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Research Article

**CAUSES, RISK FACTORS AND OUTCOMES OF HOSPITALISATION OF
MEDICAL AND SURGICAL ADULT PATIENTS IN THE MAJOR
HOSPITALS IN MAKKAH DURING RAMADAN AND THUL-HIJJA OF
THE ISLAMIC YEAR 1438 (2017)****Basem Hasan Alshareef, Abdullah Sulaiman Yamani, Muhannad Mohammed Bahashwan, Bayan Salem Alkhayat, Nada Ali Alhazmi, Abdulaziz Samir Hazzazi, Siddiq Mazin Almaghrabi, Asrar Adnan Nadhrah, Raghad Zuhair Aljurushi, Saleh Maneea Alloqmani**

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Abstract:

Introduction: More than 5 million pilgrims come from all over the world to perform Umrah and Hajj in Makkah. The continuously increasing number of pilgrims every year can increase the risk of health hazards especially the communicable diseases which necessitates the appropriate risk management and availability of advanced medical care.

Methods: We conducted a retrospective study to assess the most common causes of medical and surgical hospital admissions and their outcomes among adult patients in the major hospitals in Makkah (Kingdom of Saudi Arabia) during Ramadan and Thul-Hijja of the Islamic Year 1438 (2017). Data such as socio-demographic characteristics, personal habits and co-morbidities was retrieved from patients' files found in archives and admission office.

Results: A total of 4432 subjects were included in the study of which 55.2% were males. Most of the patients (69.4%) were medically managed after hospitalization while 30.6% required surgical intervention. The most common symptoms of hospital admission included abdominal pain (9.0%), fever (8.0%) and shortness of breath (7.8%). King Faisal hospital showed the highest cumulative survival rate (53.7%). It was revealed that having a co-morbid condition such as DM or HTN can negatively affect the rate of survival (p -value <0.001).

Conclusion: It can be concluded that a considerable percentage of pilgrims require medical or surgical care and it is very important to conduct additional studies that can inform evidence-based management of those patients especially the higher risk groups.

Keywords: Hospitalizations, Ramadan, Hajj, Makkah, survival.

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INTRODUCTION:

Hajj is considered one of the largest pilgrimages performed in the world. An estimate of more than 13 million had performed hajj between 2010 and 2014 from different nationalities [1]. The grand mosque can have more than 1.2 million pilgrims at one time for prayers. By the year 2020, it is estimated that the numbers will reach more than 10 million pilgrims [2]. Umrah is a smaller version of Hajj that can be performed at any time of the year. It can be performed along with Hajj and/or in other days as well. However, performing Umrah during Ramadan is the most recommended and equal to Hajj in merit and excellence. [3]

With the increasing number of pilgrims, health hazards and hospitals admission numbers soar. The Kingdom of Saudi Arabia offers free medical services for these pilgrims to make sure that the rituals are performed safely throughout the days of Hajj without major crisis [4].

The leading reasons for medical care and hospital admissions have been identified in descending order as respiratory disease, cardiovascular disease, gastroenteritis and trauma. Respiratory infection was identified as the most common contemporary cause of hospital admission, with pneumonia as the most common disease [1]. Infectious diseases are observed to spread easily in such large mass gatherings. Respiratory tract infections, ENT infections, influenza, pyogenic pneumonia, whooping cough, and tuberculosis are quite common infectious outcomes of Hajj [5].

Hospitalization rates due to infections or exacerbated existing medical conditions have been tackled by other studies but the topic needs more investigations. Our study aims to provide better insights to the medical problems that arise during that season and the medical burden involved. This can help us predict the influencing factors and best way for prevention in future seasons.

MATERIALS AND METHODS:

Table 1 Distribution of 4432 patients by hospitals during Ramadan and Thul-Hijja of the Islamic Year 1438 (2017)

Hospital	n (%)
King Faisal Hospital	1393 (31.4%)
King Abdul-Aziz Hospital	1248 (28.2%)
AL Noor Hospital	934 (21.1%)
Hera's Hospital.	857 (19.3%)
Total	4432 (100%)

Study design and Subjects:

This was a retrospective study to anticipate the most common causes of hospital admissions as well as the risk factors and outcome of medical and surgical hospitalisation of adult patients in the major hospitals in Makkah during Ramadan and Thul-Hijja of the Islamic Year 1438 (2017). The duration between admission and discharge was more than 24 hours. We also wanted to assess the relation between nationality and the cause of admission. King Faisal Hospital, King Abdul-Aziz Hospital, AL Noor Hospital and Hera's Hospital were included in the study and 4432 patients of both genders.

