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Research

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Abstract

Introduction

This article is a first-hand report on the experience of paramedic students providing emergency medical services (EMS) at Hajj, an annual mass gathering of Muslim pilgrims in Makkah, Saudi Arabia. Previous quantitative research on Hajj has primarily reported on demographic descriptive data. A qualitative approach to understanding Hajj was not discovered in the literature. This qualitative phenomenological study was conducted to investigate the experiences of EMS students providing patient care at Hajj.

Methods

This research was conducted using a qualitative phenomenological methodology. Focus group interviews were conducted on Bachelor degree students studying EMS at a public college in Riyadh, Saudi Arabia, who were all required to serve as support providers at Hajj as part of their paramedic training.

Results

Participants described their experiences as honorable and beneficial to their EMS education. Participants encountered medical and trauma patients and this provided opportunities to apply their EMS knowledge and medical skills. They reported an increase in motivation, confidence and ability to think critically. Common challenges included language barriers and difficulty reaching patients due to massive crowds. Participants provided recommendations for improving the EMS provided at Hajj, which were generally focused on increasing utilisation of EMS students, development of standards and scope of practice for EMS at Hajj and a preceptor-training program.

Conclusion

Attending the Hajj mass gathering was found to have significant educational value for EMS students. Specific recommendations on how to improve this education experience while benefitting from the care provided by the students at Hajj are made. These recommendations offer practical benefits for both EMS training programs and mass gathering event organisers.

Keywords:

emergency medical services; mass casualty incidents; global health; Islam; qualitative research

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Introduction

As part of their paramedic training, Prince Sultan bin Abdul Aziz College for emergency medical services (EMS) students are required to assist the Saudi Red Crescent Authority (SRCA) in providing out-of-hospital care and EMS during Hajj. Hajj is the annual pilgrimage and mass gathering of Muslims held in the holy city of Makkah in the Kingdom of Saudi Arabia (1-10). Hajj is the largest multi-national gathering worldwide, numbering in the millions of attendees (1-10). The event is scheduled according to the Hijri (H) lunar calendar and therefore is performed on different Gregorian (G) dates

each year (1-10). All adult Muslims in good health, who are able to afford the journey to Makkah, need to perform the Hajj pilgrimage once in their lifetime (1-5). Many pilgrims perform Hajj only at an older age (2).

The Grand Mosque in Makkah is estimated to accommodate 1.2 million pilgrims at one time for prayers (1). Each year Makkah and the surrounding region hosts approximately 2–3 million pilgrims (1-4,6-8) with approximately two-thirds traveling internationally (2). The documented numbers of pilgrims for Hajj from 1431H/2010G to 1435H/2014G are reported in Table 1.

Year		Number of pilgrims		
Hijri	Gregorian	Total	International	Domestic
1435	2014	2,085,238	1,389,053	696,185
1434	2013	1,980,249	1,379,531	600,718
1433	2012	3,161,573	1,752,932	1,408,641
1432	2011	2,927,717	1,828,195	1,099,522
1431	2010	2,789,399	1,799,601	989,798

Table 1. The annual number of reported Hajj pilgrims (5)

Number	Nation	%	Total	Male	Female
1	Egypt	39.5	67,088	55,083	12,005
2	Pakistan	24.7	41,912	38,943	2,969
3	India	6.3	10,687	8,606	2,079
4	Sudan	6.0	10,243	8,772	1,471
5	Yemen	6.0	10,189	8,323	1,866
6	Syria	5.1	8,668	5,809	2,859
7	Indonesia	2.2	3,730	1,319	2,411
8	Bangladesh	2.1	3,461	3,293	168
9	Jordan	1.4	2,386	1,674	712
10	Philippines	0.9	1,559	1,237	322

Table 2. Top 10 nationalities of non-Saudi domestic Hajj pilgrims in 1435H/2014G (5)

The 1435H/2014G Hajj witnessed a total of 237,023 Saudi nationals (146,095 males and 90,928 females), which represented 11.4% of domestic pilgrims (11). The total number of male and female non-Saudi domestic Hajj pilgrims for 1434H/2014G is reported in Table 2. The 1435H/2014G Hajj hosted 1,389,053 international pilgrims comprised of 758,039 males and 631,014 females (11). Almost all of the pilgrims attending Hajj either sleep in tents or outside without shelter (2).

