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An assessment of the disaster preparedness knowledge of emergency medical services providers in Hajj of 2016.

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AN ASSESSMENT OF THE DISASTER PREPAREDNESS KNOWLEDGE OF

EMERGENCY MEDICAL SERVICES PROVIDERS

IN HAJJ OF 2016

By

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DEDICATION

This dissertation is dedicated to my loving parents, Meaiwedh and Mazna Alotaibi who

have surrounded me with their eternal love, support, and sincere prayers; to my loving

wife Jamlah who has encouraged me to pursue my dreams and has been supportive and

patient throughout my doctoral studies; and to my wonderful son, Ziyad and daughter,

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ABSTRACT

AN ASSESSMENT OF THE DISASTER PREPAREDNESS KNOWLEDGE OF

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Objectives: 1) Assess knowledge regarding disaster preparedness for mass gathering among SRC-EMS providers during the Hajj 2016 2) Explore the relationship between the demographic variables and knowledge about disaster preparedness among SRC-EMS providers during the Hajj 2016 3) Explore the sources of knowledge for SRC-EMS providers about disaster preparedness.

Method: The data collection for this study was a cross-sectional survey using an online Qualtrics survey. It was convenience sample of 1650 respondents. For the analyses descriptive statistics was used, one-way ANOVA and Bonferroni correction for multiple comparisons tests, multiple regression analyses, and Pearson's product coefficients.

Results: The main findings in this study was providers in the age of 35-39 years and master's degree had more general knowledge of disaster preparedness. Paramedics had more general knowledge of disaster preparedness and physicians had more knowledge of the Hajj. The military sector had more knowledge of disaster preparedness than other

sectors. The trainings, workshops and drills should be held four times per year, the duration should be 6-12 months, trainings no more than 9 hours and workshops and drills more than 20 hours for retaining high knowledge of disasters. Thus, the characteristics of multiple regression analysis model for general knowledge of disaster preparedness are the level of EMS provider, highest level of education, and number of workshops ever attended and characteristics of knowledge of the Hajj model are the number of drills attended and level of EMS providers. Most sources of general knowledge of disaster preparedness are continuing education, university courses the media and the most sources of knowledge of the Hajj are real disasters, continuing education, university courses, and the media.

Conclusion: This study indicates a relationship between the demographic variables with general knowledge of disaster preparedness and knowledge of the Hajj 2016. It provides valuable insights into understanding predictive factors. Also, it defines the sources of knowledge about disaster preparedness for mass gathering among SRC-EMS providers. This study offers recommendations to the Saudi government for improving the knowledge of disaster preparedness for SRC-EMS providers such as improving training and education and changing the scope of practice for Saudi EMS system.

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CHAPTER I
INTRODUCTION

In recent years, the world has been affected by an increasing incidence of major

disasters caused by earthquakes, hurricanes, floods, tsunamis, tornados, storms, fires,

terrorism, outbreak of diseases, and accidents at mass gatherings of people. The resulting

enormous number of deaths and damage to property have affected the economy of the

countries concerned. Worldwide, disasters cause more than 75,000 deaths each year

(Deeny & McFetridge, 2005) and directly impact more than 210,000,000 people per year

(International Federation of Red Cross and Red Crescent Societies, 2001). According to

Klynman, Kouppari and Mukhier (2007) this number has increased by 17 percent over

the past few decades. Besides the large number of deaths and injuries, the cost over the

30 years previous to August 2012 was estimated at $22 billion (Singh and Singh, 2012).

The staggering number of disasters of all types over the last 15 years has been

accompanied by an increased focus on the work of responding health care workers from

within the countries directly impacted and in international response teams (Gebbie,

Hutton, & Plummer, 2012). Thus, it is important to assess those who worked on the first

line within disaster situations, such as EMS providers.

Haddow, Blullock and Coppola (2008) have defined a disaster as "an event that

demands substantial crisis response requiring the use of governmental powers and

resources beyond the scope of one line agency or service" and emergency management as

"the discipline dealing with risk and risk avoidance" (p27). Today, however, the term is

used not only refer to natural catastrophes but also to refer to other events such as industrial accidents or transport accidents (Moe and Pathranarakul, 2006). The concept of preparedness during emergency management can be defined as a state of readiness for a disaster, crisis or any other type of catastrophic situation.

According to the United Nations' International Strategy Disaster Reduction, a disaster is "a serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope with using its own resources" (UNISDR, 2009). Additionally, the World Health Organization (WHO) defines a disaster as when "normal conditions of existence are disrupted and the level of suffering exceeds the capacity of the hazard-effected community to respond to it" (as cited in Lee, 2010, p. 466).

One significant team of experts on disaster is that comprised of Deshmukh, Rodrigues, and Krishnamurthy who, when writing about the risks and management of earthquakes in 2008, articulated; "Disaster management is an integrated process of planning, organizing, coordinating and implementing measure that are needed for effectively dealing with its impact on people. This includes prevention, mitigation, capacity building, preparedness, response, assessment, rescue and rehabilitation" (p. 2).

Both natural and man-made disasters are generally overwhelming to hospital and emergency services and, in recent decades, more attention has been given to planning the health care response to them(Efstathiou Panos., Papafragkaki, Gogosis, & Manwlidou, 2009). Both communities and health care workers (HCWs) are essential for the management of injury, death and loss of health services infrastructure due to disasters, leading to an emphasis on awareness and preparedness by communities.

Mass gatherings present enormous challenges for disaster management. According to the National Association of Emergency Medical Services physicians (NAEMSP), mass gatherings are defined as "Events in which at least 1000 persons are gathered at a specific location for a defined period of time (Soomaroo andMurray, 2012, p. 13). Likewise, the World Health Organization has defined a mass gathering as " An organized or unplanned event where the number of people attending is sufficient to strain the planning and response resources of the community, state or nation hosting the event"(WHO, 2008). Because the Hajj implies large numbers of people, many of whom are elderly, in crowded outdoor circumstances, mass gatherings such as the Hajj require a specific organization of medical services.

In the last decades, both man-made and natural disasters such as terrorist attacks, fires, floods and epidemics have affected Saudi Arabia. Nevertheless, despite the frequent occurrence and the devastation to peoples' lives and prosperity, little attention has been paid to disaster preparedness and management (Abosouliman, Kumar, Alam, & Rasjudin, 2013). Since 1980, in Saudi Arabia, disasters have caused more than 4,660 deaths, affected 32,000 people, and caused US\$ 4.65 billion in damages (CRED, 2013), so they are costly in both human and fiscal terms (Chakraborty, Mujumdar, Behera, Ohba, & Yamagata, 2006). For example, "Black Wednesday" in 2009 was a woeful day for the Red Sea port city of Jeddah, gateway to Mecca, when flooding affected more than 25,000 residents and caused 125 deaths, destroying over 7,000 vehicles and 11,000 homes. The lack of an adequate drainage network and the slow response by emergency teams earned the government widespread criticism (Alamri, 2011).

Another pressing problem in the absolute monarchy of Saudi Arabia is the risk of a terrorist attack because internal tensions tend to rise without any means of release, as the country has modernized, the many interactions with foreigners outside of Saudi Arabia have led to an increase in attacks in the country(Alamri, 2011).

In 2005, the World Health Organization advised all countries to have a clear plan to minimize the effects of disasters and suggested strategies for disaster preparedness which included continuous assessment and monitoring coordination, planning, and implementation (WHO, 2007). A further recommendation was for health care workers in hospitals or in other health facilities to have enough knowledge and skills to be ready for any catastrophe. Usually, the first line of defense against disaster is Health Care Workers (HCWs), especially providers of Emergency Medical Services (EMS) who respond when people ask for help. Hence, it is crucial to know the level of disaster preparedness among EMS providers.

Background of the Problem

Although Saudi Arabia is in many aspects a developed country, it is, like any nation in the world, susceptible to disasters (Abosuliman, Kumar & Alam, 2013). The potential for disaster is greatest during the Hajj pilgrimage when Saudi Arabia welcomes more than three million pilgrims from all over the world to perform religious rites in and around the town of Mecca in the Western province (Al-Orainey & Ibrahim, 2013; Elachola, Assiri, & Memish, 2014; Gardouni, 2012; Yamin & Albugami, 2014). The Hajj is considered one of the largest mass gatherings in the world (Gardouni, 2012; Shafi, Booy, Haworth, & Memish, 2008) and presents specific dangers because of the enormous numbers of pilgrims present in relatively small spaces at the same time. Given that the

Islamic calendar is a lunar one, the Hajj season does not correspond to a particular date on the Gregorian solar calendar (Alshenawi, 2014). Rather, the Hajj cycles through the seasons every few years, which can be important in a country where summer temperatures can reach over 120 degrees Fahrenheit (Alamri, 2011). The king of Saudi Arabia, in his role of Custodian of the Two Holy Mosques, assumes the sacred responsibility of caring for the pilgrims and directs his government to prepare for any problems caused by the huge influx of two million temporary visitors from abroad.

Saudi Arabia in 2014 had a population of approximately 28 million, and that number swells during Hajj to more than 30 million (Al-Tawfiq and Memish, 2014). Having had to face multiple catastrophes during fourteen centuries of annual pilgrimages, today the government takes preventative measures such as evacuating houses to allow space for the travelers and distributing cold water to the pilgrims (Alamri, 2011). Nevertheless, due to overcrowding, disease, and the logistics of food and water supplies, public services, including medical services, come under great stress (Alamri, 2011).

The Health Care System in Saudi Arabia

The Ministry of Health

The ministry was created in 1950 by a government unsparing in its desire to improve health care in Saudi Arabia (Al-Yousuf, 2002). Currently, the Ministry of Health (MOH) oversees the finances, operations, and supervision of all health care in the country (Amalki, Fitzgerald and Clark, 2011). As time has progressed, the health care system has improved in Saudi Arabia, and emphasis has been placed on advancements in the medical field. The country is divided into 13 regions under the MOH, with a representative for each area (Regional Health Systems Observatory, 2006). There exist challenges to the

system, however, which include a shortage of professionals, lack of resources, and most specific to mass casualty research, a lack of policy for national crisis management (Amalki, Fitzgerald and Clark, 2011). There is a present push for more native Saudis to become involved in the medical field, as many of the nurses and doctors in the country are foreigners. There is also a current restructuring of health insurance occurring in the country allowing pilgrims to be insured during their visit by a cooperative health insurance system, that is also implemented in three stages for private workers within the country, government employees, and travelers (Amalki et al.) Although in the past the government has been responsible for the healthcare of the country, it is now working towards a public-private health partnership (Aljazira Capital, 2013).

Ministry of Health professions also participate in the Advisory Scientific Board, a government committee that manages policies, guidelines and measures that focus on public health-related issues and recommends strategies for scientific research on public health-related diseases. This board also includes members of the National Guard, from King Faisal Specialties Hospitals, and from the Faculty of Applied Medical Sciences at King Abdul-Aziz University, from the private health sector, the Ministry of the Interior, King Saud University, King Fahd Medical City, WHO, USA and the CDC.

Pre-hospital Care in Saudi Arabia

In addition to deficiencies in prevention, transportation, communication and public education, pre-hospital care along with rehabilitation in Saudi Arabia are considered suboptimal (Al-Naami, Arafah, & Al-Ibrahim, 2010). Although the Saudi Ministry of Health, along with other governmental hospitals, provides 24-hour emergency care services at their emergency units, they rely on the Saudi Red Crescent Society (SRCS) to

provide first-aid to trauma victims on the scene and to transport them to hospital emergency departments (Al-Yousuf, 2002).

Saudi Red Crescent Authority (SRCA). The SRCA is a MOH-managed governmental organization, established in 1963, that provides emergency medical services (SRCA, 2013 & UNHCR, 2007). Although small, it plays an important role in the health care system. It is a free service to extract victims from critical situations such as road traffic accidents, flood, and fire or any disaster. The SRCS provides formal pre-hospital services throughout the country through only 165 ambulance stations (Dhaffar, Sindy, Gazzaz, & Shabaz, 2005; Sasser, Gibbs, & Blackwell, 2004). As a result, only few patients are being transported to the hospital via SRCA ambulances and instead, police officers and volunteers transport most trauma victims in Saudi Arabia (Al-Ghamdi, 2002). Moreover, although trauma is the leading cause of death and disability in the country, Saudi Arabia lacks number of trauma centers (Al-Naami, Arafah, Al-Ibrahim, 2010). Emergency Medical Services as an essential part of trauma centers are very limited in the kingdom due to limited numbers of EMS stations and employees (Al-Ghamdi, 2002). In the city of Riyadh, the capital, only seven SRCA emergency stations are operating with fewer than 30 emergency medical technicians (EMTs) (Al-Ghamdi, 2002). Accordingly, the city of Riyadh has "poor" access to pre-hospital services according to a study comparing pre-hospital services in Abu Dhabi with services elsewhere in the Middle East (Sasser et al., 2004).The Saudi MOH has published reports indicating that more than 50,000 emergency cases in Riyadh were transported by police and volunteers in vehicles in 1999, representing half of all emergency calls in Riyadh of that year (Al-Ghamdi, 2002).

In an attempt to check recent information concerning the SRCA, this author found that their website of SRCA is absolutely outdated, and has no statistical information available. The home page has a banner that says, "Welcome back" to the late King Abdullah, who passed away on January of this year. Moreover, the most recent news was from the year 2010. However, the International Federation of Red Cross and Red Crescent Societies' website has a link to another Saudi Red Crescent Authority website (www.srca.org.sa), which is somewhat updated. Even that website contains no statistical information on EMS stations, emergency calls, or trauma incidents. In contrast, other Red Crescent Societies in the region, for example Qatar Red Crescent, have user-friendly, updated websites that provide statistical information in yearly reports regardless of their subordinate role in each country. The SRCA plays a primary role in Saudi Arabia's EMS, yet it fails to provide appropriate services even at the level of public awareness programs. Educational campaigns seem to be ineffective. In a survey published in 1998 by the SRCA, only 3% of Saudis know the correct emergency phone number for SRCS: 997. Seventy percent believe that the number is 911 like in the US, and the rest are unaware of any number (Al-Naami et al., 2010). A cross-sectional survey in Jeddah, the largest city in western Saudi Arabia, for which 1534 members of the general public were interviewed, showed that 64% did not know the emergency dispatch number to call (Hamam, Bagis, AlJohani, & Tashkandi, 2015). Consequently, most emergency cases are transported by volunteers in private cars, taxis, or police cars to the hospital and not by SRCA (Al-Nammi, Arafah, & Al-Ibrahim, 2010). This is a public awareness problem that could be easily solved by health promotion and awareness campaigns.

According to the Saudi Commission for Health specialties, which the sources of verification for the credentials of Saudi healthcare providers practicing in Saudi Arabia. There are three levels of EMS providers in SRCA (www.scfhs.org.sa): the basic level EMS (EMS-B), and the intermediate level EMS (EMS-I) which are called technicians, and the advanced level EMS (EMS-Paramedic) which are called technologists. The EMS-B are qualified after 18 months of study. Their primary duties are basic life support (BLS), and automated external defibrillation (AED). The EMS-I qualify after two- and-a- half years of study. Their primary duties are all of the ones carried out by EMS-B, plus IV fluid, intubation, AED, and Advanced Life Support. Qualification as an EMS-Paramedic requires four-and-a-half years of study. Their primary duties are: IV, intubation, AED, BLS, ACLS (advanced cardiovascular life support), PALS (pediatric advanced life support), PHTLS (prehospital trauma life support), and advanced medication administration.

Patients are transported to the hospital in one of two ways: by ground ambulance or by air ambulance (helicopter) services. Air ambulance is an emergency medical service to transport critical and injured patients in order to save time (Alharbi, 2015). According to the General Authority for Statistics in the Kingdom of Saudi Arabia, there are 19,676 EMS providers, and 8,632 ambulances based at 1,653 stations throughout the country. Table 1 shows the number of employees hired during the past the five years. The number of hires in 2015 was more than double the number hired in 2011. Table 2 shows the number of ambulances and number of stations that were operational in 2015 (GAS, 2015).

Table 1.

Personnel in Saudi Red Crescent Authority by profession.

Personnel in SRCA by Profession 2011 -2015			
Years	Profession		Total
	Specialist& Technicians	Physicians	
2011	2492	86	2578
2012	3560	86	3646
2013	3733	86	3819
2014	4383	161	4544
2015	5508	62	5570
Total	19676	481	20157

Source: www.stats.gov.sa/en

Table 2.

Saudi Red Crescent Authority, number of ambulances and stations.

Years	Numbers of Ambulances	Numbers of Stations
2011	1572	284
2012	1663	297
2013	1463	328
2014	1963	360
2015	1965	384
Total	8632	1653

Source: www.stats.gov.sa/en

In Saudi Arabia there exists a general lack of confidence in the services of SRCA due to long times of response (Hamam, Bagis, Aljohani, Tashkandi, 2015). However, when compared to response time in the United States, the time response is around more than 8 minutes (Blanchard et al., 2012).

The Mass Gathering of Hajj

Location

The city of Mecca, also spelled "Makkah," is considered to be the holiest place in Islam. It is located in a desert valley surrounded by rugged mountains in the western part of Saudi Arabia. The climate of Mecca is very hot and typically varies from 66°F to 110°F (WeatherSpark, 2015). The geography of Mecca can be classified into two types; type one is metro, which is 500 square miles and type two is Urban, which is 330 square miles (Mecca, 2015). The resident population of Mecca in 2017 was around 4.5 million (GAS, 2017).

The following table 3, demonstrates the current populations from different countries who attend Hajj, traveling from a variety of places around the world.

Table 3.

 The largest groups of pilgrims from different countries

Country	Numbers Traveling to the Hajj
Indonesia	214,159
India	173,165
Pakistan	170,573
Turkey	134,693
Iran	111,511

Source:(Khan et al., 2010)

The progression of the Hajj

The pilgrimage of Hajj consists of six steps that must be performed in sequential order over a period of six days, inside the Great Mosque of Mecca and in nearby areas outside the city. Of significance is the limited time for each step which dictates that all the pilgrims must be in the same places at roughly the same time with ensuing consequences. The following figure1, showed the Geographical Progression of the Hajj.

THE HAJJ GUIDE

For Muslims, hajj is the fifth and final pillar of Islam. It takes place in the month of Dhul Hijjah which is the twelfth month of the Islamic lunar calendar. Hajj officially begins on the 8th of Dhul Hijjah and lasts for five days.

The Grand Mosque: Pilgrims begin the hajj (pilgrimage) by circling the Ka'aba seven times

① Makkah

② Mina — Stop at Mina to pray and read the Quran

⑤ Pligrims throw rocks at the three pilars representing the devil. Start of Eid-al-Adha festival (three days of ritual sacrifice)

⑥ Final return to Makkah. Pilgrims circle the Ka'aba seven more times

④ Muzdalifah — Pilgrims pick up the 49 rocks needed for the following day in Mina

③ Mount Arafat — Prayer from noon to dusk in the **Arafat** valley, where the prophet Muhammed preached his last sermon

Source: AFP

(Hazif, 2013)

<u>Figure1</u>. The Geographical Progression of the Hajj

Step one: Rites at the Great Mosque. Today, more than three million pilgrims arrive in Mecca before the start of the pilgrimage through one of several gateways; either by sea through the port of Jeddah, by air through the Jeddah airport, or by land from various directions. The pilgrims visit the Great Mosque and circumambulate its center seven times. Then they must walk back and forth between the hills of Safa and Marrah before travelling to Mina, a small city some 10 km (6 miles) from the center of Mecca.

Step two: Day 1 of Hajj (stay in Mina). Mina is mostly an open desert area on the road from Mecca to the plain of Arafat. It is known as Tent City because after a 1997 fire,

the Saudi government built 100,000 white, semi-permanent fiberglass tents to accommodate Hajj pilgrims. All of the millions of pilgrims stay one night in Mina.

Step three: Day 2 of Hajj (rites in Arafat and Muzdalifah). The masses of pilgrims move in the morning from Mina to Arafat, a desert plain 12.4 miles southeast of Mecca, by bus, car, rail and on foot. Called Arafat day, it is the most central ritual of Hajj. Shielded under tents, pilgrims spend the whole day in worship and after sunset, move 5.5 miles north to the village of Muzdalifah where they spend the night in tents.

Step four: Day 3 of Hajj (Day of Eid and Jamarat). In the morning, all the pilgrims move from Muzdalifah back to Mina where they change clothes, cut their hair, slaughter an animal to distribute the meat to the poor, and perform the first of the stoning rituals by throwing symbolic pebbles at three stone pillars that represent the devil. Historically, the stoning ritual has been the scene of disasters (BBC News, 2007; BBC News, 2004), as the area is small and the crowds surge to be able to throw their stones from as close as possible to the pillars.

Step five: Days 4 and 5 (Rituals in Mina). On days 4 and 5, pilgrims stay in Mina and perform the stoning ritual, aiming at a different stone pillar each day.

Step 6: Rituals at the Great Mosque in Mecca. On day 6 all three million pilgrims must go back to the Great Mosque in Mecca to circle around its center 7 times and walk or jog 7 times between the hills of Safa and Marwa, final rites to complete their Hajj. The Ministry of Hajj has attempted to organize the pilgrims for performing these last rites. They start with elderly and women pilgrims.

Saudi Arabia's efforts for pilgrims

Most visitors come to Saudi Arabia to participate in the Umrah and Hajj. While the Hajj must take place during the annual prescribed days, Umrah, the lesser pilgrimage, can be performed at any time during the year except during Hajj season, according to Islamic law (Colliers International, 2014). The numbers of pilgrims are astronomical; according to government sources, in 2015 around 5 million people performed Umrah (Ministry of Hajj, 2015). To anticipate and facilitate the pilgrimages, the government of Saudi Arabia has established both administrative bodies and policies.

The Management of Hajj

Organizations Involved in coordinating the Hajj. Multiple agencies in Saudi Arabia contribute to the organization, coordination, and management of the Hajj each year (Al-Ahmadi, Al-Swidi, Abas, and Ghani, 2013). All the organizations that cooperate to organize the Hajj, in which the Ministries of Health and of the Interior play prominent roles (D'Alessandro, Leggo., and Almbarek, 2013). Thus, there are two main committees who incorporate representatives from the different ministries involved in the Hajj: the Supreme Hajj Committee (SHC) and General Hajj Committee (GHC). Each has sub-committees that have independent tasks related to the Hajj plan(Nojoum, 2005).

The Supreme Hajj Committee (SHC). This is the highest Hajj committee and the national level; it is directly in contact with the king of Saudi Arabia and the Council of Ministers for the implementation of policies as well as financial matters. The president of SHC is the Minister of the Interior and the vice president is the governor of Mecca. Other members are professionals from regional governorates and ministries concerned with the provision of the Hajj services and organizing the affairs of the pilgrims. The basic mission

of the SHC is to study the plans and policies proposed by administrative organizations and

operational bodies of the Hajj and to send these on to the Council of Ministers for

allocation of resources (J. A. Al-Tawfiq & Z. A. Memish, 2014; Eid, 2012; Shair &

Karan, 1979).

The General Hajj Committee (GHC). It is the lower and local level of the Hajj

administrative authority, presided over by the governor of Mecca with the deputy

governor of Mecca as vice president. The basic role of the GHC is to review and examine

plans for the Hajj (Al-Ahmadi, Al-Swidi, Abas & Ghani, 2013). The members of this

committee are from the Ministries of Hajj, Finance, Health, Commerce and Industry,

Water and Electricity, Transportation, Roads, Economy and Planning, Municipal and

Rural Affairs, Communications and Information Technology, the General Directors of

Civil Defense, the Chief of Red Crescent Society, the Chief of Civil Aviation, and the

General Director of the Mina project (Nojoum, 2005).

Role of the Ministry of Health in Hajj. The MOH is a cornerstone of the

preparedness for the Hajj. Its goals are the provision of the best health care for pilgrims

and the elaboration, with other relevant entities, of a disaster plan (Eltahir, 2000). The

preparations for Hajj season and Madinah by the MOH focused on prevention and public

health, therapeutic medicine services, and supportive services. These areas are of emphasis

for the coming seasons, as leaders look to improve current problem areas and support the

pilgrims during the mass gatherings (MOH, 2015). The MOH plays a main role in the

coordination and cooperation with other government ministries such as the Ministry of

Defense, the National Guard, the Ministry of Interior, the Ministry of Higher Education,

and the King Faisal Specialties Hospital and Research Center. Meanwhile, MOH hosts

experts and coordinates with international organizations and think tanks such as the American and European disease control centers, WHO, and CDC (Z. A. Memish et al., 2014). Representatives from these organizations come to Mecca and look at all the plans of the Saudi government and analyze the levels of safety and security for the pilgrims during the Hajj season.

Preventive and Public Health. The Hajj, a mass gathering of pilgrims from different countries with diverse epidemiological backgrounds, increases the risk of spread of communicable diseases both to the visiting pilgrims and to their contracts upon their return home (WHO, 2008). Thus, the Ministry of Health pays special attention to the preventive phase of mass gatherings, where there is high risk of outbreaks, epidemics, and exposure to particular air, water and vector-borne diseases (Memish, 2012). Saudi Arabia in collaboration with the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC) plan for any change or update on new diseases such as Middle Eastern Respiratory Syndrome (a Coronavirus), a particularly severe issue for the Middle East, as it was being passed through travelers, causing respiratory difficulty and no cases report and 2012 and 2013 (Z. A. Memish et al., 2014). The presence of Coronavirus prompted the MOH to take a multi-faceted approach to prevention.

A first step to prevention is to disseminate health awareness through the Saudi embassies. Instructions are provided in the local languages for health awareness with information on common diseases, food poisoning, and preventive measures to guide and help pilgrims during the Hajj season in the local languages (Memish & Al-rabeeah, 2014). Also provided are the health-related steps for pilgrims to follow before coming to Saudi Arabia (Memish & Al-rabeeah, 2012).

Although there are screening procedures in place in the originating countries, the MOH has established centers for disease control at land, air and sea entry points (Al-Ghamdi & Kabbash, 2011). These centers are in operation 24 hours a day during the Hajj season to prevent the spread of disease, as many people from around the world gather in a small area. Travelers must demonstrate proof of vaccination and customs officers work to ensure the safety of imported food as well. Recently, the MOH has established 232 specialized quarantine rooms where infectious cases are treated and controlled (MOH, 2015). Finally, the MOH has embarked on vaccination campaigns for Mecca residents each year before the Hajj season.

Therapeutic Medicine Services. With the goal of providing high-quality health services to the Hajj pilgrims, the MOH establishes, furnishes and equips hospitals and primary health care clinics, as well as preventive centers at the Kingdom's points of entry and at the places where pilgrims stay. To date, the MOH has prepared 25 hospitals, including 4 hospitals in Arafat, 4 hospitals in Mina, 7 hospitals in the holy city of Mecca, and 9 hospitals in the city of Medinah, where the prophet is buried, the second most-visited city in the kingdom after Mecca (Z. A. Memish et al., 2014). The total number of inpatient beds at the Hajj Sites is approximately 5,000 including 500 IC beds and 550 ER beds (Memish, et al, 2014). There are also 136 permanent and seasonal health centers which support the hospitals during Hajj season: 43 health centers in Mecca, 46 health centers in Arafat, 6 health centers in Muzdalifah, and 26 health centers in Mina (Z. Memish, 2010). The MOH has built 16 emergency health centers along the Jamarat Bridge and three ambulatory centers in the Holy Mosque in Mecca, with 18 medical stations

distributed in Holy Sites, including six medical stations in Arafat, six medical aid stations in Muzdalifah and six medical stations in Mina (Ministry, 2015).

In 2015, for the Hajj season, the MOH hired 800 physicians and nurses in various specialties from other fields, like the private sectors, to improve the performance of the health facilities. For example, specialists in intensive care, cardiology, nephrology, endoscopy, emergency and infectious diseases were hired to improve the Hajj (MOH, 2015). Some medical teams are assigned to the central area of the Holy Mosque to treat emergencies that arise among the millions of pilgrims concentrated in that area. Eight ambulances are allocated to these emergency medical stations in the central area of the Holy Mosque (MOH, 2015). Most of the critical care cases are transferred to the King Abdullah Medical City which provides full health services to pilgrims and has expanded its cardiac catheterization program and heart surgeries. In addition, it has several departments of Intensive Care and large quantities of different types of blood in the blood bank (MOH, 2015).

Role of the SRCA in the Hajj. SRCA also has a particular role to play during the Hajj to service the pilgrims. In 2016, the SRCA had established 110 ambulance stations in the holy sites (Arafat, Mizdalafah, and Mina) and along the roads leading to them (IFRC, 2016). Six seasonal ambulance stations were established along the express roads used by pilgrims to reach the Grand Mosque. In addition, 290 ambulances and 25 motorbikes were used to provide fast services to pilgrims. Finally, 100 doctors, 1550 paramedics, technicians and first responders were recruited to work for SRCS during Hajj (IFRC, 2016)

In 2012, two weeks before the Hajj, the SRCA deployed an additional 300 ambulances, 20 advance life support response vehicles, 25 motorcycle units and 100 mobile teams of physicians as part of the Hajj prehospital emergency care services, as well as 1,750 EMS providers and 600 volunteers to respond from 26 ambulance stations (D'Alessandro et al., 2013). That same year during Hajj, the SRCA answered 57, 420 calls from dispatch for assistance, and undertook 20, 210 responses, providing medical care to 18,230 patients, of which 34% were transported to hospitals and 39% were treated and released at the scene (D'Alessandro et al., 2013).

History of the Hajj disasters

With 2-3 million Islamic pilgrims attending the Hajj in Saudi Arabia each year, there are frequent deaths and injuries among the pilgrims in their journey from Arafat to the Great Mosque in Mecca. Table 4 shows the statistics related to deaths and serious injuries for the years from 1975 to 2007 (Al-Ahmadi et al., 2013). In the Hajj of 1975, a fire broke out in one of the pilgrim's tents in Mina. It quickly spread to other tents and caused the explosion of a gas cylinder, resulting in the death of 200 pilgrims (Alamri, 2011). In 1990, pedestrians trapped in a tunnel, leading to 1,426 deaths (Soomaroo, Murray, 2012). More than 1,000 pilgrims died in stampedes on the Jamarat Bridge between 1994 and 2006 (BBC News, 1998; BBC News, 2001; BBC News, 2003; BBC News, 2004; (Ahmed, Barbeschi, & Memish, 2009; Yaseen M. Arabi. & Sameer M. Alhamid., 2006)

Working during the Hajj in any capacity is a very unique and challenging situation due to the enormous crowds speaking multiple languages from different regions in the world, each with idiosyncrasies in hygiene, culinary habits, and other customs. Healthcare

providers, in particular, are usually faced with an overload of admissions at any time.

Because the Hajj is a once-in-a-lifetime and expensive religious obligation, many pilgrims

are elderly and already sick (Shujaa & Alhamid, 2015). It is sometimes difficult to find

interpreters who understand the particular language of the patient (Shujaa & Alhamid,

2015). As communication is key to helping the patient, this presents a challenge for

medical staff. This wide diversity of the groups can also present additional problems, such

as having to track outbreaks of certain diseases in pilgrims from certain regions. Because

the event takes place outside in soaring temperatures, often in harsh conditions, and over

several days, participants and staff can become ill. Patients frequently experience upper

respiratory tract infections. Other illnesses such as asthma and chest pain are also frequent,

creating further difficulties for medical staff who must treat multiple cases of severely ill

people during the event while facing difficulties in transportation, re-supply, and

refrigeration. It should be noted that other serious challenges can occur in the Hajj such as

stampedes, natural disasters, weather concerns, in addition to the medical results of

overcrowding.

Table 4.

Stampedes and Fires during Hajj.

Type of Incidents	Date of Incident	Deaths	Injuries
An exploding gas cylinder caused a fire in a tent community	December 1975	200 pilgrims	Data not available.
A stampede inside a pedestrian tunnel (Al-Ma'aism tunnel)	July 2, 1990	1,426 pilgrims	N/A
A stampede at the stoning of the Devil ritual	May 23, 1994	270 pilgrims	N/A
A tent fire in Mina	April 15, 1997	343 pilgrims	1,500 injured

A stampede at Jamarat Bridge	April 9, 1998	118 pilgrims	180 injured
A stampede at the stoning of the Devil ritual	March 5, 2001	35 pilgrims	N/A
A stampede at the stoning of the Devil ritual	February 11, 2003	14 pilgrims	N/A
A stampede at the stoning of the Devil ritual	February 1, 2004	251 pilgrims	244 injured
A stampede at Jamarat Bridge	January 12, 2006	346 pilgrims	289 injured
A stampede at Mina	September 24, 2015	769 pilgrims	934 injured

Sources: BBC News, 1998; BBC News, 2001; BBC News, 2003; BBC News, 2004; (Ahmed et al., 2009; Yaseen M. Arabi. & Sameer M. Alhamid., 2006); Khan and Noji, 2016.

Statement of Problem

Officials in Saudi Arabia have expressed significant concern regarding disaster management, as evidenced by the great increase in health care providers in the private and public health sectors, in particular in EMS providers in the Hajj season. Currently, there is no national master plan for disaster management in Saudi Arabia (Al-razeeni, 2015) and there is a lack of literature on the provision of EMS during Hajj (Ahmed et al., 2009). A knowledge of disaster preparedness is essential for all health care professionals and is a key concept in disaster management. At present, most healthcare workers in Saudi Arabia lack experience in disaster planning and practical experience responding to disasters (Lund, Gutman, & Turris, 2011). To assess the knowledge about disaster preparedness before mass gatherings among the different levels of EMS providers (i.e., first responder, EMS-technician, EMS-paramedic and physician) during the Hajj, based on qualification (level of education, training, years of experience, level of EMS, current EMS training was received), it is important to know which areas of disaster preparedness need improvement

by training or continuing education. No previous study was found that assessed the knowledge of disaster preparedness for mass gathering in EMS providers during the Hajj.

Purpose of the Study

This study has three main goals: 1) to assess the knowledge regarding mass gathering disaster preparedness among EMS providers during Hajj of 2016; 2) to explore the relationship between the demographic variables (age, level of education, working experience, previous disaster education/training and number of trainings) and the knowledge about disasters among EMS providers during Hajj 2016; and 3) to explore the sources of the knowledge about disasters that EMS providers have. This study has the potential to add to SRCA's capability to respond more effectively and competently to disastrous events.

Research Questions and Hypotheses

This research aimed to provide answers to the following questions:

1. Is there a significant difference in the knowledge of disaster preparedness for mass gatherings (DPMG) between different categories of SRCA-EMS providers based on their age?

   H01: There is no significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on their age.

   Ha1: There is a significant difference in the knowledge of DPMG between different categories of SRCEMS providers based on their age.

2. Is there a significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on their level of education?

H02: There is no significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on their level of education.

