EAJEM-89410: Research Article

Effect of Ramadan on Emergency Department Attendances: A Retrospective Study

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Aim: Ramadan is a month, in which changes in diet and lifestyle are observed. These changes have charestetic, which may affect the causes and time pattern of emergency department (ED) attendances. However it is unclear how ED attendances are affected during Ramadan. The aim of this study is to investigate the effect of Ramadan month on the ED attendances.
Materials and Methods: Hospital records and files of patients older than 17 years old who attendent to a university hospital ED in just before, during and immediately after Ramadan months between 2014- 2016 were reviewed retrospectively.
Results: In the study, 44146 ED attendances were evaluated. It was found that during Ramadan months, attendances decreased compared to the other months ($p<0.001$). It was determined that in Ramadan, there was a significant increase in ED visits one hour after iftar and one hour before sahur ($p<0.001$). It was detected that forensic cases decreased during Ramadan ($p <0.001$).
Conclusion: In the Ramadan months, the number of ED attendances have decreased and the time period of the ED attendances has changed. There is a noticeable increase in attendances in the one hour after iftar and one hour before sahur.

Keywords: Attendance time, Emergency department, Fasting, Ramadan
Short Title in English: Emergency Department Attendances in Ramadan Month

INTRODUCTION

During Ramadan, Muslims perform fasting. Fasting requires abstaining from many activities such as eating, drinking, sexual activity, drug use and smoking from sunrise to sunset (1). This worship affects health by inducing changes in the life rhythm and physiological processes (2).

Due to limitations of many requirements during the day, excessive consumption after the sunset, and changes in sleep patterns, irritability and anxiety can develop in fasting individuals (3). However the spiritual effect of Ramadan fasting may remove people from violence (4). On the other hand Ramadan fasting can cause changes in water electrolyte balance, serum total cholesterol, blood glucose level, systolic and diastolic blood pressure (5). Along with the psychological and physiological effects of fasting, changes in diet and lifestyle brought by the Ramadan month can affect ED attendances (6,7).

The analysis of the effect on the need for ED services in Ramadan is of great importance in terms of enabling emergency health service delivery in this month. The study aimed to

investigate the effect of Ramadan on causes of ED attendances and time period of ED attendances.

MATERIALS and METHODS

The study was planned according to the descriptive research method. The Study conducted in a University Hospital Emergency Department. The Emergency Department have 38 bed capacity and average 250 attendances in 24 hours have been made to the department. In the study, in the three-years period covering the years 2014-2016, the ED attendances during the Ramadan months and as a control group just before and immediately after the Ramadan months were assessed and compared with each other. In the evaluation, between the dates of May 7 to August 4, 2016; May 18 to August 16, 2015; May 28 to August 27, 2014 hospital records of all attendances made by individuals 18 years of age and older were retrospectively reviewed. In the review, the data of the patients who underwent ethanol testing and the consultation notes of the patients who required toxicology consultation were evaluated separately. The research was carried out after the approval of the University Clinical Research Ethics Committee.

In this study causes of ED attendances were divided into four groups. These groups are traffic accidents, work accidents, forensic cases (except from traffic and work accidents) and other emergency cases. Attendances which made for prescribed injections and dressing weren't included in the study.

Statistical analyses: The data obtained in the study were analyzed in IBM Statistical Package for the Social Science (IBM SPSS; Armonk, NY, USA) for Windows v23.0software. Qualitative data were assessed by chi-square test. Normality of distribution was determined using Kolmogorov Smirnov test. Parametric tests were used for the analysis of normally distributed data, nonparametric tests were used for the analysis of the data that did not normally distribute. The effect of the Ramadan months on the attendance time was examined by using ANOVA tests with repetitive measurements. Qualitative data were presented by number and percentage (%), and quantitative data by arithmetic mean ± standard deviation formula. Statistically, $p < 0.05$ was considered significant.

RESULTS

During the study period 44146 ED attendances were made. In this period, the average age of the ED attendants was 42.1 years (min = 18, max = 104). 50.3% of patients were male and 49.7% of them were female. 27.5% (n = 12139) of the attendances were made in Ramadan

month, of 38.3% (n = 16902) before the Ramadan and of 34.2% (n = 15105) after the Ramadan. The average number of daily attendances during Ramadan (n = 137), was lower than the months just before the Ramadan (n = 187) and immediately after the Ramadan (n = 167) months. This difference between the months was statistically significant ($p<0.001$) (Table 1).