Multi-agency preparations for Hajj are ongoing in Saudi

Arabia and several government organisations are involved (1,4,7). Proactive public health measures are taken to provide a safe supply of water and food, sanitation, and pre-travel health regulations including health education campaigns (5,7). The Ministry of Health of Saudi Arabia established requirements for Hajj visas based on the pilgrim's country of origin, which includes vaccinations for yellow fever, meningitis, and polio, and a recommendation for the seasonal influenza vaccination (7,9). However, in past years an estimated 200,000 pilgrims travelled from low-income countries and received little to no pre-Hajj health care (3,6).

During Hajj, all health care is provided free to pilgrims by the Kingdom of Saudi Arabia, which has constructed 25 hospitals in the Makkah region with 5000 beds, including 500 critical care beds (3,7). Health care centres staff approximately 17,609 specialised personnel and more than 15,000 doctors and nurses during Hajj (3). Hajj pilgrims have experienced complications during hospitalisation such as severe illness requiring admission to intensive care units, being placed on mechanical ventilation and developing shock (2).

A religious exemption from the obligation to attend Hajj is granted to Muslims who are in poor health, but some devotees travel against medical advice in the hope of dying in the Holy Land (7). Pilgrims requiring hospitalisation have been found to have co-morbid conditions such as diabetes mellitus, hypertension, chronic obstructive pulmonary diseases and heart disease (2). The leading reasons for medical care and hospital admissions have been identified in descending order as respiratory disease, cardiovascular disease, gastroenteritis and trauma (3,5,8-10).

Respiratory infection was identified as the most common contemporary cause of hospital admission, with pneumonia as the most common disease (2,4,8). Viral respiratory infections, such as influenza and tuberculosis, were found to be common during Hajj (4,6,8). The number of respiratory complaints and diseases have resulted in what is known by many pilgrims and researchers as the 'Hajj cough' (4 p.30). Recommendations to wear facemasks during Hajj have been made but saw a poor compliance rate of 24% (8).

The physical demands of performing Hajj rituals can result in cardiac ischaemia, especially for the unhealthy and elderly (1-2,8). Cardiovascular disease is a common cause of hospitalisation and death at Hajj (1-2,8). Retrieving patients in cardiac arrest from the massive crowds was described as difficult and dangerous (8). Cultural beliefs affect resuscitation efforts for those in cardiac arrest (3). A do-not-resuscitate status is often requested and resuscitation efforts are unlikely to be pursued if not immediately successful (1).

Gastroenteritis and 'traveller's diarrhoea' are documented as common causes of hospitalisation during Hajj (8). Gastroenteritis was the most common cause of hospitalisation in 1986 and the third most common cause in 2002 after respiratory and cardiovascular disease (8). The decrease in the number of gastroenteritis admissions was attributed to improved water supplies, pilgrim education, hand hygiene and avoidance of both street-vendor food and food made with fresh eggs (8).

Though most injuries among pilgrims are minor, trauma remains the major cause of morbidity and mortality at Hajj (5,8,10). Past Hajj disasters occurred due to fire, tent

collapses and stampedes (9). Investments were made in fireproof tents and regulations prohibiting open source flames (2,7-8). Stampedes remain the most feared trauma hazard because once started, they are difficult to stop. Frequently they result in multiple deaths as panic spreads quickly throughout the crowds. In the past, hundreds of deaths have resulted from a single stampede (1,8).

Common traumas at Hajj resulted from performing the pilgrimage, preparing food and road traffic accidents (8,10). Many minor traumas such as lacerations and soft-tissue injuries occurred due to pilgrims performing rituals and walking barefooted, which in recent years have resulted in severe burns on the soles of feet from standing on scorching marble in the midday sun (8,10). In 1435H/2014G 46,108 vehicles were used to transport pilgrims to Makkah for Hajj (11). The extreme traffic of Hajj and poor compliance with wearing seatbelts has made motor vehicle accidents inevitable and contributed to casualties during Hajj (8,10). The most common traumas requiring surgical treatment were orthopaedic and neurological (8,10).