Ha2: There is a significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on level of education.

3. Is there a significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on their level of EMS (professional classification)?

H03: There is no significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on their level of EMS.

Ha3: There is a significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on their level of EMS.

4. Is there a significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on the sector of EMS training received?

H04: There is no significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on the sector of EMS training received.

Ha4: There is a significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on the sector of EMS training received.

5. Is there a significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on years of experience?

H05: There is no significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on years of experience.

Ha5: There is a significant difference in the knowledge of DPMG between different categories of EMS providers based on years of experience.

6. Is there a significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on previous disaster education/training, the number of trainings and the number of hours of training?

   H06: There is no significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on previous disaster education/training, number of trainings and number of hours of training.

   Ha6: There is a significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on previous disaster education/training, number of trainings and number of hours of training.

7. Is there a relationship between the source of knowledge and knowledge acquired regarding DPMG among different SRCA-EMS providers in Hajj of 2016?

   H07: There is no relationship between the source of knowledge and knowledge acquired regarding DPMG among different SRCA-EMS providers in Hajj of 2016.

   Ha7: There is a relationship between the source of knowledge and knowledge acquired regarding DPMG among different SRCA-EMS providers in Hajj of 2016.

Definitions of Key Terms

Ministry of Health (MOH): The health department of Saudi Arabia, responsible for healthcare services to citizens and visitors in the country. The Ministry seeks to improve the quality of treatment in the various healthcare sectors, in general hospitals, and during public events such as hajj.

Mass gatherings: These are events where more than 1000 people are congregated at a specific location for a defined period of time (WHO, 2008).

Hajj: The annual Hajj pilgrimage, one of the world's largest gatherings, for which several millions of people flock to Mecca, Saudi Arabia, to participate in one of the Islam's five pillars of faith.

Training: It procedures for solving the problem through transmitting and receiving the information (Halloran & D'ouglas, 1987).

Workshop: A meeting of a group of people who share a concern in order to improve their knowledge or skills in a specific area (Akdeniz, 2016).

Disaster drill: "An exercise of demonstration, that tests the readiness and capacity of a hospital, a community, or other system to respond to a public health emergency or other disaster "(U.S. Department of Health and Human Services, 2012).

Medical first responder: "Local emergency medical personal who first arrive on the scene of an incident and take action to save live, protect personnel, and meet basic human needs" (Jester, 2013. Page, 19).

Emergency Medical Technician: "A health-care specialty with skills and knowledge in prehospital emergency medicine" (California Governor's Office of Emergency Services, 2006).

Paramedic: An individual with level of training other than doctors, nurses or physician's assistant, who provides advanced life support, transport and emergency medical care (Wine, 1999).

Disaster Medical Assistance Teams: A team comprised of civilian volunteer medical providers who are part of a National Disaster plan in the USA (Key, 1994).

CHAPTER II
LITERATURE REVIEW

Mass gatherings

Definitions

The concept of a group of people coming together to celebrate, worship, or experience has been often put into practice around the world as people enjoy and gather in mass proportions. Although there are multiple definitions of mass gatherings, the general estimated size ranges from 100 to 25000 people collected in one location (Locoh-Donou et al., 2013). According to Jaslow, Yancy, and Milsten (2000), however, a mass gathering involves at least 1000 persons at a specific location at the same time. Other definitions are based on the medical perspective: a mass gathering is one large crowd of people which can lead to a delay in emergency response or a difficulty to access any kind of necessary treatment (Paul Arbon, 2004; P. Arbon, 2007). The duration of a mass gathering can be anywhere from one hour to several days, weeks or even months.

Most studies on mass gatherings consist of retrospective descriptive, prospective observational, and planning guidance publications (P. Arbon, 2007; Kathrtn M. Zeitz, 2002; Milsten, Maguire, & Bissell, 2002). Prospective observational studies are few and mostly attempt to validate retrospectively-derived results (Zeitz, Zeitz, and Arbon, 2005) or evaluate interventions, using comparisons of two populations at the same event, (Morimura, Katsumi, Sugimoto, Fuse, Asai and Yamamoto, 2004) or real "historical controls" from retrospective data. It is also relevant to consider the demographics of

those attending mass gatherings, the duration of the event, current public health systems in place, as well as the analysis of risk assessments and comparison with similar countries and histories. The extant literature present on mass gatherings usually focuses on a few major events held each year and the systems in place to support those attending the events. Thackaway, Churches, Fizzell, Muscatello, and Armstrong (2009) argue that mass gatherings should be analyzed according to political, religious considerations, event durations, geographic spread, and number of international visitors.

Studies on mass gatherings

The history of mass gatherings is essential to understanding the steps which have been taken with the objective of ensuring safety and efficient medical care. It is useful also to understand how gatherings have changed, and what can be done to further improve the systems. In one memorable instance, a mass gathering occurred only once, but it was the largest in world history: that of the 2010 World Exposition in Shanghai, China. In a special report on public health preparedness for the event, Yi et al. (2012) explain the actions taken by the Shanghai Municipal Center for Disease Control and Prevention in preparing and responding to health impacts during the event. The exposition lasted for six months, in a venue of 5.28 square kilometers. Because the event took place over a long period of time, had a great number of people present, and carried the risk of high temperatures and typhoons, it created great challenges for safety and health (Yi et al.). It is common for countries hosting large mass gatherings to call on other nations for help in preparedness. In this instance, China and the United States collaborated to develop an approach, including training and technical assistance related to public health emergency management, risk assessment, as well as emergency operations

planning and disaster exercises (Yongchao, Qinneng and Yi, 2011; Jin, Ljungqvist and Troedsson, 2010). Security groups were built as internal organizational structures, with public awareness campaigns in China, focusing on technical needs and the capacities for laboratories, as well as vaccinations. An extensive risk assessment was conducted to consider public health security needs, emergency exercises, health education and intervention.

Additionally, travel tip handbooks were distributed to travelers and health hotlines were activated (He et al., 2011). With great political cooperation, a careful and effective preparation led to a successful mass gathering with a clear organizational structure and job responsibilities for all.

Looking at mass gatherings and the availability of medical care, other researchers have worked to analyze events and the efficiency of care for the people present. Sanders, Criss, Steckl, and Meslin (1986) conducted an assessment of events at 15 facilities, using surveys to question facilitators about the events and the accessibility of medical care for planned mass gatherings. During survey collection, researchers used telephone calls and patient encounter logs to determine levels of injury and additional information about medical care at the events. One of the issues that arose within the research was the lack of patient encounter logs at some facilities. It also appeared that medical care varied according to the type of event, revealing a lack of standardization in the care provided. For example, researchers found that football arenas generally planned for emergency health care fully, with the presence of physicians, nurses, and EMS providers, whereas the baseball stadium had no emergency health care plan (Sanders et al., 1986). Each venue controls its own medical personnel and facilities, allowing sponsors to control

what type of medical care to be provided and the level of efficiency they feel is necessary for the event.

In a 2012 study, which excluded extreme weather and environmental disasters, Soomaroo and Murray focused on 21 disasters that happened at mass gatherings throughout the world between the years 1971-2011. The authors analyzed the 21 events and categorized the main learning points into 5 key areas as seen in Table 6.

Table 2.1

Five Key Areas related to Mass Gathering

Five Key Areas related to mass gathering
Overcrowding and Crowd control
Fire Access points
Fire Safety Measures
Medical Preparedness
Emergency Response

Overcrowding, the main issue identified by the researchers, was found to be improved by several measures that included pre-planning and the creation of seats instead of allowing people to stand.

In a study by Kishore and Soulieres (2012), as part of the Applied Research and Innovation Center, spontaneous behavior at mass gatherings around Toronto was explored as a factor in events that occurred in the area, as well as to gauge awareness of risks within mass gatherings. The study covered the period which included Toronto's G-20 insurgence as well as Vancouver's Stanley Cup riots. The authors considered an

important shift in the safety of mass gatherings- the use of social media. They conclude

that social media can cause spontaneous human behaviors and therefore "event crisis and

subsequent crowd control has become both a flaming challenge and a matter of public

safety and security concern" (Kishore & Soulieres, 2012, p.5). The results of a survey in

which 3500 people were asked about their biggest concerns at mass gatherings indicated

that the public is mostly concerned by the twin challenges of safety and security. Below,

the graph illustrates the results of the survey which indicate that the public is most

concerned by safety and least concerned with property, environment, and public image.
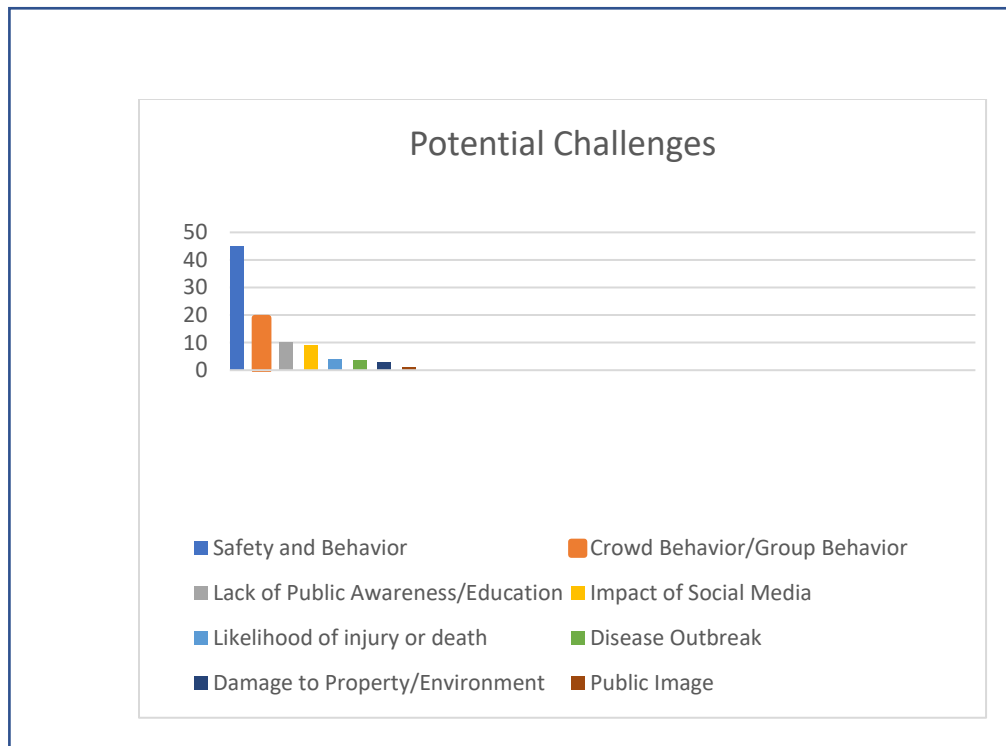
Figure 2.1. Potential Challenges Posed by Mass Gatherings (Kishore & Soulieres, 2012).

Three fourths of respondents concurred that the most attention should be paid to event

planning and response, rather than to public health (preventing disease and threats to

health) or health care (hospital, clinics, medical care). The authors of the survey also

asked about influencing factors for big crowds, with most agreeing that drugs, alcohol, and a rush for seats were by far the most important concerns. Other issues, such as traffic density and access to basic supplies, ranked much lower (Kishore & Soulieres, 2012). These studies, emphasize the role of medical care for those involved in the mass gathering experience, to include transport for patients from the venue to the hospital, or treatment provided in the on-site facilities (Paul Arbon, 2010; Gutman, Lund, & Turris, 2011; Yancey, Fuhri, Pillay, & Greenwald, 2008). Overall, results from the various studies revealed that public concern and perception can be managed through proper safety and awareness, emergency response planning, and corrective actions after safety review (Kishore & Soulieres, 2012).

Disaster preparedness for mass gatherings

According to Gebbie and Qureshi (2002), the first step towards preparedness for disaster is the identification of which health care providers should be knowledgeable about the risks, and also which role each provider is expected to play in case of a disaster. Most of studies about disaster preparedness concern health care providers, especially nurses (Al-khalaileh, Bond, Alassad, 2012; Duong, 2009; O'Sullivan et al., 2008; Arbon et al., 2013; Tichy, Bond, Beckstrand and Heise, 2009; Yin, He, Arbon, and Zhu, 2011). There are many variables in the level of disaster preparedness of health care workers such training, types of training, providers' experience, level of education, as well as the sources of any knowledge they might possess.

One of the earliest studies, undertaken by the Arizona chapter of the American College of Emergency Physicians, was a study of the medical care at 15 venues for public events. Results indicated deficiencies in the documentation of medical cases treated at

the scene, and also exposed that some EMS providers had attempted medical assessments without consulting physicians (Sanders, Criss, Steckl, & Meslin, 1986) Overall, the study provides further evidence of a need in standardization for mass gatherings and the reality of medical problems that can occur when issues, such as poor documentation and lack of physician evaluation, take place at events. One conclusion drawn by the researchers was that event organizers have the responsibility of supporting the events by providing emergency medical services for attendees (Sanders, Criss, Steckl, & Meslin, 1986). According to their findings, additional work is needed to ensure safety and medical preparedness for those attending mass gatherings.

Furbee et al. (2006) compared the training protocols of rural EMS providers to their actual response efforts performed during a disaster. To this effect, the researchers surveyed 768 rural EMS agencies in the U.S. federal emergency Agency (FEMA) Region 3 and FEMA Region 8, plus four other western states in the United States, as suggested by the Critical Illness and Trauma (CIT) Foundation of Bozeman, Montana. Respondents were asked to comment on their self-assessment of preparedness and their actual experiences in a disaster response (Furbee et al., 2006). Thirty-eight percent of rural EMS providers indicated that a mass-casualty incident had overwhelmed them during the past two years, 24% responded that their disaster plan had been activated during the past two years, and 26% of respondents had helped the state to declare disaster. Only 4% had ever worked with a Disaster Medical Assistance Team (DMAT) and only 3% had worked with a Civil Support Team (CST) although, 8% had worked a Community Emergency Response Team (CERT) in a disaster response within the past two years. The respondents reported that most of their training had focused on terrorism, outbreaks of infectious

diseases, riots, bombings, and earthquakes, whereas they received little training on weather emergencies and other common events. In addition, 74% of participants reported a significant decline in training after September 11th, 2001, especially in training for serious weather incidents of all types (Fubee, Coben, Smyth, Manley, Summers, Sanddal & Kocsis, 2006). On the other hand, when asked about their training needs, the respondents listed their top five priorities to be training for general disaster, advanced life support, the incident command system, scene safety, and triage. The most important implication of the study was disconnected between the actual experiences of rural EMS organizations and their expectations based on their training.

The results of this study indicated a need for organizations to evaluate their current level of preparedness with a view to improving it, in order to prepare their providers to deal with real disasters. Rural EMS providers need to receive training that is efficient and adequately prepares them to deal with the most common disaster scenarios, in particular in the areas of (1) communications (2) command and control and (3) interagency cooperation (Fubee et al., 2006).

The next year, 2007, saw the publication of a pilot study by Slepski to assess the background knowledge and skills of healthcare providers who had worked in the responses to Hurricanes Katrina and Rita. Two hundred healthcare providers were surveyed at two disaster conferences. The instrument included open-ended questions about the knowledge and skills needed during the disaster responses. Thirty-seven percent of the respondents were registered nurses, 24% were physicians and 10% EMTs. Most of respondents reported having 15 or more years of experience in the health care system and knew their role as health care providers. Twenty-two percent reported that

they did possess a specific skill that had become necessary for the disaster situation. The respondents offered the recommendation to expand the scope of practice by adding some specific courses such as advanced cardiac life support, triage, basic skills, first aid, and wound care. Another recommendation was to improve their "hands-on" clinical skills and group training by, for example, drills and exercises. A third recommendation proposed by the respondents was that health care providers have better personal preparedness. They should prepare themselves and their families mentally for any hardship, in order to be ready to take on any role during the response. Some weaknesses of the study were that the population sampled was very small, and no information was provided about the percentage of EMS providers, even though these are essential to disaster preparedness. Because health care providers have different backgrounds in education and experience, generalization of the results was limited.

A further study by Studnek and Fernandez (2008), supported the conclusion that EMS providers were lacking in preparedness for disasters. For the first time, this research documented the relationship between EMS providers based on community size (rural, urban), and the various types of organizations (e.g., fire department, volunteer EMS, industrial response, other). The researchers surveyed 872 National Registered EMS providers to enquire how many had received training in the management and treatment of patients from chemical, biological, radiological, nuclear or explosive (CBRNE) events as well as structural collapse during the last 24 months. The results revealed that 39.7% of providers had not received any training on CBRNEs, 48.4% of NR-EMS providers reported no training in the treatment and management of patients involved CBRNEs, 72.1% of NR-EMS providers reported not participating in multi-agency disaster drills

that included scenarios involving CBRNEs. Most importantly, most of NR-EMS

providers reported no training within the previous 24 months on disaster preparedness.

The study showed that NR-EMS providers who worked in urban areas had received more

training than those who worked in rural areas. Also, the NR-EMS providers who worked

in urban fire departments were 5.42 times more likely than EMS providers to have

received CBRNE training. Results suggested that NR-EMS providers need more training

on CBRNEs and other types of training related to disasters. One weakness of the study

was that the study did not document the quality of training provided to NR-EMS

providers and another was that no questions were asked about the respondents' previous

experience in disaster situations.

Still another study conducted in Germany by Fischer et al. (2008), showed good

disaster preparedness but a lack of knowledge about nuclear, biological, and chemical

(NCB) incidents among emergency physicians, assistants and paramedics. To assess the

current state of disaster preparedness of emergency physicians and paramedics for mass

casualty incidents (MCI) and (NCBs) among three levels of emergency service

professionals as mentioned above. One thousand seven hundred and seven professionals

were surveyed, and their levels of knowledge were compared. Most of the participants

considered themselves ready for disaster, as 79% of paramedics had already participated

in MCI drills and 88% of them knew their roles in case of a disaster. However, 46% of

those surveyed did not know the types of injuries that could be expected and how to treat

them after a terrorist attack or a NCB contamination, and how to treat them. Germany has

a good system for disaster preparedness because, first, the average age of physicians,

chief emergency physicians, and leaders of organizations is older than emergency

assistants and paramedics and they had better training and more experience. A second reason for Germany's good preparedness is that the German Association for Disaster Medicine has developed a curriculum to train medical students to be implemented at all German universities.

In 2009, Duong surveyed 152 South Australian nurses on their disaster education or training, disaster awareness, their confidence in their ability to respond to a disaster, and their previous experience. The most significant result was that 95% of respondents agreed that although disaster education for emergency nurses was important, limited education opportunities and little previous disaster response experience might be responsible for a lack of confidence and disaster awareness among emergency nurses in South Australia. Sixty-three percent of health professionals surveyed had never been involved in a disaster response in their professional life. The researchers concluded that a good standard of education as well as experience in disaster response are important for health care providers' confidence in their ability to be effective during a disaster.

While it is necessary for health care organizations to be prepared to respond to a disaster, it is important to recognize certain factors that affect the level of preparedness. Lim, Lim, and Vasu in 2013 reported the factors affecting the perception of health care providers with regard to individual and organizational preparedness for disaster and their willingness to attend disaster response training in Tan Tock Seng Hospital in Singapore. Three categories of health care providers were surveyed; doctors, nurses, and allied health workers, for a duration of two months in 2010. Respondents were asked to comment on five areas; leadership preparedness, prior experience, training, peer experience, and family support. The majority of respondents, 80.7% were willing to

attend a future disaster incident response training, although only 27.8% knew how to access these training opportunities. Seventy-four percent felt that being able to respond to disasters fell within their professional capabilities. Results indicated that most health care professionals were not confident in their abilities to respond in case of a disaster, even though they demonstrated a willingness to learn.

Fernandez et al. (2011) surveyed nationally certified EMT-basic and paramedics to assess the amount of training in terrorism and disaster preparedness as well as to know how many had participated in multi-agency disaster drills across the USA. Also included in this study was an evaluation of the correlation between providers' perception of preparedness and the amount of hours training they had received. Results showed that 91% of EMS providers reported receiving at least 1 hour of disaster preparedness training in the last 24 months. Also, 53% of respondents had not participated in multi-agency disaster drills with scenarios involving explosive materials or structure collapse in the previous 24 months. Only 38% of respondents felt ready for any disaster scenario. The study found a significant relationship between hours of training and self-perceptions of preparedness for all types of disasters, including the management of patients exposed to (BCN) events or structural collapse. Finally, the study revealed that the majority of respondents had received less than 1 hour of training in the treatment of patients involved in a structural collapse, and 40% of respondents had not participated in any multiagency disaster drills in the previous 24 months. The strength of this study was a deep exploration of the preparedness of EMS providers and their understanding of the need for training in disaster management. Because there exists no national standard for training in disaster preparedness, and because training in disaster preparedness is a requirement for

EMS providers in the US, the practice of how EMS provider organizations manage differs from state to state (NREMT, 2011; Slepski, 2007).

In Jordan, a 2011 study by Al-Khalailh, Bond, and Alasad investigated registered nurses' perceptions of their knowledge, skills, and preparedness for disaster. Using the Arabic version of the DPET, or Disaster Preparedness Evaluation Tool (Tichy et al., 2009), 474 RNs randomly selected from the Jordanian Ministry of Health hospital and two university hospitals were surveyed. Three areas were measured: the pre-disaster preparedness, the mitigation, and the recovery stage of disaster. The pre-disaster preparedness scale measured preparation for disaster and consisted of 25 statements covering knowledge, disaster skills and personal preparedness. The participants were asked to rate their degree of agreement with the statement. The mitigation scale measured response to disaster and consisted of 14 statements covering knowledge and patient management. The recovery scale, measuring post-disaster, consisted of 6 statements covering both knowledge and management.

According to Al-Khalailh, Bond, and Alasad (2011) sixty-five percent of the respondents considered their current disaster preparedness weak, 18% rated it as medium, 12% thought it good, and 5% felt their preparedness was very good. When respondents were asked about their sources of knowledge, 31% responded that they had obtained their knowledge from undergraduate programs, 8% from graduate nursing programs, 31% from facility drills, 22% from continuing education courses, while 11% had participated in a real disaster. Most of the respondents, 91%, wanted to learn more about their role in a disaster. The researchers concluded that the knowledge and skills for disaster preparedness in Jordanian RNs needed to improve, and recommended to include disaster

preparedness courses in the curricula of health care providers, as well as an increase in training and mock disaster drills.

Another study in north Jordan assessed health care providers who worked in primary health centers about their perceptions of their knowledge, skills, and preparedness for disaster management. Using the same survey instrument as the previously mentioned 2011 Al-Khaleilh study in Jordan, Al-Ali and Abu ibaid (2015) surveyed 207 physicians and nurses from 57 health centers. The results indicated that physicians were more knowledgeable and had more skills for disaster management than nurses. Also, 10.6% of the health care providers reported having experienced a real disaster. Data from the study showed that the majority of participants considered themselves only moderately prepared for disaster management with weak to moderate skills for disaster management. About a third of the participants reported acquiring their knowledge and training from their undergraduate education, 13% from their graduate studies, 24% from continuing education courses. Most of them, 37.7%, had acquired their knowledge and skills from facility drills. Researchers concluded that 80% of respondents needed more education about their role, scope and skills in disaster situations, 67.6% needed addition education about potential disaster risks in their communities, and 66.2% needed further education about resources in their communities such as referral agencies, emergency contacts, chains of command and community shelters.

It should be noted that no research was found to assess EMS providers during mass gatherings, specifically in Saudi Arabia during the Hajj.

The mass gathering of the Hajj

The Hajj is known as a major gathering where millions of people come to Western Saudi Arabia from a variety of countries around the world to perform rites simultaneously in a single area (Khan & Noji, 2016). It is regarded as one of the largest recurring religious mass gatherings in the world, with numbers of travelers increasing each year. The Hajj also has a history of disasters. Much research has been done on Hajj as a mass gathering and how to ensure safety and medical effectiveness for such a large event. A crucial problem at mass gatherings is the issue of event access points, which must be considered during the Hajj when enormous numbers of people congregate inside the city of Mecca. In the Hajj of 1990, a stampede caused the death of 1,426 people when crowds of pilgrims spontaneously attempted to leave Mecca through one exit. In 2006, Ahmed, Arabi, and Memish researched the 1990 incident and found that medical crews had been unable to reach the injured as access to the sites was not adequate, which suggested a future emphasis on access for EMS and medical services at events.

Soomaroo and Murray (2012) suggested that a key factor in improving on-site medical care is to involve the hospital beforehand with planning for the event. For example, they argued that without planning, hospitals may have no major incident plan, become overwhelmed, lack a hospital command center, and may need staff reinforcements. It is necessary to address in advance a lack of organization in medical teams, the presence of the media, and a lack of support for neighboring hospitals.

Gaffer, Achmadi, and Patellongi investigated deaths among Indonesian pilgrims during the Hajj, with the aim of formulating proposals to limit future deaths at the mass gathering. It was found, that seventy percent of Indonesians who died were 60 years old

or over (Gaffar, Achmadi, Syamsu & Patellongi, 2013), leading one to question whether

it is appropriate to assume that mass gatherings can cause deaths, or rather that because

there is a mass grouping of many people, death is inevitable, especially in elderly

participants. This study, while not very long extensive, is significant because it addressed

a particular demographic, analyzing that group's needs and unique health issues. The

Gaffar et al. study can be utilized for other mass gatherings, looking not only at age group

demographics, but also at particular countries and their travelers.

Another possible cause of health issues during Hajj is the presence of infectious

diseases, particularly the respiratory syndrome Coronavirus (MERS-CoV) which has

made an appearance during the last few Hajj events. Al-Tawfiq and Memish (2014)

explored the Hajj with regards to risk assessment, by reviewing the current medical

infrastructure and highlighting key features in the impact of viruses as well as the plans

for preparedness. In reviewing Al-Tawfiq and Memish's work, it was important to note

their ideas about appropriate mass gathering preparedness. It is argued that risk

assessment, robust surveillance and response (WHO, 2014) are most essential to public

health efforts for the Hajj. Information technology such as a local area network is used

during the Hajj to conduct surveillance, allowing for an analysis of data to help decision-

making(J. Al-Tawfiq & Z. Memish, 2014). With information technology, data can be

analyzed much faster and more efficiently than before. As technology, has continued to

improve medical preparedness for the Hajj, devices such as the Ambulance Information

System (AIS) and the Automatic Vehicle Location (AVL) have proved invaluable. The

AIS enables EMS providers to document all medical procedures performed for a patient

in the ambulance, and to send the data to the hospital by the Internet. The AIS also can

estimate the time until the ambulance will arrive to the hospitals. The AVL is a device that enables dispatch to determine the location of an ambulance and to guide it to the hospital by map with live traffic densities (Memish and Al-Rabeeah, 2014).

Saudi Arabia, like any country prone to disasters, has been keen to assess health care providers. Al-Thobaity, Plummber, Innes, and Copnell (2015) surveyed 396 nurses about their knowledge and skills, as well as the sources of their knowledge, related to disaster management in Saudi Arabia. The participants were nurses in emergency departments, in critical care and in surgical units of government and military hospitals in three cities in Saudi Arabia: Taif, Jeddah and Tabuk. The sample inclusion criteria were to hold at least a 3-years diploma in nursing, to be at least 18 years old, have a minimum of one year's experience, and be able to read and write English. Although the nurses in military hospitals appeared more knowledgeable than those who worked in government hospitals, the study revealed that nurses in Saudi Arabia have a moderate knowledge of disaster preparedness as well as the desire to learn more about it. The majority of respondents (71%) had acquired their knowledge from disaster drills, 47% from continuing education, 29% from graduate courses, 27% from undergraduate courses, and 26% from being involved in actual disasters. The researchers concluded that nurses in Saudi Arabia need more training about their role in a response to a disaster and were eager for more education in all types of disaster management, both of which can be acquired during disaster drills.

One of the first studies to explore Saudi EMS students' perception regarding their preparedness for disaster management was undertaken by Alrazeeni in 2015 with students of 3rd, 4th and 5th years in the Prince Sultan Bin Abdulaziz College for

Emergency Medical Services (PSCEMS). This descriptive cross-sectional survey

involved a convenience sample of 150 students. The instrument used was the Arabic

version of the one used with the nurses (Al-Khalailh et al., 2011). The study provided

answers to three research questions; "1) - What knowledge do Saudi EMS students have

about disaster management? 2) - What skills do Saudi EMS students have for disaster

management? 3) - How do Saudi EMS students perceive their preparedness for disaster

management?" (p.111).

The main finding of the study was that Saudi EMS students have inadequate

knowledge and skills for disaster preparedness. The mean of Saudi EMS students'

knowledge ranged from 2.50 to 3.40, and the mean of their skills ranged from 2.40 to

3.87. As expected, students in their 5th year displayed higher knowledge and skills than

those in 3rd and 4th years. The participants in the study believed that a combination of

disaster courses in EMS curricula with practical training would help them to prepare for

disasters. The researcher concluded that the Saudi EMS students in PSCEMS needed

more training, knowledge and skills and that the undergraduate curriculum should be

modified to provide them.

A further cross-sectional study to assess the knowledge of disaster preparedness

of health care workers was undertaken by Alzahrani and Kyratsis (2015) with 106

emergency department nurses in government hospitals during the Hajj season in Mecca.

Data was collected about five areas: their knowledge and awareness of disasters, their

understanding of the role of emergency nurses during mass gatherings, their education

and training about disasters, their level of awareness of the department's major incident

plan, and their previous experience in disaster response.   Of the nurses surveyed, only

34% correctly reported that most victims from a disaster are transported to the hospital by Saudi Red Crescent, only 32% correctly knew that disease and epidemics often result from the disruption and poor health caused by a major disaster, and only 29% of the respondents knew that poor people are more affected by disasters than the rich. Furthermore, 20% of the emergency department nurses knew that, after a disaster at a mass gathering, un-buried dead bodies would cause epidemics and only 16% were aware that all victims of CBR (chemical, biological, radiological) incidents would need to have dangerous substances removed from their bodies prior to arrival at hospital. Researchers concluded that knowledge and awareness among emergency nurses about Hajj disasters was insufficient. Concerning the role of emergency nurses during mass gatherings; 38% of respondents reported their role during mass gathering was providing general assessment and caring for patients, 26% of respondents indicated that their role was performing triage, 26% doing CPR, 14% saw their roles as providing leadership, while 1% felt their role was to provide psychological care. All the respondents reported that they had received limited training about disaster preparedness for mass gathering. Some 34% of respondents had attended training in the previous 6-12 months, 23% had been trained in the previous 12-24 months, and 43% had been trained more than 2 years previous to the survey. The emergency nurses had acquired their knowledge about disasters from various sources; 43% from hospital education sessions, 27% from government-sponsored emergency management courses, and 11% from mini-courses offered by private schools.

Alzahrani and Kyratsis (2015) reported that, shockingly, 53% of the emergency nurses in Mecca had not read the major incident plan, and some of them were not aware

of its existence. However, 99% of participants had had prior experience of some type of

disaster response. Among them, 47% had experienced disasters caused by fire, 24% had

participated in the transport of patients from disaster situations, 22% had experienced

disaster caused by a building collapse, 16% had been involved in a disaster caused by

food, 12% had responded to a stampede, 12.3% to an epidemic outbreak, 9% to a

biological or chemical disaster, and 7% had experience of response to other kinds of

disasters. Nevertheless, the researchers concluded that emergency nurses in Mecca public

hospitals displayed a lack of knowledge of disasters but, due to their experiences, had a

high level of awareness of their roles.

Summary

There is still much work to do in assessing and preparing for safety at mass

gatherings. At present, no international standards are clearly defined, and guidelines for

disaster preparedness training do not exist (Rudman, Clarke & Metzl, 2003; Everly,

2002; Farmer & Carlton, 2006; Rubin, 2006; Veenema, 2003). According to Waeckerle

(2004), there is no single authoritative source or approved body of knowledge for training

that can be followed internationally, so it is unclear which knowledge, skills, or

professional competencies may be essential in case of a disaster (Slepski, 2007). As a

result, knowledge on disaster management strategies appears fragmented, illustrating the

gap between information coordination and sharing. Most knowledge and experiences of

disaster practitioners remain in "individual or institutional domains" (Seneviratne et al.,

2010, no page). Furthermore, it appears from extant research that should a disaster occur,

most workers across the world would be inadequately prepared.

The mass gathering of the Hajj shares some of characteristics of other recurring mass gatherings across the world, but it is unique in its diversity, the sheer numbers of people involved, its geographical limitations, its climatic conditions, and to some extent, in its demographic composition. Due to the fact that visitors come to Saudi Arabia from all over the globe, there is increased risk of disease. As their religion demands they perform rites in circumscribed locations within certain time frames, pilgrims risk stampedes, crowd surges and other accidents. The harsh climate in Western Saudi Arabia, where even in winter temperatures can rise to dangerous levels, and the presence at the Hajj of large numbers of elderly pilgrims, both contribute to the potential for various kinds of disasters. The ever-increasing numbers of attendees as well as its history of disasters have made critical the need for disaster preparedness, in particular for health care workers.

There is an urgency for the standardization of the education and training of healthcare workers for disaster preparedness (GAO, 2003). With a view to better prepare EMS providers for future Hajj gatherings, this study will assess their knowledge about disaster preparedness during the Hajj 2016.

CHAPTER III

METHODOLOGY

This chapter provides a detailed discussion on the methodology utilized in this research and includes the consent procedures, research design, data collection procedures, sampling techniques, definitions of measures and variables, issues of validity and reliability, and the plan for data analysis.

Prior to collection of data, two main approvals were obtained: (1) the University of Louisville's Institution Review Board (IRB), (2) and that of the Saudi Red Crescent Authority (SRCA). After approval, the researcher traveled to Mecca in Saudi Arabia to collect data.

Consent procedures

Participation in the research was completely voluntary as described in the Informed Consent document. The participants were free to drop out the study at any point if they chose to do so. The researcher guaranteed that participants' responses on the questionnaire were anonymous and would be used for scientific purposes only. Consent was obtained from EMS-providers who had worked for the Saudi Red Crescent Authority during the Hajj season of 2016.

Research design

The main purposes of this study were to 1) assess the knowledge regarding Disaster Preparedness for Mass Gatherings (DPMG) among SRC- EMS providers during the Hajj of 2016; 2) explore the relationship between the demographic variables as

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independent variables (age, level of education, working experience, previous disaster education/training, number of trainings and number of hours of training), the knowledge about DPMG among SRC- EMS providers during the Hajj of 2016 as dependent variables, general knowledge and Hajj knowledge; and 3) explore the sources of knowledge about DPMG that the SRC- EMS providers possess.

