRODUCTION

Ramadan is a significant Muslim fasting time that lasts 29 to 30 days and varies from 14 to 18 hours per day during the ninth lunar month. As one of the five pillars of Islam, it is obligatory for all healthy Muslims above the age of puberty [1]. During the month of Ramadan, Muslims undergo significant changes in their daily routines, which affect their physical activity, sleeping cycle, duty hours, and the quantity and type of food they consume [2]. However, this technique can have major effects on diabetic patients, including an increased risk of hypoglycemia, hyperglycemia, diabetic ketoacidosis (DKA), and an increase in hospital visits due to diabetes-related problems [3]. This change in daily activity throughout Islam affects hospital emergency visits, as the number of patients varies between night and day during regional festivals and cultural events like Ramadan [2]. In the research conducted by Elbarsha and colleagues, there are fewer admissions of diabetic patients during Ramadan (186) compared to the eleventh lunar month Dhu al-Qidah (216) [3]. Similarly, incidences of severe hypoglycemia increased during Ramadan as a result of inadequate monitoring and restricted medication use, according to an epidemiological study conducted in 13 countries [4]. Another study found a significant increase in incidences of hypoglycemia during the month of Ramadan compared to other lunar months, particularly among insulin-treated diabetics compared to those who use oral hypoglycemic medications (OHA). This differs from the increased hospitalisation rate and incidence caused by DKA during Ramadan due to prolonged acidosis, as reported by Abdelgadir and colleagues [3]. This prospective study including 167 patients was undertaken by prominent hospitals in

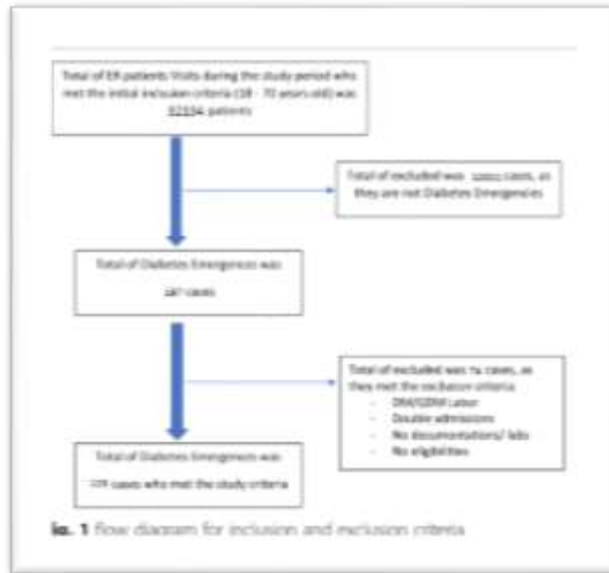
the United Arab Emirates, Sudan, Tunisia, and Morocco from the lunar month preceding Ramadan (Shaban) until one month following the fasting period (Shawal). Patients with type 1 diabetes were hospitalised during quarantine, with less than 30 percent of them completing a diabetes care regimen during Ramadan. In contrast to hypoglycemic episodes, a greater number of hyperglycemic episodes were identified by a greater variation in blood glucose levels in a separate research [9]. As untreated cases of diabetes can possibly lead to major problems, diabetic patients during Ramadan have a greater need for suitable adaptations to their treatment plans and lifestyles.

Few studies have been conducted to investigate the prevalence of diabetes throughout the month of Ramadan in Pakistan. Consequently, the goal of this study is to identify variations in visits to an emergency department (ED) at a tertiary hospital in Karachi during Ramadan. In addition, the incidence of diabetes emergencies throughout Ramadan and the final results were determined. Similarly, the data on diabetes-related ER visits from the preceding and subsequent lunar months were compared.

MATERIALS AND METHODS

This cross-sectional study built on prior research that analysed patient records. The study's primary population consisted of diabetic patients who presented to the emergency room (ER) at Memon Medical Complex Hospital in Karachi, Pakistan, within the last two years. The analysis excluded pregnant women with diabetes who were either younger than 18 or older than 70 years of age.

The total number of ER visits throughout the selected three months of the study period (two years) was large, 32134 patients; nevertheless, the number of diabetes emergencies identified was extremely low, 197 instances (0.61%). Based on the study's inclusion criteria, only 123 of the 197 instances were included in the study; this selection procedure was depicted by a flowchart for inclusion and exclusion criteria, Fig. 1. Continuous variables were expressed as frequencies and percentages. Statistical significance was determined to be $p < 0.05$ using Statistical Package for the Social Sciences (SPSS) version 23 (IBM Corp., Armonk, NY).



RESULTS

The sociodemographic factors of diabetic patients and their association with emergency room visits during Ramadan and the other two lunar months (Shaban and Shawal) were analysed (Table 1). Despite the lack of substantial differences between age groups, gender, and comorbidity, certain differences were detected. During Shaban (the lunar month preceding Ramadan), younger patients aged 18 to 39 and male patients were observed to attend the emergency room more frequently than their peers.