In recent years, Hajj occurred during summer months resulting in heat exhaustion and heat stroke as leading causes of morbidity and mortality (8). Summer temperatures in Makkah can rise higher than 45°C (8). The physical rituals involving standing for long periods of time in exposed spaces have added to the number of pilgrims experiencing heat-related emergencies (8).

An integrated part of the emergency and health care services provided at Hajj is the SRCA, which is the sole official agency tasked with providing EMS and ambulance transportation services across the Saudi kingdom. In 2012, 2 weeks prior to Hajj, the SRCA deployed an additional 300 ambulances, 20 advance life support response vehicles, 25 motorcycle units and 100 mobile teams of physicians to be part of Hajj out-of-hospital emergency care services (1). The SRCA also deployed 1750 EMS providers and 600 volunteers to respond from 26 ambulance stations. Another 47 strategic posts including 37 temporary stations established according to known crowd movement studies and patient encounter data from previous events (1).

During the 1435H/2014G Hajj, the SRCA reported treating more than 15,000 patients, which was a 41% increase from the previous year, where approximately 11,000 patients were treated by the SRCA (14). During the 1433H/2012G Hajj, the SRCA answered 57,420 calls for assistance, with 20,210 responses that provided care to 18,230 patients (1). Of these patients, 34% were transported medical patients; 39% were non-transported medical patients; 11% were transported trauma patients and 16% were non-transported trauma patients (1). The top three medical conditions reported by

patients to the SRCA were 25% as non-defined other, 19% respiratory and 18% general weakness (1). The top three mechanisms of injury documented by the SRCA were falls (29%), non-defined other (29%) and motor vehicle crash (28%) (2). Seventy-one percent of the fatalities encountered by the SRCA were attributed to medical reasons and 17% resulted from trauma (1).

The SRCA providers face the challenge caused of language barriers due to the hundreds of languages spoken by non-Arabic pilgrims (1). Custom-designed picture books with facial expressions, anatomical graphics and medical and traumatic depictions were created to assist pilgrims in communicating the location and severity of their medical condition, illness or injury (1). Keeping clinics and ambulances stocked with supplies is a constant challenge, as main roads are either shut down by the government or blocked by the massive crowds during Hajj (1). An additional challenge faced by the SRCA providers is pilgrims suffering from serious medical conditions and refusing treatment and transportation because they want to complete Hajj (1). Critical patients who agree to treatment can be transported by helicopter as special landing pads have been constructed that are capable of lifting an ambulance from the ground to the landing pad (2). One hundred and fifteen patients were transported by the SRCA helicopters in 1435H/2014G for more critical medical and traumatic conditions (15).

Absent from literature on Hajj was the experience of providing EMS during Hajj (6). Published research on Hajj presented only epidemiological and statistical reports. Therefore, this study aimed to capture the experience of paramedic students studying at a public college in Riyadh, Saudi Arabia, who, as students, provided patient care at Hajj and provided post-event recommendations on how to improve patient care, the EMS response system and the EMS student learning experience.

Methods

Study design

This study received approval by the Institutional Review Board at Prince Sultan bin Abdul Aziz College for Emergency Medical Services. A qualitative phenomenological study design was conducted to investigate EMS student perceptions and learning experiences (16). Data was obtained from interviewing focus groups of paramedic students on their experience of attending Hajj as a paramedic student. A structured interview protocol that consisted of 10 open-ended questions was utilised.

Population and setting

This study was conducted at Prince Sultan Bin Abdul Aziz College for Emergency Medical Services, an all-male college in Riyadh, Saudi Arabia. Participation in scheduled focus groups was voluntary and anonymous. Participants needed to be comfortable with being asked questions and answering them in English, which was the language most commonly used during their EMS education. Prior to data collection each participant signed an informed consent form and provided verbal consent to participate in the study.

Validating findings

All transcripts were compared to their original audio files and then sent to the participants by email for review prior to analysis. The final analysis of the data was sent by email to the participants for review as well. These post-interview interactions served as member checking, which is considered by qualitative researchers to be the most critical technique for establishing unbiased validity and, thus, creditability (16).

Analysis of findings

The audio recording from each focus group was transcribed. The researchers then independently categorised the data manually and then met together to discuss identified themes and patterns. NVivo 10 (QRS International, Doncaster, Victoria, Australia) was used to further identify themes and patterns in the data. A final joint review of all transcripts, themes and patterns was completed and found to be consistent with the final analysis.

