Original Articles

The effect of Ramadan on elderly patients presenting to the emergency department

HASAN SAHIN, SEYRAN BOZKURT BABUS, ATAMAN KÖSE, SEMRA ERDOGAN

ABSTRACT

Background. Patients visiting the emergency department (ED) may show variations by certain time periods such as Ramadan. We wished to ascertain whether Ramadan affects the ED presentations, clinical conditions and outcomes of patients aged 65 years or older.

Methods. Patients aged 65 years or older who presented to ED in Ramadan and in the following month in 2018 were reviewed retrospectively.

Results. A total of 1947 patients were enrolled, of whom 958 presented in Ramadan and 989 in the following month. The patients who presented in Ramadan most commonly (23.8%) presented between 8 p.m. and 11.59 p.m.; patients who presented in the following month most commonly (24%) presented between 8 a.m. and 11.59 a.m. ($p=0.26$). Complaints concerning the central nervous system (CNS) were more common in the month after Ramadan ($p<0.0001$). Diagnoses related to the cardiovascular system were more commonly made in Ramadan ($p=0.037$), whereas those related to CNS, otorhinolaryngology and oncology were more commonly made in the following month ($p=0.0005$, $p=0.024$ and $p=0.003$, respectively). No significant difference was found between the two groups with respect to outcomes ($p=0.36$). Compared to patients who presented in Ramadan, those that presented in the following month had a significantly longer ED stay ($p=0.036$).

Conclusion. Our study detected no significant difference between the two groups with respect to the time of presentation and ED outcomes. Patients who presented in Ramadan had a lower incidence of CNS complaints; a higher incidence of cardiovascular diagnoses; lower incidences of CNS, oncological and otorhinolaryngological diagnoses and a significantly shorter length of ED stay.

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INTRODUCTION

Ramadan is the month of fasting when Muslims deliberately avoid the consumption of food, water and oral or intravenous medications from dawn until sunset. Furthermore, nutritional habits, which are already diverse worldwide, become even more diverse among Muslim populations in Ramadan.[1,2] As fasting in Ramadan is a separate entity from real starvation, biochemical and physiological parameters during fasting are different than those observed in usual starvation. Moreover, life rhythm, sleep order, eating habits and sleep time are all altered in Ramadan.[3] Such changes in lifestyle may particularly affect patients with chronic disorders or conditions that may be exacerbated by fasting-induced dehydration.[2] The effects of 1-month starvation and fluid restriction have been examined in normal healthy individuals as well as in various potentially sensitive groups residing in a variety of countries.[4] It has been reported that they induced metabolic changes, a lesser rate of fasting-related health effects, a reduced medication compliance, increased nervousness, sleep deprivation, weakness and headache.[4]

It is important to understand the effects of Ramadan on clinical disorders and emergency department (ED) admissions to appreciate the working conditions of emergency physicians and managers.[2] Research reports focusing on the incidence and presenting features of various disorders in Ramadan are inadequate to accurately evaluate ED presentations during Ramadan.[3] Studies examining ED presentations in Ramadan have produced conflicting data about the incidence of various disorders in Ramadan. While a number of studies have reported that some conditions become more common in Ramadan, some others have reported unchanged incidence for such disorders.[2,3] Moreover, a study showed that the incidence of traffic accidents was increased with a parallel increase in the rates of ED admissions and injuries in Ramadan.[4]

No study has yet investigated the clinical outcomes of patients aged 65 years or older in Ramadan and the following month. Our study was designed to determine whether Ramadan, where lifestyles are altered, influences ED visits, clinical features and outcomes of patients aged 65 years or older, irrespective of the fasting status.

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METHODS

We retrospectively reviewed data from the 'Nucleus Medical Information System' database of patients aged 65 years or older who presented to the ED in Ramadan (16 May 2018–14 June 2018) and the following month (15 June 2018–14 July 2018) in 2018. Patients younger than 65 years of age, those with missing medical data and those who did not present in Ramadan or the following month were excluded from the study.

