

A study of the distribution of medical cases and the number of pilgrims visiting King Fahd Hospital in Medina during the Hajj season

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ABSTRACT

Background: Religious activities that draw large crowds can provide serious public health risks, especially when it comes to the spread of infectious diseases. The Hajj pilgrimage is the biggest annual event hosted by the Kingdom of Saudi Arabia (KSA). The pilgrims are exposed to several health risks when living in close quarters. The study aimed to examine King Fahd Hospital's patient volume and medical case categories during the Hajj season. Determine the common illnesses that pilgrims present with. Make suggestions for enhancing medical treatment during upcoming Hajj seasons.

Methodology: In the Kingdom of Saudi Arabia, a descriptive analytic cross-sectional research design was conducted with the purpose of detecting the distribution of medical cases and the number of pilgrims visiting King Fahd Hospital in Medina during the Hajj season. Aim of the study: To detect the distribution of medical cases and the number of pilgrims visiting King Fahd Hospital in Medina during the Hajj season.

Conclusion: Over 10 million pilgrims participate in the Hajj and Umrah each year. For several days, attendees congregate in cramped spaces. There is a huge public health concern when people of different ages, health, susceptibilities to disease, and levels of hygiene sophistication come into close contact. Rapid diagnostic tests, containment techniques, and surveillance are necessary to prevent respiratory illnesses during the Hajj. While the Hajj is unique, similar risks might arise from other large-scale events.

Keywords: pilgrims, King Fahd Hospital, Medina, the Hajj season.

INTRODUCTION

There are particular health and epidemiological hazards associated with the Hajj because there are always a lot of pilgrims congregating in a limited area for a brief period of time. (Ahmed et al., 2006).

Pilgrims may experience heat exhaustion when temperatures rise above 40 degrees Celsius. During the hot summer months, pilgrims who perform the Hajj outside are more likely to suffer from sunburn, dehydration, heat exhaustion, and heatstroke. Through a range of policies, programs, and initiatives, the Kingdom of Saudi Arabia's government works to avoid health issues in partnership with the Ministry of Hajj, the Ministry of Health (MOH), and other organizations. According to earlier research, pilgrims who attend primary and secondary medical facilities during the Hajj are susceptible to a number of infectious and non-communicable illnesses, including as heat stroke, respiratory conditions, and cardiovascular disease. (Shimemeri, 2012).

Less than 10% of hospital admissions during the Hajj were due to trauma, despite the enormous population. Over one-third (39%) of pilgrims needed medical attention for co-occurring conditions. One-fifth (19.4%) had diabetes mellitus, and over one-fifth (22.2%) had cardiovascular conditions (hypertension, ischemic heart

disease, congestive heart failure, valvular heart disease, and prior cerebrovascular accidents). (Alrufaidi et al., 2023).

LITERATURE REVIEW

In order to complete the Hajj, pilgrims must walk or occasionally take a bus from one holy site to another. Because of traffic, cars can only cover a few kilometers in a few hours, which causes physical strain and may exacerbate preexisting conditions (such as diabetes mellitus, cardiovascular, and renal diseases). Congestion, fatigue, occasionally high temperatures, and changes in bodily fluids and electrolytes are some of the contributing elements that cause some illnesses during the Hajj. Additionally, pilgrims are more vulnerable to the spread of infectious diseases as a result of congestion. (Alakkas, 2015).

For the relevant authorities, providing medical facilities to 2.5 million individuals who congregate in a comparatively limited region for brief periods of time is a major task. Numerous studies on pilgrims' health problems and the Hajj pilgrimage are available. (Bakhsh et al., 2015).