Results

A total of seven focus group interviews were conducted in November and December 2014. Each group ranged from 3–8 participants for a total of 39 participants. The focus group interviews ranged between 30 and 63 minutes. All participants were in paramedic training during Hajj. Some of the participants attended Hajj during their first semester and others attended during their third semester of paramedic training. The data yielded five super-themes:

- preparation
- Hajj experience and the educational impact it made
- medical patients they treated, trauma patients they treated
- recommendations for improving the educational experience
- recommendations for improving EMS care provided.

Representative quotes from the data and their associated super-theme are reported in Table 3.

Super-theme	Quote
Preparation	'[Y]ou learn something here [the EMS college] and you memorise it and then just forget it, but when you actually practice in Hajj you just remember like a sea of information. The information can relate to the patient, relate to the disease. It's very easy.'
Experience and impact	<p>'I think as you mentioned before, the critical thinking, it was the biggest point for us because we think from the books, we experience in the labs, but we cannot get the real feeling of the critical thinking and dealing with really huge crowds. Whatever you do here, we have not experienced these valuable opportunities to be honest. These two points was the biggest for me.'</p> <p>'The thing is to apply things, you have study, applying them. Not even the skill needed, the science of cases, which we have studied. You can apply them. You can see in the real life. You can be with them on your own, as I said before. That's put you like in the fire. That's maybe summarised the experience with Hajj, being in the fire and see what you have studied, and you apply what you have studied.'</p> <p>'[T]he knowledge we take from here [the EMS college] it's like drawing a white and black picture. When you go there [Hajj], you start adding colours to the picture so you get the full picture in front of you. Of course, when you see the full picture you will be more happy to have this picture.'</p>

Table 3. Super-theme and meaningful quotes

Preparation

Participants described Hajj as an event 'like no other'. Not all participants felt educationally prepared to go to Hajj and acknowledged how difficult it was to prepare for such an event. Only one participant reported going to Hajj previously as a pilgrim and noted that the prior experience only provided him with a 'visual experience'. Participants described how their emergency medical team (EMT) training contributed the most to their preparation, because majority of the patient care they provided was basic in nature, and during EMT training they learned foundational life-saving and resuscitation skills. Participants acknowledged the preparatory value of their paramedic courses and the simulated training. They described how paramedic courses helped to develop a deeper understanding of disease and injury, and how to monitor a patient's condition. Training in simulation labs helped to develop useful skills such as patient assessment and establishing an intravenous line, which were both frequently used during their Hajj experiences.

Participants noted that American Heart Association courses and their in-hospital and out-of-hospital rotations throughout their EMS training prepared them with interventional skills and how to treat and interact with patients. Participants reported

also being required to complete a similar mass gathering experience at Umrah during the Hijri month of Ramadan as part of their EMS education. Some of the participants completed their Umrah requirement before Hajj and those with the prior experience reported that Umrah participation helped to prepare them to be a part of Hajj.

Educational impact

Hajj provided participants with opportunities to develop decision-making skills and increase their ability to think critically as they found themselves making patient care decisions either on their own or with preceptors. Making patient care decisions in a mass gathering setting was reported to be challenging by the student participants because of difficulties resulting from communication barriers and prolonged ambulance response and transport times.

The experience of treating real patients was described as a significant benefit from their Hajj experience. Participants had described the benefits or practising on manikins as students, but said that Hajj provided many enhanced opportunities to perform skills on real patients. Repeatedly performing basic assessment skills, such as taking vital signs, helped to develop proficiency and provided participants with more experience than just simulation labs.

In addition to practising medical skills the participants reported being able to apply their EMS knowledge in providing actual patient care and decision-making with a team of providers. The Hajj experience allowed participants to work as a multi-level clinical team member with a variety of providers, including physicians and nurses, and to administer medications and monitor patient conditions in real-time. Participants reported returning from Hajj with a list of topics that they personally wanted to research. They described an increase in their confidence as future EMS providers and higher motivation to study in their remaining EMS courses.