Patients' age, gender, presenting symptom, time of presentation, type of presentation, comorbid conditions, trauma type (if presentation was due to trauma), laboratory and radiological studies done, consultations requested from other departments, final diagnosis according to ICD-10 coding system, ED outcome and length of stay in the ED were recorded on pre-prepared data forms.

The presenting complaints were arranged by adding common patient complaints to the classification used in the ED clinical practice model developed by Hockberger *et al*.[5]

Our study was approved by Mersin University Rectorate Clinical Research Ethics Committee (dated 17 October 2018; no. 2018/416).

Statistical analysis

Continuous variables were tested for normality using Shapiro–Wilk test. Student's *t*-test was used to test the differences between the mean ages of both sexes, as well as to test the intergroup differences in the length of ED stay. Descriptive statistics were reported as mean and standard deviation. Categorical variables were compared using Pearson's chi-square and likelihood ratio chi-square tests. Their descriptive statistics were expressed as number and percentage. A value of $p<0.05$ was considered statistically significant. Data analysis was performed using MedCalc®17.9.7 software package.

RESULTS

Two months before Ramadan, the number of patients >65 years old was 2523 in total (1293 presentations between 16 March 2018 and 15 April 2018 and 1230 presentations between 16 April 2018 and 15 May 2018). Two months after Ramadan, the number of patients >65 years old was 2603 (1363 presentations between 15 June 2018 and 14 July 2018 and 1240 presentations between 15 July 2018 and 14 August 2018). There were 1152 ED presentations of patients aged 65 years or older in Ramadan and 1363 presentations in the following month. A total of 1947 patients meeting the inclusion criteria were studied, of which 958 presented in Ramadan and 989 in the following month. Their mean (SD) age was 74.8 (7.2) years. The mean (SD) age of those presenting in Ramadan was 74.68 (7.12) years, and of those presenting in the following month was 74.98 (7.24) years (p=0.57). The mean (SD) age of women and men was 75.1 (7.3) and 74.5 (7.0) years, respectively (p=0.04).

Women constituted 53.9% of patients presenting in Ramadan and 52.7% of patients presenting in the following month. Patients presenting to the ED on their own were 66.9% in Ramadan and 66.3% of those in the following month (p=0.79). Patients who presented in Ramadan most commonly (23.8%) presented between 20:00 and 23:59 hours and those who presented in the following month most commonly (24%) presented between 08:00 and 11:59 (p=0.26; Table I).

Among patients who presented in Ramadan, 90% (*n*=862) had a chronic disease, while 86.7% (*n*=857) of those who presented in the following month had a chronic disease (p=0.02) and the difference was not significant (Table I); 9.5% of the patients who presented in Ramadan and 16.8% of those who presented in the following month had presented with complaints related to the central nervous system (CNS) (p<0.0001). Also 12.1% of patients who presented in Ramadan and 6.8% of those that presented in the following month presented with non-specific complaints (p=0.0002). No significant difference was found between the two groups with regard to other parameters of complaints (Table I).

A history of trauma was more common (present in 11.5%) in patients who presented in Ramadan compared to those who presented in the following month (10%; p=0.29). The two groups did not show a significant difference of type of trauma (p=0.13); therefore, no paired group comparison was made on a categorical basis. An analysis of trauma types in patients with a trauma history showed that 67.3% of patients who presented in Ramadan and 61.6% of patients who presented in the following month presented after falls from the same height (Table II).

Cardiac enzymes were more commonly ordered for patients who presented in Ramadan (p=0.04). However, the two groups were similar in terms of other laboratory studies. Scintigraphy was requested for only 3 patients who presented in Ramadan and for none of those that presented in the following month (p=0.04). Other radiological studies were ordered at similar rates in both groups (Table III).

Consultation from another department was requested for 39% of patients who presented in Ramadan and for 37.9% of those who presented in the following month (p=0.6). A greater number of consultations was requested from neurology, and gynaecology and obstetrics departments for patients who presented in Ramadan (p=0.01 and p=0.04, respectively; Table IV).