Data collection:

A data collected form patients' files found in archives and admission office. socio-demographic characteristics such as (age, sex, nationality and residency) and co-morbidities were collected. In addition to the presenting symptoms, primary diagnosis, admission unit, specialty required, complications and outcomes as well as the follow-up duration.

Statistical methodology:

Descriptive statistics were computed in the form of frequency and percentage for categorical data, and measures of central tendency (mean, median and mean rank) and measures of dispersion (standard deviation "SD" and inter-quartile range "IQR") for continuous variables. The statistical package used was version SPSS (20.0).

Ethical considerations:

During the research activities, the confidentiality of the collected was maintained by the data collector.

RESULTS:

1.1. Description of study population

4432 patients involved in this study. Table 1 shows the number of patients that were admitted in each hospital. Males were 2448 (55.2%) and females were 1984 (44.8%). The mean age of the population was 54.2 ± 18.2 years.

1.1.1. Nationality:

Patients included in the study were categorised according to their nationality. Saudi citizens were 1787(40.3%) patients, while other nationalities were as follows: 400(9%) Egyptians, 373(8.4%) Indonesian, 258 (5.8%) Pakistani and 1614 (36.4%) were of other nationalities.

1.1.2. Residency

Almost half of the patients were residents who live in Makkah making up (50.2%) of the patients.

Table 2 Population Description for the 4432 patients hospitalized during Ramadan and Thul-Hijja of the Islamic Year 1438 (2017)

Demographic data	n (%)
Gender	
Male	2448 (55.2)
Female	1984 (44.8)
Age (years)	
Range	14 - 104
Mean \pm SD	54.2 \pm 18.2
Median (IQR)	56 (41 - 67)
Nationality	
Saudi	1787 (40.3)
Egyptian	400 (9)
Indonesian	373 (8.4)
Pakistani	258 (5.8)
Others	1614 (36.4)
Residency	
Live in Makkah	2224 (50.2)
Visitor	2208 (49.8)

1.1.3. Co-morbidities

1567 (35.4%) of patients had co-morbidities such as: diabetes mellitus, hypertension, ischemic heart disease, renal impairment and Thyroid disease.

Table 3 Co-morbid conditions in patients hospitalized during Ramadan and Thul-Hijja of the Islamic Year 1438 (2017)

	n (%)
Co-morbidities	1567 (35.4)
Diabetes Mellitus	884 (19.9)
Hypertension	766 (17.3)
Ischemic Heart Disease	189 (4.3)
Renal impairment	144 (3.2)
Thyroid disease	25 (0.6)

1.1.4. Causes of admission, specialities needed, symptoms and primary diagnosis:

More than half of the patients (69.4%) required medical intervention while 30.6% required surgical intervention. 89.8% of patients admitted to wards was while 10.2% admitted to ICU. The most common presenting symptom was Abdominal pain (9%), followed by fever 8%, 7.8% reported shortness of breath, 5.9% reported diffuse cutaneous lesions, 5.7% had weakness and 5.1% complained of nausea and vomiting. Other symptoms such as chest pain, other body pains, cutaneous swelling, bleeding, diarrhoea,

convulsions, headache, constipation and weight loss were also reported.

19.3% of patients were diagnosed with respiratory disorders and an equal percentage were diagnosed with gastrointestinal disorders. 13.9% were diagnosed with CNS disorders, 11% were diagnosed with cardiovascular disorders while 7.2% were diagnosed with haematological and vascular disorders.

Table 4 Admitting diagnosis, management and outcome of the 4432 patients hospitalized during Ramadan and Thul-Hijja of the Islamic Year 1438 (2017)

Admitting diagnosis	n (%)
Respiratory	855 (19.3)
GIT	854 (19.3)
CNS	618 (13.9)
CVS	487 (11)
Hematologic & vascular	318 (7.2)
Endocrine	290 (6.5)
Derma	247 (5.6)
Renal	234 (5.3)
Unknown	233 (5.3)
Orthopedic	104 (2.3)
Gynecological	58 (1.3)
Neoplastic	42 (0.9)
Metabolic	40 (0.9)
Miscellaneous	36 (0.8)
Drug toxicity	16 (0.4)