General experience

Study participants reported that being part of Hajj as an EMS student was a valuable, positive and honorable opportunity to serve pilgrims. Participants reported being assigned to different ambulance stations, volunteer groups to walk amongst the crowds, and the dispatch centre for 12-hour shifts, with some working longer hours because of call volume. Some participants reported taking care of 3–40 patients per ambulance shift.

Participants described the difficulty in locating patients due to the number of pilgrims, crowd movement, long response times and lack of precise locations. They described experiences of arriving at a location and finding as many as 15 patients waiting for help and having to triage and manage all of them. Other participants reported that they encountered only a few patients per shift, a variation attributable to the location of the EMS station and numbers of volunteer teams in their assigned coverage area.

The crowd size and number of bystanders that would surround patients was described as an overwhelming challenge that included access and transport times reaching several hours due to the crowds. Student participants reported that moving through the crowds was physically exhausting, which emphasised a need to be physically fit. As one participant described moving through the crowds: 'At Hajj you cannot even walk, even for the distance of 500 metres, it will take more than 30 minutes to an hour. So by the car, it will take 3 hours, 4 hours'.

Language and cultural barriers were identified as a challenges faced while providing EMS care. Participants treated pilgrims from several nations and found themselves serving as an English translator for patients who could not speak Arabic. For patients who spoke neither English nor Arabic, participants resorted to using gestures and hand signals. Having to provide care with limited verbal communication challenged participants to think critically in gathering information, identifying potential illnesses and in finding ways to assess the patients. In addition to developing critical thinking skills and atypical communication strategies, participants described a personal benefit gained from interacting with pilgrims from other cultures.

Not having a defined scope of practice or standard set of medical protocols and having only nominal oversight from medical direction provided little guidance for providers. Further, medical equipment and supplies were minimal. Participants reported that they were generally ineffective in situations where they knew how to treat patients but were unable to do so because of the limited equipment and supplies, which included not even having bottled oxygen available.

Many participants reported being welcomed by EMS staff during Hajj and were recognised as coming from a good EMS program. However, others reported being treated poorly by EMS staff and felt like an outsider at their assigned station. Some reported not having clear learning objectives, needing to explain to their preceptors what their role was. Others reported that they received negative reactions from providers when they made patient care suggestions. Many of the challenges the participants experienced were attributed to the environmental conditions of the mass gathering and the poor communication between their program and preceptors.

Though there were challenges and areas that could be improved, the participants emphasised the experience was positive and motivating. Participants felt as if they had some positive impact on the emergency services provided at Hajj, but did express how they, as individuals, could not positively impact the overall system. However, individual patients benefited from having a student-provider assisting EMS providers.

Medical patients

Participants reported treating both male and female cardiac patients from multiple nations. Participants described patients suffering from a range of cardiac complaints from hypertension to cardiac arrest. One participant described taking care of a patient with chest pain, who had open-heart surgery just 2 weeks prior to traveling to Hajj. Participants treated patients suffering from ST segment elevated myocardial infarction (STEMI) and reported being able to transmit patient 12-lead electrocardiograms to the receiving hospital. Some participants reported having their first cardiac arrest experience with full advanced cardiac life support care.

Participants reported several experiences treating both hyper- and hypo-glycaemic diabetic patients, who were found unresponsive or complaining of exhaustion after performing Hajj rituals all day. Similarly, dehydrated patients reported feeling exhausted and weak. The limited number of places to get food and water frustrated the participants as this contributed to pilgrims, especially the elderly, easily becoming hypoglycaemic and dehydrated, even to the extent of hypovolaemic shock. Participants reported that the weather was hot, which resulted in patients developing heat stroke complicated by co-morbidities such as cardiovascular disease and diabetes. A participant described treating a new heat stroke patient every 2 hours.

Treating respiratory patients was a frequent experience of the participants. Respiratory patient complaints ranged from a simple cough to being found unresponsive and cyanotic. Participants described patients waiting for hours to seek help in addition to the patients not having their inhalers and then having only oxygen available to provide minimal treatment. Other respiratory patients were thought to have pneumonia and requiring hospitalisation. Infectious respiratory disease was a concern for the participants but described treating febrile respiratory patients without protective masks.