Diagnoses related to the cardiovascular system (CVS) were more commonly made in Ramadan (p=0.037), while diagnoses related to CNS, otorhinolaryngology and oncology were made more commonly in the following month (p=0.0005, p=0.024 and p=0.003, respectively; Table V).

The two study groups did not differ significantly with respect to the emergency department outcomes (p=0.36); thus, no paired comparison was made on a categorical basis (Table V). Among patients who were admitted to hospital in Ramadan, 56.1% (*n*=129) were admitted to a regular ward and 43.9% (*n*=101) to the intensive care unit; among those who presented in the following month, 58.7% (*n*=128) were admitted to a regular ward and 41.9% (*n*=90) to the intensive care unit.

The mean (SD) length of stay in the ED was 220.8 (209.1) minutes among patients who presented in Ramadan and 243.2 (260.2) minutes among those who presented in the following month (p=0.04).

DISCUSSION

Patient populations visiting ED may show variations by the size of regional population, school holidays, sudden influx of visitors to towns or certain time periods such as Ramadan.[6] We studied 1947 patients aged 65 years or older to ascertain their demographic and clinical properties and the effects of Ramadan on these features. It has been reported that the proportion of women among the elderly population is greater[7] although different proportions of women have been reported by studies in Ramadan and the following month.[2,3,8,9] Our study revealed that 53.9% of patients who presented in Ramadan and 52.7% of those who presented in the following month were women.

In a study by Al Assaad *et al*., which investigated ED

TABLE I. Characteristics of patients presenting in Ramadan and in the following month

Characteristic	Ramadan (*n*=958) *n* (%)	Month after Ramadan (*n*=989), *n* (%)	p value
Gender			
Women	516 (53.9)	521 (52.7)	0.60
Men	442 (46.1)	468 (47.3)	
Time of presentation			
08:00–11:59	198 (20.7)	237 (24.0)	0.26
12:00–15:59	205 (21.4)	199 (20.1)	
16:00–19:59	181 (18.9)	209 (21.1)	
20:00–23:59	228 (23.8)	209 (21.1)	
00:00–03:59	78 (8.1)	75 (7.6)	
04:00–07:59	68 (7.1)	60 (6.1)	
Type of presentation			
Ambulance	317 (33.1)	333 (33.7)	0.79
By own means	641 (66.9)	656 (66.3)	
Presenting complaint/system involvement			
Gastrointestinal	190 (19.8)	201 (20.3)	<0.001
Pulmonary	128 (13.4)	124 (12.5)	
Trauma	110 (11.5)	99 (10.0)	
Central nervous	91 (9.5)	166 (16.8)	
Cardiovascular	69 (7.2)	66 (6.7)	
Musculoskeletal	62 (6.5)	63 (6.4)	
Weakness	52 (5.4)	48 (4.9)	
Fever	36 (3.8)	47 (4.8)	
Genitourinary	36 (3.8)	39 (3.9)	
Head and neck	22 (2.3)	14 (1.4)	
Dermatological	17 (1.8)	16 (1.6)	
Poor overall medical status	11 (1.1)	16 (1.6)	
Endocrinological	8 (0.8)	8 (0.8)	
Assault by pets or wild animals	7 (0.7)	5 (0.5)	
Haematological and oncological	2 (0.2)	3 (0.3)	
Cardiac arrest	2 (0.2)	2 (0.2)	
Psychological	1 (0.1)	5 (0.5)	
Toxicological	0 (0)	0 (0)	
Non-specific	116 (12.1)	67 (6.8)	
Chronic disorders			
Hypertension	501 (52.3)	537 (54.3)	0.38
Diabetes	321 (33.5)	334 (33.8)	0.9
Coronary artery disease	262 (27.3)	290 (29.3)	0.33
Malignancy	133 (13.9)	127 (12.8)	0.5
Congestive heart failure	131 (13.6)	109 (11.0)	0.08
Chronic obstructive pulmonary disease (asthma)	91 (9.5)	115 (11.6)	0.13
Cerebrovascular accident	76 (7.9)	74 (7.5)	0.71
Renal failure	62 (6.5)	55 (5.6)	0.4
Alzheimer disease	40 (4.2)	57 (5.0)	0.11
Parkinson disease	18 (1.9)	20 (2.0)	0.82
Hepatic diseases/cirrhosis	5 (0.5)	9 (0.9)	0.31
Other disorders	138 (14.4)	110 (11.1)	0.03