Table 1: Socio-demographic characteristics of diabetes patients who visited ER in a tertiary care hospital in Karachi, Pakistan from 2020 to 2022. (n = 123)

	SHAABAN		RAMADAN		SHAWAL		
	(n)	Percentage (%)	(n)	Percentage (%)	(n)	Percentage (%)	
Age Group	18-39	19	31.10%	14	48.27%	13	39.39%
	40-59	16	26.20%	6	20.69%	15	45.45%
	60+	26	42.60%	9	31.03%	5	15.15%
	Total	61	100.00%	29	100.00%	33	100.00%
Gender	Male	39	63.93%	18	62.06%	22	66.66%
	Female	22	36.06%	11	37.93%	11	33.33%
	Total	61	100.00%	29	100.00%	33	100.00%
Co-morbidities	Yes	48	78.68%	21	72.41%	28	84.84%
	No	13	21.31%	8	27.58%	5	15.15%
	Total	61	100.00%	29	100.00%	33	100.00%

During Ramadan, over 48% of ER patients were between the ages of 18 to 39, the majority of whom were male (62.06%). On the tenth lunar month (Shawal), older individuals,

predominantly men, were reported to visit the emergency room. During these three lunar months, the majority of participants reported the existence of disorders other than diabetes. The prevalence of diabetic emergency visits was 0.61%, and only 197 out of 32,134 ER visits were diabetes emergencies.

Table 2: Prevalence of diabetic emergencies in three lunar months from 2020-2022 (n = 32134)

	Total Pt. ER Visits	Total Diabetic ER Visits	% of ER Diabetic Visits	% of ER Diabetic Visits during 3 Lunar months
SHAABAN	11056	61	0.55%	49.59%
RAMADAN	9076	29	0.32%	23.58%
SHAWAL	12002	33	0.27%	26.83%
Total	32134	123	1.14%	100.00%

As shown in Table 2, diabetes-related ER visits decreased from Shaban to Ramadan to Shawal (0.55, 0.32, and 0.27%, respectively) during the course of three lunar months. However, 0.38% of all ER visits throughout three lunar months were for diabetes-related emergencies that matched research inclusion criteria. As demonstrated in Table 2, statistical analysis revealed significant variance in the number of ER visits among diabetes patients during these 3 lunar months. This variation is mostly explained by a markedly higher number of type 2 diabetes patients admitted one month prior to Ramadan. The number of type 1 and type 2 hospitalised patients does not significantly change over the course of Ramadan.

Table 3: Clinical characteristics of diabetic with ER visits during the 3 lunar months (n = 123)

	SHAABAN		RAMADAN		SHAWAL		TOTAL	P VALUE	
	(n)	%	(n)	%	(n)	%			
Type of Antidiabetic Medications									
INSULIN	17	27.8685	9	31.034483	6	18.18182	30	24.39024	0.045*
ORAL	31	50.81967	12	41.37931	14	42.42424	63	51.21951	
MIXED	12	19.67213	8	27.586207	10	30.30303	27	21.95122	
NONE	1	1.639344	0	0.00%	3	9.090909	3	2.439024	
Total	61	100.00%	29	100.00%	33	100.00%	123	100.00%	
Type of Diabetes									
IDDM	19	31.15%	7	24.14%	6	18.18%	32	26.01%	0.001*
NIDDM	42	68.85%	20	68.96%	23	69.70%	85	68.11%	
GDM	0	0.00%	1	3.45%	2	6.06%	3	2.44%	
UNKNOWN	0	0.00%	1	3.45%	2	6.06%	3	2.44%	
Total	61	100.00%	29	100.00%	33	100.00%	123	100.00%	
Annual Time at ER									
Day shift	24	39.34%	13	44.83%	9	27.27%	46	37.40%	0.001*
Evening shift	28	45.90%	11	37.93%	6	18.18%	45	36.58%	
Night shift	9	14.75%	5	17.24%	18	54.55%	32	26.02%	
Total	61	100.00%	29	100.00%	33	100.00%	123	100.00%	
Precipitating factors									
Missed Dose	20	32.80%	8	27.58%	6	18.18%	34	27.65%	0.025*
Infection	11	18.05%	6	20.69%	13	39.39%	30	24.39%	
No Obvious cause	8	13.10%	3	10.34%	1	3.03%	12	9.75%	
First time	5	8.19%	1	3.45%	8	24.24%	14	11.38%	
Mixed Meal	17	27.87%	11	37.93%	5	15.15%	33	26.83%	
Total	61	100.00%	29	100.00%	33	100.00%	123	100.00%	
Clinical presentation									
Hypoglycemia	24	39.34%	19	65.52%	11	33.33%	54	43.90%	0.051*
Hyperglycemia	33	54.09%	10	34.48%	20	60.61%	63	51.22%	
DKA	4	6.56%	0	0.00%	2	6.06%	6	4.88%	
Total	61	99.99%	29	100.00%	33	100.00%	123	100.00%	