For this study, a cross-sectional survey design was utilized. Babbie (2015), defined cross-sectional as involving "observations of a sample, or cross section, of a population or phenomenon made at one point in time" (p. 106). The quantitative research method is appropriate for the several reasons, as follow. First, quantitative methods in general afford a researcher a reliable objectivity, second, a cross-sectional survey is appropriate for analysis of data obtained from a large sample, third, it allows the researcher to generalize results to larger populations (Trochim, Donnelly, and Arora, 2015).

An online survey provided inexpensive and efficient access to a large population sample. All of EMS-providers from SRCA who worked during the Hajj of 2016 were invited to participate voluntarily in the survey by sending the link of the survey to their cell-phone as a text message. Finally, the surveys were scored and analyzed for descriptive and significant statistics.

Data Collection Procedures

After receiving IRB approval and according to standard legal and ethical guidelines, the researcher conducted an online Qualtrics survey to collect data. Participants were informed about the study, and could answer survey questions after providing informed consent (Appendix A). For widely-distributed populations such the

SRC-EMS providers, who are recruited from across Saudi Arabia and who return to their home bases after Hajj season, prior research has shown benefits attached to online survey as compared to paper-based surveys, such as low cost and flexibility (Cobanoglu, Warde, and Moreco, 2001; Dilman et al., 2009; Kaplowitz, Hadlock, and Levine, 2004; Wright, 2005). Social network technology and electronic communication were utilized to invite the SRC-EMS providers to be research participants. Prospective participants received the survey questions by e-mail or by receiving a broadcast link. To encourage them to respond and participate, the link led to a Qualtrics survey in which data can be entered anonymously every two weeks. Participants received no financial reward or compensation for involvement in this study. The survey was distributed to the prospective sample from March until May 2017.

Sample population

The target population for this study was the SRC-EMS providers who worked in the Hajj of 2016. Based on IFRC, there were 1,550 SRC EMS-providers plus 100 physicians who worked in the Hajj of 2016 (IFRC, 2016). EMS-providers engaged by any other employers during Hajj season, such as by the Ministry of Health hospitals, the National Guard hospital, and the Ministry of Defense military hospital, were not included in this study.

To be a part of this study, the participants had to meet the following criteria: 1) be 21 years old or older; 2) be currently licensed by the Saudi Health Commission as a certified EMS provider or as a Paramedic, and 3) be a full-time employee of SRCA.

The participants were a convenience sample of the 1,650 SRC-EMS providers, selected on availability rather than probability (Wrench, Thomas-Maddox, Richmond, &

McCroskey, 2008). Efficiency in time and cost informed the choice of this method. Nevertheless, it should be noted that although availability selection does not limit the importance of the study, it does limit its generalizability. Hence, even if the results may not represent the whole population, they will add to the literature on subject, even if only in an exploratory view (Wrench, Thomas-Maddox, Richmond, & McCroskey, 2008). The purpose of exploring the knowledge of disaster preparedness of mass gatherings among this same population also supports the use of a convenience sample.

As indicated by Light et al. (2009), the more people included in your study, the better your chances of finding effects that exist (p.186). An attempt was made to recruit all 1,650 providers who worked in the Hajj season 2016, but the final sample was a convenience sample. To potentially increase the response rate, the researcher sent the link of the survey to the participants by phone text message.

Definition of research variables and instrumentation development

Research Variables

There were seven independent variables in this research:

1. Age of SRC-EMS provider

2. Level of education, not including EMS training

3. Level of SRC-EMS provider in the Saudi system.

4. Sector of EMS training is received

   There are two main sectors of health education in Saudi Arabia, governmental and private. The government sector includes; Ministry of Health, Ministry of Defense and Aviation, Ministry of Education and the National Guard, however, the private

sector includes all the private colleges that do receive not support from the government (Al-Hashem, 2016).

5. Years of experience in EMS field

6. Training (Previous disaster education/training, number of trainings and number of hours of trainings).

There were two dependent variables in this research:

1. The measure of general knowledge of disaster preparedness was comprised of 12 items. This DV focused about general disaster situations such as fire, flooded, and multi-car (more than two) accidents.

2. The measure of Hajj knowledge was comprised of 6 items. This DV focused on all types of disaster throughout the Hajj season such as stampedes, fires, terror attacks.

Instrumentation Development

The instrument used in this research study was compiled and modified by the researcher, based on a comprehensive review of the literature on the topic and on the researcher's own experience in working in the field (Fung, Loke &Lai, 2008; Tichy, Bond, Beckstrand, Heise, 2009; Lim, Lim & Vasu, 2013; (Al Khalaileh, Bond, Beckstrand, & Al-Talafha, 2010). Before distribution, the survey was translated to Arabic by the researcher and reviewed by Arabic-speaking professionals in the field. The survey questionnaire (See Appendix B for English version and Appendix C for Arabic version) completed by participants in this study was comprised of five parts. The first part of the survey was a statement of confidentiality. Participation was entirely voluntary and SRCA-EMS providers had the option to choose to continue or to stop the survey. The

informed consent (See Appendix D for English version and Appendix E for Arabic version) was given to each participant before administrating the questionnaire.

The second part of survey included four questions regarding the participants' demographic characteristics: (1) the age of provider (less than 25 years- 50 years and above), (2) Marital status (single, married, divorced, widowed), (3) nationality (Saudi, non-Saudi), (4) highest level of education completed, not including EMS training (high school, diploma + 2 years, diploma + 3 years, Bachelor's degree, Master's, Doctor (Ph.D. or MD).

The third part of survey included ten questions regarding the participant's disaster preparedness for mass gathering experience:(1) the level of EMS for participants (first responder, EMS-Technician, EMS-Paramedic, Physician), (2) current training received (Government sector, Private sector, Military sector, outside of the kingdom of Saudi Arabia), (3) years of working experience (under one year- 20 years and above), (4) Number of the Hajj seasons worked (one season, two seasons, three seasons, four seasons or more), (5) Average number of patients treated daily during the Hajj of 2016 (0-10, 11-20, 21-30, 31-40, over 40), (6) Number of training, drill, and workshops ever attended (never, one, two, three, more than three), (7) Number of training, drill, and workshops attended per year (never, one time per year, two times per year, three times per year, four times per year, five times or more per year), (8) Time passed since the last training, drill and workshop (less than six months ago, six months ago to a year ago, more than one year ago, Non Available), (9) Duration of the last training drill, and workshop (less than five hours, from five hours but less than 10 hours, from 10 hours but less than 20 hours- 20 hours or more- N/A), (10) Asked participants to which of the following disasters his

workplace was ready to respond. Participants could select more than one answer (fire disasters, transport disasters, building collapse disasters, flood disasters, epidemic disasters, stampede disasters, none of the above).

The fourth part of survey was in two parts. Section one included 12 items regarding the general knowledge of participant's disaster preparedness for mass gatherings and two questions as follow: Please read each of the following questions and describe how often you implemented each item during the average year: (1) participation in disaster drills or exercises at workplace, (2) participation in continuing education classes dealing with DPMG, (3) participation in seminars dealing with DPMG, (4) participation in conferences dealing with DPMG or read journal articles related to DPMG. Responses were scored on a Likert scale (never, one, two times, four times or more), (5) I am interested in participating in DPMG offered at workplace or other institutes (e.g., university or community), (7) I am interested in educational classes specifically on DPMG with Likert-scale responses (really not interested, really interested), (8) Finding relevant information about DPMG related to the Hajj season needs is an obstacle to the level of preparedness, (9) I know where to find relevant research or information related DPMG in the Hajj season to fill in gaps in the knowledge, (10) I find that literature on DPMG and management is easy accessible, (11) I find that literature on DPMG is understandable, (12) I am able to refer cases to the correct medical department. Likert-scale responses were (strongly disagree- strongly agree). The final two questions referred to 1) participation in emergency plan drafting or emergency planning for disaster situation for the Hajj season and 2) I know whom to contact (chain

of command) in a disaster situation in the Hajj season. The possible answers were (yes or no).

Section two included 6 items regarding participant's knowledge of disaster preparedness for the mass gathering of the Hajj and one question, to wit: Please carefully read each of the following items and decide to what extent you agree or disagree by checking the appropriate choice: (1) My knowledge about DPMG for the Hajj season 2016 was sufficient, (2) In my experience during the Hajj of 2016, there was sufficient equipment to respond to accidents, (3) In my experience during the Hajj of 2016, the police presence was sufficient, (4) In my experience during the Hajj of 2016, the presence of the fire department was sufficient, (5) I am aware of the potential risks in the Hajj season (e.g. stampedes, floods, terrors, fires, etc.), (6) I had sufficient knowledge, skills, and authority as an EMS provider to act in disaster situations in the Hajj season of 2016. Possible Likert-scale were responses were (strongly disagree to strongly agree). The question was as follows: Which have you ever experienced during the Hajj season? Participants could select more than one answer from the following: (fire disasters, transport disasters, building collapse disasters, flood disasters, epidemic disasters, stampede disasters, none of the above)

Part five questioned the participants on the sources of their knowledge. It consisted of three questions: Where the participant obtained his knowledge of disaster preparedness for mass gatherings, which materials and activities related to disaster preparedness should be developed to enable EMS providers to prepare for future disasters in mass gatherings, and what kind of educational courses should be taken to prepare for

disasters in mass gatherings. The answers to these items had scales 1-5 (1= least useful to 5= most useful).

A Likert scales, which are considered common reliable than others, are often used when the goal is to evaluate respondents' attitudes toward a specific issues (Leedy & O'rmrod, 2005). It is also more efficient in terms of time and has high reliability when compared with other scales (Crano & Brewer, 2002). Therefore, a Likert scale was used in this study with five points that allowed SRC-EMS providers to respond based on level of agreement (Strongly disagree = 1, Disagree = 2, Neither agree or disagree = 3, and Strongly Agree = 5).

Validity and Reliability

Five experts in the fields of EMS who have worked with SRCA in Saudi Arabia in the areas of disaster preparedness, research, mass gatherings, and measures from University of Louisville reviewed the questionnaire's validity. A cover letter was attached to the questionnaire to explain the purpose of the study, the items on the questionnaire (including a reference list of reviewed literature) and a summary of the methodological procedure of the research. Also, the questionnaire's items were reviewed to ensure a comprehensive evaluation of the levels of knowledge disaster preparedness for mass gatherings among SRC-EMS providers in Hajj season 2016. Furthermore, to increase the validity of the study, a pilot testing of the questionnaire was sent to ten SRC-EMS providers not involved in the final sample to discern whether the questionnaire appropriately measured participant perspectives. The pilot group was asked about the clarity of the questions and about the order of the items. Finally, the pilot test participants

were asked to suggest elements to be included in the survey based on their experience, and education.

To test the appropriateness of the variables, the questionnaire was submitted to a group of experts for feedback (e.g. EMS providers in SRCA, disaster preparedness experts, and mass gathering experts). To obtain reliability indicators, a Cronbach Alpha was computed for each of the four sections/items that target level of knowledge of disaster preparedness for mass gatherings among EMS providers in the Hajj season 2016. Higher scores correspond to more reliable scales. According to Hattie (1985), 0.7 is an accepted reliability coefficient, but lower thresholds are sometimes used in the literature.

Data Analysis

The data was analyzed using the Statistical Package for the Social Sciences (SPSS-21.0 IBM). Descriptive statistics (e.g., frequencies, mean, standard deviations, ranges, and percentages) were used to analyze data (age, level of education, level of EMS of provider, years of experience etc.). Bar charts, histograms and pie charts were created for all the categorical variables.

A test appropriate for examining the probable strength and direction of the bivariate relationship posed in research questions is the one-way Analysis of Variance (or ANOVA) with the Bonferroni correction for multiple comparison. This common statistical procedure informed which enabled the analysis of the mean values of dependent variables for this study. The ANOVA has been found to be statistically acceptable as long as the ordinal variables have five or more categories, in order that they behave as having interval scales (Boyle, 1970). More specifically, this analysis assisted the researcher to answer questions 1, 2, 3, 4, 5, and 6

1) Is there a significant difference in the knowledge of disaster preparedness for mass gatherings (DPMG) between different categories of EMS-providers based on their age?

2) 2. Is there a significant difference in the knowledge of DPMG between different categories of SRCA EMS-providers based on level of education?

3) Is there a significant difference in the knowledge of DPMG between different categories of EMS-providers based on their level of SRCA EMS?

4) Is there a significant difference in the knowledge of DPMG between different categories of SRCA EMS-providers based on the current SRCA EMS training received?

5) Is there a significant difference in the knowledge of DPMG between different categories of SRCA EMS-providers based on years of experience?

6) Is there a significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on previous disaster education/training, number of trainings and number of hours of training?

The second technique, Pearson's product correlation coefficient (r) was used to assess the relationship between two variables. When squared (r), the coefficient indicated the presence or absence of a relationship and explained of the proportion of the variance in the dependent variable by the independent variables. The value of Pearson's (r) ranges from -1.0 to +1.0. The closer the value is to zero, the less likely the two variables interrelate. Negative correlations mean that as one variable goes up the other will go down. Positive correlations mean that as one variable moves, the other will move in the same direction. A Pearson's (r) of zero means no association exists between the variables;

however, a zero correlation does not always indicate the absence of a causal relationship (Cozby, 2012). This technique was used to answer research question seven:

7) Was there a relationship between the sources of knowledge and knowledge acquired regarding DPMG among different SRCA-EMS-providers in the Hajj of 2016?

In addition, one of the final goals of this study was to develop a model to predict important factors that affected the knowledge of disaster preparedness for mass gatherings for SRC-EMS providers. When the intent is to examine the impact of several independent variables on a single dependent variable, multiple regression is the appropriate analysis technique. Stepwise regression analysis allowed the researcher to identify the predictor variables of magnitude of contribution to the variance in general knowledge and Hajj knowledge.

Assumption

According to Keppel (1991) the researchers were checked on the assumptions of an ANOVA before running the analysis. Thus, the assumptions of independence, normal distribution of scores, and homogeneity of variance were met for each variable (Keppel, 1991). That means all observations were independent of each another. The function of ANOVA test was determined to see if the variables were independent of one another and to make sure the assumption that the null hypotheses are true. The results of statistic revealed that the assumption of independence was not violated; therefore, ANOVA was the most appropriate test for analyzing the data (Lix, Keselman, & Keselman, 1996).

Regression assumptions were also evaluated and met. These included (1) the continuous dependent variables, (2) more than two independent variables, (3) the

independence of observations or residuals, (4) the linear relationship between the dependent variable and each of the independent variables, (5) homoscedasticity in the data, (6) the absence of multicollinearity, (7) no significant outliers, and (8) a normal distribution of scores.

Summary

This chapter included the clarification of methodology used to address the research questions, purpose of the quantitative research, and to identify the relationship between the independent and dependent variables. A cross-section design allowed for an assessment of the relationship between variables, general knowledge of disaster preparedness, knowledge of the Hajj 2016. Furthermore, the instrument used to collect the data was explained. This chapter also outlined and discussed the research design and consent procedures, sample population, definition of variables in this study, instrument development, validity and reliability, data analysis and assumption. Chapter 4 provide a synopsis of the statistical results from the study.

CHAPTER IV

RESULTS

This study had three main goals: 1) to assess the knowledge regarding disaster preparedness for mass gatherings (DPMG) among SRCA-EMS providers during the Hajj of 2016; 2) to explore the relationship between the demographic variables (age, level of education, working experience, previous disaster education/training, number of trainings and number of hours of training), the knowledge about DPMG among SRCA-EMS providers during the Hajj 2016; and 3) to explore the sources of knowledge about disaster preparedness for mass gatherings that SRCA-EMS providers posses. To achieve these goals, the researcher prepared an online questionnaire that was sent to the participants for the study.

Research Questions

The study specifically focused on the following research questions and hypotheses:

1. Is there a significant difference in the knowledge of disaster preparedness for mass gatherings (DPMG) between different categories of SRCA-EMS providers based on their age?

2. Is there a significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on their level of education?

3. Is there a significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on their level of EMS?

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4. Is there a significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on the sector of EMS training received?

5. Is there a significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on years of experience?

6. Is there a significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on previous disaster education/training, the number of trainings and the number of hours of training?

7. Is there a relationship between the source of knowledge and knowledge acquired regarding DPMG among different SRCA-EMS providers in the Hajj of 2016?

Hypotheses

The following hypotheses presented were addressed in relation to the research questions proposed above:

H01: There is no significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on their age.

Ha1: There is a significant difference in the knowledge of DPMG between different categories of SRCEMS providers based on their age.

H02: There is no significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on their level of education.

Ha2: There is a significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on level of education.

H03: There is no significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on their level of EMS.

Ha3: There is a significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on their level of EMS.

H04: There is no significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on the sector of EMS training received.

Ha4: There is a significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on the sector of EMS training received.

H05: There is no significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on years of experience.

Ha5: There is a significant difference in the knowledge of DPMG between different categories of EMS providers based on years of experience.

H06: There is no significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on previous disaster education/training, number of trainings and number of hours of training.

Ha6: There is a significant difference in the knowledge of DPMG between different categories of SRCA-EMS providers based on previous disaster education/training, number of trainings and number of hours of training.

H07: There is no relationship between the source of knowledge and knowledge acquired regarding DPMG among different SRCA-EMS providers in the Hajj of 2016.

Ha7: There is a relationship between the source of knowledge and knowledge acquired regarding DPMG among different SRCA-EMS providers in the Hajj of 2016.

This chapter includes the results of the study, beginning with reliability analysis, general sample descriptives, knowledge in general directions, knowledge regarding the

Hajj 2016, and source of knowledge. The results are presented according to the research questions and corresponding hypothesis.

Response Rate

Based on the survey analysis provided by Qualitrics, the average time for completing the survey was approximately twelve minutes for each respondent. The survey was distributed to 1,650 SRCA-EMS providers who worked for the SRCA in the Hajj season of 2016. A total of 700 surveys were returned, resulting in a 41% response rate (with follow-up). While this response rate may seem low, it must be noted that the response rate for this research study is not necessarily true or accurate, for reasons described below. In recent years, lower response rates have been observed specifically with internet/web based surveys (Cook, Heath, & Thompson, 2000; Couper, 2000; Fan & Yan, 2010; Sax, Gilmartin, & Bryant, 2003).

Reliability Analysis

Reliability was established for the questionnaire using internal consistency with Cronbach's alpha. The calculated Cronbach's Alpha for the questionnaire and its dimensions are shown in table 4.1.

Table 4.1.

 Cronbach's alpha for dimensions of the questionnaire

No	Dimension	No. of Statements	Cronbach's Alpha
1	PART A: General knowledge for disaster preparedness for mass gatherings	12	0.845
2	PART B: Knowledge of Hajj 2016	6	0.871

3	PART C: Sources of knowledge	20	0.832
Overall Reliability		38	0.869

According to Bryman and Cramer (2004), the dimension with alpha coefficients values of 0.7 and above are considered a reliable dimension. The output of alpha coefficients for all dimensions is high and above 0.7, ranging from 0.832 to 0.871. So, the dimensions are internally reliable.

General Sample Descriptive

The sample size of the survey consisted of 700 (n=700) respondents. The demographic information of the sample consisted of two main sections which included: Age, Status, Nationality and Level of Education in section 1, as well as EMS level, Experience and Training details in section 2. This demographics information is shown in the next table. Other sections, general knowledge of disaster preparedness of mass gathering, knowledge of the Hajj 2016, and source of knowledge.

Section 1: Demographics Information

This section included nationality, status, level of education and age of SRC-EMS providers in this study.

Table 4.2.

Sample of Demographics Information

Variables		Frequency (n)	Percentage (%)
Nationality	Saudi	690	98.6
	Non-Saudi	10	1.4
Status	Single	118	16.9
	Married	571	81.6
	Divorced	8	1.1
	Widowed	3	0.4

Level of Education	High school	52	7.4
	Diploma + 2 years	198	28.3
	Diploma +3yrs	253	36.1
	BS	169	24.1
	MS	23	3.3
	Other	5	0.7
Age	Less than 25 years	7	1
	25-29 years	215	30.7
	30-34 years	232	33.1
	35-39 years	135	19.3
	40-44 years	59	8.4
	45-49 years	28	4
	50 years and above	24	3.4

Table 4.2. shows that the highest percent were Saudi nationals (98.6%) of the total sample, 81.6% were married as the highest percent in the total sample, 63.8% were between 25 to 34 years old, and 64.4% possessed a high school diploma plus either two years or three as the highest percent in the total sample.

Section 2: SRCEMS Provider's Disaster Preparedness for Mass Gathering Experience and Training

This part presents more details of experience and training of the sample.

Table 4.3.

 SRC-EMS Provider's DPMG Experience and Training

Variables		Frequency (n)	Percentage (%)
5-What is your EMS level?	First responder	62	8.9
	EMS-TECH	459	65.6
	EMS-Paramedic	158	22.6
	Physician	21	3
6- Which of the following best describe the training you received current EMS training?	Government sector	235	33.6
	Private sector	358	51.1
	Military sector	63	9
	Outside of Saudi Arabia	44	6.3

8- How many times have you worked at Hajj?	One season	127	18.1
	Two seasons	162	23.1
	Three seasons	140	20
	Four seasons or more	271	38.7
9- How many patients did you treat on the average day during the Hajj of 2016?	0- 10	190	27.1
	11- 20	219	31.3
	21- 30	124	17.7
	31 -40	55	7.9
	Over 40	112	16
7- How long have you worked as EMS providers for the Saudi Red Crescent Authority?	Under one year	9	1.3
	1-5 years	196	28
	6-9 years	244	34.9
	10-14 years	132	18.9
	15-19 years	64	9.1
	20 years or more	55	7.9

Table 4.3. shows that the highest percent in the total sample (i.e., 65.6%) were EMS-Technicians, 51.1% of the total sample received their current EMS training in the private sector, 38.7% of the total sample had worked four seasons of Hajj or more, 31.3% treated an average of 11-20 patients per day during the Hajj of 2016, and 34.9% had worked between 5-9 years as EMS providers for the Saudi Red Crescent Authority.

Table 4.4. provides more details of trainings received by the providers. It includes how many trainings/workshops/drills about disaster preparedness were attended, and the best way to describe their experience at a trainings/workshops/drills about disaster preparedness.

Table 4.4.

Continue Experience and Training Details

Variables			Frequency (n)	Percentage (%)
10- How many trainings/workshops/drills about disaster preparedness have you EVER attended?	**Training**	Never	187	26.7
		One	143	20.4
		Two	122	17.4
		Three	87	12.4
		More than three	161	23
	Workshops	Never	285	40.7
		One	154	22
		Two	132	18.9
		Three	55	7.9
		More than three	74	10.6
	Drills	Never	211	30.1
		One	179	25.6
		Two	123	17.6
		Three	62	8.9
		More than three	125	17.9
11- Which of the following best describes the frequency of your attendance at a trainings/workshops/drills about disaster preparedness?	**Training**	Never	282	40.3
		One time per year	245	35
		Two times per year	91	13
		Three times per year	54	7.7
		Four times per year	13	1.9
		Five times or more per year	15	2.1
	Workshops	Never	375	53.6
		One time per year	203	29
		Two times per year	82	11.7

		Three times per year	19	2.7
		Four times per year	11	1.6
		Five times or more per year	10	1.4
	Drills	Never	319	45.6
		One time per year	245	35
		Two times per year	79	11.3
		Three times per year	34	4.9
		Four times per year	9	1.3
		Five times or more per year	14	2

Table 4.4 shows that the highest percent in the total sample for all kinds of trainings/ workshops/ drills were "Never" followed by one time per year. Both choices represent more than 50% of the responses of the total sample.

Table 4.5 reveals the last time that respondents attended a trainings/ workshops/ drills about disaster preparedness, and the best way to describe their experience.

Table 4.5.

Continue Details of training

Variables			Frequency (n)	Percentage (%)
12- When was the last time you attended a training/ workshop/ drill about disaster preparedness?	**Training**	Less than six months ago	146	20.9
		Six months ago- A year ago	165	23.6
		More than one year ago	177	25.3
		N/A	212	30.3

	Workshops	Less than six months ago	91	13
		Six months ago- A year ago	170	24.3
		More than one year ago	149	21.3
		N/A	290	41.4
	Drills	Less than six months ago	102	14.6
		Six months ago- A year ago	183	26.1
		More than one year ago	173	24.7
		N/A	242	34.6
13- Which of the following best describes your experience at a trainings/workshops/drills about disaster preparedness?	**Training**	Less than 5 hours	250	35.7
		From 5 hours but less than 10 hours	151	21.6
		From 10 hours but less than 20 hours	43	6.1
		20 hours or more	46	6.6
		N/A	210	30
	Workshops	Less than 5 hours	152	21.7
		From 5 hours but less than 10 hours	181	25.9
		From 10 hours but less than 20 hours	54	7.7
		20 hours or more	26	3.7
		N/A	287	41
	Drills	Less than 5 hours	175	25
		From 5 hours but less than 10 hours	140	20

		From 10 hours but less than 20 hours	116	16.6
		20 hours or more	28	4
		N/A	241	34.4

Table 4.5 shows that the highest percent in the total sample for all kinds of trainings/ workshops/ drills were (N/A) by more than 30% of the total sample, while more than 40% of the responses of the total sample responded (Less than six months ago) and (Six months ago) in all kinds of trainings/ workshops/ drills.

Table 4.6.

Experience during Workplace Ready to Respond

Q14	Types	N	Percentage	Rank
To which of the following disasters was your work place ready to respond?	Transport disaster	326	46.6%	1
	Stampede disaster	255	36.6%	2
	Fire disaster	250	35.7%	3
	None of above disasters	236	33.7%	4
	Building collapse disaster	178	25.4%	5
	Epidemic disaster	63	9%	6
	Flood disaster	50	7.1%	7
	Bioterrorism/Biological and Chemical disasters	36	5.1%	8

Table 4.6 shows that 46.6% of the sample reported that their workplace was ready to respond to a Transport disaster, followed 36.6% who were ready to respond to a stampede disaster, followed by 35.7% who were ready to respond to a Fire disaster,

whereas only 25.4% of the total sample were ready to respond to a building collapse disaster, 9% felt ready to respond to an epidemic disaster, 7.1% were ready to respond to a Flood disaster, and finally only 5.1% of the total sample were ready to respond to a Bioterrorism/Biological and Chemical disaster. Furthermore, it should be noted that 33.7% of the total sample considered that their workplace was ready to respond to none of the above-mentioned disasters.

Section 3: General Knowledge of Disaster Preparedness for Mass Gathering

Table 4.7 describes how often respondents implemented each item during the average year (Never- Once- Two times- Three times – Four times or more

Table 4.7.

General Knowledge of Disasters Preparedness for Mass Gathering

Statements of Q15	Mean*	Std. Deviation	Direction
I read journal articles related to disaster preparedness for mass gatherings.	2.31	1.326	One
I participated in disaster drills or exercises at my workplace (station, clinical, hospital, etc.) on a regular basis.	2.04	1.198	One
I participate in continuing education classes dealing with disaster preparedness for mass gatherings.	1.85	1.104	One
I participate in seminars dealing with disaster preparedness for mass gatherings.	1.83	1.104	One
I participate in conferences dealing with disaster preparedness for mass gatherings.	1.72	1.036	Never

*Average of respondents' answers for every statement.

Table 4.7 shows that the highest mean was for the statement: *I read journal articles related to disaster preparedness for mass gatherings* with (M=2.31,SD=1.326) which represents (One) as a general direction; since the mean (2.31) lies on the interval of

[1.81- 2.60] in the Likert 5-point scale, followed by the statement: *I participate in disaster drills or exercises at my workplace (station, clinical, hospital, etc.) on a regular basis* with (M=2.04,SD=1.198) which represents (One) as a general direction, followed by the statement: *I participate in continuing education classes dealing with disaster preparedness for mass gatherings* with (M=1.85,SD=1.094) which represents (One) as a general direction, followed by the statement: *I participate in seminars dealing with disaster preparedness for mass gathering* with (M=1.83,SD=1.104) which represents (One) as a general direction. While the last rank was for the statement: *I participate in conferences dealing with disaster preparedness for mass gathering* with (M=1.72, SD=1.036) which represents (Never) as a general direction; since the mean (1.72) lies on the interval of [1 – 1.80] in the Likert 5-point scale.

In the next part, we also describe the knowledge in general directions of disasters in terms of (*Really not interested- Not interested – Neutral- Interested – Really interested*) and (*Strongly Disagree- Disagree – Neither Agree nor Disagree – Agree – Strongly Agree*). Results are shown in Table 4.8.

Table 4.8.

Continue of General Knowledge of Disasters Preparedness for Mass Gathering

Statements of Q15	Mean*	Std. Deviation	Direction
I am interested in participating in disaster preparedness for mass gathering training offered at my workplace or other institutes (e.g. university or community).	4.11	1.152	Interested
I would be interested in educational classes specifically on disaster preparedness for mass gatherings.	4.00	1.208	Interested

During disasters, I am able to refer cases to the correct medical department.	3.52	1.291	Agree
Finding relevant information about disaster preparedness for mass gatherings related to Hajj is an obstacle to my level of preparedness.	3.28	1.382	Neither Agree nor Disagree
I find that literature on disaster preparedness for mass gatherings is understandable.	3.04	1.249	Neither Agree nor Disagree
I know where to find relevant research or information related to disasters preparedness for mass gatherings in Hajj season to fill in gaps in my knowledge.	2.82	1.273	Neither Agree nor Disagree
I find that literature on disaster preparedness for mass gatherings and management is easily accessible.	2.67	1.252	Neither Agree nor Disagree

*Average of respondents' answers for every statement.

Table 4.8 shows that the highest mean was for the statement: *I am interested in participating in disaster preparedness for mass gathering training offered at my workplace or other institutes (e.g. university or community)* with (M=4.11,SD=1.152) which represents (Interested) as a general direction; since the mean (4.11) lies on the interval of [3.41 – 4.20] in the Likert 5-point scale, followed by the statement: *I would be interested in educational classes specifically on disaster preparedness for mass gatherings,* with (M=4 ,SD=1.208) which represents (Interested) as a general direction. The statement: *During a disaster, I am able to refer cases to the correct medical department* with (M=3.52, SD=1.291) which represents (Agree). The other statements were all Neither agree nor disagree, and the last ranked statement was *I find that literature on disaster preparedness for mass gathering and management is easily accessible*) with (M=2.67, SD=1.252) which represents (Neither Agree nor Disagree) as a general direction; since the mean (2.67) lies on interval of [2.61 – 3.40] in a Likert 5-point scale.

When respondents were asked about their participation in emergency plan drafting or emergency planning for disaster situations in the Hajj season, they answered as reported in the next table 4.9.

Table 4.9.

Participation in Emergency Plan Drafting, Emergency Planning or know whom to contact for Disaster Situations for the Hajj Season

Q16- Q17		n	%
Q16-I participated in emergency plan drafting or emergency planning for disaster situations in Hajj season.	Yes	200	28.6
	No	500	71.4
	Total	700	100
Q17- I knew whom to contact (chain of command) in disaster situations in Hajj season.	Yes	584	83.3
	No	116	16.6
	Total	700	100

Table 4.9 shows that the highest average was for "No" when responding to: *I participated in emergency plan drafting or emergency planning for disaster situations for the Hajj season* with (71.4%) of the total sample. Additionally, the highest average was for "Yes" when responding to: *I knew whom to contact (chain of command) in disaster situations in Hajj season* with (83.3%) of the total sample.

 Section 4: Knowledge of the Hajj 2016

In the next section, the directions of the knowledge of disasters in the Hajj of 2016 are described in terms of (Strangely Disagree, Disagree, Neither Agree nor Disagree, Agree, Strangely Agree). Results are shown in table 4.10.   .

Table 4.10.

Knowledge of the Hajj 2016

Statements of Q18	Mean*	Std. Deviation	Direction
I am aware of the potential risks in Hajj season (e.g. stampede, floods, terror, fire, etc.).	3.77	1.140	Agree
In my experience during Hajj of 2016, the presence of the fire department was sufficient.	3.63	1.101	Agree
In my experience during Hajj of 2016, the police presence was sufficient.	3.62	1.149	Agree
My knowledge about disaster preparedness for mass gathering about the Hajj season 2016 was sufficient.	3.29	1.293	Neither Agree or Disagree
I knew the limits of my knowledge, skills, and authority as an EMS provider to act in disaster situations in Hajj season 2016.	3.14	1.226	Neither Agree or Disagree
In my experience during Hajj of 2016, there was sufficient equipment to respond to accidents.	2.92	1.201	Neither Agree or Disagree

*Average of respondents' answers for every statement.

Table 4.10 shows that the highest mean was for the statement: *I am aware of the potential risks in Hajj season (e.g., stampede, floods, terror, fire, etc.)* with (M=3.77,St.D=1.140) which represents Agree as a general direction; since the mean (3.77) lies on the interval of [3.41 – 4.00] on the Likert 5-point scale, followed by the statement: *In my experience during Hajj of 2016, the presence of the fire department was sufficient* with (M=3.63,St.D=1.101) which represents Agree, followed by the statement: *In my experience during Hajj of 2016, the police presence was sufficient* with (M=3.62,St.D=1.149) which represents Agree, While all other statements were (Neither Agree or Disagree), the last rank was for: *In my experience during Hajj of 2016, there was sufficient equipment to respond to accidents* with (M=2.92,St.D=1.201) which represents Neither Agree or Disagree as a general direction.

When respondents were asked about which disaster they had ever experienced during Hajj season, they answered as reported in table 4.6.

Table 4.11.

Experience during Hajj Season

Q19	Types	N	(%)	Rank
Which of the following have you ever experienced during Hajj season?	Stampede disaster	424	60	1
	Fire disaster	325	46.4	2
	Transport disaster	322	46	3
	Building collapse disaster	229	32.7	4
	None of above	136	19.4	5
	Flood disaster	89	12.7	6
	Bioterrorism/Biological and Chemical disaster	46	6.6	7
	Epidemic disaster	41	5.9	8

Table 4.11 shows that the most experienced disaster during the Hajj season was a stampede with 60.6% of the total sample, followed by a fire disaster with 46.4% of the total sample, followed by a transport disaster with 46.0% of the total sample, followed by a building collapse disaster with 32.7% of the total sample, followed by a flood disaster with 12.7% of the total sample, followed by a bioterrorism/biological and chemical disaster with 6.6%. The last rank was for epidemic disaster with 5.9% of the total

sample, whereas 19.4% of the total of sample had experienced none of the
aforementioned disasters.

Section5: Source of Knowledge

The sources of knowledge of disasters are described in the following section,
from 1 for least useful to 5 as most useful. Results are shown in table 4.12.

Table 4.12.

Sources of Knowledge

Q20	Mean*	Std. Deviation	Rank
Real disaster	4.31	0.977	1
Drills practice	4.25	1.046	2
Continuing education	4.17	1.052	3
Co-workers, friends, or family	4.05	1.104	4
Institution or University courses	3.85	1.155	5
Media (TV, social media, radio, or internet)	3.03	1.184	6

* Average of respondents' answers for every statement.