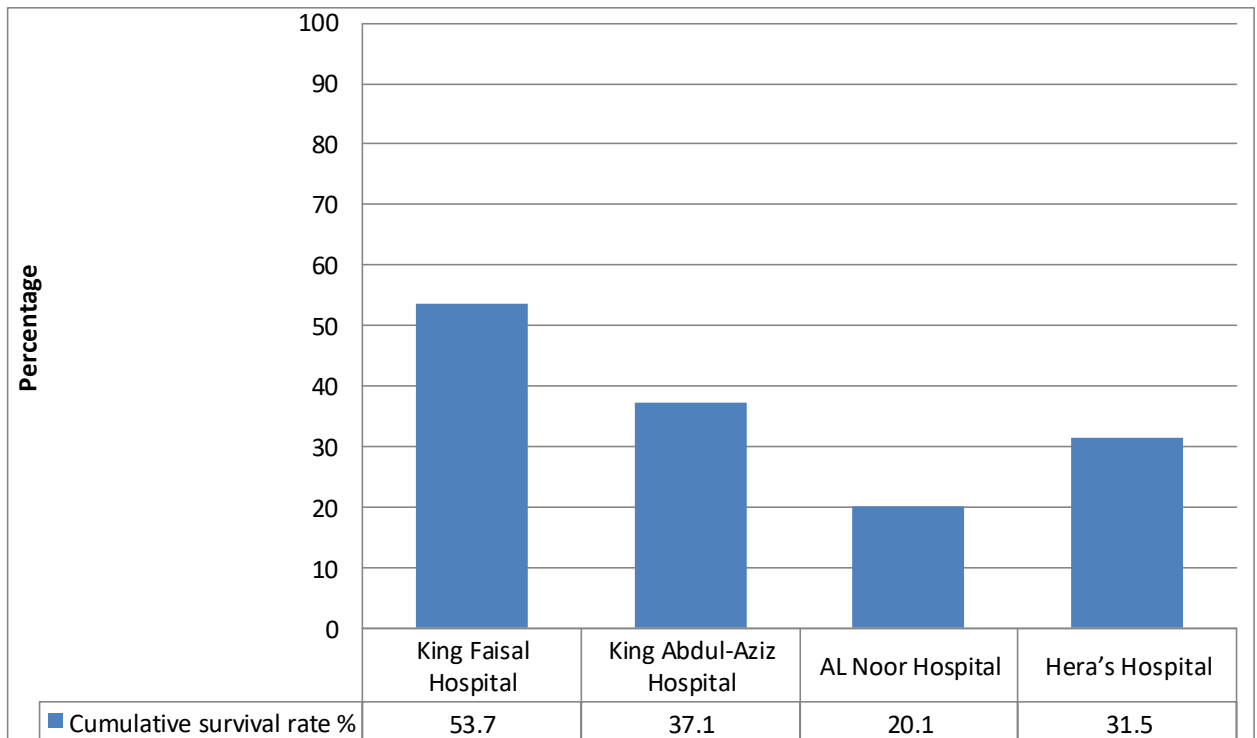
1.2. Factors affecting survival rates

1.2.1. The hospitals

When we compared the cumulative survival rate in each hospital, King Faisal Hospital had the highest cumulative survival rate at 53.7%, followed by King Abdul-Aziz Hospital and Hera's Hospital at 37.1% and 31.5% respectively. The cumulative survival rate in Al Noor Hospital was the lowest at 20.1%.

As for comparing the number of survivors from each hospital, King Faisal Hospital had 32.2% of the survivors, followed by 27.8% in King Abdul-Aziz Hospital, 20.2% in Hera's Hospital and 19.8% AL Noor Hospital. These values for Hera's Hospital and AL Noor Hospital were the most significant with p-value <0.001.

Figure 1 Cumulative survival rate in each hospital



1.2.2. Gender and age

It was found that 54.9% of the survivors were males and 45.1% of the survivors were females (p-value=0.249). While gender played no significant role in the survival, the age of mean \pm SD was 53.1 \pm 18.2 with a p-value <0.001.

1.2.3. Nationality and Residence

With 42.1% of the survivors being Saudi, it was deemed as a significant factor in the survival rates. This was followed by Indonesian patients at 7.2% (p-value <0.001). Also, Makkah residents had a more significant chance of survival making up 52% of the survivors while 64.5% of the visitors did not survive (p-value <0.001).

1.2.4. Co-morbidities

On the other hand, having a co-morbid condition such as DM or HTN was proved to be significant

with 27.6% of the non-survivors suffering from co-morbidities, 11.7% suffering from DM and 7.9% suffering from HTN (p-value <0.001).

1.2.5. Specialty required, admission unit and case management

Medical attention was a significant factor in the survival of 67.3% of the survivors while 32.7% required surgical attention. Having the surgery was also a significant factor in the survival of 91.1% of the patients who refused it.

Around 60.9% of the non-survivors were not transferred to the ICU while 1.3% of the survivors were transferred to the ICU. This was considered also a significant factor in the patient survival (p-value <0.001).