Participants recalled treating patients with abdominal pain, which was thought to result from food poisoning or from kidney stones. Participants described providing care to several non-emergency patients who would say: 'I want to know my blood pressure, my blood sugar'. Others reported pilgrims acting as patients only so they could escape from the heat in the air-conditioned ambulance and asking for transport to the furthest hospital outside of Makkah.

Some participants reported vividly remembering their opportunities to deliver newborns in the ambulance. A participant described delivering a premature newborn. Another experienced the mother grabbing his hand during the delivery as he assisted with the delivery and provided her with emotional support. The participant described the joy he experienced from this and went to visit the family a few days later in the hospital to deliver a gift he purchased for them.

Trauma patients

Participants reported predominantly treating numerous minor injuries and small open wounds. Major traffic accident responses were experienced by those assigned to ambulance stations outside of the Hajj camps. These participants treated adult and paediatric patients, most with head trauma, which was the most severe and challenging type of trauma they encountered. One participant responded to a mass-casualty incident (MCI) of 15 patients injured by a vehicle that struck a crowd of pedestrians. Similarly, another reported an MCI that involved a bus collision with eight or 12 patients. Both reported how vividly they remembered these experiences and learning how to manage an MCI as an EMS responder in addition to being able to perform triage.

Participant recommendations

Participants reported that they were underutilised and misunderstood by EMS providers who delegated them to limited observational roles and prevented them from practising their EMS skills. This was, however, partly attributed to the participants not being officially identifiable as EMS students. Participants described how other Saudi health care students studying medicine or nursing that go to Hajj are able to function as an integral part of the clinical teams. It was suggested that being identified by a uniform as a student from their college would result in more opportunities to utilise their skills and knowledge.

Participants adamantly expressed the need for learning objectives and expected outcomes from their Hajj experience. This recommendation was coupled with the recommendation for a needed preceptor-training program and then having assigned preceptors capable and interested in teaching participants. Participants emphasised the importance of student learning during the Hajj experience and asserted that preceptors should debrief students as a way to learn from their experiences.

Many participants described the importance of pre-training on the types of patients they would be most likely to see. They described the need for cardiopulmonary resuscitation (CPR) refresher training and courses covering triage, MCIs and disaster management. Similarly, many participants stressed the value of completing their Umrah experience the year prior to attending Hajj and then participating in Hajj as a capstone experience later in their paramedic clinical training.

Better scheduling of the students that takes into account time spent at both busy and non-busy stations was recommended. Participants assigned to the dispatch centre reported this as a positive experience and recommended it as an important non-clinical experience related to EMS. Adding clinical rotations at in-hospital emergency departments was strongly recommended. Many had friends from other health care colleges assigned to in-hospital units near Makkah and reported that this time as viewed as highly beneficial. This recommendation had prima face validity as emergency departments receive large numbers of patients with differing levels of acuity and complaints, including patients transported by EMS. Thus, time spent in hospital emergency departments would provide an experience with higher frequency of more acutely ill and injured patients.

Overwhelming support for developing EMS standards and a scope of practice during Hajj was expressed with discussions on how EMS colleges and ambulance services should seek ways to better organise and provide emergency care during Hajj. Participants suggested addressing the difficulty of finding patients through the use of global positioning technology and addressing the limited amount of medical supplies and equipment available.

Discussion

The participants described Hajj as an intensely crowded international mass gathering with prolonged EMS response times. Participants encountered many patients with medical and trauma complaints. Participants described challenges in providing patient care as language barriers and inadequate EMS supplies, equipment and medications, and described taking care of respiratory patients suffering from respiratory infections without having supplemental oxygen available. Participants also reported a low compliance rate for the use of respiratory masks for both pilgrims and care providers.

Given the hottest season that some participants experienced Hajj, the number of heat emergencies encountered on an hourly basis for those participants was not surprising. Participants treated patients with many varying life-threatening conditions, such as septic shock and ill patients with co-morbid conditions of diabetes, hypertension, chronic obstructive pulmonary disease and heart disease. Cardiac patients suffering from active STEMIs and witnessed and unwitnessed cardiac arrests were encountered. Participants reported withholding CPR due to cultural beliefs (3).

Traumatic injuries ranged from minor wounds related to performing rituals to more serious head injuries from motor vehicle accidents. The description of these patients indicated poor seatbelt compliance and how the number of motor vehicle accidents contributes to casualties during Hajj. None of the participants reported a stampede, which in past Hajjs resulted in MCIs with deaths (1,8).