TABLE II. Distribution of patients with trauma presenting to the emergency department in Ramadan and in the following month

Trauma	Ramadan (*n*=110), *n* (%)	Month after Ramadan (*n*=99), *n* (%)	p value
Fall from same height	74 (67.3)	61 (61.6)	0.125
Fall from height	10 (9.1)	4 (4.0)	
Out-of-vehicle traffic accident	7 (6.4)	12 (12.1)	
Battery	3 (2.7)	1 (1.0)	
In-vehicle traffic accident	2 (1.8)	1 (1.0)	
Cuts	2 (1.8)	8 (8.1)	
Gunshot wound	0 (0)	0 (0)	
Burn	0 (0)	1 (1.0)	
Others	12 (10.9)	11 (11.1)	

TABLE III. Investigations ordered for patients presenting to the emergency department in Ramadan and in the following month

Investigation	Ramadan (*n*=958), *n* (%)	The following month after Ramadan (*n*=989), *n* (%)	p value
Laboratory study			
Haemogram	737 (99.9)	769 (99.6)	0.625
Biochemistry	734 (99.5)	769 (99.6)	0.720
Cardiac enzyme	485 (65.7)	468 (60.6)	0.040
Urinalysis	215 (22.4)	253 (25.6)	0.105
Blood gas analysis	195 (20.4)	214 (21.6)	0.487
Coagulation profile	87 (11.8)	74 (9.6)	0.166
Drug level	15 (1.6)	19 (1.9)	0.550
Blood type	14 (1.5)	12 (1.2)	0.634
Ethanol	10 (1.0)	5 (0.5)	0.174
Imaging			
Chest X-ray	395 (41.2)	376 (38.0)	0.147
Brain CT	159 (16.6)	169 (17.1)	0.722
Diffusion MR	95 (9.9)	106 (10.7)	0.561
Plain film of limb	89 (9.3)	73 (7.4)	0.127
Upright plain abdominal film	81 (8.5)	95 (9.6)	0.376
Thorax CT	66 (6.9)	68 (6.9)	0.990
Abdominal CT	51 (5.3)	62 (6.3)	0.372
Ultrasonography	31 (3.2)	29 (2.9)	0.698
Doppler ultrasonography	7 (0.7)	2 (0.2)	0.086
Pelvic plain film	8 (0.8)	13 (1.3)	0.306
CT of limb	5 (0.5)	6 (0.6)	0.803
Scintigraphy	3 (0.3)	0 (0)	0.039
Cerebral MR	3 (0.3)	1 (0.1)	0.291
Vertebral plain film	3 (0.3)	2 (0.2)	0.628
Spinal MR	2 (0.2)	2 (0.2)	0.975

TABLE IV. Distribution of patients presenting to the emergency department in Ramadan and in the following month by consulted department