Table 5 Rates of admission and transfer to the ICU among the 4432 patients hospitalized during Ramadan and Thul-Hijja of the Islamic Year 1438 (2017) with the outcomes

Admission to the ICU	Yes, n (%)			No, n (%)
	452 (10.2%)			3980 (89.8%)
Outcome of patients admitted to the ICU	Non-survivors (n=496)	Survivors (n=3936)	P value	
	325 (65.5%)	127 (3.2%)	<0.001	
Transfer to the ICU	Yes, n (%)			No, n (%)
	246 (5.6%)			4186 (94.4%)
Outcome of patients transferred to the ICU	Non-survivors (n=496)	Survivors (n=3936)	P value	
	194 (39.1)	52 (1.3)	<0.001	

Complications comprised another significant factor affecting 0.3% of the survivors and 11.3% of the non-survivors (p-value <0.001).

1.2.6. Presenting symptoms

Most of the presenting symptoms had a statistical significance in the outcome of the case except bleeding, diarrhoea, convulsion, headache, constipation and weight loss.

1.2.7. Diagnosis

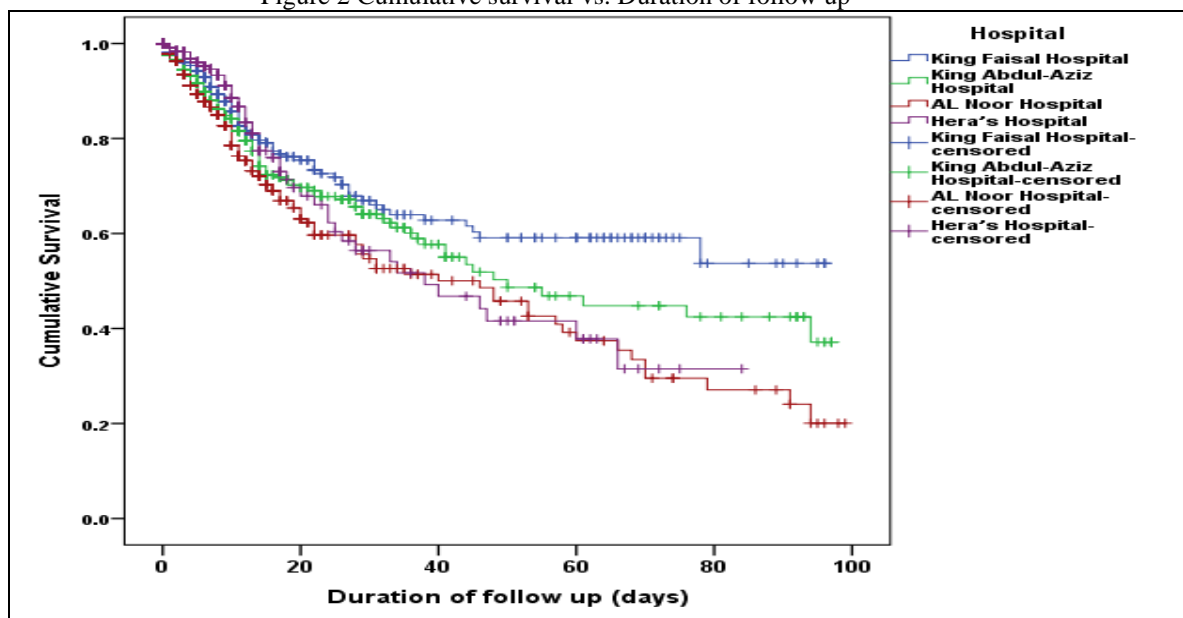
Suffering from respiratory, gastrointestinal, endocrinal or dermatological disorders was proved to be the most significant diagnosis

affecting survival with 17.6%, 20.4%, 7% and 6.2% of the survivors and 32.5%, 10.5%, 2.8% and 0.8% of the non-survivors suffering from those disorders respectively (p-value <0.001).

1.2.8. Duration of follow-up

The mean \pm SD for survivors was 6.8 ± 12.8 days while the mean \pm SD for non-survivors was 12.2 ± 15.6 days. This was considered a significant factor in the survival of patients with p-value <0.001.

Figure 2 Cumulative survival vs. Duration of follow up



1.2.9. Comparing between the four hospitals regarding all variables

When we compared all the variables against each other in each hospital and compared all the hospitals with each other using a pairwise comparison, we found that most of the values were significant, but it could not be determined which value was specified in each hospital, the pairwise comparison cleared that.