Table 4.12 shows that the first source of knowledge was *Real disaster* with
(M=4.31, SD=0.977), followed by *Drills practice* with (M=4.25, SD=1.046), followed by
Continuing education with (M=4.17, SD=1.052), followed by *Co-workers, friends, or
family* with (M=4.05, SD=1.104), followed by Institution or University courses with
(M=3.85, SD=1.155), followed by *Media (TV, social media, radio, or internet)* with
(M=3.03, SD=1.184) as the last ranked source of knowledge of disasters.

When respondents were asked about improving their knowledge about disaster
preparedness, they answered as shown the table 4.13.

Table 4.13.

Courses that Improved knowledge about disaster preparedness

Q21	Mean*	Std. Deviation	Rank
Disaster management courses	4.54	0.829	1
Drills practice	4.44	0.900	2
Disaster management protocol	4.31	0.952	3
Onsite visit	4.07	1.031	4
Information website	3.20	1.169	5
Information pamphlets	3.11	1.266	6

* Average of respondents' answers for every statement.

Table 4.13 shows that the first source of improving knowledge about disaster preparedness was *Disaster management courses* with (M=4.54, SD=0.829), followed by *Drills practice* with (M=4.44, SD=0.900), followed by *Disaster management protocol* with (M=4.31, SD=0.952), followed by *Onsite visit* with (M=4.07, SD=1.031), followed by *Information website* with (M=3.20, SD=1.169), followed by *Informational pamphlets* as the last ranked with (M=3.11, SD=1.266).

When respondents were asked their opinion about which educational courses should be taken by EMS providers to prepare for disasters, they answered as shown in table 4.14.

Table 4.14.

Educational Courses That Should be taken in Preparing for disaster

Q22	Mean*	Std. Deviation	Rank
Incident command system	4.54	0.800	1
Field triage	4.50	0.787	2
Advance Trauma Life Support (ATLS)	4.47	0.811	3
Prehospital Trauma Life Support (PHTLS)	4.30	0.879	4
Advance Cardiac Life Support (ACLS)	4.26	0.892	5

Basic Life Support (BLS)	4.23	0.952	6
First Aid	4.19	1.026	7
Infection Control	3.98	1.128	8

*Average of respondents' answers for every statement.

Table 4.14 shows that, in the opinion of SRC-EMS providers, the first educational course that should be taken in preparing for disaster was *Incident command system* with (M=4.54, SD=0.800), followed by *Field triage* with (M=4.50, SD=0.787), followed by *ATLS* with (M=4.47, SD=0.811), followed by *PHTLS* with (M=4.30, SD=0.879), followed by *ACLS* with (M=4.26, SD=0.892), followed by *BLS* with (M=4.23, SD=0.952), followed by *First Aid* with (M=4.19, SD=1.026), followed by *Infection control* with (M=3.98, SD=1.128) as the last ranked among educational courses.

Research Questions and Hypotheses Answers by using Univariate Analysis

Research Question 1

Is there a significant difference in the knowledge of disaster preparedness for mass gatherings between different categories of EMS providers based on their age?

To answer this question, a one-way analysis of variance (ANOVA) was used to determine whether there are any statistically significant differences between the means of three or more independent (unrelated) groups. The test results are shown in table 4.15.

Table 4.15.

 Differences in general knowledge of Disasters Preparedness based on age

Age	N	Mean*	SD	F Value	ANOVA P-value
Less than 25 years	7	2.916	0.695		
25-29 years	215	2.582	0.678	5.068	0.000
30-34 years	232	2.736	0.667		

35-39 years	135	2.977	0.767		
40-44 years	59	2.902	0.816		
45-49 years	28	2.931	0.850		
50 years and above	24	2.923	1.041		

*Average of respondents' answers for every statement.

Table 4.15 shows that P-value of ANOVA test was 0.000 < 0.0001, which enabled the researcher to conclude that there is a statistically significant difference among participants. Thus, there is a difference in the general knowledge of disaster preparedness for mass gatherings between different categories of SRC-EMS providers based on their age.

Use Bonferroni adjustment for multiple Comparisons test was affected to decide which Age group had more knowledge. The results are shown in Figure (4.1) below.
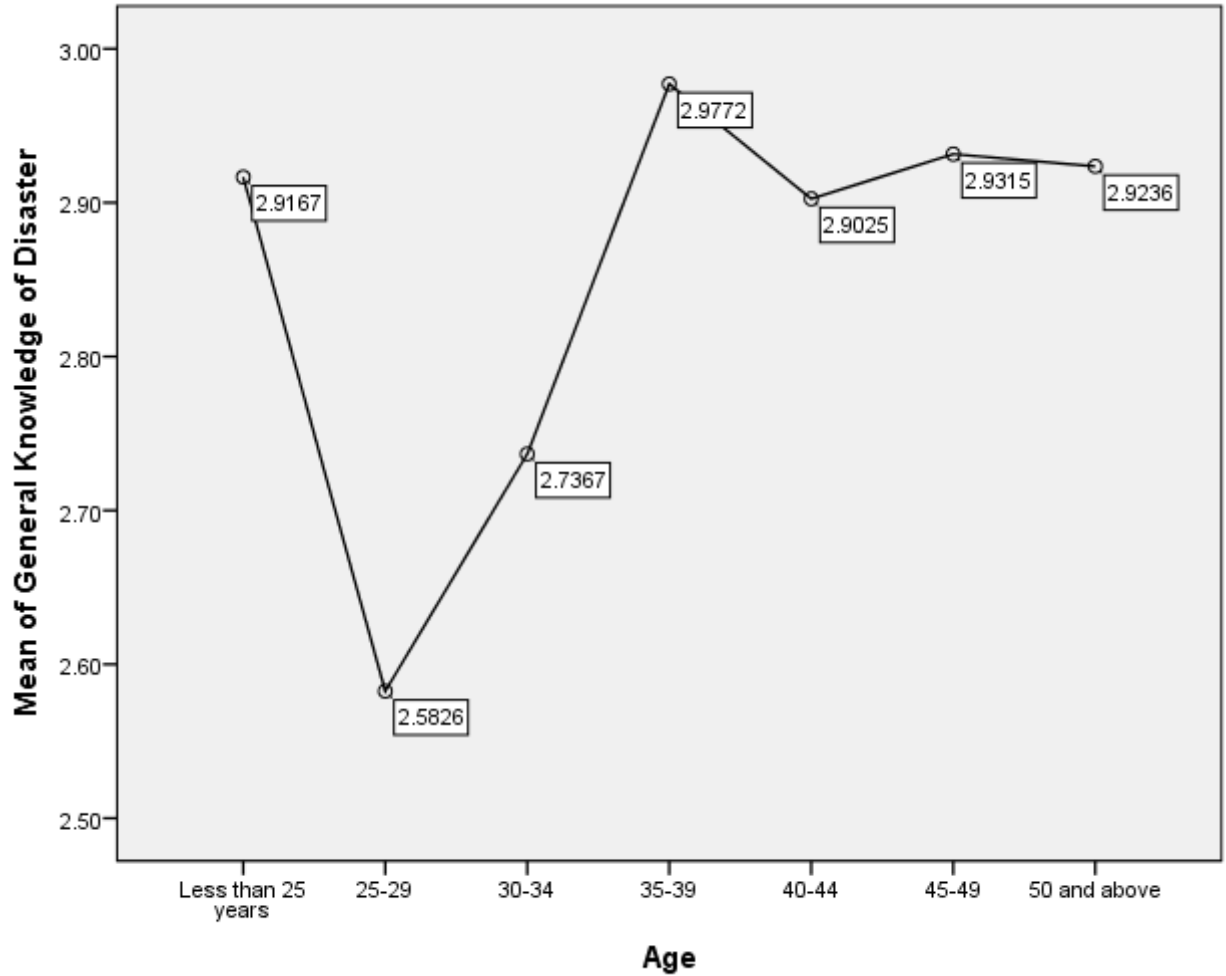
Figure 4.1 Mean knowledge of disaster based on the age

Figure 4.1 shows that there is a statistically significant difference between the age group of 35-39 years and both groups 25-29 and 30-34 years in favor of 35-39 years which has the highest mean of the General Knowledge of Disaster with 2.977, with significant differences 0.240 and 0.394 between the other group respectively (See Appendix F for SPSS result).

Table 4.16.

Difference in Knowledge of Hajj 2016 based on Age.

Age	N	Mean*	SD	F Value	ANOVA P-value
Less than 25 years	7	2.928	0.584		
25-29 years	215	3.310	0.933		
30-34 years	232	3.357	0.934	1.772	0.102
35-39 years	135	3.550	0.798		
40-44 years	59	3.437	0.866		
45-49 years	28	3.660	1.00		
50 years and above	24	3.284	1.350		

*Average of respondents' answers for every statement.

Table 4.16 shows the distribution of knowledge averages according to age; from which F = 1.772 with a P-value is 0.102 > 0.0001 enabled this researcher to conclude that there is no statistically significant difference in Knowledge of disaster regarding the Hajj of 2016 based on Age (See Appendix G for SPSS result).

Research Question 2

Is there a significant difference in the knowledge of disaster preparedness for mass gatherings between different categories of EMS-providers based on level of education?

To answer this question, a one-way analysis of variance (ANOVA) was performed, and the results are shown in table 4.17.

Table 4.17.

Difference in general knowledge of disasters preparedness based on level of education.

level of education	N	Mean*	SD	F-Value	ANOVA P-value
High school	52	2.423	0.701		
Diploma + 2 years	198	2.584	0.583		
Diploma +3 years	253	2.618	0.634		
Bachelor's degree	169	3.165	0.800	28.863	0.000
Master's degree	23	3.695	0.706		

Other	5	3.183	1.053		

*Average of respondents' answers for every statement.

Table 4.17 showed that the P-value of the ANOVA test was $0.000 < 0.0001$, enabling this researcher to conclude that there is a statistically significant difference among participants. Thus, there is a statistically significant difference in the general knowledge of disaster preparedness for mass gathering between different categories of EMS-providers based on their level of education.

Use Bonferroni adjustment for multiple Comparisons test was performed to decide which education level was more informed about disaster preparedness. Results are shown in Figure 4.2 below.
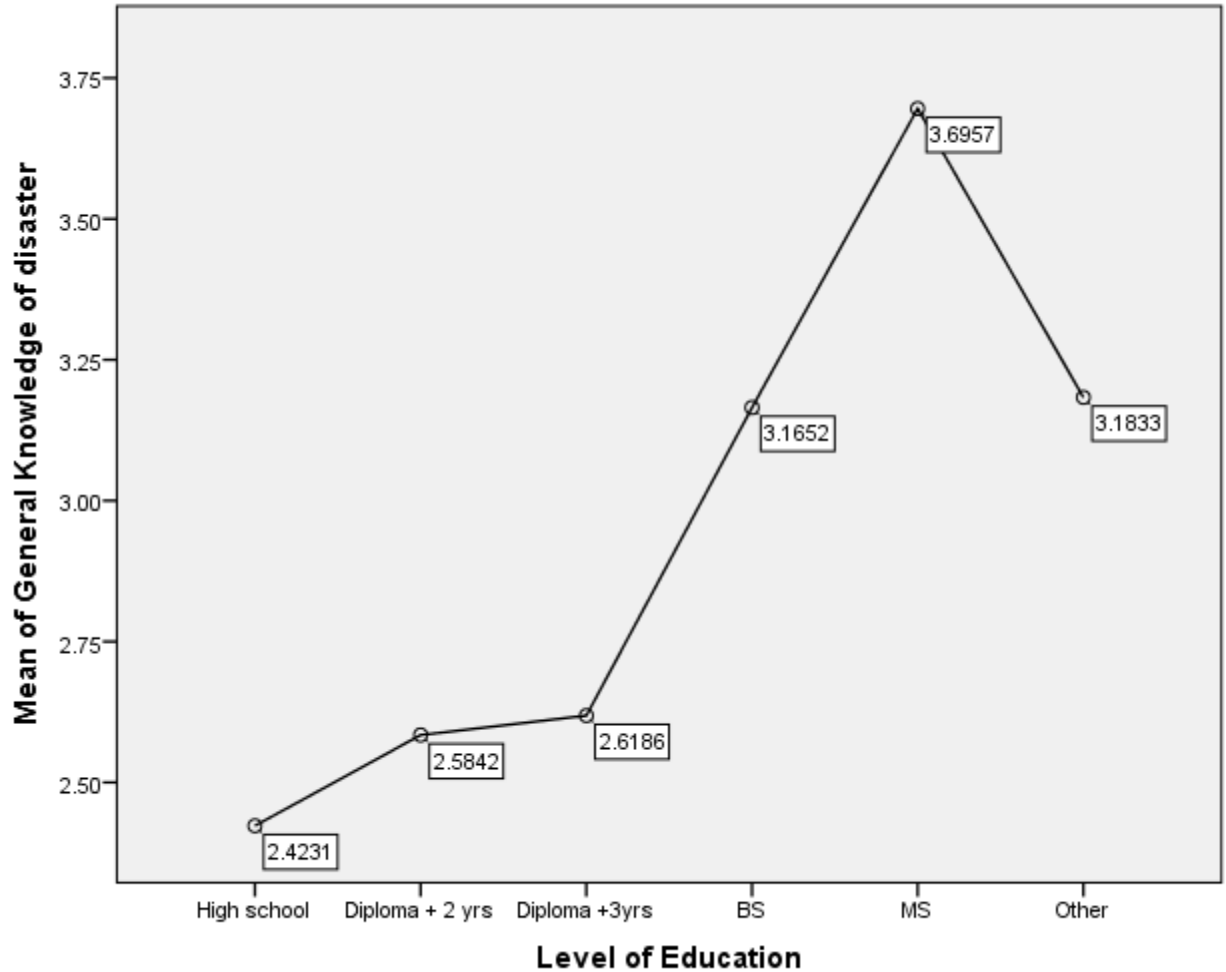
Figure 4.2 Mean general knowledge of disaster based on the level of education

Figure 4.2 shows that there is a statistically significant difference between the Education level Master's degree and the other groups in favor of a Master's degree holders, who had the highest mean of general knowledge of disasters with (3.695), with significant differences 1.272, 1.111, 1.077 and 0.530 between High school, Diploma + 2 years, Diploma +3 years and Bachelor's degree respectively. Also, there is a statistically significant difference between the Bachelor's degree and the groups of High school, Diploma + 2 years and Diploma +3 years in favor of BS which has 3.165 as a mean of the general knowledge of disasters with significant differences 0.742, 0.581 and 0.546

between High school, Diploma + 2 years and Diploma +3 years respectively (See

Appendix H for SPSS result).

Table 4.18.

Differences in knowledge of Hajj 2016, based on level of education

Level of Education	N	Mean*	SD	F-Value	ANOVA P-value
High school	52	3.070	1.042		
Diploma + 2 years	198	3.344	0.928		
Diploma +3 years	253	3.332	0.947	6.469	0.000
Bachelor's degree	169	3.505	0.785		
Master's degree	23	4.217	0.704		
Other	5	4.033	1.138		

*Average of respondents' answers for every statement.

Table 4.18 shows that the P-value of the ANOVA test is $0.000 < 0.0001$, leading

the researcher to conclude that there is a statistically significant difference among

participants. Therefore, there is a statistically significant difference in the knowledge of

disaster regarding the Hajj of 2016 directions based on level of EMS providers.

Use Bonferroni adjustment for multiple Comparisons test was performed to

decide which education level possessed the most knowledge. The results are shown in

Figure 4.3 below.
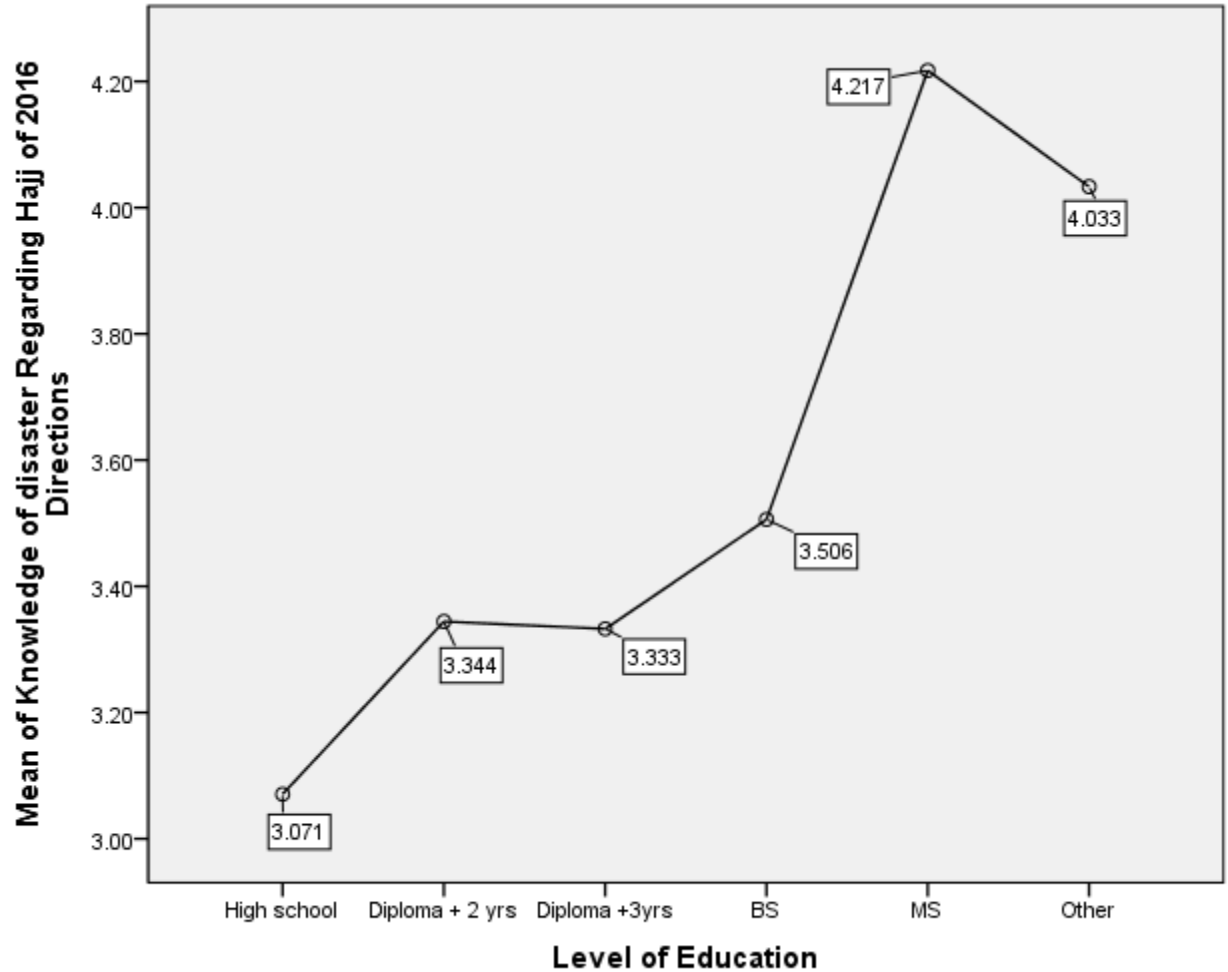
Figure 4.3 Mean of knowledge of disaster regarding the Hajj of 2016 based on level of education

Figure 4.3 shows that there is a statistically significant difference between Master's degree holders and other groups, in favor of Master's degree holders, who had the highest mean of knowledge of disasters regarding Hajj of 2016. The Directions 4.217, indicated significant differences 1.146, 0.873, 0.884 and 0.711 between High school, Diploma + 2 years, Diploma +3 years and Bachelor's degree respectively (See Appendix I for SPSS result).

Research Question 3

Is there a significant difference in the knowledge of disaster preparedness for mass gatherings between different categories of EMS-providers based on their level of EMS (professional classification)?

To answer this question, a one-way analysis of variance (ANOVA) was performed. The results are shown in the following tables.

Table. 4.19.

Difference in General Knowledge of disasters preparedness based on level of EMS

level of EMS	N	Mean*	SD	F-Value	ANOVA P-value
First responder	62	2.524	0.741		
EMS- Technician	459	2.601	0.618	44.522	0.000
EMS- paramedic	158	3.278	0.794		
Physician	21	3.210	0.815		

*Average of respondents' answers for every statement.

Table 4.19 shows that P-value of ANOVA test is $0.000 < 0.0001$, enabling the researcher to conclude that there is a statistically significant difference among participants. Therefore, there is a statistically significant difference in the general knowledge of disaster preparedness for mass gatherings between different categories of EMS-providers based on their level of EMS.

Use Bonferroni adjustment for multiple Comparisons test was performed to decide which EMS level possessed more general knowledge of disaster preparedness for mass gatherings. This is shown in Figure 4.4 below.

Figure 4.4 Mean of general knowledge of disaster based on EMS level

Figure 4.4 shows that there is a statistically significant difference between EMS-paramedic level and the two groups of First responder, EMS- Technician in favor of EMS- paramedic which has the highest mean of the General Knowledge of Disaster with 3.278, with significant differences 0.753 and 0.676 respectively.

There is a statistically significant difference between EMS-Paramedic level and the two groups of First responder, EMS- Technician in favor of Physician which has

3.210 as a mean of the General Knowledge of Disaster, with significant differences 0.686

and 0.608 respectively (See Appendix J for SPSS result).

Table 4.20.

Difference in Knowledge the Hajj of 2016 based on the level of EMS.

level of EMS	N	Mean*	SD	F Value	ANOVA P-value
First responder	62	3.121	1.056		
EMS- Technician	459	3.350	0.929	6.767	0.000
EMS- Paramedic	158	3.539	0.822		
Physician	21	4.015	0.718		

*Average of respondents' answers for every statement.

Table 4.20 shows that the P-value of the ANOVA test is 0.000 < 0.0001, leading

the researcher to conclude that there is a statistically significant difference among

participants. Thus, there is a statistically significant difference in knowledge of disasters

regarding the Hajj of 2016 Directions based on the level of certification.

Use Bonferroni adjustment for multiple Comparisons test was performed to

decide which level of certification possesses more knowledge of disasters regarding the

Hajj of 2016. Results are shown in Figure 4.5 below.
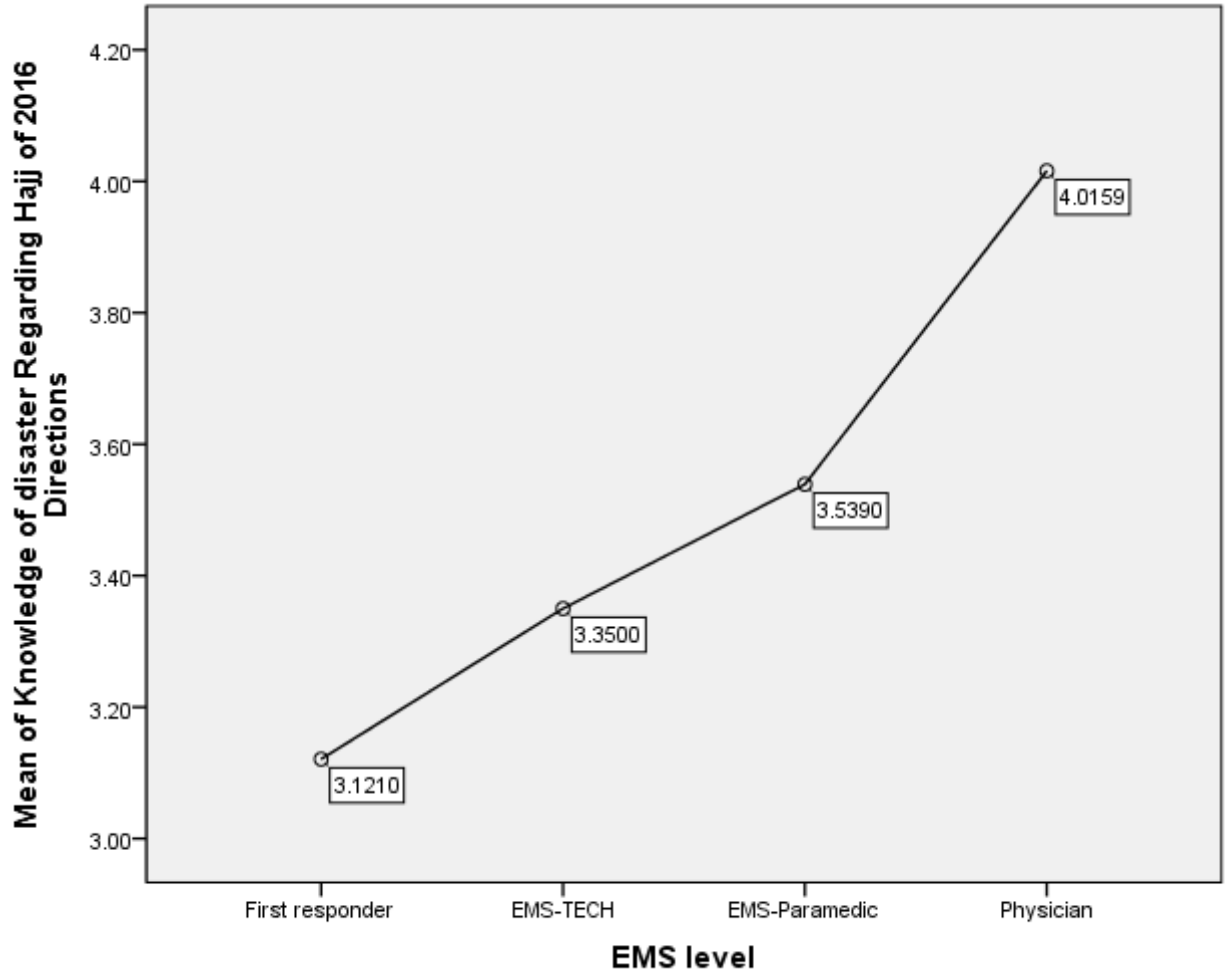
Figure 4.5 Mean of knowledge of disaster regarding Hajj based on level of EMS

Figure 4.5 shows that there is a statistically significant difference of general knowledge about disasters between Saudi Red Crescent EMS providers at the physician level and the other three groups, namely: First responders, EMS- Technicians and EMS-paramedics, in favor of Physicians who have 4.015 as the highest mean. There are also significant differences between the other three groups 0.894, 0.665 and 0.476 respectively.

There exists a statistically significant difference between Physicians and the two groups of First responders and EMS-Technicians, in favor of the paramedics who have

3.539 as a mean of the general knowledge of disasters, with significant differences

between the other two groups; 0.418 and 0.188 respectively (See Appendix K for SPSS

result).

Research Question 4

Is there a significant difference in the knowledge of disaster preparedness for mass

gatherings between different categories of EMS-providers based on the sector of EMS

training received?

To answer this question, a one-way analysis of variance (ANOVA) was performed.

The results are shown in table 4.21.

**Q6- Which of the following statements best describe the EMS training you
received?**
Table 4.21.

Difference in General Knowledge of disaster preparedness based on the sector of EMS

training

Sector of EMS Training	N	Mean*	SD	F Value	ANOVA P-value
Government sector	235	2.714	0.790	24.407	0.000
Private sector	358	2.642	0.599		
Military sector	63	3.366	0.878		
Outside of the Saudi Arabia	44	3.181	0.740		

* Average of respondents' answers for every statement.

Table 4.21 shows that P-value of ANOVA test is 0.000 < 0.0001, leading the

researcher to conclude that there exists a statistically significant difference among

participants. There is a statistically significant difference in the general knowledge of

disaster preparedness for mass gatherings between the different categories of EMS-

providers based on the sector in which the training was received.

Use Bonferroni adjustment for multiple Comparisons tests were performed to
decide which training is more effective. This is shown in Figure 4.6 below.
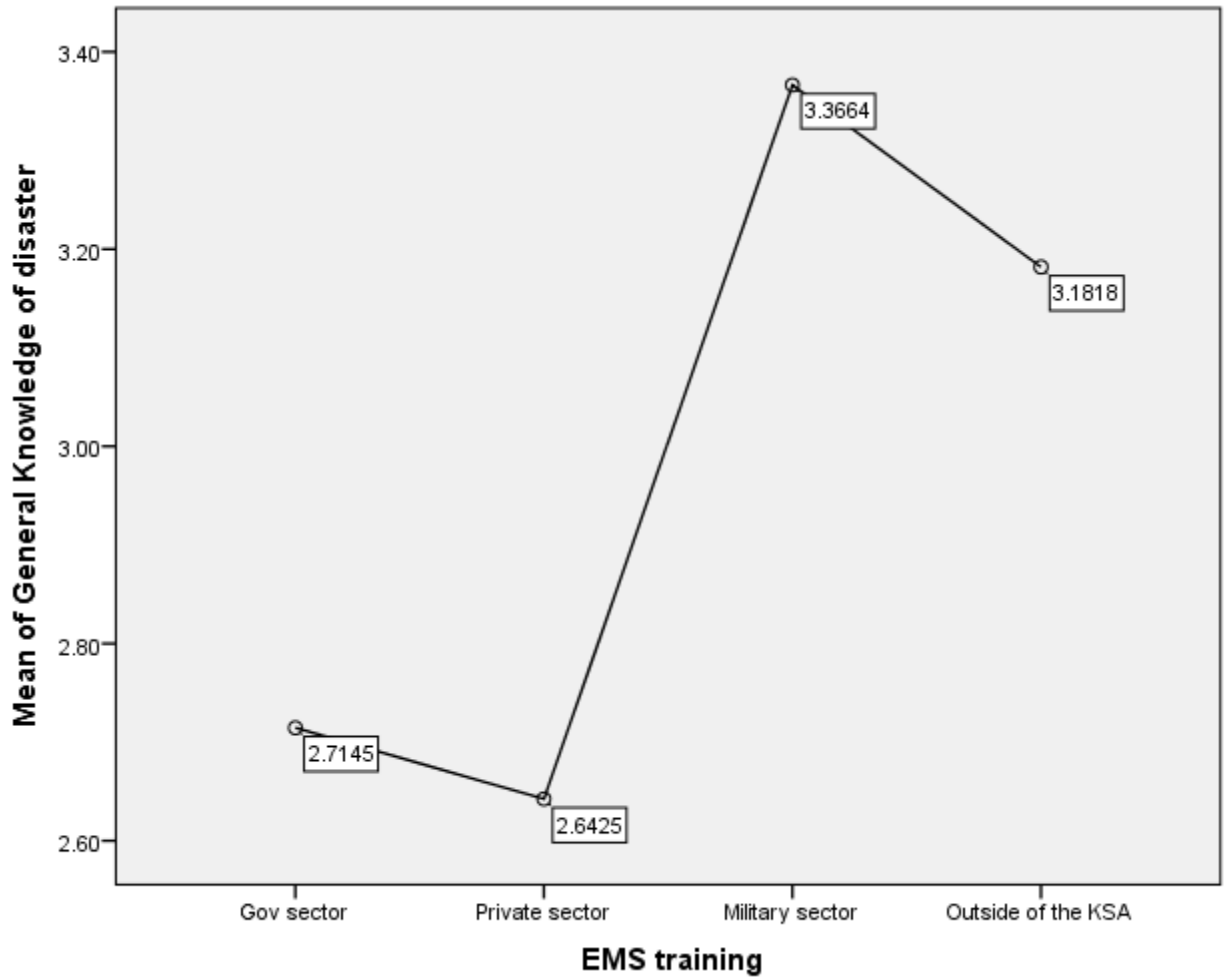
Figure 4.6 Mean of knowledge of disaster based the sector of EMS training received

Figure 4.6 shows that there is a statistically significant difference in disaster
knowledge between the EMS providers who were trained in the military sector and both
of the other groups who received training in the government sector and in the private
sector, in favor of those trained by the military. The providers trained in the military
sector had the highest mean of the general knowledge of disasters with 3.366, with
significant differences 0.651, 0.723 with Government and Private sectors respectively.

There is a statistically significant difference between those trained outside of Saudi Arabia and those trained in the government sector or the private sector, in favor of the former. Those trained outside of Saudi Arabia had a mean of 3.181 in General Knowledge of Disasters with significant differences 0.467, and 0.539 with Government, Private sectors respectively (See Appendix L for SPSS result).

Table 4.22.

Difference in Knowledge of the Hajj 2016 based on the sector of EMS training.

Sector of EMS Training received	N	Mean*	SD	F Value	ANOVA P-value
Government sector	235	3.332	1.00		
Private sector	358	3.379	0.881	1.896	0.129
Military sector	63	3.500	0.942		
Outside of the KSA	44	3.662	0.788		

*Average of respondents' answers for every statement.

Table 4.22 shows the distribution and directions of Knowledge of disasters regarding the Hajj of 2016 based on EMS Training; from which F = 1.896 with P-value is 0.129 > 0.0001 leading the researcher to conclude that there is no statistically significant difference in Knowledge of disaster regarding the Hajj of 2016 based on EMS Training (See Appendix M for SPSS result).

Research Question 5

Is there a significant difference in the knowledge of disaster preparedness for mass gatherings between different categories of EMS providers based on years of experience?

To answer this question, a one-way analysis of variance (ANOVA) was performed, the results of which are shown in table 4.23.

First: Years of experience worked at SRCA

Q7- How long have you worked as EMS providers for the Saudi Red Crescent?

Table: 4.23.

Difference in General Knowledge of disasters preparedness based on years of

experience working for SRCA

Years of Experience	N	Mean*	SD	F Value	ANOVA P-value
Under one year	9	2.564	0.623		
1- under 5 years	196	2.658	0.736		
5-under 10 years	244	2.714	0.701	4.790	0.000
10-under 15 years	132	2.862	0.685		
15-under 20 years	64	3.125	0.752		
20 years and above	55	2.759	0.903		

*Average of respondents' answers for every statement.

Table 4.23 shows that the P-value of the ANOVA test is 0.000 < 0.0001, which

enables the researcher to conclude that there is a statistically significant difference among

participants. Thus, there is a statistically significant difference in the general knowledge

of disaster preparedness for mass gatherings between different categories of EMS-

providers based on their years of experience.