Department consulted	Ramadan (*n*=374), *n* (%)	Month after Ramadan (*n*=375), *n* (%)	p value
Cardiology	107 (28.6)	85 (22.7)	0.063
Neurology	59 (15.8)	87 (23.2)	0.010
Chest diseases	58 (15.5)	55 (14.7)	0.748
Infectious diseases	46 (12.3	43 (11.5)	0.725
Orthopaedics	41 (11.0)	30 (8.0)	0.166
Nephrology	38 (10.2)	54 (14.4)	0.077
Gastroenterology	33 (8.8)	22 (5.9)	0.121
General surgery	31 (8.3)	33 (8.8)	0.802
Haematology	18 (4.8)	16 (4.3)	0.720
Oncology	16 (4.3)	15 (4.0)	0.848
Neurosurgery	15 (4.0)	21 (5.6)	0.309
Otorhinolaryngology	10 (2.7)	8 (2.1)	0.629
Anaesthesia	6 (1.6)	4 (1.1)	0.520
Cardiovascular surgery	6 (1.6)	5 (1.3)	0.758
Ophthalmology	5 (1.3)	12 (3.2)	0.087
Thoracic surgery	5 (1.3)	5 (1.3)	0.997
Urology	4 (1.1)	9 (2.4)	0.163
Endocrinology	3 (0.8)	8 (2.1)	0.130
Plastic surgery	2 (0.5)	4 (1.1)	0.414
Psychiatry	1 (0.3)	3 (0.8)	0.306
Dermatology	1 (0.3)	0 (0)	0.238
Obstetrics and gynaecology	0 (0)	3 (0.8)	0.041

presentations before, during and after Ramadan, the mean (SD) age of patients who presented in Ramadan was 53.88 (22.58) years, and of those who presented in the other 2 months was 54.21 (21.88) years, with no significant difference between both groups.[2] In another study, the mean (SD) age was 59.91 (14.60) years in Ramadan and 62.11 (14.61) years in the following month.[3] In our study, the mean age of patients was higher as we included patients who were 65 years or older.

In the literature, regardless of age group, it was reported that more patients were seen during the daytime shift in all months

TABLE V. Diagnosis and outcome of patients presenting to the emergency department in Ramadan and in the following month

Diagnosis/outcome	Ramadan (*n*=958), *n* (%)	Month after Ramadan (*n*=989), *n* (%)	p value
Diagnosis			
Gastrointestinal	162 (16.9)	159 (16.1)	<0.0001
Pulmonary	117 (12.2)	103 (10.4)	
Cardiovascular	100 (10.4)	75 (7.6)	
Trauma	98 (10.2)	91 (9.2)	
Central nervous system-related	83 (8.7)	136 (13.8)	
Musculoskeletal	59 (6.2)	65 (6.6)	
Endocrinological-metabolic	48 (5.0)	55 (5.6)	
Urogenital system	44 (4.6)	51 (5.2)	
Non-specific symptoms	41 (4.3)	32 (3.2)	
Otorhinolaryngological	39 (4.1)	64 (6.5)	
Infectious	28 (2.9)	30 (3.0)	
Dermatological	20 (2.1)	17 (1.7)	
Haematological	18 (1.9)	20 (2.0)	
Mental and behavioural problems	8 (0.8)	10 (1.0)	
Prophylaxis and needle rabies vaccination	8 (0.8)	3 (0.3)	
Oncological	7 (0.7)	25 (2.5)	
Ophthalmological	5 (0.5)	12 (1.2)	
Dog, scorpion, snake bites	3 (0.3)	5 (0.5)	
Intoxication	1 (0.1)	1 (0.1)	
Mastoid	0 (0)	0 (0)	
Non-specific	69 (7.2)	35 (3.5)	
Outcome			
Discharge	686 (71.6)	740 (74.8)	0.36
Admission	230 (24.0)	218 (22.0)	
Refusal of treatment	36 (3.8)	26 (2.6)	
Left against medical advice	4 (0.4)	2 (0.2)	
Deceased	2 (0.2)	3 (0.3)	

except during Ramadan when more patients were seen during the night shift.[6,10] In line with the literature, we too found that patients frequently presented to the ED at the evening in Ramadan and at daytime in the following month. However, we did not find a statistically significant difference.

It has been reported that one-third of elderly patients reach the ED by ambulance.[11] We also found a similar number during and after Ramadan 33.1% and 33.7%, respectively.