Because the Hajj follows the Islamic lunar calendar, its season changes. The Hajj is performed for five days, from days 8 to 12, during the 12th month of the lunar calendar. The pilgrimage has been held in the fall and winter for the past ten years, starting in January 2005 and continuing through October 2013. Winter illnesses have been linked to these months. Over the next ten years, as the lunar calendar progresses, the Hajj will occur during the summer, and various illnesses will be prevalent. Due to the event's short duration, constrained geographic region, and high participation numbers—with population densities among the millions of pilgrims reaching 7 persons/m²—Hajj pilgrims are at risk for a variety of serious health issues. (Aldossari et al., 2019).

Health Hazards during Hajj

Temperatures in Makkah range from 38°C to 50°C with a relative humidity of 25% to 50%, especially during the summer months of May through September. Heat disorders such as heat exhaustion, heat stroke, unintended physical injuries, respiratory infections, and dehydration—all classified as non-communicable diseases or problems—are more likely to occur in this kind of hot atmosphere with high radiant heat. Traveling puts pilgrims at risk for numerous health problems and leaves them feeling worn out. The functions of those with adequate heart, chest, and kidney function may be overtaxed. (Noweir et al., 2008).

The likelihood of tuberculosis transmission is increased by the crowded conditions during the Hajj. If pilgrims experience symptoms of active tuberculosis, such as coughing up blood or sputum sometimes, chest aches, weakness, fever, and night sweats, they should consult their physicians. Preventive measures, oral rehydration techniques, antimotility medications, and the use of emergency antibiotics to treat traveler's diarrhea should all be covered at a pre-travel appointment. To ensure hygiene, clothing should be loose-fitting, light, and frequently changed. It is recommended that travelers apply talcum powder, keep their skin dry, and be mindful of any discomfort or soreness brought on by clothing. Any blisters or sores that appear should be covered and cleaned. Since the feet are exposed when in the Grand Mosque, more care should be taken to keep them safe. (Memish et al., 2011).

Muslim men are required to shave their heads after the Hajj. Blood-borne infections like HIV, hepatitis B, and hepatitis C can be spread by using dirty blades. Licensed barbers must use single-use, disposable blades and undergo testing for certain blood-borne infections. Sadly, unlicensed barbers still work by the side of the road, cutting several males with nonsterile blades. It is recommended that male passengers only shave in officially recognized, conspicuously marked centers. Many pilgrims are not seeking medical counsel, even though the Kingdom of Saudi Arabia's government offers free health care to pilgrims and the Saudi Arabian health authorities advises vaccination and other infection prevention measures. Furthermore, a large number of people do not stay in hospitals for the required amount of time in order to avoid missing any Hajj ceremonies. (Ramadan & Zahra, 2016).

The role of KSA towards pilgrims

All pilgrims are eligible for free medical care from the Saudi government. The healthcare system had 154 health facilities and 27 hospitals totaling 5038 beds in 1437 (Islamic calendar year; 2016 Gregorian calendar year). Curative and preventive services are offered by the healthcare system, which is run by 26,421 local staff members in addition to foreign visiting medical professionals. Infectious illness monitoring, outbreak investigations, mass immunizations, mass prophylactic drug delivery, environmental health services, and health education are all examples of preventive services. Awareness campaigns, leaflet distribution to pilgrims arriving, and the establishment of toll-free phone lines manned by qualified medical professionals are all examples of the health education initiatives. The data reported from different departments in hospitals and primary care centers, in addition to the surveillance data, feed the electronic web-based healthcare surveillance network at the Command-and-Control Center in Mecca, and are published in the annual statistical book of the Saudi Ministry of Health. (Aldossari et al., 2019).

Mass Gatherings and the Spread of diseases among pilgrims

The annual Hajj has been associated with a wide variety of viral and bacterial upper and lower respiratory tract infections. Pneumonia is a common cause of hospitalization. The estimated occurrence of respiratory tract infections among pilgrims ranges from 20 to 80%. Understanding the illnesses, their causative agents, and modes of transmission may help control and prevent them. (Al-Tawfiq et al., 2016).