To decide which group of EMS providers had more knowledge, use Bonferroni

adjustment for multiple comparison test was performed. Results are shown in Figure 4.7
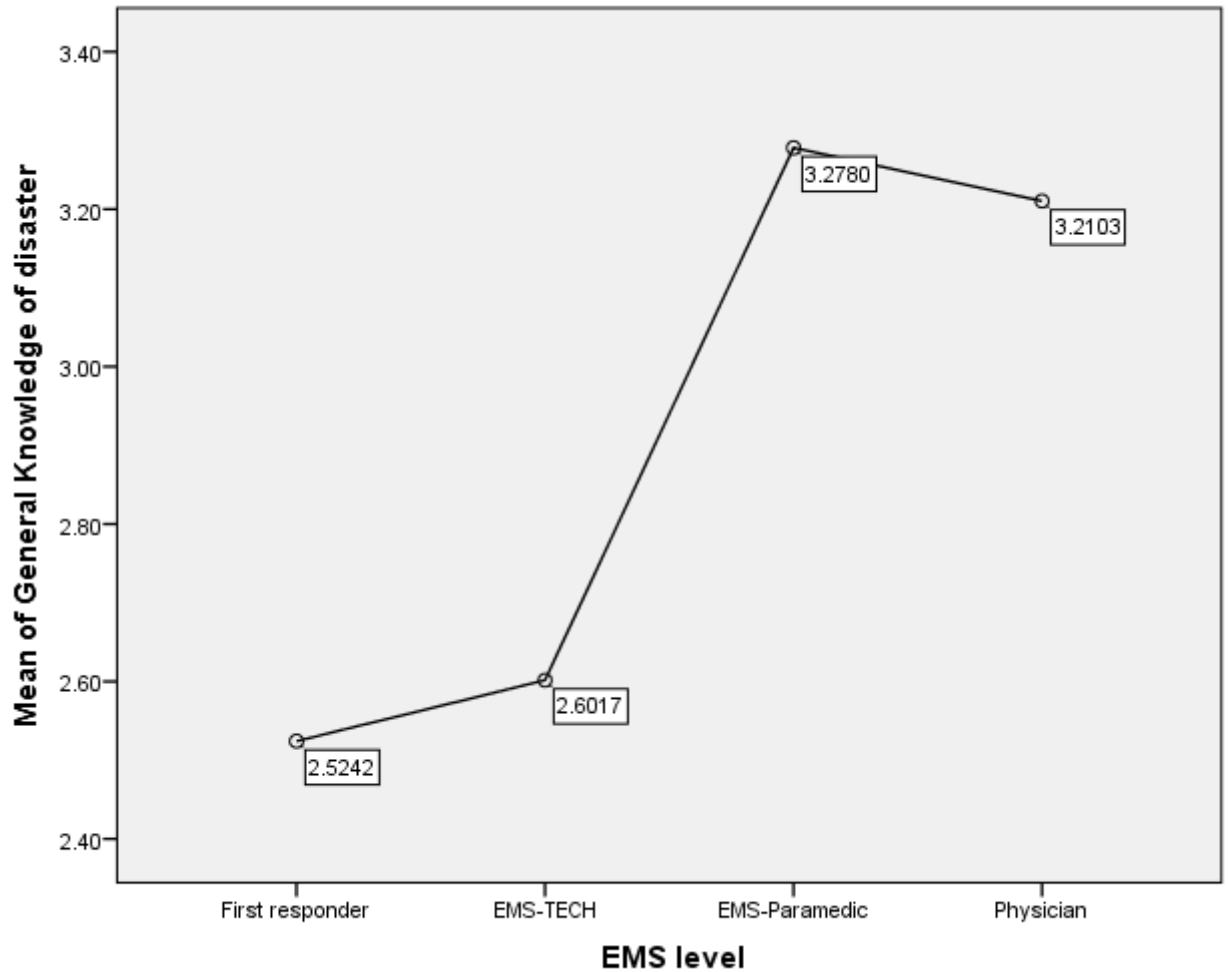
below.
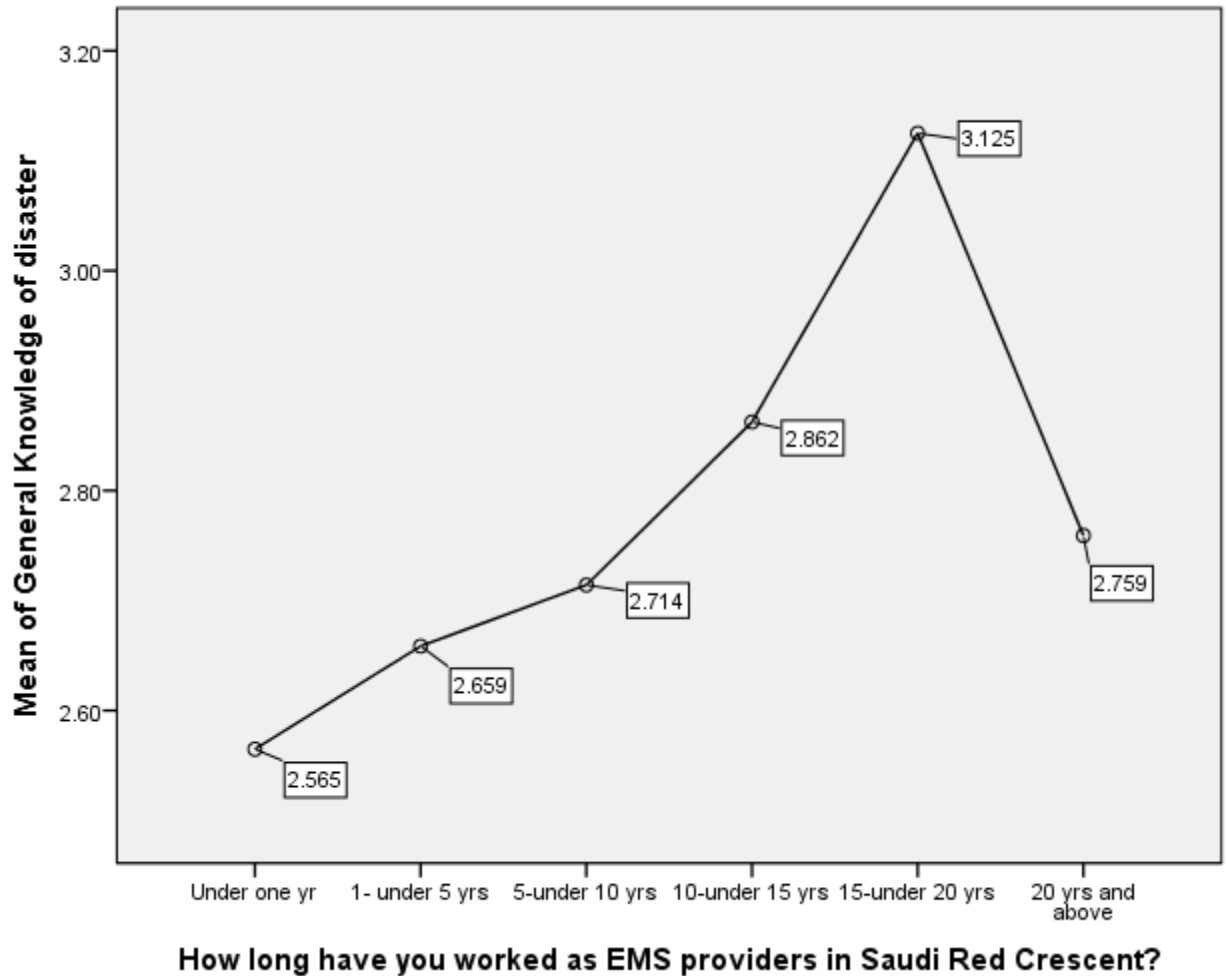
<u>Figure 4.7</u> Mean of general knowledge of disaster based on years of experience

Figure 4.7 shows that there is a statistically significant difference between the group having 15-less than 20 years of experience with the Red Crescent and all other groups. This group had the highest mean of the General Knowledge of Disaster with 3.12, with significant differences 0.56, 0.46, 0.41, 0.26 and 0.36 with other groups respectively.

Moreover, there is a statistically significant difference between the group having 10-less than 15 years of experience the group having 1-less than 4 years of experience and in favor of the former, which has 2.86 as a mean of the General Knowledge of

Disasters, with significant differences 0.20 relative to the group having 1-less than 4

years of experience (See Appendix N for SPSS result).

Table: 4.24.

Difference in Knowledge of Hajj 2016 based on years of experience working for SRCA

Years of Experience	N	Mean*	SD	F-Value	ANOVA P-value
Under one year	9	2.685	0.626		
1- under 5 years	196	3.346	1.010		
5-under 10 years	244	3.332	0.891	3.602	0.003
10-under 15 years	132	3.471	0.737		
15-under 20 years	64	3.752	0.800		
20 years and above	55	3.327	1.184		

*Average of respondents' answers for every statement.

Table 4.24 shows that the P-value of the ANOVA test is $0.003 < 0.0001$, enabling

the researcher to conclude that there is a statistically significant difference among

participants. Hence, there is a statistically significant difference in Knowledge of

disasters regarding Hajj of 2016 directions based on the years of experience working for

the Saudi Red Crescent.

The results of using Bonferroni adjustment for Multiple Comparisons tests are

shown in Figure 4.8 below.
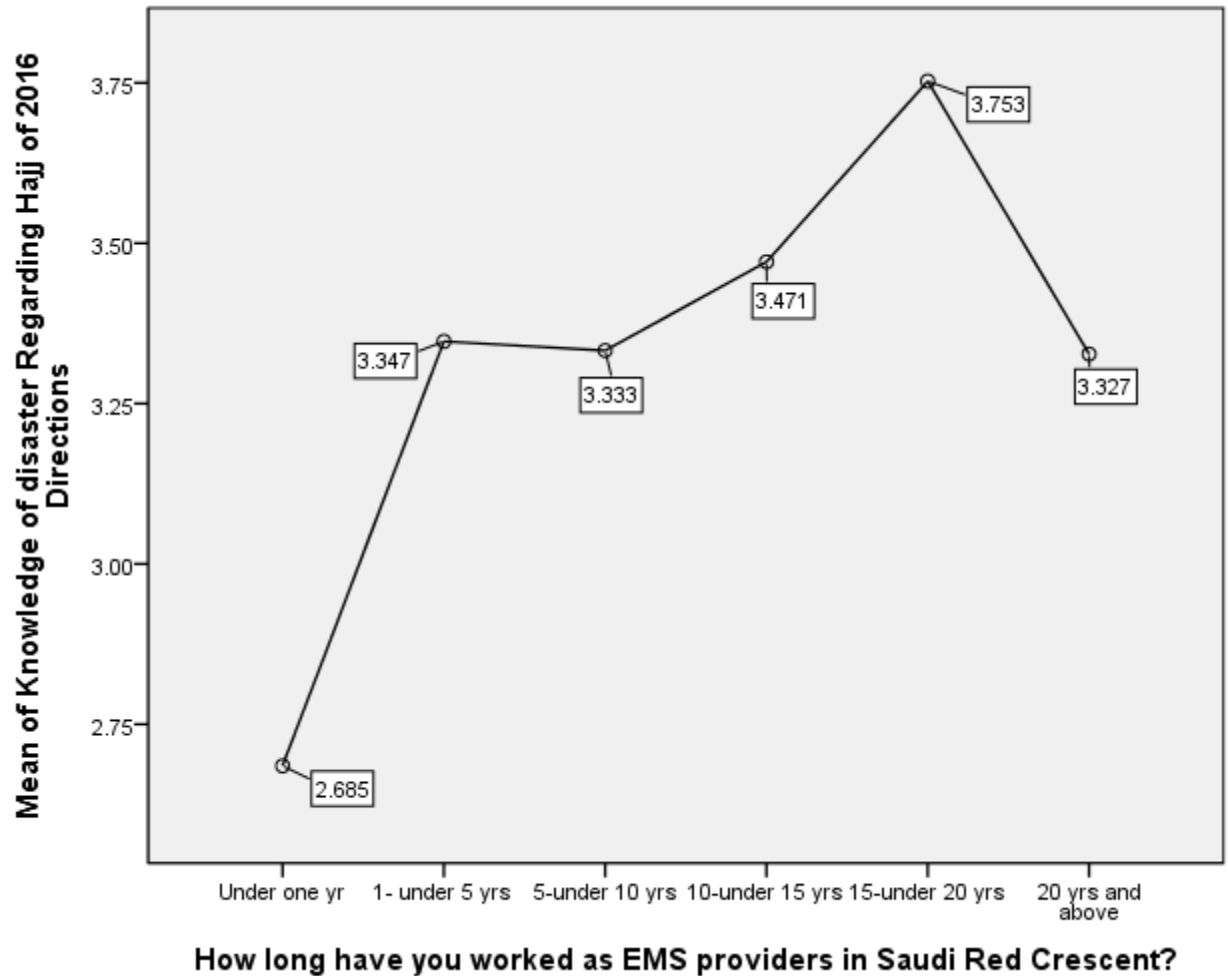
Figure 4.8 Mean of knowledge of disaster regarding Hajj of 2016 based years of experience.

Figure 4.8 shows that there is a statistically significant difference between the group having 15-under 20 years of experience and all the other groups under 1 year, 1-under 5 years, 5- under 10 years in favor of the former, which has the highest mean of the General Knowledge of Disasters with 3.75, with significant differences 1.06, 0.40 and 0.41 respectively.

Additionally, there is a statistically significant difference between the group having 10-less than 15 years of experience working as an EMS provider for the Saudi

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Red Crescent and the group having under one year experience in favor of the former

which has 3.47 as a mean of the General Knowledge of Disasters, with significant

differences 0.78 (See Appendix O for SPSS result).

Second: number of times worked at the Hajj

Q8- How many times have you worked at the Hajj?

 Table 4.25.

 Difference in General Knowledge of disasters preparedness based on number of times

worked at the Hajj

Experience How many times have you worked at Hajj?	N	Mean*	SD	F Value	ANOVA P-value
One Hajj season	127	2.570	0.691		
Two Hajj seasons	162	2.793	0.731	4.632	0.003
Three Hajj seasons	140	2.731	0.828		
Four Hajj seasons or more	271	2.858	0.702		

*Average of respondents' answers for every statement.

Table 4.25 shows that P-value of ANOVA test is 0.003 < 0.0001, thus leading the

researcher to conclude that there is a statistically significant difference among

participants. There is therefore a difference in the general knowledge of disaster

preparedness for mass gatherings between different categories of EMS-providers based

on their experience of Hajj.

The results of using Bonferroni adjustment for multiple Comparisons tests to

decide which group is more knowledgeable are shown in Figure 4.9 below.
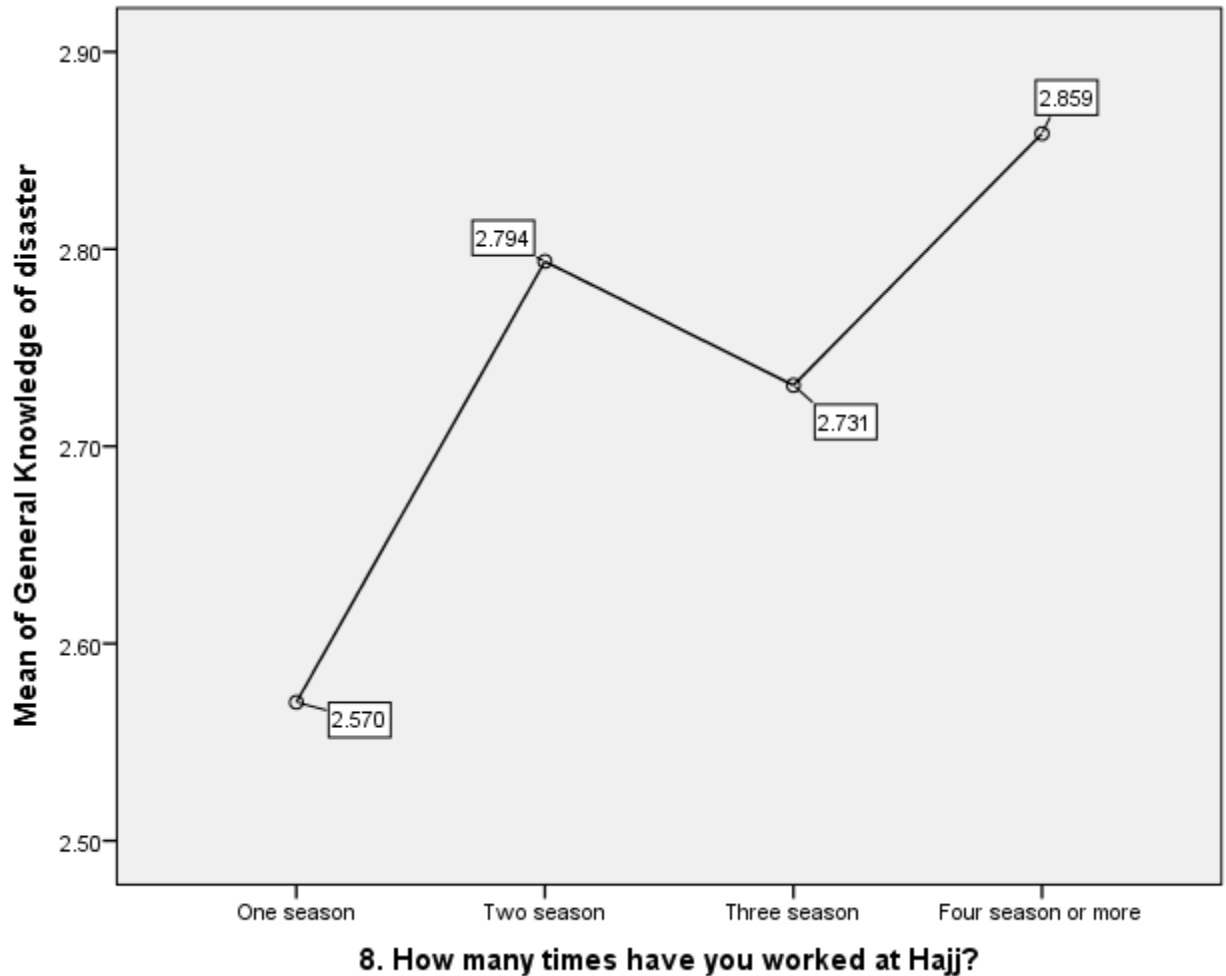
Figure 4.9 Mean of general knowledge of disaster based number of times worked at Hajj

Figure 4.9 shows that there is a statistically significant difference between the

Four seasons or more group and the group having worked only one season in favor of the

former, which has the highest mean of General Knowledge of Disasters with 2.859.

Moreover, there is a statistically significant difference between the group having worked

at Hajj twice and the group having worked only one season in favor of the former, which

has a mean of General Knowledge of Disasters, with significant differences 0.223 (See

Appendix P for SPSS result).

Table 4.26.

Difference in Knowledge of the Hajj 2016 based on number of times worked at the Hajj.

Experience How many times have you worked at Hajj?	N	Mean*	SD	F Value	ANOVA P-value
One Hajj season	127	3.266	0.930		
Two Hajj seasons	162	3.412	0.930	2.260	0.080
Three Hajj seasons	140	3.298	0.937		
Four Hajj seasons or more	271	3.392	0.925		

*Average of respondents' answers for every statement.

Table 4.24 shows the distribution of knowledge averages according with to the Hajj experience. The F value = 2.260 with a P-value is 0.080 > 0.0001 enables the researcher to conclude that there is no statistically significant difference in Knowledge of disaster regarding the Hajj of 2016 based on years of experience at the Hajj (See Appendix Q for SPSS result).

Research Question 6

Is there a significant difference in the knowledge of disaster preparedness for mass gatherings between different categories of EMS providers based on training (previous disaster education/training, number of trainings and number of hours of training)?

To answer this question an (ANOVA) Test was performed to compare averages between different categories of EMS providers based on previous disaster education/training, number of trainings and number of hours of training, as follow:

Table 4.27.

Difference in General Knowledge of Disaster Preparedness Based on training

Training (Education/ Training Number of trainings Number of hours of training)			Mean*	SD	F Value	ANOVA P-value
10- How many trainings/workshops/drills about disaster preparedness have you ever attended? (See Appendix R for SPSS result).	Training	*Three times*	3.08	0.72	29.07	0.000
	Workshops	*More than three times*	3.29	0.84	41.41	0.000
	Drills	*More than three times*	3.29	0.84	36.21	0.000
11- Which of the following best describes the frequency of your attendance at a trainings/workshops/drills about disaster preparedness? N/A (See Appendix S for SPSS result).	Training	*Four times per year*	3.55	0.53	37.96	0.000
	Workshops	*Four times per year*	3.56	0.61	44.48	0.000
	Drills	*Four times per year*	3.61	0.79	33.04	0.000
12- When was the last time you attended a trainings/ workshops/ drills about disaster preparedness? (See Appendix T for SPSS result).	Training	*6-12 months ago*	3.06	0.70	33.64	0.000
	Workshops	*6-12 months ago*	3.22	0.72	56.94	0.000
	Drills	*6-12 months ago*	3.17	0.73	51.27	0.000
13- What was the duration of the last trainings/workshops/drills about disaster that you attended? (See Appendix U for SPSS result).	Training	5-9 hours	3.09	0.73	23.85	0.000
	Workshops	*20 hours or more*	3.29	0.73	43.06	0.000
	Drills	*20 hours or more*	3.30	0.65	43.96	0.000

*Average of respondents' answers for every statement.

Table 4.25 shows that all P-values of ANOVA tests are < 0.0001, enabling the

researcher to conclude that there is a statistically significant difference among

participants. Hence, there is a difference in the general knowledge of disaster

preparedness for mass gatherings between different categories of EMS-providers based

on training Education/ Training, Number of trainings, and Number of hours of training

(See Appendix R, S, T, U for SPSS result)

Table 4.28.

Difference in Knowledge of Disaster Regarding the Hajj of 2016 Based on training

Education/ Training Number of trainings Number of hours of training			Mean	SD	F Value	ANOVA P-value
10- How many trainings/workshops/drills about disaster preparedness have you ever attended? (See Appendix V for SPSS result)	Training	*Three times*	3.62	0.86	7.31	0.000
	Workshops	*More than three times*	3.70	0.93	9.16	0.000
	Drills	*Three times*	3.69	0.78	14.81	0.000
11- Which of the following best describes the frequency of your attendance at trainings/workshops/drills about disaster preparedness? N/A (See Appendix W for SPSS result).	Training	*Four times per year*	4.12	0.60	10.92	0.000
	Workshops	*Four times per year*	4.06	1.22	10.88	0.000
	Drills	*Four times per year*	4.35	0.69	17.51	0.000
12- When was the last time you attended a trainings/ workshops/ drills about disaster preparedness? (See Appendix X for SPSS result).	Training	*6- 12 months ago*	3.58	0.81	10.04	0.000
	Workshops	*6- 12 months ago*	3.66	0.77	14.00	0.000
	Drills	*6- 12 months ago*	3.73	0.74	22.33	0.000
13- What was the duration of the last trainings/workshops/drills about disaster that you attended? (See Appendix Y for SPSS result).	Training	5-9 hours	3.61	0.87	6.43	0.000
	Workshops	*20 hours or more*	3.69	1.06	9.16	0.000
	Drills	*20 hours or more*	3.64	0.97	14.66	0.000

Table 4.26 shows that all P-values of ANOVA test are < 0.0001, so the researcher can conclude that there is a statistically significant difference among participants. Hence, there is a difference in Knowledge of disaster Regarding the Hajj of 2016 Directions between different categories of EMS-providers based on training Education/ Training, Number of trainings, and Number of hours of training (See Appendix V, W, X, Y for SPSS result).

Research Question 7

Is there a relationship between the sources of knowledge and knowledge acquired regarding disaster preparedness during mass gatherings among different EMS-providers in the Hajj of 2016?

To answer this question, the Pearson Correlation test was performed to find the relationship between the sources of knowledge and knowledge acquired regarding disaster preparedness during mass gatherings among different EMS-providers in the Hajj of 2016. Results are shown in table 4.29.

Table 4.29.

Sources of General Knowledge of Disaster Preparedness

Sources of knowledge		directions of general knowledge of disaster preparedness
Drills practice	Pearson Correlation	.025
	Sig. (2-tailed)	.505
	N	700
Real disaster	Pearson Correlation	-.040
	Sig. (2-tailed)	.295
	N	700
Continuing education	Pearson Correlation	.161**
	Sig. (2-tailed)	.000
	N	700

Institution or University courses	Pearson Correlation	.168**
	Sig. (2-tailed)	.000
	N	700
Media (TV, social Media, Radio, internet)	Pearson Correlation	.084*
	Sig. (2-tailed)	.026
	N	700
Co-workers, friends, or family	Pearson Correlation	-.010
	Sig. (2-tailed)	.797
	N	700

Table 4.29 shows that there is a statistically significant relation between the sources of knowledge *Continuing education, Institution or University courses, Media* and general Knowledge of disaster preparedness; since the p-values of Pearson Correlation tests = 0.029 -0.000- 0.002- 0.000 < 0.0001 respectively.

However, there is no statistically significant relation between sources of knowledge (Drills practice), (Co-workers, friends, or family) and Knowledge of disaster regarding the Hajj of 2016; since the p-values of Pearson Correlation test = 0.230 -0.774 > 0.0001 respectively.

Table 4.30.

<u>Source of knowledge of Hajj 2016</u>

source of knowledge		Directions of Knowledge of Hajj of 2016
Drills practice	Pearson Correlation	.045
	Sig. (2-tailed)	.230
	N	700
Real disaster	Pearson Correlation	.082*
	Sig. (2-tailed)	.029
	N	700
Continuing education	Pearson Correlation	.145**
	Sig. (2-tailed)	.000
	N	700
	Pearson Correlation	.117**

Institution or University courses	Sig. (2-tailed)	.002
	N	700
Media (TV, social Media, Radio, internet)	Pearson Correlation	.159**
	Sig. (2-tailed)	.000
	N	700
Co-workers, friends, or family	Pearson Correlation	.011
	Sig. (2-tailed)	.774
	N	700

Table 4.30 shows that there is a statistically significant relation between source of *knowledge Real disaster, Continuing education, Institution or University courses, Media* and Knowledge of disaster regarding Hajj of 2016; since p-value of Pearson Correlation test = 0.029, 0.000, 0.002, 0.000 < 0.0001 respectively.

However, there is no statistically significant relation between source of knowledge Drills practice, Co-workers, friends, or family and Knowledge of disaster regarding Hajj of 2016; since p-value of Pearson Correlation test = 0.230, 0.774 > 0.0001 respectively.

Multiple Regression Analysis Model

A multiple regression analysis was done next to examine how the independent variables collectively relate to dependent variables, as well as exploring their relationship to each other. Until this point the analysis coefficients had been bivariate. The relationship had been examined consecutively, pairing one independent variable (Age, highest level of education, level of EMS, current EMS training received, number of time worked at the Hajj, number of training/workshop and drill EVER attended, number of training/workshop and drill attended, last time attended training/workshop and drill, duration of the last training/workshop and drill) with two dependent variables general knowledge and Hajj knowledge of disaster preparedness for mass gatherings for the

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purpose of determining the empirical relationship between them. These analyses display and interpret the univariate data and document each predictor variable's zero-order correlation with the dependent variables. In general, most variables do not stand alone as they interact with each other; it is important to treat multiple causes that affect the same collective relationship. Therefore, Multiple regression analysis model is a suitable statistical technique for these analyses (Mosteller & Tukey, 1977).

Multiple regression is a multivariate statistical technique that can be used to examine linear relationships and generate predictive equations when there are multiple independent variables present. Lewis-Beck (1980) notes two ways in which multiple regression is useful:

> First, it almost inevitably offers a fuller explanation of the dependent variable, since few phenomena are products of a single cause. Second, the effect of a particular independent variable is made more certain, for the possibility of distorting influences from the other independent variables is removed (p.47).

Thus, Questions about the relative importance of each independent variable in causing changes in the dependent variable are answered by multiple regression and a description of how much variance of the independent variable is also explained (Mosteller & Turkey, 1977).

The beta (β) coefficient is the "standardized partial regression coefficient" used to provide an estimate of the relative importance of the predictor variables (Matlack, 1993). One standard deviation change in the independent variable is indicated by a beta value of 0.8 which causes a mean increase of 0.8 in the dependent variable. An increase in the beta value is directly proportional to an increase in the impact of independent variable on

the independent variable (Brace, Kemp, & Snelger, 2012). The valence indicating the direction of relationship by beta coefficients range in values from -1.0 to 1.0. This allows comparisons across variables from the same regression equation.

Certain features of the data outside of the model, such as multicollinearity, specification error, and scale unreliability may obscure the true relationship between independent and dependent variables potentially resulting in accurate beta coefficient (Lewis-Beck, 1980). Nevertheless, researchers should carefully construct their conceptual models to avoid these problems, then the beta coefficients can be meaningfully interpreted (Blalock, 1979). Therefore, beta coefficients measure how many units of the dependent variable will change when the independent variable associated with the beta weight changes by one unit while holding all other independent variables constant (Sirkin, 2006).

The multiple correlation coefficient (R) is a measure of explained variance between the observed value of cases and their predicted value (Brace et al., 2000; Neter et al., 2004). As described by Sirkin (2006), the "concept of multiple correlation, R, and the coefficient of multiple determination, R^2, is an extension of the Pearson's r and r^2 to more than two variables" (p. 519). While R can be difficult to interpret, Mueller, Schussler and Costner (1977) nevertheless maintain that it indicates the proportion of variance in the dependent variable that is attributed to the model of all predictor variables acting together. Values for R^2 range between zero (i.e., none of the variation is explained) to 1.0 (i.e., 100% of the variance is explained). The multiple correlation coefficient squared can also be tested for statistical significance using the F-ratio (Abdi, 2007). This

test assesses whether or not the difference between the observed explained variance (R^2) is significantly different for zero.

General Knowledge

H$_0$: Characteristics "General knowledge" highest level of education, EMS level or provider, number of times worked at Hajj, number of workshop ever attended, last workshop attended, number of workshops and drills attended for disaster preparedness for mass gatherings are not statistically different between SRCA-EMS providers.

H$_A$: The level of "General knowledge" is not affected by the highest level of education, EMS level or provider, number of times worked at Hajj, number of workshop ever attended, last time attended workshop, number of workshop and drill attended to disaster preparedness for mass gathering are statistically different between SRCEMS-providers.

The significant characteristics include: highest level of education, EMS level of provider, number of times worked at the Hajj, number of workshops ever attended, last workshop attended, number of workshops and drills attended for disaster preparedness for mass gathering.

Table 4.31.

Final Stepwise Model for General Knowledge of Disaster Preparedness

Predictor	B	SE	Beta	P
Number of workshop attended	0.07	0.03	0.10	0.03
EMS level of Provider	0.18	0.05	0.15	0.00
Last time attended workshop	**-0.07**	0.02	-0.10	0.00
Highest level of education	0.12	0.03	0.16	0.00
Number of workshop EVER attended	0.09	0.02	0.18	0.00

Number of times worked at Hajj	0.05	0.02	0.07	0.01
Number of drill attended	0.09	0.03	0.13	0.00
Constant	1.618	0.171		0.00

Note: Adjusted R^2 = 0.333, (7, 692) =50.776 , P< 0.000

In Table 4.31 the final stepwise regression model for prediction of general knowledge of disaster preparedness for mass gathering is presented. The R^2 indicates that the explanatory variables accounted for 33.3% of the variance of general knowledge of disaster preparedness for mass gatherings (DV). The regression is statistically significant (P< 0.0001). Thus, the H_o was rejected and H_A, accepted. The overall regression equation was significant (7, 692) = 50.776, P< 0.0001. The independent variables have a statistically significant effect on the dependent variable. For example, the DV was significantly predicted by: highest level of education completed, not including EMS training (0.12), the EMS level of the provider (0.18), the number of times worked at the Hajj (0.05), the number of workshops ever attended (0.09), the number of workshops attended (0.07), or the number of drills attended (0.09). These variables predicted an increase in the general knowledge of disaster preparedness for mass gatherings. However, the general knowledge of disaster preparedness for mass gathering was negatively predicted by the last workshop attended (-0.07). The researcher may conclude that the model developed in this research study is appropriate for the data.

Hajj Knowledge

H₀: Characteristics "Hajj knowledge" EMS level of providers, number of drills ever attended, number of drills attended, and duration of the last drill attended for disasters at the Hajj are not statistically different between SRCA-EMS providers.

Hₐ: Characteristics "Hajj knowledge" according to the EMS level of providers, number of drills ever attended, number of drills attended, and duration of last disaster drill at Hajj are statistically different between SRCA-EMS providers.

The significant characteristics include: EMS level of providers, number of drills ever attended, number of drills attended, and duration of last drill about disasters at the Hajj.

Table 4.32.

Final Stepwise Model for the Knowledge of Hajj 2016

Predictor	B	SE	Beta	P
Number of drill attended	0.12	0.03	0.14	0.00
Duration last time attended drill	**-0.06**	0.02	-0.12	0.00
EMS levels of provider	0.18	0.05	0.12	0.01
Number of drill EVER attended	0.06	0.03	0.09	0.03
Constant	2.875	0.189		0.000

Note: Adjusted R^2 = 0.110, (4, 695) =22.605 , P< 0.000

In Table 4.32 the final stepwise regression model for prediction of knowledge of the Hajj is presented. The R^2 indicates that the explanatory variables accounted for 11% of the variance in knowledge of the Hajj (DV), and the regression is statistically significant (P< 0.0001). Thus, the H₀ was rejected, and the alternative Hₐ is accepted. The overall regression equation was significant (4, 695) = 22.605, P< 0.0001. The

independent variables. have a statistically significant effect on the DV. For example, the DV is significantly predicted by: EMS level of provider (0.18), the number of drills ever attended (0.06), and the number of drills attended per year (0.12). These variables predicted an increase in knowledge of the Hajj. However, the knowledge of the Hajj was negatively predicted by the duration of the last drill (-0.06).

Summary

This chapter conducting a series of data analysis, provided quantitative data for assessing the knowledge of DPMG for the SRC-EMS providers who worked in the Hajj of 2016 after conducted a series of data analyses. A summary of the hypotheses and results is presented in Table 4.33. The next chapter summarizes the findings, provides a discussion of the results and conclusions related to literature, the limitations of the research, potential implications for the DPMG for SRC-EMS providers, and provides recommendations for further research.