It was found that during the months of Ramadan, there was a decrease in the number of attendances for all hours of the day in general. It was seen that the decrease was more prominent especially about one hour before the iftar. However, about an hour after iftar (during the research period, iftar hours changed between 19.53-20.07), the attendances increased rapidly, and it was determined that the number of attendances exceeded the number of attendances made before and after Ramadan at the same time (Figure 1). It was also determined that the attendances to the ED increased significantly one hour before sahur and during the sahur hours compared to the attendances were made at the same time in the previous and next months (during the survey period, the hours of sahur changed from 02.39 to 03.16). This change in the attendance hours during Ramadan was statistically significant ($p<0.001$).

It was determined that forensic cases accounted for 1.8% of all attendances during Ramadan. This rate was significantly lower than before and after Ramadan ($p<0.001$). In addition traffic accidents constitute 1.3% of all attendances before Ramadan, 1.6% of during and after Ramadan (Table 2). Increase in the traffic accidents in Ramadan months was found to be statistically significant compared to the months just before Ramadan months ($p=0.025$).

In the study alcohol use related ED attendances were evaluated. During the study period, blood ethanol levels of 538 patients were examined. It was found that the attendances of individuals with high ethanol level were significantly lower in the month of Ramadan than the other months ($p<0.001$) (Table 3). Causes of attendance of patients with high blood ethanol level were examined. 34.2% (n = 13) of these patients admitted to the ED due to traffic accident and 52.6% (n = 20) of them were forensic cases.

During the study period, toxicology evaluation of 157 patients was performed. When the attendance periods of these patients were examined, it was seen that the number of attendance related to substance use was lower in Ramadan (18.4%) compared to just before (36.7%) and immediately after (44.9%) the Ramadan months. The blood substance levels were examined according to the attendance periods of the patients (Table 4). There was a significant difference between the months of Ramadan and the months after Ramadan in the blood

Tetrahydrocannabinol level (p=0.016). It was detected that the frequency of positive results were found to be lower in Ramadan compared to before and after Ramadan. However, this difference was not statistically significant (p = 0.752).

DISCUSSION

It was seen that in the month of Ramadan, ED attendances declined in general. While the ED attendances evidently decreased about an hour before iftar, there was sharply increase in the ED attendances approximately one hour after iftar. There was also significant increase in one hour before sahur in the ED attendances. In the study it was detected that there was a significant increase in traffic accidents compared to the month before Ramadan. On the other hand there was a significant decrease in the number of forensic cases forensic cases in Ramadan. In addition, attendances of individuals with high blood ethanol level were significantly lower in the month of Ramadan.

Ramadan causes changes in nutrition, medication use and social life. Lifestyle and socio-cultural characteristics are known to influence the use of ED (8). However, a limited number of studies have been conducted on how the Ramadan month affects the use of ED. In some studies on this subject, it was found that the number of daily attendances in Ramazan is similar to the months that other than Ramadan (9, 10). In the study of Pekdemir and his colleagues, it was determined that the average number of attendances per day in Ramadan was significantly higher than that of the next month (11). In our study, it was determined that the number of ED attendances decreased significantly in Ramadan compared to before and after Ramadan. The difference from other publications in the literature may be related to the fasting rate in the regions where the studies were conducted.

According to the results of the studies, there are some changes in the ED attendance times in Ramadan. Kayipmaz et al. detected that ED admissions made during the fasting period in Ramadan was significantly higher than the other times of the day (12). In the study of Butt et al. it was determined that during Ramadan, night-time attendances (19:00-06:59) were more compared to day-time attendances (07:00-18:59) (6). In the study of Pekdemir and colleagues, it was found that the ED attendances in Ramadan concentrated during the first four hours (16:00-20:00) after iftar (11). In the study of Balhara et al., The pattern of ED attendances in Ramadan changed significantly compared to the other months than Ramadan; it was determined that the number of ED attendances was lowest at the time of iftar and that the number of the

attendances increased rapidly in the first half hour afterwards (9). These results were in parallel with findings from our study.

In the study of Khammas et al., it was determined that there is no difference in the number, seriousness and time of traffic accidents of fasting and non-fasting people in Ramadan (13). However Kalafat et al., and Tahir et al., found that the traffic accidents in Ramadan were significantly higher than the other months (14,15). Similarly, in the current study it was determined that traffic accidents increased in the month of Ramadan compared to the just before months of Ramadan. A survey showed that people felt more nervous in traffic during Ramadan (16). In addition, fasting individuals may develop insomnia, fatigue, inattention (17) and such factors can lead to an increase in traffic accidents.