According to a cross-sectional study, respiratory disorders were responsible for 47.7% of the 140 patients admitted to intensive care units during the 2004 Hajj in Mina (four hospitals) and Arafat (three hospitals). Of these admissions, 9.3% were due to exacerbations of chronic obstructive pulmonary disease, and 22.1% were due to pneumonia. During the same Hajj season, 42 out of 165 patients treated to two more hospitals experienced septic shock or severe sepsis. The most frequent cause of sepsis (54.8%) was pneumonia. (Baharoon et al., 2009).

Of the 452 individuals hospitalized to hospitals during the 2009 and 2010 Hajj seasons, 27.2% experienced a catastrophic illness connected to pneumonia, and 49.3% suffered respiratory conditions. Gram-negative infections accounted for 18% of the pneumonia patients, gram-positive infections for 10.6%, and influenza A (H1N1) for 24.4%. Pneumonia patients had a 19.5% death rate. (Yasser Mandourah et al., 2012).

38 people were admitted to the hospital during the 2013 Hajj due to severe bilateral pneumonia; 22 of these patients had bacterial infections, the most frequent of which were *Streptococcus pneumoniae* and *Hemophilus influenzae*. The influenza A virus and the human coronaviruses 229E and OC43 were the most prevalent among the 21 additional individuals who had a viral infection. Patients with bilateral pneumonia had a 36.8% death rate. (Memish et al., 2014).

Recommendations for improving healthcare services during Hajj seasons

The Saudi Ministry of Health suggested that national health officials educate pilgrims on the signs and symptoms of infectious diseases, how they spread, potential complications, and how to prevent them. They should also inform pilgrims about temperature fluctuations that could have negative health impacts. It is important to urge those who attend the Hajj and Umrah to consume adequate water and to eat a balanced diet rich in fresh fruits and vegetables. (Ramadan & Zahra, 2016).

Additionally, it is advised that pilgrims be educated about personal hygiene, food poisoning during the Hajj and how to prevent it, and diseases that could affect their health. Consuming salt-containing foods and beverages also helps to replenish electrolytes in the event of heat exhaustion and after excessive perspiration. To prevent and manage health risks, nations and individuals should educate pilgrims about these risks and create self-care strategies. The nations and pilgrims alike encouraged them to think about health precautions during this holy pilgrimage. Nevertheless, a number of studies have found that pilgrims' adoption of these measures varies, and it is still unknown why. (The Saudi Arabian Ministry of health, 2015).

During the Hajj season, the MOH's main duties include giving pilgrims the best medical treatment possible, ensuring the capacity and preparedness of health facilities, assigning skilled medical personnel, and creating "Emergency or disaster Plans" in coordination with other relevant sectors. All medical professionals, including pharmacists and other critical pharmacy staff, have been crucial to these efforts over the years, even if there aren't many dedicated clinical pharmacists on staff. The MOH pharmaceutical care administration launched a trial program to provide clinical pharmacy services for Hajj 2019; in 2022, they recruited seven clinical pharmacists with a focus on infectious illness, critical care units, and cardiac care units. (Aljuhani et al., 2023).

METHODOLOGY

Aim of the study

To detect the distribution of medical cases and the number of pilgrims visiting King Fahd Hospital in Medina during the Hajj season.

Research design

In the Kingdom of Saudi Arabia, a descriptive analytic cross-sectional research design was conducted with the purpose of detecting the distribution of medical cases and the number of pilgrims visiting King Fahd Hospital in Medina during the Hajj season. This design is a method that is both systematic and organized, and it is used to gather data from a sample of individuals or entities that are part of a larger population. The major objective of this design is to provide a comprehensive and accurate description of the characteristics, behaviors, perspectives, or attitudes that are present within the target group.

Research Setting

The study will be conducted in King Fahd Hospital in Medina during the Hajj season.

Sample size

We have covered 89 beds, including SICU, MICU, 1C, intermediate ICU and critical ER.

Sampling Technique

Data were collected from patients records.