Table 4.33

Hypotheses and Results

Hypothesis	Descriptive	Results
1.Age	**GENERAL KNOWLEDGE OF DISASTER** There is no significant difference in the knowledge of DPMG between different categories of EMS providers based on the age of EMS providers. **KNOWLEDGE of DISASTER REGARDING the Hajj of 2016** There is no significant difference in the knowledge of disaster regarding the Hajj of 2016 between different categories of EMS providers based on the age of EMS providers.	Reject Accept

2.Level of Education	**GENERAL KNOWLEDGE OF DISASTER** There is no significant difference in the knowledge of DPMG between different categories of EMS providers based on level of education.	Reject
	KNOWLEDGE of DISASTER REGARDING the Hajj of 2016 There is no significant difference in the knowledge of disaster regarding the Hajj of 2016 between different categories of EMS providers based on level of education.	Reject
3.Level of EMS	**GENERAL KNOWLEDGE OF DISASTER** There is no significant difference in the knowledge of DPMG between different categories of EMS providers based on level of EMS.	Reject
	KNOWLEDGE of DISASTER REGARDING the Hajj of 2016 There is no significant difference in the knowledge of disaster regarding of the Hajj of 2016 between different categories of EMS providers based on level of EMS.	Reject
4.The sector EMS training received	**GENERAL KNOWLEDGE OF DISASTER** There is no significant difference in the knowledge of DPMG between different categories of EMS providers based on the sector of EMS training received.	Reject
	KNOWLEDGE of DISASTER REGARDING the Hajj of 2016 There is no significant difference in the knowledge of disaster regarding the Hajj of 2016 between different categories of EMS providers based on the sector of EMS training is received.	Accept
5.Years of experience	**GENERAL KNOWLEDGE OF DISASTER** There is no significant difference in the knowledge of DPMG between different categories of EMS providers based on years of experience.	Reject
	There is no significant difference in the knowledge of DPMG between different categories of EMS providers based on number of times worked at the Hajj.	Reject
	KNOWLEDGE of DISASTER REGARDING the Hajj of 2016 There is no significant difference in the knowledge of disaster regarding the Hajj of 2016 between different categories of EMS providers based on years of experience.	Reject
	There is no significant difference in the knowledge of disaster regarding the Hajj of 2016 between different categories of EMS providers based on number of times worked at the Hajj.	Accept
6.Training	**GENERAL KNOWLEDGE OF DISASTER** There is no significant difference in the knowledge of DPMG between different categories of EMS providers based on training (previous disaster education/training, number of trainings and number of hours of training).	Reject
	KNOWLEDGE of DISASTER REGARDING the Hajj of 2016 There is no significant difference in the knowledge of disaster regarding the Hajj of 2016 between different categories of EMS providers based on training (previous disaster education/training, number of trainings and number of hours of training).	Reject

7.Source of knowledge	**GENERAL KNOWLEDGE OF DISASTER** There is no relationship between the source of knowledge and knowledge acquired regarding general knowledge for mass gatherings among different SRCEMS providers. **KNOWLEDGE of DISASTER REGARDING the Hajj of 2016** There is no relationship between the source of knowledge and knowledge acquired regarding DPMG among different EMS providers in the Hajj of 2016.	Reject Reject

CHAPTER V

DISCUSSION, IMPLICATIONS, AND CONCLUSION

This study had three main goals to: 1) assess the knowledge regarding disaster preparedness for mass gatherings DPMG among SRCEMS providers during the Hajj of 2016, 2) explore the relationship between the demographic variables (age, level of education, working experience, previous disaster education/training, number of trainings and number of hours of training), the knowledge about DPMG among SRC-EMS providers during the Hajj 2016, and 3) explore the sources of knowledge about disaster preparedness for mass gatherings SRCEMS providers possess. To achieve these goals the researcher used an online questionnaire that was sent to the participants for their response. This study assessed the relationship between the general knowledge, knowledge of the Hajj 2016 and demographics information and SRCEMS-providers' disaster preparedness for mass gatherings.

The independent variables for this study were: Age of SRCEMS provider, his level of education, his level of SRCEMS provider, current of EMS training received, years of experience in SREA, number of times worked at the Hajj, training (previous educational/training number of trainings, and number of hours training). The dependent variables were: general knowledge of disaster preparedness for mass gatherings and knowledge of the Hajj 2016. The researcher discusses the findings of the study and examines them in light of the current literature in this chapter. Finally, this chapter outlines implications for the findings of the study in terms of the knowledge of disaster

preparedness for mass gatherings for SRCEMS providers in SRCA, as well as limitations of the study, its implications, and the conclusions reached by this researcher.

Demographic Characteristics

The sample for this study consisted of 700 respondents who completed the survey, of whom 64.9% were between less than 25 to 34 years of age, 64.4% had a diploma either two or three years. 65.6% were EMS technicians, and 51.1% had received their current EMS training in the private sector. Concerning their experience, 34.9% had from 5 to 9 years of experience and 38.7% of them had worked in four or more Hajj seasons.

Concerning their experience working for the Saudi Red Crescent, 26.7% had never attended trainings on disaster preparedness for mass gatherings, 40.7% had never attended any workshop, and 30% had never attended any drills on the subject.

Concerning their continuing education, 40.3% did not attend any training every year, 53.6% did not attend any workshop every year, and 45.6% did not participate in any annual drill. Only 25.3% of the SRC-EMS providers had attended trainings within the last year, 24.3% had attended workshops between the last six months to a year, and 26.1% had participated in drills in the last six months to a year. The duration of the last training was less than 5 hours (35.7%), the duration of the last workshop was 5 to 9 hours (25.9%), and the last drill was less than 5 hours long (25.0%).

The most frequent disaster experienced by SRC-EMS providers was a transport disaster, experienced by 46.6% of the respondents. For the Hajj experience, 60% of SRC-EMS providers had experience with a stampede disaster. However, 71.4% of SRC-EMS providers did not participate in drafting any emergency plan or in emergency planning for

disaster for the Hajj season. Only 83.3% of them know whom to contact (chain of command) in a disaster situation in the Hajj season.

The highest mean for the sources of their knowledge was real disaster (mean = 4.31), followed by drills (mean = 4.25). To improve their disaster preparedness, SRC-EMS providers first recommended a disaster management course (mean = 4.54) and secondly drills practice (mean = 4.54). To increase their knowledge about disasters. SRC-EMS providers considered that most needed a course on incident command system (mean = 4.54) and secondly, a course on field triage (mean = 4.50).

Key Findings

The study had several key findings and the knowledge of disaster preparedness for mass gatherings varied among of SRCEMS providers according to their age, level of education, professional level of EMS, current EMS training received, years of experience, types of training, and source of knowledge. First, there was a significant difference in the knowledge of disaster preparedness for mass gatherings between different categories of SRCEMS providers according to their age. The group aged 35-39 years possessed a significantly superior general knowledge of disaster preparedness for mass gatherings compared to any other age group. However, there was no statistically significant knowledge of the Hajj 2016 based on age.

Second, there is a significant difference in the knowledge of disaster preparedness between different categories of SRCEMS providers based on level of education. Those possessing a Master's degree were statistically significantly more prepared than other categories of SRCEMS providers, indicating that the graduate level contributed more to their general knowledge of disaster preparedness for mass gatherings than any other level

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of education. Moreover, there is a statistically significant difference in the knowledge of the Hajj 2016 according to their level of education. The holders of Master's degree possessed a knowledge about the Hajj of 2016 which was a significantly superior to other categories of SRCEMS providers. Similarly, one can conclude that graduate studies were more strongly associated with knowledge of the Hajj 2016 than other levels of education.

Third, there was a significant difference in the knowledge of DPMG between the different categories of EMS providers. The paramedic level of EMS had a significantly superior general knowledge of disaster preparedness for mass gatherings compared to other EMS levels. The paramedic level had significantly higher scores on the general knowledge questions compared to the other EMS providers. There was also a significant difference in the knowledge of the Hajj 2016 between categories of EMS providers. Physicians had significantly superior knowledge of the Hajj 2016 compared to other EMS levels.

Four, there was a significant difference in the general knowledge of disaster preparedness for mass gatherings based on the current SRCEMS providers training received. The military sector had significantly better scores on general knowledge than other categories of SRCEMS providers. However, there was no significant difference in the knowledge of the Hajj of 2016 across all providers regardless of which sector they trained in.

Fifth, there was a significant difference in the general knowledge of disaster preparedness for mass gatherings based on years of experience. Scores on general knowledge assessment were significantly higher in the group having 15- 19 years of experience. The general knowledge of disaster preparedness for mass gatherings

according to number of times worked at the Hajj was also statistically significantly higher among SRC-EMS providers who had worked at the Hajj for four seasons or more. The EMS group with 15-19 years of experience had statistically significantly higher knowledge of the Hajj 2016 compared to other groups. Knowledge of the Hajj in 2016, based on the number of times worked at the Hajj, did not indicate any statistically significantly differences among SRC-EMS providers.

Sixth, the general knowledge of disaster preparedness for mass gatherings based on different levels of training (previous disaster education/training, number of trainings and number of hours of training) was highest among those who had attended three trainings. In the workshops and drills category, the statistical difference in general knowledge of disaster preparedness for mass gatherings among of SRC-EMS favored providers who attended more than three times. The general knowledge of disaster preparedness for mass gatherings among SRCEMS was greater among those who attended four trainings, workshops and drills per year. Those SRC-EMS providers who had attended trainings, workshops or drills in the last 6 months to 12 months possessed statistically more general knowledge of disaster preparedness for mass gatherings than other groups. Additionally, the general knowledge of disaster preparedness for mass gathering was significantly higher among those SRC-EMS providers who had attended a training that lasted from five hours to nine hours. The general knowledge of disaster preparedness for mass gatherings was better for workshops and drills that lasted 20 hours or more but not necessarily 20 hours at one time; the 20 hours could be distributed across several days or months.

Those SRC-EMS providers who had attended trainings and drills three times had significantly higher knowledge of the Hajj in 2016 scores. In the workshop category, the statistical difference in knowledge of the Hajj 2016 among of SRCEMS favored providers who workshops attended more than three times. Knowledge of the Hajj 2016 was greatest for the group that had attended for trainings, workshops and drills four times per year. SRC-EMS providers who had attended trainings, workshops or drills in the last 6 months to 12 months had statistically more knowledge of the Hajj 2016. Furthermore, knowledge of the Hajj 2016 among SRCEMS providers was significantly better among those who had attended a training lasting from five to nine hours. Knowledge of the Hajj 2016 among SRCEMS providers was significantly better among those who attended a training that lasted from five hours to nine hours. Knowledge of the Hajj 2016 among SRCEMS providers was significantly better among those who attended a workshop or drill lasting 20 hours or more.

Seventh, there is a definite relationship between the source of knowledge and general knowledge for mass gatherings among different SRC-EMS providers. Those who obtained the higher knowledge scores received their training from continuing education, institution or university courses, and the media. The level of knowledge regarding the Hajj of 2016 was higher in those SRC-EMS providers who had received the following types of training; real disaster, continuing education, institution or university courses and media.

Additional findings were obtained by examining, by stepwise regression modeling, how the independent variables collectively predicted the dependent variables. Most importantly, the significant predictors for general knowledge of disaster

preparedness for mass gatherings include: highest level of education, EMS level of providers, number of times worked at the Hajj, number of workshop ever attended, last workshop attended, and number of workshops and drills attended for disaster preparedness for mass gatherings.

Secondly, multiple regression analysis of knowledge of the Hajj 2016 revealed the following predictors: EMS level of providers, number of drills ever attended, number of drills attended, and duration of last drills attended for a disaster at the Hajj.

Discussion Summary

From the analysis performed for this study, the following conclusions were reached:

<u>The Age of SRC-EMS providers is relevant</u>

Evidently, the SRC-EMS providers who were aged 35- 39 years old have sufficient knowledge of disaster preparedness for mass gatherings, which aligns with Chan (2009) who found that young adults age 26-30 had less knowledge and skills than adults aged 31-40 years in clinical management. This could imply that young adults aged less than 34 years might not have yet enough accumulated experience in field of disaster preparedness, leading to limited competency in the specific and advanced clinical skills needed to care for Hajj patients in the field. However, according to Kliegel and Martin (2007) young adults have a better memory higher, a speed of information processing and fewer inhibition that older adults. With these considerations, recruiters for SRC-EMS providers for the Hajj should know that young adults should be encouraged to have continuing education and training emphasizing emergency and disaster to improve their knowledge of disaster preparedness for mass gathering such as the Hajj season. Likewise, Saudi Red Crescent Human Resources officials should provide incentives to incentives

EMS providers aged 40 or more, such as salary increase or time off days for training, to improve their knowledge of disaster preparedness.

<u>The Level of Education completed, not including EMS training. is relevant.</u>

There was a significant difference in the knowledge of disaster preparedness between different categories of SRCEMS providers based on level of education. Those with a Master's degree are statistically significantly more prepared than the other categories of SRCEMS providers. That means the master level of education contributed more to general knowledge of disaster preparedness for mass gatherings than other levels of education. Similar studies indicated that the graduate level of education for the health care providers were more knowledgeable and willingness to work in disaster situations (Chan, 2009; Fung, Loke& Lai, 2008; Arbon, Ranse, Cusack, Considine, Woodman, Bahnisch, Kako, Hammand, & Mitchell, 2013).

The majority of respondents for this study had two or three diplomas and findings suggest that the educational level of SRC-EMS providers might be have played an important role in their knowledge of disaster preparedness. Those at the diploma level displayed limited knowledge for disaster preparedness, in particular dealing with complex issues. They reported insufficient skills in seeking information, and had limited capability to develop advanced clinical skills in response to complicated health problems, which likewise aligned with Chan's 2009 study, that reported healthcare providers at a diploma level showed a lower level of knowledge and skills than bachelor, master or PhD level students in clinical management. It may be that the level of education of SRC-EMS providers influenced their response to an emergency disaster and their willingness to respond (Evers & Puzniak, 2005).

There is a statistically significant difference in the knowledge of the Hajj 2016 based on levels of education. The Master's degree is a significantly superior to other categories of SRCEMS providers, which means that the master level of education was more strongly associated with knowledge of the Hajj 2016 than other levels of education. Saudi Arabia currently does not have master or PhD level that focuses on disaster preparedness for mass gatherings. Usually people with high levels of education are willing to learn and improve their job performance.

The category of EMS for SRC-EMS providers is relevant

There is a significant difference in the knowledge of DPMG between categories of EMS providers. The paramedic level of EMS is significantly superior in the general knowledge of disaster preparedness for mass gatherings compared to other EMS levels. The paramedic is highest level of EMS providers and the kinds of courses and trainings are different from the first responders and EMS technicians. However, in the Hajj knowledge physicians scored higher than the other EMS levels. Surprisingly, the physicians worked in the field during the Hajj more than the other providers because some patients need advanced care. Previous, similar studies had indicated that physicians had more knowledge of critical situations compared to other EMS levels (Fischer, Kabir, Stein, & Burger, 2008).

The training received by SRC-EMS providers was relevant

There was a significant difference in the general knowledge of disaster preparedness for mass gatherings based on the current SRCEMS providers training received. Those who had trained in the military sector had significantly better scores on general knowledge about disaster preparedness than other groups, supporting previous

studies that had found that military healthcare providers had more knowledge of disaster preparedness than the civilian hospital providers (Al-Thobaity, Plumber, Innes, Copnell, 2015). Thus, the SECA should be interested in hiring military-trained EMS providers for their organization.

<u>The number of years of experience</u>

There was a significant difference in the general knowledge of disaster preparedness for mass gatherings based on years of experience. Scores on the general knowledge assessment were significantly higher in the group having 15 to 19 years of experience. More knowledge, more experience and improved readiness increased confidence in disaster preparedness compared to those having little experience, which supports earlier studies indicating that healthcare workers who had many years of experience were more knowledge able about disasters (Al-Khaliah, Bond, & Alasad, 2012; Lim, Lim, & Vasu, 2013). In addition, the EMS group with 15 to 19 years of experience had statistically significantly higher knowledge of the Hajj 2016 compared to other groups.

The general knowledge of disaster preparedness for mass gatherings was also statistically higher among SRCEMS providers who had worked in the Hajj at least four seasons or more. Then more times one worked at the Hajj is associated with greater knowledge of disaster preparedness.

<u>Training was relevant</u>

The general knowledge of disaster preparedness for mass gatherings was influenced by the training attended by previous disaster education/training, number of trainings and number of hours of training. Those who had three attended trainings had

significantly higher knowledge scores. In the workshops and drills category, the statistical difference in general knowledge of disaster preparedness for mass gatherings among of SRC-EMS providers favored those who had attended drills more than three times, while those who had had some training had some knowledge more than those who had attended no trainings or workshops aligning with other studies whose results indicated that previous trainings, workshops or drills such as disaster management, BLS, ACLS, BTLS and biological or chemical and terrorism were important to prepare healthcare providers for dealing with disaster situation(Crane, McCluskey, Johnson, & Harbison, 2010; Husan, Hatthakit, & Chaowalit, 2011). Moreover, those who attended trainings and drills three times or more had significantly higher scores on knowledge of the Hajj 2016. In the workshop category, the statistical difference in knowledge of the Hajj 2016 among of SRCEMS also favored providers who attended workshops more than three times.

General knowledge of disaster preparedness for mass gatherings and knowledge of Hajj 2016 among SRCEMS was greater among those who attended trainings, workshops and drills four times per year.

Attending trainings, workshops or drills in the last 6 months to 12 months appears to be influential in the general knowledge of disaster preparedness for mass gatherings and knowledge of the Hajj 2016 among of SRC-EMS providers. Those who had attended trainings, workshops and drills in the last 6 months to 12 months had more knowledge of disaster preparedness (Alzahrani, Kyratisis, 2016).

Also, the general knowledge of disaster preparedness for mass gathering and knowledge of Hajj 2016 among of SRCEMS providers was significantly better among

those who had attended a training of five to nine hours duration. Findings were in accordance with a similar study that indicated, in 2011, increased number of hours of training for disaster preparedness would increase the healthcare providers' knowledge of disaster preparedness (Fernadez, Studnek, Margoils, Crawford, Bentely, & Marcozzi, 2011). The general knowledge of disaster preparedness for mass gatherings was best who had attended workshops and drills that lasted 20 hours or more.

<u>Source of knowledge</u>

There was a relationship between the source of knowledge and general knowledge for mass gatherings among different SRCEMS providers with the higher knowledge scores for those who were trained by continuing education, institution or university courses, and media (TV, social media, radio, and Internet). These were the main sources of general knowledge of disaster preparedness for mass gatherings that SRCEMS providers used to improve their knowledge. Similar, previous studies had also indicated that the best sources of general knowledge for healthcare providers were continuing education, institution or university, and media (Al-Thobaity, Plummer, Innes, & Copnell, 2015; McKibbin, Sekula, Colbert, & Peltier, 2011; Wisniewski, Dennik-Champion, & Peltier, 2004).

The general knowledge about disaster and knowledge of the Hajj 2016 among different SRC-EMS providers was higher among those who had had following types of training; real disaster, continuing education, institution or university courses and media. Working at Hajj was important for SRC-EMS providers to learn about disasters as a real disaster experience was one of the important sources of knowledge.

Predictive Model of the group general knowledge of disaster preparedness for mass gatherings

From the regression model on general knowledge of disaster preparedness for mass gatherings, significant predictors include: highest level of education, EMS level of providers, number of times worked at the Hajj, number of workshop ever attended, last workshop attended, number of workshops and drills attended. The highest level of education, not including EMS training, significantly predicted and affected the general knowledge of disaster preparedness among SRCEMS providers. Findings of this study indicated that the Master's degree holder is a significantly superior to other categories of SRC-EMS providers and the amount of increased general knowledge between the level of education would increase ($\beta = 0.12$). For example, the amount of general knowledge of disaster preparedness would be increased 0.12 from bachelors' degree to masters' degree.

Additionally, EMS level of the provider significantly predicted an increased general knowledge of disaster preparedness among SRC-EMS providers. This study, showed that the paramedic level of EMS is significantly superior in the general knowledge of disaster preparedness for mass gatherings compared to other EMS levels and the amount of increased general knowledge between the level of EMS provider would increase ($\beta = 0.18$). for example, the amount of general knowledge of disaster preparedness would be increased 0.18 from first responder to EMT-technician.

The number of times worked at the Hajj significantly predicted an increased general knowledge of disaster preparedness among SRC-EMS providers. In this study, those who worked four seasons or more had statistically significantly higher scores on general knowledge, and the beta was ($\beta = 0.05$). For example, the amount of general

knowledge would be increased 0.05 from one season at the Hajj, two times to four times if the SEC-EMS providers worked in more Hajj seasons.

The number of workshops ever attended about disaster preparedness also significantly predicted an increase in general knowledge of disaster preparedness among SRC-EMS providers. In this study, the number of workshops ever attended was significant in the general knowledge of disaster preparedness among of SRC-EMS providers, and favored providers who attended more than three times. The amount of general knowledge increase between the number of workshop ever attended was (β = 0.09). For example, the disaster preparedness of SRC-EMS providers would be increased 0.09 for each workshop, to two or three.

The number of workshops attended per year significantly predicted and affected the increased general knowledge of disaster preparedness among SRC-EMS providers. In this study, the number of workshops per year affected the general knowledge of disaster preparedness among of SRC-EMS providers, favoring those who attended four times per year and increasing their general knowledge between the number of workshops attended per year (β = 0.07).

The number of drills attended per year also significantly predicted an increased general knowledge of disaster preparedness among SRC-EMS providers. In this study, the number of drills attended made a significant difference in general knowledge of disaster preparedness among of SRC-EMS providers, and favored those who attended four times per year. Their general knowledge increased between the number of drills attended per year (β = 0.09).

However, the general knowledge of disaster preparedness for mass gatherings was negatively predicted by the last time participating in a workshop ($\beta = -0.07$), indicating that the general knowledge of disaster preparedness for SRC-EMS providers would decrease over time since the last time the providers attended a workshop. This study, revealed that attending a workshop in the last 6 months to 12 months was optimal for SRC-EMS providers' general knowledge of disaster preparedness for mass gatherings and knowledge of the Hajj 2016.

Predictive Model of the group knowledge of the Hajj 2016

According to the multiple regression analysis of knowledge of the Hajj 2016, predictors include: EMS level of providers, the number of drills ever attended, the number of drills attended, and duration of the last time attended a drill for a disaster at the Hajj.

EMS level of provider significantly predicted and affected the knowledge of Hajj 2016 among SRC-EMS providers. In this study, physicians had significantly superior knowledge of 2016 Hajj compared to other EMS levels. The increase of general knowledge between the levels of EMS provider would increase ($\beta = 0.18$), meaning that the general knowledge of disaster preparedness would be increased 0.18 from paramedic to physician.

The number of drills ever attended related to Hajj disaster preparedness significantly predicted and affected the knowledge of the Hajj 2016 among SRC-EMS providers. In this study, there was a significant difference in knowledge of 2016 Hajj according to the number of drills ever attended, favoring providers who attended three drills. Knowledge of the Hajj 2016 increased according to the number of drills ever attended ($\beta = 0.06$), indicating, for example, that the knowledge of a SRC-EMS provider

who attended drills related to the Hajj disaster preparedness would be increased by 0.06 for one time, 0.12 for two times and 0.18 for three times.

Likewise, the number of drills attended per year significantly predicted and affected the knowledge of the Hajj 2016 among SRC-EMS providers. In this study, the number of drills attended affected the knowledge of the Hajj 2016 among of SRC-EMS providers, favoring those who attended four times per year. Their general knowledge would increase according to the number of drills attended per year by ($\beta = 0.12$), indicating that the knowledge of 2016 Hajj SRC-EMS providers would increase by 0.12 each time they participated in a drill per year.

In contrast, the knowledge of the Hajj was negatively predicted by the duration of last drill attended ($\beta = -0.06$). SRC-EMS providers' knowledge of the Hajj 2016 would decrease as the drill's duration increased. This study showed that knowledge of the Hajj 2016 among SRC-EMS providers decreased among those who attended a drill of 20 hours or more, suggesting that long drills should take place over several days or a week.

Implications

Training / Education

This study found that the knowledge of disaster preparedness for mass gathering was sub-optimal among SRC-EMS providers. The training and education are imperative approaches to improve the knowledge of disaster management. In this study, 64.9% of the respondents were less than 25 to 34 years old. The SRC-EMS providers who were more than 40 years old had less than the recommended knowledge, and less than the group age from 35 to 39 years old. That means young (less than 35 years) SRC-EMS providers as well as those older than 40 need more training, workshops, and drills. SRCA

should encourage members of those age group to attend specific programs focused on disaster preparedness, to include basic epidemiology, patient assessment (Medical and Trauma), crowd control, critical thinking, triage, disaster management, and incident command systems. These programs should be in the form of workshops or drills. Providers should be sent to the Hajj for work to prove their ability to perform in these situations.

The SRCA stations should offer trainings for their providers to be ready when a disaster happens and should be credited as continuing education. It will keep EMS workers up to date about disaster management, especially in the knowledge and skills related to the Hajj season. In addition, training should be supported with workshops and drills to provide familiarity with critical knowledge and skills.

The majority of participants of this study were EMS technicians and had diploma degrees. This group of providers had lower knowledge of disaster preparedness for mass gatherings than the other groups of providers in this study. SRC-EMS technicians need additional trainings on disaster management and leadership. Workshops and drills are critical components of training to ensure the necessary skills for EMS providers. In addition, Incident Command System should be integrated into daily routines to improve first responders and EMS technicians familiarity and allow them to take leadership roles during the disaster situations.

This study showed that 51% of the participants had current EMS training through the private sector and had lower knowledge of disaster preparedness than those trained by other sectors. The health education provided by private sector needs support from the government and its curricula should be reviewed to assure that they meet the standards of

EMS training. The government should have standards for private colleges to allow them to teach EMS training. The government should impose standards for private colleges to allow them to teach EMS training and should supervise them from beginner to end. SRCA should assess providers and provide them additional courses and training before they are hired. In this study SRC-EMS providers whose current training was in the military sector had more knowledge than those from other sectors. Future studies should focus on the military experience of health education and study it as a model of how to implement the military experience of health education for other sectors.

Prior Experience

Saudi EMS providers have unique opportunities for disaster situations during the Hajj each year. It is imperative to encourage them to work during the Hajj. Work during the Hajj season offers a chance to practice and learn numerous skills. Additionally, it is important for SRC-EMS providers to participate in writing disaster plans for the Hajj. Experience in disaster situations such the Hajj will give providers more confidence and increase their knowledge and practice of disaster management.

Scope of recommendation for practice

The Hajj season is a potential disaster situation and challenge for the Saudi government. The practice of Saudi EMS providers in Saudi Arabia needs to change and improve, so methods of training and education should also change from the very beginning. The curricula of EMS training in school should include additional courses about disaster preparedness for mass gatherings with, for example, courses about disaster management, ICS, crowd medicine, crowd control and triage. Another recommended change is for EMS training to use simulation labs to practice the skills learned in

classroom lectures. The simulation lab should be set up for the scenario of mass casualty

triage and train the providers during a simulated disaster. Following a practicum training,

providers should be debriefed to identify mistakes and areas for additional provider

training. Also, EMS technicians should have more responsibilities during the Hajj, to

include advanced skills of EMS providers such as leadership of treatment and

transportation. Decision- makers with the SRCA should establish a research center to

study the new EMS field protocol in Saudi Arabia, as EMS research is very weak in

Saudi Arabia, especially in SRCA (Al-shammari, Jennings, & Williams, 2017). Thus,

academic professors should be encouraged to publish papers on research into the scope of

practice for EMS providers during disaster preparedness for mass gatherings, as this will

help the Saudi system improve and fill the gaps of knowledge of disaster preparedness of

the Hajj.

Synthesis and Application of these Results

It is important that the salient findings from this dissertation be communicated to the

highest levels of the Saudi Arabian first responders training command. The important

findings of this investigation center on the training and characteristics of the EMS

workers who are best prepared for working mass gatherings such as the Hajj.

1. **<u>Years of Experience:</u>** More mature EMS workers (35-39 years old) were

   superior to less experienced age groups. While this is not a modifiable factor, it

   provides insight into the current age group with the best knowledge (training,

   workshops, and degree programs) preparation. Therefore, this finding should

   provide a template for the training that those 35-39 years have had and assure that

younger workers are provided the same training, in an attempt to enhance the skills to the level of the 35-39 year old workers.

2. **<u>Certification:</u>** A strict certification program needs to be implemented because a large proportion (26% to 45.6%) of EMS providers did not attend training. The certification program should include mandatory annual training that is documented through a central authority. It may be necessary to implement a regulation that states one MUST NOT BE ALLOWED to be a practicing EMS/first responder without current certification/licensure. Penalties should be attached to non-compliance.

3. **Training Content and Delivery:** the training of EMS providers should have the goal of delivering advanced training that parallels the skills learned by those who hold a master's degree. There should be incentives for EMS workers to pursue higher education leading to the master's degree. Training should include classroom training, workshops, and disaster drills. The training must be updated and renewed each year because it was found that those whose training was within 12 months was significantly higher than other categories.

Classroom training should be concise and last <u>no more than five contact hours,</u> except when the classroom exercises are part of a structured curriculum leading to the master's degree. It was found that longer training did not increase knowledge. *training* should be concise and last <u>no more than 9 hours</u> because it was found that workshops that last 5 to 9 hours contributed to knowledge about as much as workshops that lasted 20 hours. Content delivery should be concise and focus on specific emergency types such as stampedes, victim transport, and medical aid.

Disaster drills should be conducted no fewer than four times per year, and the training drills should last about a day, but should last about 20 hours, but the time can be divided across a month to facilitate work schedules.

Paramedic training should be included for all EMS providers with levels of proficiency noted, and the expectation that the provider will enhance their training annually with the end goal to obtain a master's degree knowledge level or equivalent thereof. The paramedic training is a mandatory skill that EMS providers must acquire, and this skillset must be updated and advanced annually.

The Mandated Schedule of training for re-certification should include several types of training with specific frequency. Classroom training should be conducted no less than four times per year. Workshops should be conducted no less than four times per year. Drills should also be conducted no less than four times annually.

In summary, the types of training and number of times the activity is conducted annually will be documented. *It is recommended that a certification or licensure be implemented and enforced.* Continuing education is a critical component of the program because it was found that training that occurred more than a year (more than 12 months) was not significantly associated with increased knowledge. These actions will dramatically increase the proficiency of the EMS workforce in Saudi Arabia for the Hajj, and other mass gatherings. In addition, this program will result in a more highly trained and effective emergency services workforce.

Limitations of Study

Limitations of this study include the use of only a self-reported survey, and a 41% response rate (i.e., 700 respondents to 1650 surveys sent). The most obvious limitation was the use of online self-reporting data collection procedures. For example, the participants' responses to questionnaires might have been biased and the researcher had no control over the environment. In addition, this study was a cross-sectional study in which participants responded to the survey at only one time. Therefore, other factors, such as such as having an unexpected issue on the specific day the survey was completed, might have affected the responses. The second limitation in this study is that the respondents were only Saudi EMS providers who worked in SRCA. This study excluded another Saudi EMS providers who worked in another Ministries in Saudi Arabia such as Ministry of Health, Ministry of Defense and National Guard hospitals. The finial limitation of this study was its focus on Saudi EMS providers in SRCA and did not assess the leaders of SRCA or their knowledge of disaster preparedness for mass gatherings. Future EMS leaders should be the most intensely trained, which will lead to significant and rapid improvement of the system.

Strengths of study

The strength of this study is that it is the first empirical study on the role of SRC-EMS providers in disaster preparedness for the Hajj season in Saudi Arabia. As such, it provides new valuable information on the perceived preparedness of SRCEMS providers during the Hajj against role standards as stated in the emergency plan of SRCA. The study identified specific health education and training programs deemed appropriate and relevant by the SRC-EMS providers. Finally, this study is the first study to investigate

predictive factors associated with increasing knowledge of disaster preparedness for the SRC-EMS providers.

Future Study Research

This study was focused on assessment of SRC-EMS providers for disaster preparedness for mass gatherings and found various different levels of knowledge among EMS providers. It will be beneficial if other studies assess other Saudi EMS providers who work for other agencies such MOH, Saudi National Guard, and Ministry of defense because all of them work in second line capacity with SRCA when disasters happen during the Hajj.

As this study found the military sector of education is more efficient and effective for disaster preparedness. Future research should focus on health education within the military sector to find out why their students are more knowledgeable than other students from other sectors.

Finally, this study provides a basis for further research into disaster preparedness as a whole. The results for this specific population of SRC-EMS providers showed a lack of knowledge of disaster preparedness for mass gatherings which has effects on the entire disaster management approval for mass gathering events. It is recommended that a qualitative and mixed methods approaches be taken to identify variables that may influence actions. The influence of knowledge on individual preparedness for disasters should be studied and should include experimentation.

Conclusion

This study was the first Saudi study that explored the SRC-EMS provider's perception of their readiness for disasters at mass gatherings. The findings indicate a

relationship between the demographic variables of SRC-EMS providers (age, level of education, level of EMS providers, working experience, previous disaster education/training, number of trainings, number of hours of training) with general knowledge of disaster preparedness and the Hajj knowledge of 2016. All of these variables were related to knowledge of disaster preparedness for mass gatherings. The findings indicate that the best sources of general knowledge of SRC-EMS providers were continuing education, institutional or University courses, and media. However, the best sources for Hajj knowledge of 2016 for SRC-EMS providers were real disasters, continue education, institution or university courses, and media.

This study provides valuable insights into understanding predictive factors associated with better levels of general knowledge of disaster preparedness for mass gathering and disaster preparedness for the Hajj of 2016. These predictive factors determined the level of knowledge of disaster preparedness for SRC-EMS providers. The following characteristics for general knowledge of disaster preparedness should be included; highest level of education, EMS level of provider, number of time working at the Hajj, number of workshops ever attended, time elapsed since last workshop, number of workshops and drills attended for disaster preparedness for mass gatherings. However, the characteristics for knowledge of the Hajj 2016 included; EMS level of provider, number of drills ever attended, number of drills attended, and duration of last drill attended for a disaster in the Hajj.

Finally, this study offers major recommendations to the Saudi government to improve the knowledge of disaster preparedness for mass gathering for SRC-EMS providers, such as improving the training and education, encouraging the providers to

work in the Hajj, and changing the scope of practice for the Saudi EMS system. Thus, the

Saudi government can apply these recommendations to improve the Saudi EMS system.

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APPENDICES

Appendix A

Approval Form the University of Louisville's Institutional Review Board

UNIVERSITY OF LOUISVILLE

Human Subjects Protection Program Office
MedCenter One – Suite 200
501 E. Broadway
Louisville, KY 40202-1798
Office: 502.852.5188 Fax: 502.852.2164

DATE:	March 06, 2017
TO:	Susan O Allen
FROM:	The University of Louisville Institutional Review Board
IRB NUMBER:	17.0120
STUDY TITLE:	An Assessment of the disaster preparedness knowledge of Emergency Medical Services providers in Saudi Red Crescent Authority during Hajj of 2016
REFERENCE #:	636670
IRB STAFF CONTACT:	Barbara Dearinger, BS, CIP (502)852-5987 badear01@louisville.edu

This study was reviewed on 03/03/2017 by the Chair/Vice Chair of the Institutional Review Board and approved through the Expedited Review Procedure, according to 45 CFR 46.110(b), since this study falls under Category 7: Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

This study was also approved through 45 CFR 46.116 (C), which means that an IRB may waive the requirement for the investigator to obtain a signed informed consent form for some or all subjects if it finds either:

- That the only record linking the subject and the research would be the consent document and the principal risk would be potential harm resulting from a breach of confidentiality. Each subject will be asked whether the subject wants documentation linking the subject with the research, and the subject's wishes will govern; or

- That the research presents no more than minimal risk of harm to subjects and involves no procedures for which written consent is normally required outside of the research context.