Mohseni et al., reported that violence related ED attendances such as gunshot and knife injuries decreased significantly in Ramadan (18). Findings of this study support Mohseni et al. We detected that forensic cases caused by violence significantly decreased in Ramadan compared to the other months. In Ramadan month, which is called as "patience month", cooperation and solidarity increase among people. Our findings are thought to be related to the spiritual effect of the month of Ramadan.

Literature about ED attendances related to substance use wasn't accessed. In this study, it was determined that the number of ED attendances related to substance use decreased during the month of Ramadan. This result is thought to be associated with Muslims trying to abandon the harmful habits in the month of Ramadan.

STUDY LIMITATIONS

Patient files and hospital records were investigated retrospectively in the study. In the analyzed period, during Ramadan months, the fact that the rate of fasting and not fasting persons among patients is unknown is the limittation of this study.

CONCLUSION

Findings obtained from this study showed that the number of ED attendances decreased during the month of Ramadan and the time period of the ED attendances changed. There was a noticeable increase in ED attendances an hour after iftar, and an hour before sahur. Significant decrease were seen in ED attendances due to forensic incidents.

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TABLES

Table 1. Average daily emergency department attendances by period (N=44146)

Year	Before Ramadan n	Ramadan n	After Ramadan		p
2014	160	115	148	F=74.30	<0.001
2015	195	141	180	F=58.45	<0.001
2016	206	157	175	F=42.44	<0.001
Total	187	137	167	X^2=106.99	<0.001

Table 2. Causes of emergency department attendances by periods (N=44146)

Causes of attendances	Before Ramadan n* (%)	Ramadan n (%)	After Ramadan n (%)	X^2	p
Forensic case	363 (2.1)	220 (1.8)	382 (2.5)	16.35	<0.001
Traffic accident	217 (1.3)	194 (1.6)	240 (1.6)	6.86	0.032
Work accident	110 (0.7)	94 (0.8)	95 (0.6)	2.40	0.301
Other Emergency cases	16212 (95.6)	11631 (95.8)	14388 (95.3)	9.43	0.009

***** Percentages give the proportion of selected cases in all cases

Table 3. Blood ethanol levels of patients by periods (n=538)

Period	High n (%)	Normal n (%)	X^2	p
Before Ramadan	15 (7.3)	190 (92.7)		
Ramadan	1 (0.7)	146 (99.3)	15,57	<0.001
After Ramadan	22 (11.8)	164 (88.2)		
Total	38 (7.9)	500 (92.1)		

Table 4. Laboratory test results for blood and urine substance levels by periods (N**=1857)

	Before Ramadan		Ramadan		After Ramadan			
	Normal n (%)	High n (%)	Normal n (%)	High n (%)	Normal n (%)	High n (%)	X^2	p
Benzodiazepine (U)	8 (72.7)	3 (27.3)	5 (50)	5 (50.0)	19 (70.4)	8 (29.6)	1.598	0.469
Tricyclic antidepressant (U)	7 (87.5)	1 (12.5)	9 (90.0)	1 (10.0)	16 (94.1)	1 (5.9)	0.340	1.000
Paracetamol (U)	7 (87.5)	1 (12.5)	9 (90.0)	1 (10.0)	16 (94.1)	1 (5.9)	0.340	1.000
Tetrahydrocannabinol (U)	5 (62.5)	3 (37.5)	8 (80.0)	2 (20.0)	16 (94.1)	1 (5.9)	3.909	0.151
Opiate (B)	51 (98.1)	1 (1.9)	19 (95.0)	1 (5.0)	56 (98.2)	1 (1.8)	0.749	1.000
Paracetamol(B)	51 (98.1)	1 (1.9)	18 (90)	2 (10)	51 (89.5)	6 (10.5)	3.435	0.145
Methamphetamine (B)	51 (98.1)	1 (1.9)	20 (100)	-	56 (98.2)	1 (1.8)	0.378	1.000
Tricyclic antidepressant (B)	49 (94.2)	3 (5.8)	19 (95.0)	1 (5.0)	57 (100)	-	3.296	0.214
Tetrahydrocannabinol (B)	45 (86.5)	7 (13.5)	20 (100)	-	43 (75.4)	14 (24.6)	7.061	0.029
Benzodiazepine (B)	38 (77.6)	11 (22.4)	16 (80.0)	4 (20.0)	32 (68.1)	15 (31.9)	1.554	0.460
Bonzai (B)	17 (94.4)	1 (5.6)	10 (100)	-	25 (100)	-	1.982	0.528

*: More than one test was administered to a patient
N**: Number of tests applied
U: Urine test
B: Blood test