Balhara *et al*. reported that patients most commonly presented with complaints concerning the gastrointestinal system (GIS) followed by those of the ear, nose and throat (ENT) and muscular complaints in Ramadan, whereas they most commonly presented with complaints of ENT followed by GIS and CNS in the following month.[10] In our study, the patients most commonly presented with complaints of GIS followed by respiratory complaints in Ramadan, whereas the most common complaints in the following month were related to GIS and CNS. A higher incidence of complaints of GIS in the elderly may be attributed to reduced motility, secretion and absorption capacities of GIS and increased prevalence of peptic ulcer; atrophic gastritis and hypochlorhydria due to physiological changes. A significant increase in complaints of the CNS in the month after Ramadan may be explained by the extremely high temperatures in summer; a majority of patients had underlying cardiovascular and hypertensive comorbid conditions and thus were using multiple medications. The heat caused complaints of the CNS such as dizziness, headache and weakness.

Ageing is associated with reduced muscle mass and strength, neuronal loss and related slowed motion, delayed reaction time and imbalance.[12] Such physiological and metabolic alterations may result in an increased incidence of trauma, including falls from the same height. It has been reported that falls constitute approximately three-fourths of all trauma incidents in the geriatric population, and almost the entire remaining one-fourth are caused by motor vehicle accidents and injuries.[13] We found that 10.2% of our patients presented for trauma injuries, with falls being the most common aetiology, followed by motor vehicle accidents in both groups. Although there was no significant difference between the Ramadan month and the following month with respect to the number of falls, it was greater in Ramadan than the following month. A greater incidence of falls in Ramadan may be associated with reduced cognitive functions during daytime fasting, which weakens defensive reflexes.

A study by Al Assaad *et al*. found no significant difference between the rates of ED presentations in Ramadan and the following month among elderly people with at least one chronic disorder.[2] However, we found that a higher proportion of elderly patients with chronic conditions presented during Ramadan than in the following month. This difference may be because elderly people with chronic disorders may be omitting medications during fasting. In a group of patients with a history of diabetes mellitus (DM), Elbarsha *et al*. reported that 60.5% of patients presenting in Ramadan had a history of hypertension (HT); 28.2% had a history of coronary artery disease (CAD) and 13% had a history of cerebrovascular accident; they also noted that the ranks of chronic conditions remained unchanged for patients who presented in the months following Ramadan.[14] Another study scrutinized the prevalence of chronic conditions and found that 30.4% of patients had HT, 15.4% DM and 6.7% CAD.[2] Topacoglu *et al*. reported that the number of ED presentations of patients with HT was significantly higher in Ramadan than in the following month.[3] Perk *et al*., on the other

hand, reported no significant difference between Ramadan and the following month with regard to ED presentations of patients with HT.[15] In our study, no significant difference was observed between the two groups in terms of chronic disease.

Elderly patients presenting with atypical symptoms and underlying disorders may give rise to the need for providing more intensive care and ordering an increased number of laboratory and radiological studies. We did not come across any study that focused on orders of laboratory or radiological studies in Ramadan or the following month. Our study revealed that blood tests were ordered for 77% of the patients in Ramadan and 78.1% in the following month. We found that cardiac enzymes were ordered more commonly in Ramadan. A greater number of complaints related to CVS at admission, CVS-related diagnoses and cardiology consultations in Ramadan than that of the following month may explain a higher number of orders for cardiac enzyme studies in Ramadan. Radiological studies were ordered at similar rates in both groups except for scintigraphy.

Logoglu *et al*. reported that consultations were requested from the departments of cardiology (15.2%), internal diseases (13.7%) and chest diseases (7.4%).[16] It was found that cardiology consultations were requested for 28.6%, neurology consultations for 15.8% and chest disease consultation for 15.5% of patients, who presented in Ramadan. It was also found that neurology consultations were requested for 23.2%, cardiology consultations for 22.7% and chest disease consultation for 14.7% of patients, who presented in the month after Ramadan. Our study showed that the number of consultations requested from the neurology and obstetrics and gynaecology departments was greater in the month after Ramadan. This difference may have stemmed from a significant increase in the rate of CNS-related complaints in the following month compared to that of Ramadan itself.