*significant at P-value less than 0.05

A month after Ramadan, type 2 diabetes patients were admitted more than type 1. In accordance with Table 3, more than half of the diabetes emergencies patients were type 2 (69.11%), almost three quarter of them were on oral hypoglycemic therapy (51.22%) and majority of their clinical presentation was hyperglycemia (51.22%). Contrarily, few ED cases were associated with nonadherence during Ramadan; 27.65% of patients omitted insulin doses, and 26.83% skipped meals. Additionally, more than 9.75% of patients stated that their ED visits during the past three months had no apparent cause or

precipitating factor. In terms of diabetes type, more than half of diabetic patients during all three lunar months were found to have type 2 diabetes. Other variables, such as precipitating factors, type of antidiabetic medication, clinical presentation, and arrival time at ER during Shaban and Ramadan were found to have statistical variation, as shown in Table 3. On the other hand, arrival time at ER was found to be substantially different when comparing Ramadan, Shawal, and Shaban months. The majority of patients visited the emergency during the evening shift in the month of Shawal, the day shift in the month of Ramadan, and the night shift in the month of Shaban. As shown in Table 3, more people with type 2 diabetes than type 1 attended the emergency room during the course of these three months.

DISCUSSION

There was no discernible link between the number of ER visits and any of the demographic or clinical characteristics in this investigation. A study of ER visits during and 30 days after the aforementioned lunar month and Ramadan indicated that the number of patients admitted during Ramadan was not significantly greater than the following lunar month. In terms of general or clinical features, there is no statistically significant difference between the two time periods. Furthermore, there is no noticeable difference in patient clinical features or the frequency of admission for respiratory, neurological, or injury-related illnesses during Ramadan. (7).

This study evaluated categorical factors of diabetic ER patients, as indicated in Table 3. The Chi-square test of these variables revealed significant variance among various variables, including type of antidiabetic medicine, type of diabetes, arrival time to ER, and precipitating circumstances. However, there is no statistically significant difference in clinical presentation or final decision in the ER during these lunar months. (Table 3).

Despite the decrease in admissions from before to after Ramadan, less insulin-dependent patients were admitted as Ramadan progressed; 24.14% of patients were admitted throughout Ramadan, while 18.18% were admitted during Shawal. The patients' use of insulin indicates that they have either type 1 or uncontrolled type 2 diabetes mellitus. The majority of the participants in the research had hyperglycemia and were non-insulin dependent. (Table 3).

Considering the sociodemographic results of the following study, more emergency cases in the age group of 18-39 years were reported in the month of Ramadan, but higher number of cases were reported in the age group of 40-49, in the month of festive i.e., Shawal.

Considering the etiology regarding gender, more cases were reported in males rather than females in all three of the months. Comorbidities such as hypertension, any infection, diabetic ketoacidosis were present throughout the three months, but reporting of such cases was less in Ramadan, when compared to Shaban and Shawal.

While evaluating the prevalence of the diabetic emergencies, least ER visits were reported in the month of Ramadan i.e., 23.58%, which proved that fasting has a positive impact on diabetic patients. Most cases were reported in the month of Shaban i.e., 49.59%.

Non-insulin dependent diabetes mellitus cases were more common in patients through the three months i.e., 69% cases that were reported were of NIDDM rather than insulin dependent or gestational diabetes.

Most ER Visits were reported in Day time specially in the month of Ramadan, then in evening shift and there were rare cases reported in the night shift.

Missed dose of the antidiabetic medication or skipping a meal was the precipitating factor that led to the emergency visit rather than any other comorbid factor.

The most important i.e., clinical presentation of hypoglycemia was highest in the month of Ramadan as the patients were in a state of fasting, where as hyperglycemia was most commonly reported in shawal, which might be due to the festive days after fasting. Diabetic ketoacidosis was not reported in Ramadan but its total 6 emergency cases were reported in the other two months.

Blood glucose levels must be checked during fasting throughout Ramadan in order to identify, stop, and treat hypoglycemia. A Bangladeshi study found that 23% of kids had to break their fast after experiencing severe hypoglycemia symptoms. Contrarily, young people refrain from breaking their fast, especially if hypoglycemia strikes close to sundown. (8)

Another research investigation discovered that more children and adolescents were willing to break their fast after experiencing hypoglycemia, regardless of the length of their fast. (9)

CONCLUSION

In contrary with previous studies, a downward trend of prevalence, from Shaban, to Ramadan, to Shawal was found. This indicated that fasting during month of Ramadan does not impact negatively on the diabetes emergencies in comparison with other months.

On the basis of these research findings and data obtained, it is necessary to observe the dietary pattern and associated factors and then deduce a management plan of treating diabetic patients according to the life style and habits of the individuals.

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