The following items have been approved:

Title	Version #	Version Date	Outcome
New research protocol	Version 1.0	02/26/2017	Approved
Survey Arabic version	Version 1.0	02/03/2017	Approved
Survey English version	Version 1.0	02/03/2017	Approved
informed consent	Version 1.0	01/31/2017	Approved

This study now has final IRB approval from 03/03/2017 through 03/02/2018.

For guidance on using iRIS, including finding your approved stamped documents, please follow the instructions at
https://louisville.edu/research/humansubjects/iRISSubmissionManual.pdf

Site Approval
If this study will take place at an affiliated research institution, such as KentuckyOne Health, Norton Healthcare or University of Louisville Hospital, permission to use the site of the affiliated institution is necessary before the research may begin. If this study will take place outside of the University of Louisville Campuses, permission from the organization

must be obtained before the research may begin (e.g. Jefferson County Public Schools). Failure to obtain this permission may result in a delay in the start of your research.

Privacy & Encryption Statement
The University of Louisville's Privacy and Encryption Policy requires such information as identifiable medical and health records: credit card, bank account and other personal financial information; social security numbers; proprietary research data; dates of birth (when combined with name, address and/or phone numbers) to be encrypted. For additional information: http://security.louisville.edu/PolStds/ISO/PS018.htm.

Implementation of Changes to Previously Approved Research
Prior to the implementation of any changes in the approved research, the investigator will submit any modifications to the IRB and await approval before implementing the changes, unless the change is being made to ensure the safety and welfare of the subjects enrolled in the research. If such occurs, a Protocol Deviation/Violation should be submitted within five days of the occurrence indicating what safety measures were taken, along with an amendment to revise the protocol.

Unanticipated Problems Involving Risks to Subjects or Others (UPIRTSOs)
In general, these may include any incident, experience, or outcome, which has been associated with an unexpected event(s), related or possibly related to participation in the research, and suggests that the research places subjects or others at a greater risk of harm than was previously known or suspected. UPIRTSOs may or may not require suspension of the research. Each incident is evaluated on a case by case basis to make this determination. The IRB may require remedial action or education as deemed necessary for the investigator or any other key personnel. The investigator is responsible for reporting UPIRTSOs to the IRB within 5 working days. Use the UPIRTSO form located within the iRIS system to report any UPIRTSOs.
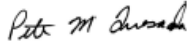
Continuation Review Requirements
You are responsible for submitting a continuation review 30 days prior to the expiration date of your research study. Investigators who allow their study approval to expire have committed significant non-compliance with federal regulations. Such lapses may require reporting to federal agencies, a program audit by compliance auditors to ensure that subjects were not enrolled during the expired period, and may lead to findings of serious and continuing non-compliance if expiration were to occur a second time.

The committee will be advised of this action at a regularly scheduled meeting.

If you have any questions, please contact the IRB analyst listed above or the Human Subjects Protection Program office at hsppofc@louisville.edu.

Sincerely,

Peter M Quesada

Peter M. Quesada, Ph.D., Vice - Chair
Biomedical Institutional Review Board

Appendix B
Survey Instrument (English Version)

Q1   What is your age?

- Less than 25 years
- 25-29
- 30-34
- 35-39
- 40-44
- 45-49
- 50 and above

Q2   What is your status?

- Single
- Married
- Divorced
- Widowered

Q3   What is your Nationality?

- Saudi
- Non-Saudi

Q4   What is your highest level of education completed, not including EMT training?

- High school
- Diploma + 2 yrs
- Diploma +3yrs
- BS
- MS
- Doctor (PhD or MD)
- Other

Q5   What is your EMS level?

- First responder
- EMS-TECH
- EMS-Paramedic
- Physician

Q6   Which of the following best describe the training you received current EMS training?

- Gov sector
- Private sector
- Military sector
- Outside of the KSA

Q7   How long have you worked as EMS providers in Saudi Red Crescent?

- Under one yr
- 1- under 5 yrs
- 5-under 10 yrs
- 10-under 15 yrs
- 15-under 20 yrs
- 20 yrs and above

Q8 How many times have you worked at Hajj?

- ○ One season
- ○ Two season
- ○ Three season
- ○ Four season or more

Q9 How many patients did you treat on the average day during the Hajj of 2016?

- ○ 0-10
- ○ 11-20
- ○ 21-30
- ○ 31-40
- ○ Over 40

Q10 How many trainings/workshops/drills about disaster preparedness have you ever been attended?

	Never	One	Two	Three	More than Three
Training	○	○	○	○	○
Workshops	○	○	○	○	○
Drills	○	○	○	○	○

Q11 Which of the following best describes your attendance at a trainings/workshops/drills about disaster preparedness? N/A

	Never	One time per year	Two times per year	Three times per year	Four times per year	Five times or more per year
Training	○	○	○	○	○	○
Workshop	○	○	○	○	○	○
Drill	○	○	○	○	○	○

Q12 When was the last time you attended a trainings/ workshops/ drills about disaster preparedness?

	Less than six months ago	Six months ago-A year ago	More than one year ago	N/A
Training	○	○	○	○
Workshop	○	○	○	○
Drill	○	○	○	○

Q13 What was the duration of the last trainings/workshops/drills about disaster that you attended?

	Less than 5 hours	From 5 hours but less than 10 hours	From 10 hours but less than 20 hours	20 hours or more	N/A
Training	○	○	○	○	○
Workshop	○	○	○	○	○
Drill	○	○	○	○	○

Q14 Which of the following have you ever experienced during Hajj season? multiple choice

- ☐ Fire disaster
- ☐ Transport disaster
- ☐ Building collapse disaster
- ☐ flood disaster
- ☐ Epidemic disaster
- ☐ Stampede disaster
- ☐ Bioterrorism/Biological and Chemical disaster
- ☐ None of above

Q15

PART-A Knowledge in General
Directions
  Please read each of the following questions and describe how often you implemented each item during the average year.

	Never	One	Two times	Three times	Four times or more
I participate in disaster drills or exercises at my workplace (station, clinical, hospital, etc.) on a regular basis.	○	○	○	○	○
I participate in continuing education classes dealing with disaster preparedness for mass gathering.	○	○	○	○	○
I participate in seminars dealing with disaster preparedness for mass gathering.	○	○	○	○	○
I participate in conferences dealing with disaster preparedness for mass gathering.	○	○	○	○	○
I read journal articles related to disaster preparedness for mass gatherings.	○	○	○	○	○

	Really not interested	Not interested	Neutral	Interested	Really interested
I am interested in participating in disaster preparedness for mass gathering training offered at my workplace or other institutes (e.g. university or community).	○	○	○	○	○
I would be interested in educational classes on disaster preparedness for mass gathering that relate specifically.	○	○	○	○	○

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	SD	Disagree	Neither Agree nor Disagree	Agree	SA
Finding relevant information about disaster preparedness for mass gathering related to Hajj season needs is an obstacle to my level of preparedness.	○	○	○	○	○
I know where to find relevant research or information related to disasters preparedness for mass gathering in Hajj season to fill in gaps in my knowledge.	○	○	○	○	○
I find that literature on disaster preparedness for mass gathering and management is easily accessible.	○	○	○	○	○
I find that literature on disaster preparedness for mass gatherings is understandable.	○	○	○	○	○
During disaster, I am able to refer cases to the correct medical department.	○	○	○	○	○

■
Q16   I participated in emergency plan drafting or emergency planning for disaster situations for the Hajj season.

⚙

✱

   ○ Yes

   ○ NO

■
Q17   I knew whom to contact (chain of command) in disaster situation in Hajj season.

⚙

✱

   ○ Yes

   ○ NO

Please carefully read each of the following items and decide to what extent you agree or disagree by checking the appropriate choice.

	SD	Disagree	Neither Agree nor Disagree	Agree	SA
My knowledge about disaster preparedness for mass gathering about the Hajj season 2016 was sufficient.	○	○	○	○	○
In my experience during Hajj of 2016, there was sufficient equipment to respond to accidents.	○	○	○	○	○
In my experience during Hajj of 2016, the police presence was sufficient.	○	○	○	○	○
In my experience during Hajj of 2016, the presence of the fire department was sufficient.	○	○	○	○	○
I am aware of the potential risks in Hajj season (e.g. stampede, floods, terror, fire, etc.).	○	○	○	○	○
I knew the limits of my knowledge, skills, and authority as an EMS provider to act in disaster situations in Hajj season 2016	○	○	○	○	○

Q19

For which of the following disaster was your work place ready to respond? (multiple choice)

☐ Fire disasters

☐ Transport disasters

☐ Building collapse disasters

☐ Flood disasters

☐ Epidemic disasters

☐ Stampede disasters

☐ Bioterrorism/Biological and Chemical disasters

☐ None of above

Add Block

Source of Knowledge

Block Options ⌄

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Q20 ■ ⚙ ✳

Please indicate which source of knowledge were most useful to you in disaster preparedness. 1 = least useful, 5 = most useful

	1	2	3	4	5
Drills practice	○	○	○	○	○
Real disaster	○	○	○	○	○
Continuing education	○	○	○	○	○
Institution or University courses	○	○	○	○	○
Media (TV, social Media, Radio, internet)	○	○	○	○	○
Co-workers, friends, or family	○	○	○	○	○

Q21 ■ ⚙ ✳

If the following were developed how useful would they be in improving your knowledge about disaster preparedness?   1 = least useful, 5 = most useful

	1	2	3	4	5
Drills practice	○	○	○	○	○
Disaster mang protocol	○	○	○	○	○
Information website	○	○	○	○	○
Onsite visit	○	○	○	○	○
Disaster mang courses	○	○	○	○	○
Information pamphlets	○	○	○	○	○

Q22 ■ ⚙ ✳

In your opinion which of the following educational courses that should be taken in preparing for disaster by EMS provider: 1 = least useful, 5 = most useful

	1	2	3	4	5
First Aid	○	○	○	○	○
Field triage	○	○	○	○	○
BLS	○	○	○	○	○
ACLS	○	○	○	○	○
PHTLS	○	○	○	○	○
ATLS	○	○	○	○	○
Infection Control	○	○	○	○	○
Incident command system	○	○	○	○	○

Add Block

UNIVERSITY OF
LOUISVILLE
It's Happening Here.

Qualtrics.com   Contact Information   Legal

البيانات الاولية

Block Options ∨

١. ماهو عمرك؟

○ اقل من ٢٥ عام

○ ٢٥ - ٢٩

○ ٣٠ - ٣٤

○ ٣٥ - ٣٩

○ ٤٠ - ٤٤

○ ٤٥ - ٤٩

○ ٥٠ فاكثر

٢. ماهي حالتك الاجتماعية؟

○ اعزب

○ متزوج

○ مطلق

○ ارمل

٣. ماهي جنسيتك؟

○ سعودي

○ غير سعودي

٤. ماهو اعلى مستوى حصلت عليه من التعليم؟

◉ الشهادة الثانوية
◉ دبلوم + سنتان
◉ دبلوم + ثلاث سنوات
◉ البكالوريوس
◉ الماجستير
◉ الدكتوراة
◉ اخرى

Add Block

Block Options ⌄   استعداد مقدمي الخدمات الطبية الطارئة وخبرة التعامل مع الحشود الضخمة

٥. ماهو مستوى خدمة الطوارى لديك؟
◉ مساعد صحي
◉ فني
◉ اخصائي
◉ طبيب

٦. من اي مؤسسة تعليمية تخرجت بطب الطوارئ؟
◉ تعليم حكومي
◉ تعليم خاص
◉ تعليم عسكري (معهد اوكلية تابعة للقطاع العسكري)
◉ تعليم خارج المملكة

٧. كم عدد سنوات الخبرة لك في الهلال الأحمر السعودي كمقدم للخدمات الطبية الطارئة؟
◉ اقل من سنة
◉ ١ سنة واقل من ٥ سنوات
◉ ٥ سنوات واقل من ١٠ سنوات
◉ ١٠ سنوات واقل من ١٥ سنة
◉ ١٥ سنة واقل من ٢٠ سنة
◉ ٢٠ سنة فاكثر

٨. كم عدد المرات التى شاركت بها فى موسم الحج؟

○ موسم واحد
○ موسمين
○ ثلاثة مواسم
○ اربعة مواسم فأكثر

٩. كم متوسط عدد المرضى الذين عالجتهم في كل يوم خلال مشاركتك في موسم الحج لعام ١٤٣٧ هـ؟

○ ٥-١٠
○ ١١-٢٠
○ ٢١-٣٠
○ ٣١-٤٠
○ ٤٠ او اكثر

١٠. كم عدد التدريبات التي سبق ان حضرت تدريب / ورشة عمل/تدريب تجريبي حول الاستعداد للكوارث؟

Q28

	اكثر من ثلاثة	ثلاثة	اثنتان	واحدة	مطلقا
التدريب Training	○	○	○	○	○
ورشة عمل Workshops	○	○	○	○	○
تجارب الاستعداد للكوارث Drills	○	○	○	○	○

١١. اي مما يلي يُبين حضوركم في التدريب/ورشة العمل/ التدريب التجريبي حول الاستعداد للكوارث؟ اذا كانت اجابتك بمطلقا فارجو الاجابة على السوال ١٣أ و ١٣ب (N/A)

	خمس مرات او اكثر في السنة	اربع مرات في السنة	ثلاثة مرات في السنة	مرتان في السنة	مرة واحدة في السنة	مطلقا
التدريب Training	○	○	○	○	○	○
ورشة عمل Workshop	○	○	○	○	○	○
التدريب التجريبي Drill	○	○	○	○	○	○

١٢. متى كانت آخر مرة قمت بها بحضور تدريب/ورشة عمل/التدريب التجريبي حول الاستعدادت للكوارث؟

	N/A ✕	اكثر من سنة	اكثر من ستة شهور الى سنة	اقل من ستة شهور
التدريب Training	○	○	○	○
ورشة عمل Workshop	○	○	○	○
التدريب التجريبي Drill	○	○	○	○

170

١١٣ . كم عدد الساعات التدريبية لاخر تدريب حضرتها/ورشة عمل/التدريب التجريبي حول الاستعداد للكوارث؟

	اقل من 5 ساعات	من 5 الى اقل من 10 ساعات	من 10 الى اقل من 20 ساعة	اكثر من 20 ساعة	N/A ✗
تدريب Training	○	○	○	○	○
ورشة عمل Workshop	○	○	○	○	○
التدريب التجريبي Drill	○	○	○	○	○

١٤ . اي من انواع الكوارث التالية سبق ان استجبت لها اثناء الحج؟ يرجى التحقق من كل ما طبقتة . بآمكانك اختيار اكثر من نوع من الكوارث التي سبق ان استجبت لها:

☐ كوارث الحريق
☐ كوارث النقل
☐ كوارث انهيار مبني
☐ كوارث الفيضانات
☐ كوارث الاوبة
☐ كوارث التدافع
☐ كوارث الار هاب /البيولوجية/الكيميائية
☐ لاشى مما سبق

Block Options ⌄   معرفة الاستعداد مقدمي الخدمات الطبية الطارئة للكوارث الحشود الضخمة 🖼

الجزء أ – المعرفة عموما:

١٥ . يرجى قراءة كل سؤال من الأسئلة التالية واختيار ما ينطبق على خبراتك السابقة كمتوسط في السنة:

	اربع مرات	ثلاثة مرات	مرتان	مرة واحدة	مطلقا
أشارك في التدريبات على الكوارث أو التمارين في مكان العمل (المركز والاكلينيكية، والمستشفيات، الخ) على أساس منتظم.	○	○	○	○	○
أشارك في فصول التعليم المستمر التي تتعامل مع الاستعداد للكوارث للحشود الضخمة.	○	○	○	○	○
أشارك في الندوات العلمية التي تتعامل مع الاستعداد للكوارث للحشود الضخمة.	○	○	○	○	○
أشارك في المؤتمرات التي تتعامل مع الاستعداد للحشود الضخمة.	○	○	○	○	○
وأنا أقرأ المقالات العلمية ذات العلاقة بالاستعداد للكوارث للحشود الضخمة.	○	○	○	○	○

Click to write the question text

	حقيقة اهتم	اهتم	محايد	لا اهتم	حقيقة لا اهتم
أنا مهتم في المشاركة للاستعداد للكوارث للتدريب للحشود الضخمة المقدمة في مكان العمل أو باماكن أخرى (مثل الجامعات أو بالمجتمع).	○	○	○	○	○
اهتم في الفصول التعليمية التي تتعلق بالاستعداد للكوارث للحشود الضخمة التي تتعلق بذلك الخصوص.	○	○	○	○	○

	او افق بشدة	اوافق	محايد	لا اوافق	لا اوافق بشدة
أوجه صعوبة في إيجاد المعلومات التي تتعلق بالاستعداد للكوارث الحشود الضخمة لموسم الحج.	○	○	○	○	○
اعلم اين أجد بحثا مناسبا او معلومات تتعلق بالاستعداد للكوارث للحشود الضخمة لموسم الحج لزيادة معرفتي.	○	○	○	○	○
أجد سهوله في الوصول للبحوث المتعلقة بالاستعدادات للكوارث الحشود الضخمة.	○	○	○	○	○
أجد أنه يمكن فهم البحوث المتعلقة بالاستعداد للكوارث الحشود الضخمة.	○	○	○	○	○
أثناء الكوارث، أنا قادر على نقل الحالات الطارئة إلى الاماكن المخصصة لها بسبب معرفتي لتعامل مع الكوارث.	○	○	○	○	○

١٦ . سبق ان شاركت في صياغة او وضع خطة لتعامل مع الحالات الطارئة اثناء الكوارث لموسم الحج.

○ نعم
○ لا

١٧ . في حالات الكوارث في موسم الحج اعرف من اتواصل معه للاستجابة في حالات الطارئة (كتسلسل مهني اداري).

○ نعم
○ لا

الجزء ب - المعرفة فيما يتعلق بالحج عام ١٤٣٧ هـ: ■

١٨٠ ارجو قراءة كل من العناصر التالية بعناية واختيار ما تراه مناسب لك حسب خبرتك في الاستجابة للكوارث في موسم الحج:

	اوافق بشدة	اوافق	محايد	لا وافق	لا اوافق بشدة
كانت معرفتي حول الاستعداد للكوارث للحشود الضخمة لموسم الحج 1437 كافية.	○	○	○	○	○
في تجربتي خلال موسم الحج لعام 1437، كان هناك معدات كافية للاستجابة للحوادث.	○	○	○	○	○
في تجربتي خلال موسم الحج لعام 1437، وكان وجود رجال الامن كافي.	○	○	○	○	○
في تجربتي خلال موسم الحج لعام 1437، وكان وجود ادارة الاطفاء كافي.	○	○	○	○	○
كنت مدرك لعوامل الاخطار المحتملة خلال مشاركتي في الحج مثلا التدافع، الغرق، الإرهاب، والحرائق).	○	○	○	○	○
في تجربتي خلال موسم الحج لعام 1437، كان هناك معدات كافية للاستجابة للحوادث.	○	○	○	○	○

١٩. في أيٍ نوع من الكوارث الاتية كان مركز عملك مجهز تجهيزات كافية لاستجابة الكوارث؟ (اختيار متعدد) ■

☐ كوارث الحريق

☐ كوارث النقل

☐ كوارث انهيار مبنى

☐ كوارث الفيضانات

☐ كوارث الأوبئة

☐ كوارث التدافع

☐ كوارث الإرهاب البيولوجي / البيولوجية والكيميائية

☐ لا شيء مما سبق

۳. . يرجى توضيح مصادر المعرفة الأكثر فائدة لك في الاستعداد للكوارث.   1 = الأقل مفيدة،   5 = مفيدة جدا.

	5	4	3	2	1
ممارسة التدريبات	○	○	○	○	○
الكوارث حقيقية	○	○	○	○	○
التعليم المستمر	○	○	○	○	○
دورات الجامعات والمعاهد والموسسات	○	○	○	○	○
وسائل الإعلام (التلفزيون، وسائل الاعلام الاجتماعية، راديو، الانترنت)	○	○	○	○	○
زملاء العمل، الأصدقاء أو الأسرة	○	○	○	○	○

۳١. إذا تم تطوير ما يلي فما مدى الفائدة التي تكون في تحسين معرفتك حول الاستعداد للكوارث؟   1 = الأقل فائدة،   5 = مفيد جدا

	5	4	3	2	1
التدريب	○	○	○	○	○
بروتوكولات إدارة الكوارث	○	○	○	○	○
معلومات الانترنت	○	○	○	○	○
زيارة في الموقع	○	○	○	○	○
دورة إدارة الكوارث	○	○	○	○	○
كتيبات المعلومات	○	○	○	○	○

٣٣ ـ في رأيك ما مدى الفائدة مما يلي إذا تم تجهيز الكوارث لمزود خدمات الطوارئ.   1 = الاقل فائدة،   5 = مفيد جدا

	5	4	3	2	1
الإسعافات أولية	○	○	○	○	○
الفرز بالموقع	○	○	○	○	○
دعم الحياة الأساسية	○	○	○	○	○
دعم الحياة المتقدم للقلب	○	○	○	○	○
دعم الحياة قبل دخول المستشفى	○	○	○	○	○
دعم الحياة المتقدم لاصابات	○	○	○	○	○
التحكم بالعدوى	○	○	○	○	○
نظام السيطرة على الحوادث	○	○	○	○	○

Add Block

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LOUISVILLE.

AN ASSESSMENT OF THE DISASTER PREPAREDNESS KNOWLEDGE OF EMERGENCY
MEDICAL SERVICES PROVIDERS IN HAJJ OF 2016

Date: 1 / 23 / 2017

Dear Participant:

You are being invited to participate in a research study by answering the attached survey about an assessment of the disaster preparedness knowledge of EMS providers in Hajj of 2016. There are no known risks for your participation in this research study. The information collected may not benefit you directly. The information learned in this study may be helpful to others. The information you provide will help identify the level of knowledge of EMS providers at Saudi Red Crescent Authority in Hajj of 2016. Your completed survey will be stored at School of Public Health and Information Sciences (SPHIS) in a locked file drawer. The survey will take approximately *20-25 minutes* time to complete.

Individuals from the Department of *SPHIS*, the Institutional Review Board (IRB), the Human Subjects Protection Program Office (HSPPO), and other regulatory agencies may inspect these records. In all other respects, however, the data will be held in confidence to the extent permitted by law. Should the data be published, your identity will not be disclosed.

Taking part in this study is voluntary. By completing this survey you agree to take part in this research study. You do not have to answer any questions that make you uncomfortable. You may choose not to take part at all. If you decide to be in this study you may stop taking part at any time. If you decide not to be in this study or if you stop taking part at any time, you will not lose any benefits for which you may qualify.

If you have any questions, concerns, or complaints about the research study, please contact: Ahmed Alotaibi at: +966555712196, +1(703) 9393-3154 or e-mail at: a0alot01@louisville.edu or Susan Allen, PhD at 502-852-1824, susan.allen@louisville.edu

If you have any questions about your rights as a research subject, you may call the Human Subjects Protection Program Office at (502) 852-5188. You can discuss any questions about your rights as a research subject, in private, with a member of the Institutional Review Board (IRB). You may also call this number if you have other questions about the research, and you cannot reach the research staff, or want to talk to someone else. The IRB is an independent committee made up of people from the University community, staff of the institutions, as well as people from the community not connected with these institutions. The IRB has reviewed this research study.

If you have concerns or complaints about the research or research staff and you do not wish to give your name, you may call 1-877-852-1167. This is a 24-hour hot line answered by people who do not work at the University of Louisville.

Sincerely,

Susan Allen, PhD, Principal Investigator
Assistant Professor, SPHIS

Ahmed Alotaibi, Co-Principal Investigator
Doctoral Candidate, SPHIS

Appendix E
Consent Form to Participate in Research (Arabic Version)

UNIVERSITY OF
LOUISVILLE.

بسم الله الرحمن الرحيم

تقييم معرفة مسعفين الهلال الأحمر السعودي للجاهزية للكوارث في حج ٢٠١٦

التاريخ: ٢٠١٧/٢٣/١
عزيزي المشارك
السلام عليكم ورحمة الله وبركاته،،،،

انت مدعو للمشاركة في دراسة بحثية من خلال الاجابة على الاستبيان المرفق حول تقييم مسعفين الهلال الأحمر السعودي عن مدى معرفتهم للجاهزية في حالات الطوارئ في حج ٢٠١٦لا توجد مخاطر محددة بناءً على مشاركتكم في هذه الدراسة البحثية. المعلومات التي تم جمعها قد لا يترتب عليها منفعة مباشرة لكم. ولكن قد تكون المعلومات المستخلصة من هذه الدراسة مفيدة للآخرين. كما ان المعلومات التي تقدمها سوف تساعد في تحديد مستوى المسعفين المشاركين في الحج. سوف يتم تخزين استباناتكم المكتملة في مبنى مدرسة الصحة العامة والمعلومات الصحية في درج مؤمن. لكي تكملوا هذا الاستبيان يحتاج منكم حوالي ٢٠ الى ٢٥ دقيقة.

افراد من قسم مدرسة الصحة العامة و المعلومات الصحية، مجلس المراجعة المؤسسية(IRB)، مكتب برنامج حماية الموارد البشرية (HSPPO)، وهيئات تنظيمية اخرى قد تتفقد هذه السجلات. من جميع النواحي الاخرى، اضافة الى ذلك، البيانات سوف يتم التعامل معها بسرية في الحد الذي يسمح به القانون. البيانات المجموعة يجب نشرها، ولكن لن يتم الكشف عن هويتكم.

المشاركة في هذه الدراسة هي عمل تطوعي. اكمالك لهذا الاستبيان يعتبر موافقة منكم على المشاركة في هذه الدراسة البحثية. لا يجب عليكم الاجابة على اية اسئلة قد تجعلكم غير مرتاحين. يمكن ان تختار عدم المشاركة في هذه الدراسة. اذا قررت المشاركة في هذه الدراسة، لكم الحق في التوقف في اي وقت ترغبون. اذا قررتم عدم المشاركة في هذه الدراسة أو التوقف عن المشاركة في اي وقت، فأنكم لن تخسروا اي مميزات قد تكون مؤهل لها.

اذا كان لديكم أي أسئلة ، مخاوف، أو شكاوى حول هذه الدراسة البحثية، الرجاء الاتصال بـ : احمد العتيبي على الارقام التالية: 939-3154 (703)1+, +966555712196 أو من خلال البريد الالكتروني التالي: a0alot01@louisville الدكتور/ سوزان الين على الرقم التالي: 852-1824 (502)1+ او البريد الالكتروني التالي: susan.allen@louisville.edu

اذا كان لديكم أي أسئلة حول حقوقكم كمشارك بحثي، يمكنكم الاتصال على مكتب برنامج حماية الموارد البشرية على الرقم التالي: 852-5188 (502) . يمكنكم مناقشة أي اسئلة حول حقوقكم كمشارك في بحث، على انفراد،مع أحد اعضاء مجلس المراجعة المؤسسية (IRB). يمكنكم ايظاً مكالمة هذا الرقم إذا كان لديكم اسئلة اخرى حول البحث ولم تستطع التواصل مع فريق البحث، أو ترغب في التحدث الى شخص آخر. مجلس المراجعة المؤسسية هو لجنة مستقلة مؤلفة من اشخاص من اسرة الجامعة، موظفي مؤسسات، ايظاً من اشخاص من المجتمع لا علاقة لهم مع هذه المؤسسات. مجلس المراجعة المؤسسية قام بمراجعة هذه الدراسة البحثية.

اذا كان لديكم مخاوف او شكاوى حول البحث و فريق البحث وترغب في عدم اعطاء اسمك، يمكنكم الاتصال على الرقم التالي: 852-1167 (877)1+ هذا حط ساخن على مدار ٢٤ ساعة يتم الاجابة عليكم بواسطة اشخاص لا يعملون في جامعة لويزفيل.

لكم جزيل الشكر،،

احمد العتيبي، الباحث الرئيسي
مرشح دكتوراه، مدرسة الصحة العامة والمعلومات الصحية

الدكتور. سوزان الين، الباحث الرئيسي
أستاذ مشارك، مدرسة الصحة العامة والمعلومات الصحية

The Results of the "One Way ANOVA" of the difference in general knowledge of disaster preparedness for mass gatherings between different categories of EMS providers based on their age.

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 1. Age of EMS provider	(J) 1. Age of EMS provider	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
Less than 25 years	25-29	.33411	.27926	1.000	-.5174	1.1857
	30-34	.17996	.27893	1.000	-.6706	1.0305
	35-39	-.06049	.28185	1.000	-.9200	.7990
	40-44	.01412	.29067	1.000	-.8722	.9005
	45-49	-.01488	.30726	1.000	-.9518	.9220
	50 and above	-.00694	.31234	1.000	-.9594	.9455
25-29	Less than 25 years	-.33411	.27926	1.000	-1.1857	.5174
	30-34	-.15415	.06883	.534	-.3640	.0557
	35-39	-.39460*	.07984	.000	-.6381	-.1511
	40-44	-.31998	.10686	.060	-.6458	.0059
	45-49	-.34899	.14608	.360	-.7944	.0965
	50 and above	-.34105	.15648	.622	-.8182	.1361
30-34	Less than 25 years	-.17996	.27893	1.000	-1.0305	.6706
	25-29	.15415	.06883	.534	-.0557	.3640
	35-39	-.24045*	.07871	.049	-.4805	-.0004
	40-44	-.16583	.10602	1.000	-.4891	.1574
	45-49	-.19484	.14547	1.000	-.6384	.2487
	50 and above	-.18690	.15591	1.000	-.6623	.2885
35-39	Less than 25 years	.06049	.28185	1.000	-.7990	.9200
	25-29	.39460*	.07984	.000	.1511	.6381
	30-34	.24045*	.07871	.049	.0004	.4805
	40-44	.07462	.11348	1.000	-.2714	.4206
	45-49	.04561	.15099	1.000	-.4148	.5060
	50 and above	.05355	.16107	1.000	-.4376	.5447
40-44	Less than 25 years	-.01412	.29067	1.000	-.9005	.8722
	25-29	.31998	.10686	.060	-.0059	.6458
	30-34	.16583	.10602	1.000	-.1574	.4891

	35-39	-.07462	.11348	1.000	-.4206	.2714
	45-49	-.02901	.16686	1.000	-.5378	.4798
	50 and above	-.02107	.17604	1.000	-.5579	.5157
45-49	Less than 25 years	.01488	.30726	1.000	-.9220	.9518
	25-29	.34899	.14608	.360	-.0965	.7944
	30-34	.19484	.14547	1.000	-.2487	.6384
	35-39	-.04561	.15099	1.000	-.5060	.4148
	40-44	.02901	.16686	1.000	-.4798	.5378
	50 and above	.00794	.20226	1.000	-.6088	.6247
50 and above	Less than 25 years	.00694	.31234	1.000	-.9455	.9594
	25-29	.34105	.15648	.622	-.1361	.8182
	30-34	.18690	.15591	1.000	-.2885	.6623
	35-39	-.05355	.16107	1.000	-.5447	.4376
	40-44	.02107	.17604	1.000	-.5157	.5579
	45-49	-.00794	.20226	1.000	-.6247	.6088

Appendix G

The Results of the "One Way ANOVA" of the difference in Hajj knowledge of disaster preparedness for mass gatherings between different categories of EMS providers based on their age.

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 1. Age of EMS provider	(J) 1. Age of EMS provider	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
Less than 25 years	25-29	-.38151	.35410	1.000	-1.4613	.6983
	30-34	-.42919	.35369	1.000	-1.5077	.6493
	35-39	-.62205	.35739	1.000	-1.7119	.4678
	40-44	-.50928	.36857	1.000	-1.6332	.6146
	45-49	-.73214	.38961	1.000	-1.9202	.4559
	50 and above	-.35615	.39605	1.000	-1.5638	.8515
25-29	Less than 25 years	.38151	.35410	1.000	-.6983	1.4613
	30-34	-.04768	.08728	1.000	-.3138	.2185
	35-39	-.24054	.10124	.373	-.5493	.0682
	40-44	-.12778	.13550	1.000	-.5410	.2854
	45-49	-.35064	.18524	1.000	-.9155	.2142
	50 and above	.02536	.19842	1.000	-.5797	.6304
30-34	Less than 25 years	.42919	.35369	1.000	-.6493	1.5077
	25-29	.04768	.08728	1.000	-.2185	.3138
	35-39	-.19286	.09980	1.000	-.4972	.1115
	40-44	-.08009	.13443	1.000	-.4900	.3298
	45-49	-.30296	.18445	1.000	-.8654	.2595
	50 and above	.07304	.19769	1.000	-.5298	.6759
35-39	Less than 25 years	.62205	.35739	1.000	-.4678	1.7119
	25-29	.24054	.10124	.373	-.0682	.5493
	30-34	.19286	.09980	1.000	-.1115	.4972
	40-44	.11276	.14389	1.000	-.3260	.5515
	45-49	-.11010	.19146	1.000	-.6939	.4737
	50 and above	.26590	.20424	1.000	-.3569	.8887
40-44	Less than 25 years	.50928	.36857	1.000	-.6146	1.6332
	25-29	.12778	.13550	1.000	-.2854	.5410
	30-34	.08009	.13443	1.000	-.3298	.4900

	35-39	-.11276	.14389	1.000	-.5515	.3260
	45-49	-.22286	.21158	1.000	-.8680	.4223
	50 and above	.15313	.22322	1.000	-.5275	.8338
45-49	Less than 25 years	.73214	.38961	1.000	-.4559	1.9202
	25-29	.35064	.18524	1.000	-.2142	.9155
	30-34	.30296	.18445	1.000	-.2595	.8654
	35-39	.11010	.19146	1.000	-.4737	.6939
	40-44	.22286	.21158	1.000	-.4223	.8680
	50 and above	.37599	.25647	1.000	-.4061	1.1581
50 and above	Less than 25 years	.35615	.39605	1.000	-.8515	1.5638
	25-29	-.02536	.19842	1.000	-.6304	.5797
	30-34	-.07304	.19769	1.000	-.6759	.5298
	35-39	-.26590	.20424	1.000	-.8887	.3569
	40-44	-.15313	.22322	1.000	-.8338	.5275
	45-49	-.37599	.25647	1.000	-1.1581	.4061

Appendix H

The Results of the "One Way ANOVA" of the Difference in General Knowledge of Disaster Preparedness for Mass Gatherings between Different Categories of EMS Providers Based on their Level of Education.