Participants extensively discussed the educational benefits and positive experiences from attending Umrah, which brings an approximate 5 million pilgrims annually to Saudi Arabia (3). However, the Hijri month of Ramadan is the busiest month for Umrah (7) and is when participants reported performing their Umrah requirement as an EMS student. Concerns regarding infectious diseases, health risks and crowd management during Umrah are the same as at Hajj, as both host pilgrims from across the world in the same location (4,7). Participants recommended attending Umrah as an EMS student as an ideal way to prepare for the Hajj EMS experience because it is more organised and the number of pilgrims and patients are more manageable.

The educational value for EMS students in attending the mass gatherings of Umrah and Hajj was easily identified in study data and is consistent with prior reports in the literature. Participants described an overall experience that they viewed to be positive, that assisted in their EMS development, and that allowed them to encounter and assess and treat many real patients. Even the benefits for non-EMS health care students involved in health care were briefly discussed. Though a positive and beneficial experience was reported, there remain areas to improve the experience and EMS care provided at Hajj.

Recommendations

Recommendations made by the participants that have practical implications for both EMS training programs and Hajj organisers include a need for EMS training programs to develop learning objectives and expected outcomes from the Hajj experience; developing a preceptor-training program, which is recommended with the aim of a better utilising students and improving the learning experience; identifying EMS students separately from students of other health care

colleges; adopting standardised infectious disease control devices, procedures and uniforms; providing adequate medical supplies and equipment; improving scheduling of students to assign rotations equitably through busy and non-busy stations, in addition to emergency department placements; limiting student fatigue through assignment of rotations and providing relief at the end of the assigned shifts; standardising EMS operating procedures and protocols to include a protocol specifically designed for Hajj that takes in account cultural considerations and known challenges faced by providers; developing formal procedures to address pilgrims seeking EMS assessment and transportation for non-emergency requests; and resolving the challenges of being able to locate patients through global positioning technology and area grids.

A training program for both EMS students and providers going to Hajj is strongly recommended, which includes the recommendation to have EMS students attend Umrah before attending Hajj. The course should refresh EMS knowledge and skills and cover important concepts of mass-gathering and disaster management, and performing triage at an MCI.

This study adds support for continued collaboration in Hajj planning, sharing of information and research (5). Research on the feasibility, implications and best practices for the recommendations discussed above is suggested. Research specifically on cardiac arrests at Hajj, barriers to providing patient care and the frequency of deliveries at Hajj is also recommended. A phenomenological approach similar to this study is recommended to assess the experiences of other health care students and providers at Hajj. This study and similar qualitative studies related to Hajj could be conducted periodically because the experience of providing care would most likely change, just as the dates of Hajj change each year. Developing quantitative tools to gather data on participant experiences and longitudinal research is recommended as well.

Limitations

The data of this study was collected from 39 EMS students who attended only one Hajj of 1433H/2012G to 1435/2014G. This is a limitation because past Hajj events occurred during different weather seasons, just as future Hajjs will. An additional limitation was that all participants were male EMS students. This was because at the time of this study there were no paramedic programs in Saudi Arabia that sent female EMS students to Hajj. Last, data was collected through interviews that were conducted in English, which was not the native language of the participants. Thus, it is presumed that some contextual meaning was likely lost in translation, even though the participants all had conversational English competency at the level of EMT and paramedic training.

Conclusion

This article collected data from paramedic students about their experience of providing patient care with EMS during Hajj. This study is believed to be the first to provide qualitative insight into the experience of students providing EMS patient care during Hajj. The value and educational benefits for the participants due to attending the largest and most internationally diverse mass gathering of pilgrims in the world was identified as this experience was found to be a positive learning experience.

Based on a review of the literature and data collected in this study, recommendations for further research and EMS mass gathering systems development have been made for Hajj planners in the Kingdom of Saudi Arabia. These recommendations may inform all EMS managers, educators and providers, as well as all mass gathering planners and managers of major events, about the benefits and challenges of incorporating EMS students into mass gathering service coverage.

Conflict of interest

The authors declare they have no competing interests. Each author of this paper has completed the ICMJE conflict of interest statement.

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