Concerning co-morbidities and their contribution to survival, there was no difference between the first three hospitals while Hera's Hospital showed a significant lower percentage of co-morbidities admitted.

DISCUSSION:

Previous studies have reported several communicable disease outbreaks in medical and surgical departments during Hajj period. Study has been conducted in 2003 in King Abdulaziz University Hospital which showed (79%) were older than 40 years. There was no gender predominance. This study showed total of 575 (71.2%) patients were admitted to medical wards, 105 (13.0%) to surgical wards, and 76 (9.4%) to intensive care units. Most patients (84.8%) had one acute medical problem. Al-Shimemeri in 2012 declared that cardiovascular diseases are the leading cause for deaths compared to other infectious and noninfectious ailments⁶. On the other hand, in 2015 Mortazavi stated that the most recurrent reasons of referring pilgrim patients back to Iran in 2012 were psychiatric, neurological, as well as gastrointestinal, and respiratory diseases [7]. A systemic literature review was conducted in 2016 and showed that that respiratory diseases including pneumonia, influenza, and asthma (73.33%) were the main infectious health issues affecting the pilgrims during Hajj, followed by heat stroke (16.67%), cardiovascular disease (10%) as non-infectious conditions [8].

According to a prospective study performed in 2003 in 4 Saudi hospitals, the most affected systems in Hajj 2003 was the respiratory system (57%), followed by cardiovascular system (19.4%), and gastrointestinal tract (GIT) in 6.3% of cases. Pre-existing co-morbid medical conditions had included bronchial asthma and COPD (22.5%), hypertension (17.5%), and Diabetes mellitus (15%) [9]. Another study was conducted in 2004 during hajj period in King Abdulaziz Hospital showed that out of 54% of the patients admitted to ICUs were over 60 years old. The risk of morbidity and mortality increased with age, with the highest risk noticed among pilgrims older than 80 years. 67.6% of the patients were men. 89(63.6%) patients were admitted with cardiovascular diseases and 37 (26.4%) patients with infections. Myocardial infarction (25%) and pneumonia (22%) were the most common admitting

Survival outcomes of the King Faisal Hospital and the Hera's hospital were not significantly different, but both showed lower mortalities than the King Abdul-Aziz Hospital and AL Noor Hospital. Also, mortalities of the AL Noor Hospital were significantly higher than that of the King Abdul-Aziz Hospital. The admission unit was not statistically significant in any of our comparisons. Symptoms such as convulsions, constipation and weight loss were also non-significant.

diagnoses. Trauma accounted for only 6.4% (9 patients) of admissions. 10.7% of the patients died [10].

Other study in 2005 of common diseases in hospitalised patients at University hospital in Saudi Arabia estimate the results of the same diseases where the Cardiovascular system was the most commonly affected (19.9%), followed by the respiratory (14.5%). Diabetes mellitus (10.5%), ischemic heart disease (8.6%) and bronchial asthma (5.8%) were the most common co-morbidities observed having the highest diagnoses frequency among hospitalized patients. Most of hospitalized patients in that study (69.2%) didn't have an associated co-morbidity [11].

King Khalid university hospital also justify the most common causes of admission that diseases of the circulatory, respiratory, and endocrine systems, metabolic disorders, digestive system and neoplasms accounted for more than 60% of all causes of admission. Infectious diseases were responsible for only 6.7% of all admission [12].

In 2015, Miraz et.al monitored the clinical conditions of inpatients at King Abdullah Medical City (KAMC), Makkah, Saudi Arabia during the annual Hajj pilgrimage between August and October 2015. None of the patients observed were Saudi. Most patients were males (73.6%) and over 55 years of age (77%). Acute coronary syndrome was the most prevalent provisional diagnosis (65.2%) with a large majority of the patients admitted with cardiac problems. It was suggested that that was due the elderly nature of the study population in terms of outcomes, 89.2% of the inpatients were discharged in a stable condition, with 37.5% discharged within ≤ 24 hours of admission. Overall, length of stay was significantly associated with various factors, including the mode of admission, admission period, admitting department, number of co-morbidities and ICU admission ($P < 0.050$ each)¹³. However, 40% required admission to the Intensive Care Unit (ICU). This was higher than the numbers reported in other studies [14,15].

CONCLUSION:

This study provided a pattern of the most common health problems encountered during Ramadan and Hajj seasons and their potential outcomes. More studies are needed to establish a clearer profile of the management of patients at the highest risk during Hajj which will allow better readiness for future Ramadan and Hajj seasons. It will also provide more data for targeted patient counselling on the potential risks of Ramadan and Hajj and how to avoid them.

CONFLICT OF INTEREST:

None declared.

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