Ethical considerations

Data was submitted by individuals via questionnaires. Participants were notified that participation in the research would be elective and that their anonymity would be preserved. Data will be acquired using a self-reported questionnaire. The ethics committee will offer clearance for this initiative. Before the questionnaire was conducted, each participant supplied signed informed consent.

RESULTS

Regarding the respiratory therapy department, we have covered 89 beds, including SICU, MICU, 1C, intermediate ICU and critical ER. There is a list of our statics during the hajj period 1444.

Table 1. Respiratory therapy department statistics during hajj period 1444

Extubation and weaning	transport patient	Non invasive	End of week number	Total ventilator patine	Date
14	4		8	23	29 week 1
10	1		3	28	36 week 2
9	0		6	35	44 week 3
7	5		8	26	38 week 4
5	1		8	26	32 week 5
5	3		7	26	34 week 6

Regarding the respiratory therapy department, the total ventilator patients reach its peak at the week 3, although the least number was in week 1. Patients exposed to extubating in week 1 were the largest number but decreased in the last two weeks. There is no transport patient in week 3.

Table 2. Statement of services provided to pilgrims from 1/11/1444 to 30/12/1444 AH

Department	Pilgrims
Emergency patients	1204
Clinic patients	43
Admission	203
ICU Admission	72
Operation room	74
Dialysis	137
Road traffic accidents (RTA)	8
(In) mortality rate	10
(Out) mortality rate	9

Emergency department (ED) has the upper hand in patients, but RTA has the least number of patients. Inpatient mortality rate is 10, but outpatient is 9.

Table 3. Statistics of chronic disease medications dispensed to health centers and hospitals operating during the Hajj season of 1444 AH

Statistics of chronic disease medications dispensed to health centers and hospitals operating during the Hajj season of 1444 AH			
Medications for treating diabetes	Antihypertensive medications	and Asthma bronchial constriction treatment medications	Type of treatment
1393825	527050	50574	The issue is the Hajj season of 1444 AH
811510	1000000	593972	The issue is the Hajj season of 1440 AH

Table 4. Statistics of chronic disease medications dispensed to health centers and hospitals operating during the Hajj season of 1444 AH

Statistics of chronic disease medications dispensed to health centers and hospitals operating during the Hajj season of 1444 AH			
Medications for treating diabetes	Antihypertensive medications	Asthma and bronchial constriction treatment medications	year
GLICLAZIDE (DIAMICRON MR)	AMLODIPINE 5 MG TAB	IPRATROPIUM 500 MCG/2 ML	1440
METFORMIN 500 MG TABLET	CLOPIDOGREL 75 MG TABLET	SALBUTAMOL	
INSULIN GLARGINE	BISOPROLOL 5 MG TABLET	BUDESONIDE 0.5 MG/ML IN 2 ML	
INSULIN GLARGINE	VALSARTAN 80 MG TAB	MONTELUKAST 10 MG TAB	1441
METFORMIN	AMLODIPINE 5 MG TAB	SALBUTAMOL	
GLICLAZIDE (DIAMICRON MR)	BISOPROLOL 5 MG TABLET	IPRATROPIUM 500 MCG/2 ML	
GLICLAZIDE (DIAMICRON MR)	AMLODIPINE 5 MG TAB	FLUTICASONE FURATE/VILANTEROL	1442
INSULIN ASPART NOVORAPID	VALSARTAN 80 MG TAB	MONTELUKAST 10 MG TAB	
INSULIN GLARGINE	hydrALAZINE 25 MG TABLET	SALBUTAMOL	
INSULIN GLARGINE	CLOPIDOGREL 75 MG TAB	IPRATROPIUM 500 MCG	1443
INSULIN ASPART NOVORAPID	AMLODIPINE 5 MG TAB	SALBUTAMOL	
GLICLAZIDE (DIAMICRON MR)	BISOPROLOL 5 MG TABLET	MONTELUKAST 10 MG TAB	
GLICLAZIDE (DIAMICRON MR)	AMLODIPINE 5 MG TAB	SALBUTAMOL	1444
INSULIN GLARGINE	CLOPIDOGREL 75 MG TAB	TIOTROPIUM 18 mcg INHALER	
METFORMIN	BISOPROLOL 5 MG TAB	MONTELUKAST 10 MG TAB	

We found that common medications used in treating Asthma and bronchial constriction were Salbutamol & Ipratropium 500 mcg. Regular medications used for treating hypertension were Amlodipine 5 mg & Bisoprolol 5 mg. Common medications for treating diabetes Gliclazide & Insulin Glargine.