Many studies have mentioned different final diagnoses for elderly patients at the time of their discharge from the emergency department.[17–19] Our study found that GIS-related diagnoses were most commonly made (16.9%) in Ramadan, which were followed by respiratory (12.2%) and cardiovascular diagnoses (10.4%). In the month following Ramadan, GIS diagnoses were the most common (16.1%), followed by CNS (13.8%) and respiratory (10.4%). A higher incidence of GIS complaints in the elderly may be attributed to physiological changes. During Ramadan, because people eat most of their food in the early part of the night and then in the early morning, they may be more prone to develop acute gastritis. A review of the literature shows that the most common diagnoses vary by country and region. Previous studies comparing stroke rates in Ramadan and other months have shown no significant differences.[20,21] We found a significant increase in the rate of CNS-related diagnoses in the month after Ramadan. Al Suwaidi *et al*. reported that the proportion of patients diagnosed with decompensated heart failure was significantly lower in Ramadan than in the other months of the year.[22] Several studies have indicated that the proportion of patients diagnosed with acute coronary syndrome was lower in Ramadan than in other months.[8,23,24] Balhara *et al*. found no significant difference in CVS diagnoses during Ramadan and in the following month.[10] We, on the other hand, found a higher proportion of elderly patients with CVS diagnoses in Ramadan than in the following month. During Ramadan, patients are more likely to miss their drugs compared to the non-Ramadan period. This could lead to higher complications, particularly accelerated HT, decompensated heart failure, myocardial infarction, etc. The lack of any information about the fasting status and drug use of patients constitutes a limitation of our study.

It has been reported that 12.8%–28.1% of elderly patients are admitted to hospital.[11,17] We found an admission rate of 28.4% in Ramadan and 25.2% in the following month. A study by Al Assaad *et al*. showed that patients stayed longer in the ED in Ramadan than in other months (5.42 [14.86] hours *v.* 3.96 [4.29] hours; p=0.006).[2] In our study, the mean length of ED stay was 220.8 (209.1) minutes in Ramadan and 243.2 (260.2) minutes in the following month. The difference in the length of stay may be explained by Ramadan in our region having coincided with the last days of spring when the climate is temperate, whereas the following month coincided with hotter days of summer when air temperature and humidity were higher, which adversely affected elderly people and prolonged their ED stay.

Limitations

The major limitations of our study were its retrospective design and the lack of any information about the fasting status and drug usage of the patients. Some of the diseases may become more prevalent immediately following Ramadan due to various reasons including effects of long fasting on various body systems. The lack of comparison with the month preceding Ramadan in terms of diseases constitutes one of the limitations of our study. On the other hand, its strengths include its being a large-study encompassing data from Ramadan and the following month, in a large number of patients.

Conclusion

Our study showed that, among patients presenting in Ramadan, the rates of chronic disorders were higher; the rate of CNS-related complaints were lower; CVS-related diagnoses were more common; diagnoses related to CNS and otorhinolaryngology were less common and the duration of ED stay was shorter. We also found that the two groups did not differ significantly with respect to mean age, gender distribution, times of presentation, type of presentation, presence of trauma, trauma types, number of orders for radiological studies and ED outcomes.

Author contribution

All authors reviewed and edited the manuscript and approved the final version of the manuscript. Substantial contributions to the conception: Babus SB, design of the work; writing: Babus SB, Sahin H; the acquisition, analysis of data: Babus SB, Sahin H, Erdogan S; interpretation of data for the work: Babus SB, Sahin H, Kose A, Erdogan S; drafting the work or revising it critically for important intellectual content: Babus SB, Sahin H, Kose A.

Availability of data and materials

The dataset used and analysed during this study is available from the corresponding author on reasonable request.

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Conflicts of interest. None declared

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