Summary of Results

Regarding the respiratory therapy department, the total ventilator patients reach its peak at the week 3, although the least number was in week 1. On the other hand, patients exposed to extubating in week 1 were the largest number. Emergency department has the upper hand in patients, but RTA has the least number of patients. Inpatient mortality rate is more than outpatient. There is increase in medications for treating diabetes in 1444 than 1440, but there is a decline in antihypertensive and asthma medication in 1444 than 1440. Results in hajj season 1444 AH also show common medications used in treating Asthma and bronchial constriction were Salbutamol & Ipratropium 500 mcg. Regular medications used for treating hypertension were Amlodipine 5 mg & Bisoprolol 5 mg. Common medications for treating diabetes Gliclazide & Insulin Glargine.

DISCUSSION

The primary goal is to examine the kinds of medical cases and patient volume at King Fahd Hospital during the Hajj season, as well as the distribution of medical cases and pilgrims who visit the Medina hospital during this time. King Fahd Hospital is the study's location.

The study results discussed respiratory therapy department statistics, Statement of services provided to pilgrims, statistics of chronic disease medications dispensed to health centers and hospitals operating during the Hajj season.

Emergency department has the upper hand in patients, but RTA has the least number of patients. Inpatient mortality rate is more than outpatient. There is increase in medications for treating diabetes in 1444 than 1440, but there is a decline in antihypertensive and asthma medication in 1444 than 1440.

ED flow was smooth despite the huge numbers of patients have been seen, yet there are always room for improvements which we can list it as follow:

- Patients flow to the hospital should be organized at higher level in order not to overwhelm any hospital in the city including ours.
- Lack of important emergency medical supply like glid-scope, fan and cardiac pacing pads.
- In general, the season was a success

Previous research on this topic goes along with our findings:

Amin et al. (2021) sought to determine the prevalence of illnesses among Bangladeshi pilgrims doing the Hajj in Mecca, Saudi Arabia. According to the survey, the most prevalent health issues among pilgrims traveling to Mecca, Saudi Arabia, are respiratory illnesses, which are followed by diabetes, PUD, and cardiovascular disorders.

According to Yezli et al. (2020), who looked at the pharmaceutical use patterns of outpatients during the Hajj mass gathering, the most often given medications for outpatients during the Hajj include antibiotics, analgesics, and nonsteroidal anti-inflammatory drugs. The findings—which include the WHO drug use indicators—can serve as a foundation for future research on acceptable drug use during the Hajj as well as for planning.

There is a number of difficulties facing respiratory therapy department:

- Shortness and delayed of direct purchases of medical supplies
- Shortness of staff, delay of medical maintenance to fix our devices
- There is no space to store enough machine. We only have one store to service a 500-bed hospital
- There is no lounge for or female employees or locum

CONCLUSION

Less than 25% of the patients were referred to tertiary care facilities, with respiratory issues accounting for the majority of cases, followed by skin and GIT disorders. Policymakers and providers of healthcare facilities can use the current data to enhance their facilities for Hajj patients. We suggested that pilgrims in their home nations undergo a comprehensive pre-Hajj health evaluation. By adopting the right treatment, this step would not only lessen the likelihood that their chronic illness would worsen, but it would also assist in recognizing any new issues that may be underlying and provide information on the difficulties of their chronic illnesses. It would significantly lower the death rate and burden of health-related problems during the Hajj.

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