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 4. Highest level of education completed, not including EMS training	(J) 4. Highest level of education completed, not including EMS training	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound
High school	Diploma + 2 yrs	-.16110	.10525	1.000	-.4711
	Diploma +3yrs	-.19550	.10284	.866	-.4984
	BS	-.74211*	.10711	.000	-1.0576
	MS	-1.27258*	.16914	.000	-1.7708
	Other	-.76026	.31625	.247	-1.6918
Diploma + 2 yrs	High school	.16110	.10525	1.000	-.1489
	Diploma +3yrs	-.03440	.06409	1.000	-.2232
	BS	-.58101*	.07074	.000	-.7894
	MS	-1.11148*	.14879	.000	-1.5497
	Other	-.59916	.30586	.758	-1.5000
Diploma +3yrs	High school	.19550	.10284	.866	-.1074
	Diploma + 2 yrs	.03440	.06409	1.000	-.1544
	BS	-.54661*	.06710	.000	-.7443
	MS	-1.07708*	.14710	.000	-1.5103
	Other	-.56476	.30504	.968	-1.4632
BS	High school	.74211*	.10711	.000	.4266
	Diploma + 2 yrs	.58101*	.07074	.000	.3727
	Diploma +3yrs	.54661*	.06710	.000	.3490
	MS	-.53046*	.15012	.007	-.9726
	Other	-.01815	.30650	1.000	-.9209
MS	High school	1.27258*	.16914	.000	.7744
	Diploma + 2 yrs	1.11148*	.14879	.000	.6732
	Diploma +3yrs	1.07708*	.14710	.000	.6438
	BS	.53046*	.15012	.007	.0883
	Other	.51232	.33328	1.000	-.4693
Other	High school	.76026	.31625	.247	-.1712

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	Diploma + 2 yrs	.59916	.30586	.758	-.3017
	Diploma +3yrs	.56476	.30504	.968	-.3337
	BS	.01815	.30650	1.000	-.8846
	MS	-.51232	.33328	1.000	-1.4940

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 4. Highest level of education completed, not including EMS training	(J) 4. Highest level of education completed, not including EMS training	95% Confidence Interval Upper Bound
High school	Diploma + 2 yrs	.1489
	Diploma +3yrs	.1074
	BS	-.4266
	MS	-.7744
	Other	.1712
Diploma + 2 yrs	High school	.4711
	Diploma +3yrs	.1544
	BS	-.3727
	MS	-.6732
	Other	.3017
Diploma +3yrs	High school	.4984
	Diploma + 2 yrs	.2232
	BS	-.3490
	MS	-.6438
	Other	.3337
BS	High school	1.0576
	Diploma + 2 yrs	.7894
	Diploma +3yrs	.7443
	MS	-.0883
	Other	.8846
MS	High school	1.7708
	Diploma + 2 yrs	1.5497
	Diploma +3yrs	1.5103
	BS	.9726
	Other	1.4940
Other	High school	1.6918
	Diploma + 2 yrs	1.5000

	Diploma +3yrs	1.4632
	BS	.9209
	MS	.4693

Appendix I

The Results of the "One Way ANOVA" of the Difference in Hajj Knowledge of Disaster Preparedness for Mass Gatherings between Different Categories of EMS Providers Based on their Level of Education.

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 4. Highest level of education completed, not including EMS training	(J) 4. Highest level of education completed, not including EMS training	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound
High school	Diploma + 2 yrs	-.27376	.14140	.799	-.6902
	Diploma +3yrs	-.26216	.13817	.873	-.6691
	BS	-.43540*	.14390	.039	-.8593
	MS	-1.14688*	.22724	.000	-1.8162
	Other	-.96282	.42489	.356	-2.2143
Diploma + 2 yrs	High school	.27376	.14140	.799	-.1427
	Diploma +3yrs	.01160	.08610	1.000	-.2420
	BS	-.16164	.09503	1.000	-.4416
	MS	-.87312*	.19990	.000	-1.4619
	Other	-.68906	.41091	1.000	-1.8994
Diploma +3yrs	High school	.26216	.13817	.873	-.1448
	Diploma + 2 yrs	-.01160	.08610	1.000	-.2652
	BS	-.17324	.09015	.826	-.4388
	MS	-.88472*	.19763	.000	-1.4668
	Other	-.70066	.40981	1.000	-1.9077
BS	High school	.43540*	.14390	.039	.0116
	Diploma + 2 yrs	.16164	.09503	1.000	-.1183
	Diploma +3yrs	.17324	.09015	.826	-.0923
	MS	-.71147*	.20168	.007	-1.3055
	Other	-.52742	.41178	1.000	-1.7403
MS	High school	1.14688*	.22724	.000	.4776
	Diploma + 2 yrs	.87312*	.19990	.000	.2843
	Diploma +3yrs	.88472*	.19763	.000	.3026
	BS	.71147*	.20168	.007	.1174
	Other	.18406	.44777	1.000	-1.1348
Other	High school	.96282	.42489	.356	-.2886

	Diploma + 2 yrs	.68906	.41091	1.000	-.5212
	Diploma +3yrs	.70066	.40981	1.000	-.5064
	BS	.52742	.41178	1.000	-.6854
	MS	-.18406	.44777	1.000	-1.5029

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 4. Highest level of education completed, not including EMS training	(J) 4. Highest level of education completed, not including EMS training	95% Confidence Interval Upper Bound
High school	Diploma + 2 yrs	.1427
	Diploma +3yrs	.1448
	BS	-.0116
	MS	-.4776
	Other	.2886
Diploma + 2 yrs	High school	.6902
	Diploma +3yrs	.2652
	BS	.1183
	MS	-.2843
	Other	.5212
Diploma +3yrs	High school	.6691
	Diploma + 2 yrs	.2420
	BS	.0923
	MS	-.3026
	Other	.5064
BS	High school	.8593
	Diploma + 2 yrs	.4416
	Diploma +3yrs	.4388
	MS	-.1174
	Other	.6854
MS	High school	1.8162
	Diploma + 2 yrs	1.4619
	Diploma +3yrs	1.4668
	BS	1.3055
	Other	1.5029
Other	High school	2.2143
	Diploma + 2 yrs	1.8994
	Diploma +3yrs	1.9077

| | BS | 1.7403 |
| | MS | 1.1348 |

Appendix J

The Results of the "One Way ANOVA" of the Difference in General Knowledge of Disaster Preparedness for Mass Gatherings between Different Categories of EMS Providers Based on their Level of EMS.

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 5. EMS level of provider	(J) 5. EMS level of provider	Mean Difference (I-J)	Std. Error	Sig.
First responder	EMS-TECH	-.07748	.09187	1.000
	EMS-Paramedic	-.75376*	.10175	.000
	Physician	-.68612*	.17143	.000
EMS-TECH	First responder	.07748	.09187	1.000
	EMS-Paramedic	-.67628*	.06263	.000
	Physician	-.60865*	.15152	.000
EMS-Paramedic	First responder	.75376*	.10175	.000
	EMS-TECH	.67628*	.06263	.000
	Physician	.06764	.15771	1.000
Physician	First responder	.68612*	.17143	.000
	EMS-TECH	.60865*	.15152	.000
	EMS-Paramedic	-.06764	.15771	1.000

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 5. EMS level of provider	(J) 5. EMS level of provider	95% Confidence Interval	
		Lower Bound	Upper Bound
First responder	EMS-TECH	-.3206	.1656
	EMS-Paramedic	-1.0230	-.4845
	Physician	-1.1397	-.2325
EMS-TECH	First responder	-.1656	.3206
	EMS-Paramedic	-.8420	-.5106
	Physician	-1.0095	-.2078
EMS-Paramedic	First responder	.4845	1.0230
	EMS-TECH	.5106	.8420
	Physician	-.3496	.4849
Physician	First responder	.2325	1.1397
	EMS-TECH	.2078	1.0095

EMS-Paramedic	-.4849	.3496

The Results of the "One Way ANOVA" of the Difference in Hajj Knowledge of Disaster Preparedness for Mass Gatherings between Different Categories of EMS Providers Based on their Level of EMS.

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 5. EMS level of provider	(J) 5. EMS level of provider	Mean Difference (I-J)	Std. Error	Sig.
First responder	EMS-TECH	-.22907	.12364	.386
	EMS-Paramedic	-.41806*	.13694	.014
	Physician	-.89491*	.23072	.001
EMS-TECH	First responder	.22907	.12364	.386
	EMS-Paramedic	-.18899	.08429	.152
	Physician	-.66584*	.20391	.007
EMS-Paramedic	First responder	.41806*	.13694	.014
	EMS-TECH	.18899	.08429	.152
	Physician	-.47684	.21224	.150
Physician	First responder	.89491*	.23072	.001
	EMS-TECH	.66584*	.20391	.007
	EMS-Paramedic	.47684	.21224	.150

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 5. EMS level of provider	(J) 5. EMS level of provider	95% Confidence Interval	
		Lower Bound	Upper Bound
First responder	EMS-TECH	-.5562	.0981
	EMS-Paramedic	-.7804	-.0557
	Physician	-1.5053	-.2845
EMS-TECH	First responder	-.0981	.5562
	EMS-Paramedic	-.4120	.0340
	Physician	-1.2054	-.1263
EMS-Paramedic	First responder	.0557	.7804
	EMS-TECH	-.0340	.4120
	Physician	-1.0384	.0847
Physician	First responder	.2845	1.5053
	EMS-TECH	.1263	1.2054

EMS-Paramedic	-.0847	1.0384

The Results of the "One Way ANOVA" of the Difference in General Knowledge of Disaster Preparedness for Mass Gatherings between Different Categories of EMS Providers Based on the EMS Training Received.

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 6. Current EMS training that recieved	(J) 6. Current EMS training that recieved	Mean Difference (I-J)	Std. Error	Sig.
Gov sector	Private sector	.07208	.05920	1.000
	Military sector	-.65186*	.10004	.000
	Outside of the KSA	-.46728*	.11583	.000
Private sector	Gov sector	-.07208	.05920	1.000
	Military sector	-.72394*	.09634	.000
	Outside of the KSA	-.53936*	.11264	.000
Military sector	Gov sector	.65186*	.10004	.000
	Private sector	.72394*	.09634	.000
	Outside of the KSA	.18458	.13853	1.000
Outside of the KSA	Gov sector	.46728*	.11583	.000
	Private sector	.53936*	.11264	.000
	Military sector	-.18458	.13853	1.000

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 6. Current EMS training that recieved	(J) 6. Current EMS training that recieved	95% Confidence Interval	
		Lower Bound	Upper Bound
Gov sector	Private sector	-.0845	.2287
	Military sector	-.9165	-.3872
	Outside of the KSA	-.7737	-.1608
Private sector	Gov sector	-.2287	.0845
	Military sector	-.9788	-.4691
	Outside of the KSA	-.8374	-.2413
Military sector	Gov sector	.3872	.9165
	Private sector	.4691	.9788
	Outside of the KSA	-.1820	.5511
Outside of the KSA	Gov sector	.1608	.7737
	Private sector	.2413	.8374

Military sector		-.5511	.1820

Appendix M

The Results of the "One Way ANOVA" of the Difference in Hajj Knowledge of Disaster Preparedness for Mass Gatherings between Different Categories of EMS Providers Based on the EMS Training Received.

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 6. Current EMS training that recieved	(J) 6. Current EMS training that recieved	Mean Difference (I-J)	Std. Error	Sig.
Gov sector	Private sector	-.04680	.07751	1.000
	Military sector	-.16738	.13099	1.000
	Outside of the KSA	-.33025	.15166	.179
Private sector	Gov sector	.04680	.07751	1.000
	Military sector	-.12058	.12614	1.000
	Outside of the KSA	-.28346	.14749	.330
Military sector	Gov sector	.16738	.13099	1.000
	Private sector	.12058	.12614	1.000
	Outside of the KSA	-.16288	.18139	1.000
Outside of the KSA	Gov sector	.33025	.15166	.179
	Private sector	.28346	.14749	.330
	Military sector	.16288	.18139	1.000

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 6. Current EMS training that recieved	(J) 6. Current EMS training that recieved	95% Confidence Interval	
		Lower Bound	Upper Bound
Gov sector	Private sector	-.2519	.1583
	Military sector	-.5139	.1792
	Outside of the KSA	-.7315	.0710
Private sector	Gov sector	-.1583	.2519
	Military sector	-.4543	.2132
	Outside of the KSA	-.6737	.1068
Military sector	Gov sector	-.1792	.5139
	Private sector	-.2132	.4543
	Outside of the KSA	-.6428	.3170
Outside of the KSA	Gov sector	-.0710	.7315
	Private sector	-.1068	.6737

Military sector	-.3170	.6428

The Results of the "One Way ANOVA" of the Difference in General Knowledge of Disaster Preparedness for Mass Gatherings between Different Categories of EMS Providers Based on Years of Experience.

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 7. Experience EMS providers in Saudi Red Crescent	(J) 7. Experience EMS providers in Saudi Red Crescent	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound
Under one yr	1- under 5 yrs	-.09377	.24881	1.000	-.8266
	5-under 10 yrs	-.14932	.24773	1.000	-.8790
	10-under 15 yrs	-.29756	.25144	1.000	-1.0382
	15-under 20 yrs	-.56019	.25983	.471	-1.3255
	20 yrs and above	-.19428	.26244	1.000	-.9673
1- under 5 yrs	Under one yr	.09377	.24881	1.000	-.6391
	5-under 10 yrs	-.05555	.07001	1.000	-.2618
	10-under 15 yrs	-.20379	.08218	.201	-.4458
	15-under 20 yrs	-.46641*	.10508	.000	-.7759
	20 yrs and above	-.10050	.11137	1.000	-.4285
5-under 10 yrs	Under one yr	.14932	.24773	1.000	-.5804
	1- under 5 yrs	.05555	.07001	1.000	-.1506
	10-under 15 yrs	-.14823	.07886	.908	-.3805
	15-under 20 yrs	-.41086*	.10250	.001	-.7128
	20 yrs and above	-.04495	.10894	1.000	-.3658
10-under 15 yrs	Under one yr	.29756	.25144	1.000	-.4430
	1- under 5 yrs	.20379	.08218	.201	-.0383
	5-under 10 yrs	.14823	.07886	.908	-.0840
	15-under 20 yrs	-.26263	.11117	.277	-.5901
	20 yrs and above	.10328	.11714	1.000	-.2417
15-under 20 yrs	Under one yr	.56019	.25983	.471	-.2051
	1- under 5 yrs	.46641*	.10508	.000	.1569
	5-under 10 yrs	.41086*	.10250	.001	.1090
	10-under 15 yrs	.26263	.11117	.277	-.0648
	20 yrs and above	.36591	.13420	.098	-.0294
20 yrs and above	Under one yr	.19428	.26244	1.000	-.5787

1- under 5 yrs	.10050	.11137	1.000	-.2275
5-under 10 yrs	.04495	.10894	1.000	-.2759
10-under 15 yrs	-.10328	.11714	1.000	-.4483
15-under 20 yrs	-.36591	.13420	.098	-.7612

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 7. Experience EMS providers in Saudi Red Crescent	(J) 7. Experience EMS providers in Saudi Red Crescent	95% Confidence Interval Upper Bound
Under one yr	1- under 5 yrs	.6391
	5-under 10 yrs	.5804
	10-under 15 yrs	.4430
	15-under 20 yrs	.2051
	20 yrs and above	.5787
1- under 5 yrs	Under one yr	.8266
	5-under 10 yrs	.1506
	10-under 15 yrs	.0383
	15-under 20 yrs	-.1569
	20 yrs and above	.2275
5-under 10 yrs	Under one yr	.8790
	1- under 5 yrs	.2618
	10-under 15 yrs	.0840
	15-under 20 yrs	-.1090
	20 yrs and above	.2759
10-under 15 yrs	Under one yr	1.0382
	1- under 5 yrs	.4458
	5-under 10 yrs	.3805
	15-under 20 yrs	.0648
	20 yrs and above	.4483
15-under 20 yrs	Under one yr	1.3255
	1- under 5 yrs	.7759
	5-under 10 yrs	.7128
	10-under 15 yrs	.5901
	20 yrs and above	.7612
20 yrs and above	Under one yr	.9673
	1- under 5 yrs	.4285
	5-under 10 yrs	.3658

10-under 15 yrs		.2417
15-under 20 yrs		.0294

Appendix O

The Results of the "One Way ANOVA" of the Difference in Hajj Knowledge of Disaster Preparedness for Mass Gatherings between Different Categories of EMS Providers Based on Years of Experience.

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 7. Experience EMS providers in Saudi Red Crescent	(J) 7. Experience EMS providers in Saudi Red Crescent	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound
Under one yr	1- under 5 yrs	-.66175	.31245	.518	-1.5820
	5-under 10 yrs	-.64747	.31110	.567	-1.5638
	10-under 15 yrs	-.78577	.31576	.196	-1.7158
	15-under 20 yrs	-1.06742*	.32629	.017	-2.0285
	20 yrs and above	-.64209	.32956	.777	-1.6128
1- under 5 yrs	Under one yr	.66175	.31245	.518	-.2585
	5-under 10 yrs	.01429	.08791	1.000	-.2447
	10-under 15 yrs	-.12402	.10320	1.000	-.4280
	15-under 20 yrs	-.40567*	.13195	.033	-.7943
	20 yrs and above	.01967	.13985	1.000	-.3923
5-under 10 yrs	Under one yr	.64747	.31110	.567	-.2688
	1- under 5 yrs	-.01429	.08791	1.000	-.2732
	10-under 15 yrs	-.13831	.09903	1.000	-.4300
	15-under 20 yrs	-.41995*	.12872	.017	-.7991
	20 yrs and above	.00538	.13681	1.000	-.3976
10-under 15 yrs	Under one yr	.78577	.31576	.196	-.1443
	1- under 5 yrs	.12402	.10320	1.000	-.1799
	5-under 10 yrs	.13831	.09903	1.000	-.1534
	15-under 20 yrs	-.28164	.13960	.661	-.6928
	20 yrs and above	.14369	.14710	1.000	-.2896
15-under 20 yrs	Under one yr	1.06742*	.32629	.017	.1064
	1- under 5 yrs	.40567*	.13195	.033	.0170
	5-under 10 yrs	.41995*	.12872	.017	.0408
	10-under 15 yrs	.28164	.13960	.661	-.1295
	20 yrs and above	.42533	.16852	.177	-.0710
20 yrs and above	Under one yr	.64209	.32956	.777	-.3286

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1- under 5 yrs	-.01967	.13985	1.000	-.4316
5-under 10 yrs	-.00538	.13681	1.000	-.4083
10-under 15 yrs	-.14369	.14710	1.000	-.5769
15-under 20 yrs	-.42533	.16852	.177	-.9217

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 7. Experience EMS providers in Saudi Red Crescent	(J) 7. Experience EMS providers in Saudi Red Crescent	95% Confidence Interval Upper Bound
Under one yr	1- under 5 yrs	.2585
	5-under 10 yrs	.2688
	10-under 15 yrs	.1443
	15-under 20 yrs	-.1064
	20 yrs and above	.3286
1- under 5 yrs	Under one yr	1.5820
	5-under 10 yrs	.2732
	10-under 15 yrs	.1799
	15-under 20 yrs	-.0170
	20 yrs and above	.4316
5-under 10 yrs	Under one yr	1.5638
	1- under 5 yrs	.2447
	10-under 15 yrs	.1534
	15-under 20 yrs	-.0408
	20 yrs and above	.4083
10-under 15 yrs	Under one yr	1.7158
	1- under 5 yrs	.4280
	5-under 10 yrs	.4300
	15-under 20 yrs	.1295
	20 yrs and above	.5769
15-under 20 yrs	Under one yr	2.0285
	1- under 5 yrs	.7943
	5-under 10 yrs	.7991
	10-under 15 yrs	.6928
	20 yrs and above	.9217
20 yrs and above	Under one yr	1.6128
	1- under 5 yrs	.3923
	5-under 10 yrs	.3976

| | 10-under 15 yrs | .2896 |
| | 15-under 20 yrs | .0710 |

The Results of the "One Way ANOVA" of the Difference in General Knowledge of Disaster Preparedness for Mass Gatherings between Different Categories of EMS Providers Based on Years of Experience (number of times worked in Hajj).

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 8. How many times have you worked at Hajj?	(J) 8. How many times have you worked at Hajj?	Mean Difference (I-J)	Std. Error	Sig.
One season	Two season	-.22351	.08699	.062
	Three season	-.16074	.08995	.446
	Four season or more	-.28834*	.07893	.002
Two season	One season	.22351	.08699	.062
	Three season	.06277	.08470	1.000
	Four season or more	-.06482	.07289	1.000
Three season	One season	.16074	.08995	.446
	Two season	-.06277	.08470	1.000
	Four season or more	-.12760	.07639	.572
Four season or more	One season	.28834*	.07893	.002
	Two season	.06482	.07289	1.000
	Three season	.12760	.07639	.572

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 8. How many times have you worked at Hajj?	(J) 8. How many times have you worked at Hajj?	95% Confidence Interval	
		Lower Bound	Upper Bound
One season	Two season	-.4537	.0067
	Three season	-.3987	.0772
	Four season or more	-.4972	-.0795
Two season	One season	-.0067	.4537
	Three season	-.1613	.2869
	Four season or more	-.2577	.1280
Three season	One season	-.0772	.3987
	Two season	-.2869	.1613
	Four season or more	-.3297	.0745
Four season or more	One season	.0795	.4972
	Two season	-.1280	.2577

Three season	-.0745	.3297

The Results of the "One Way ANOVA" of the Difference in Hajj Knowledge of Disaster Preparedness for Mass Gatherings between Different Categories of EMS Providers Based on Years of Experience (number of times worked in Hajj).

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 8. How many times have you worked at Hajj?	(J) 8. How many times have you worked at Hajj?	Mean Difference (I-J)	Std. Error	Sig.
One season	Two season	-.14615	.10934	1.000
	Three season	-.03241	.11305	1.000
	Four season or more	-.22130	.09921	.156
Two season	One season	.14615	.10934	1.000
	Three season	.11374	.10645	1.000
	Four season or more	-.07515	.09162	1.000
Three season	One season	.03241	.11305	1.000
	Two season	-.11374	.10645	1.000
	Four season or more	-.18889	.09602	.297
Four season or more	One season	.22130	.09921	.156
	Two season	.07515	.09162	1.000
	Three season	.18889	.09602	.297

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 8. How many times have you worked at Hajj?	(J) 8. How many times have you worked at Hajj?	95% Confidence Interval	
		Lower Bound	Upper Bound
One season	Two season	-.4354	.1431
	Three season	-.3315	.2667
	Four season or more	-.4838	.0412
Two season	One season	-.1431	.4354
	Three season	-.1679	.3954
	Four season or more	-.3176	.1673
Three season	One season	-.2667	.3315
	Two season	-.3954	.1679
	Four season or more	-.4429	.0652
Four season or more	One season	-.0412	.4838

Two season		-.1673	.3176
Three season		-.0652	.4429

Appendix R

The Results of the "One Way ANOVA" of the Difference in General Knowledge of

Disaster Preparedness for Mass Gatherings between Different Categories of EMS

Providers Based on Number of Training, Workshop, and Drill EVER Attended.

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 10. How many trainings/workshops/drills about disaster preparedness have you ever been attended? - Training	(J) 10. How many trainings/workshops/drills about disaster preparedness have you ever been attended? - Training	Mean Difference (I-J)	Std. Error	Sig.
Never	One	-.20910	.07627	.063
	Two	-.55159*	.07990	.000
	Three	-.69354*	.08910	.000
	More than Three	-.64763*	.07382	.000
One	Never	.20910	.07627	.063
	Two	-.34249*	.08462	.001
	Three	-.48443*	.09335	.000
	More than Three	-.43852*	.07890	.000
Two	Never	.55159*	.07990	.000
	One	.34249*	.08462	.001
	Three	-.14194	.09634	1.000
	More than Three	-.09603	.08241	1.000
Three	Never	.69354*	.08910	.000
	One	.48443*	.09335	.000
	Two	.14194	.09634	1.000
	More than Three	.04591	.09136	1.000
More than Three	Never	.64763*	.07382	.000
	One	.43852*	.07890	.000
	Two	.09603	.08241	1.000
	Three	-.04591	.09136	1.000

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

95% Confidence Interval

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(I) 10. How many trainings/workshops/drills about disaster preparedness have you ever been attended? - Training	(J) 10. How many trainings/workshops/drills about disaster preparedness have you ever been attended? - Training	Lower Bound	Upper Bound
Never	One	-.4239	.0057
	Two	-.7766	-.3266
	Three	-.9445	-.4426
	More than Three	-.8555	-.4398
One	Never	-.0057	.4239
	Two	-.5808	-.1042
	Three	-.7473	-.2215
	More than Three	-.6607	-.2164
Two	Never	.3266	.7766
	One	.1042	.5808
	Three	-.4133	.1294
	More than Three	-.3281	.1360
Three	Never	.4426	.9445
	One	.2215	.7473
	Two	-.1294	.4133
	More than Three	-.2114	.3032
More than Three	Never	.4398	.8555
	One	.2164	.6607
	Two	-.1360	.3281
	Three	-.3032	.2114

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 10. How many trainings/workshops/drills about disaster preparedness have you ever been attended? - Workshops	(J) 10. How many trainings/workshops/drills about disaster preparedness have you ever been attended? - Workshops	Mean Difference (I-J)	Std. Error	Sig.
Never	One	-.34647*	.06667	.000
	Two	-.70749*	.07018	.000
	Three	-.53868*	.09818	.000
	More than Three	-.86861*	.08697	.000

One	Never	.34647*	.06667	.000
	Two	-.36102*	.07907	.000
	Three	-.19221	.10471	.668
	More than Three	-.52214*	.09429	.000
Two	Never	.70749*	.07018	.000
	One	.36102*	.07907	.000
	Three	.16881	.10699	1.000
	More than Three	-.16112	.09681	.965
Three	Never	.53868*	.09818	.000
	One	.19221	.10471	.668
	Two	-.16881	.10699	1.000
	More than Three	-.32993	.11868	.056
More than Three	Never	.86861*	.08697	.000
	One	.52214*	.09429	.000
	Two	.16112	.09681	.965
	Three	.32993	.11868	.056

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 10. How many trainings/workshops/drills about disaster preparedness have you ever been attended? - Workshops	(J) 10. How many trainings/workshops/drills about disaster preparedness have you ever been attended? - Workshops	95% Confidence Interval	
		Lower Bound	Upper Bound
Never	One	-.5342	-.1587
	Two	-.9051	-.5099
	Three	-.8151	-.2622
	More than Three	-1.1135	-.6237
One	Never	.1587	.5342
	Two	-.5837	-.1384
	Three	-.4871	.1027
	More than Three	-.7877	-.2566
Two	Never	.5099	.9051
	One	.1384	.5837
	Three	-.1325	.4701
	More than Three	-.4337	.1115
Three	Never	.2622	.8151
	One	-.1027	.4871

	Two	-.4701	.1325
	More than Three	-.6641	.0043
More than Three	Never	.6237	1.1135
	One	.2566	.7877
	Two	-.1115	.4337
	Three	-.0043	.6641

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 10. How many trainings/workshops/drills about disaster preparedness have you ever been attended? - Drills	(J) 10. How many trainings/workshops/drills about disaster preparedness have you ever been attended? - Drills	Mean Difference (I-J)	Std. Error	Sig.
Never	One	-.35966*	.06857	.000
	Two	-.74409*	.07655	.000
	Three	-.56517*	.09748	.000
	More than Three	-.75445*	.07616	.000
One	Never	.35966*	.06857	.000
	Two	-.38443*	.07903	.000
	Three	-.20551	.09944	.391
	More than Three	-.39479*	.07866	.000
Two	Never	.74409*	.07655	.000
	One	.38443*	.07903	.000
	Three	.17892	.10510	.892
	More than Three	-.01036	.08570	1.000
Three	Never	.56517*	.09748	.000
	One	.20551	.09944	.391
	Two	-.17892	.10510	.892
	More than Three	-.18928	.10482	.714
More than Three	Never	.75445*	.07616	.000
	One	.39479*	.07866	.000
	Two	.01036	.08570	1.000
	Three	.18928	.10482	.714

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

95% Confidence Interval

(I) 10. How many trainings/workshops/drills about disaster preparedness have you ever been attended? - Drills	(J) 10. How many trainings/workshops/drills about disaster preparedness have you ever been attended? - Drills	Lower Bound	Upper Bound
Never	One	-.5528	-.1666
	Two	-.9597	-.5285
	Three	-.8397	-.2907
	More than Three	-.9689	-.5400
One	Never	.1666	.5528
	Two	-.6070	-.1619
	Three	-.4855	.0745
	More than Three	-.6163	-.1733
Two	Never	.5285	.9597
	One	.1619	.6070
	Three	-.1171	.4749
	More than Three	-.2517	.2310
Three	Never	.2907	.8397
	One	-.0745	.4855
	Two	-.4749	.1171
	More than Three	-.4845	.1059
More than Three	Never	.5400	.9689
	One	.1733	.6163
	Two	-.2310	.2517
	Three	-.1059	.4845

Appendix S

The Results of the "One Way ANOVA" of the Difference in General Knowledge of Disaster Preparedness for Mass Gatherings between Different Categories of EMS Providers Based on Number of Training, Workshop, and Drill Attended.

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 11. Which of the following best describes your attendance at a trainings/workshops/drills about disaster preparedness? If not select N/A - Training	(J) 11. Which of the following best describes your attendance at a trainings/workshops/drills about disaster preparedness? If not select N/A - Training	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Never	One time per year	-.20736*	.05745	.005	-.3766	-.0381
	Two times per year	-.75556*	.07931	.000	-.9892	-.5220
	Three times per year	-.99031*	.09771	.000	-1.2781	-.7025
	Four times per year	-1.07424*	.18660	.000	-1.6239	-.5246
	Five times or more per year	-.70544*	.17431	.001	-1.2188	-.1920
One time per year	Never	.20736*	.05745	.005	.0381	.3766
	Two times per year	-.54819*	.08076	.000	-.7861	-.3103
	Three times per year	-.78295*	.09889	.000	-1.0742	-.4917
	Four times per year	-.86688*	.18722	.000	-1.4183	-.3154
	Five times or more per year	-.49807	.17497	.068	-1.0134	.0173
Two times per year	Never	.75556*	.07931	.000	.5220	.9892
	One time per year	.54819*	.08076	.000	.3103	.7861
	Three times per year	-.23475	.11300	.572	-.5676	.0981
	Four times per year	-.31868	.19504	1.000	-.8932	.2558
	Five times or more per year	.05012	.18331	1.000	-.4898	.5901
Three times per year	Never	.99031*	.09771	.000	.7025	1.2781
	One time per year	.78295*	.09889	.000	.4917	1.0742
	Two times per year	.23475	.11300	.572	-.0981	.5676
	Four times per year	-.08393	.20322	1.000	-.6825	.5147

		Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
	Five times or more per year	.28488	.19199	1.000	-.2806	.8504
Four times per year	Never	1.07424*	.18660	.000	.5246	1.6239
	One time per year	.86688*	.18722	.000	.3154	1.4183
	Two times per year	.31868	.19504	1.000	-.2558	.8932
	Three times per year	.08393	.20322	1.000	-.5147	.6825
	Five times or more per year	.36880	.24927	1.000	-.3654	1.1030
Five times or more per year	Never	.70544*	.17431	.001	.1920	1.2188
	One time per year	.49807	.17497	.068	-.0173	1.0134
	Two times per year	-.05012	.18331	1.000	-.5901	.4898
	Three times per year	-.28488	.19199	1.000	-.8504	.2806
	Four times per year	-.36880	.24927	1.000	-1.1030	.3654

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 11. Which of the following best describes your attendance at a trainings/workshops/drills about disaster preparedness? If not select N/A - Workshop	(J) 11. Which of the following best describes your attendance at a trainings/workshops/drills about disaster preparedness? If not select N/A - Workshop	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Never	One time per year	-.39606*	.05629	.000	-.5619	-.2303
	Two times per year	-1.00520*	.07875	.000	-1.2372	-.7732
	Three times per year	-.89325*	.15191	.000	-1.3407	-.4458
	Four times per year	-1.08105*	.19762	.000	-1.6631	-.4990
	Five times or more per year	-.86211*	.20699	.001	-1.4718	-.2524
One time per year	Never	.39606*	.05629	.000	.2303	.5619
	Two times per year	-.60914*	.08453	.000	-.8581	-.3602
	Three times per year	-.49719*	.15499	.021	-.9537	-.0407
	Four times per year	-.68499*	.19999	.010	-1.2740	-.0959
	Five times or more per year	-.46605	.20926	.394	-1.0824	.1503
Two times per year	Never	1.00520*	.07875	.000	.7732	1.2372
	One time per year	.60914*	.08453	.000	.3602	.8581
	Three times per year	.11195	.16448	1.000	-.3725	.5964

		Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
	Four times per year	-.07585	.20743	1.000	-.6868	.5351
	Five times or more per year	.14309	.21638	1.000	-.4942	.7804
Three times per year	Never	.89325*	.15191	.000	.4458	1.3407
	One time per year	.49719*	.15499	.021	.0407	.9537
	Two times per year	-.11195	.16448	1.000	-.5964	.3725
	Four times per year	-.18780	.24475	1.000	-.9087	.5331
	Five times or more per year	.03114	.25238	1.000	-.7122	.7745
Four times per year	Never	1.08105*	.19762	.000	.4990	1.6631
	One time per year	.68499*	.19999	.010	.0959	1.2740
	Two times per year	.07585	.20743	1.000	-.5351	.6868
	Three times per year	.18780	.24475	1.000	-.5331	.9087
	Five times or more per year	.21894	.28226	1.000	-.6124	1.0503
Five times or more per year	Never	.86211*	.20699	.001	.2524	1.4718
	One time per year	.46605	.20926	.394	-.1503	1.0824
	Two times per year	-.14309	.21638	1.000	-.7804	.4942
	Three times per year	-.03114	.25238	1.000	-.7745	.7122
	Four times per year	-.21894	.28226	1.000	-1.0503	.6124

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 11. Which of the following best describes your attendance at a trainings/workshops/drills about disaster preparedness? If not select N/A - Drill	(J) 11. Which of the following best describes your attendance at a trainings/workshops/drills about disaster preparedness? If not select N/A - Drill	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Never	One time per year	-.39576*	.05668	.000	-.5627	-.2288
	Two times per year	-.87202*	.08384	.000	-1.1190	-.6251
	Three times per year	-.64196*	.12036	.000	-.9965	-.2875
	Four times per year	-1.14768*	.22550	.000	-1.8119	-.4835
	Five times or more per year	-.97110*	.18218	.000	-1.5077	-.4345
One time per year	Never	.39576*	.05668	.000	.2288	.5627
	Two times per year	-.47626*	.08632	.000	-.7305	-.2220

	Three times per year	-.24621	.12210	.662	-.6058	.1134
	Four times per year	-.75193*	.22643	.014	-1.4189	-.0850
	Five times or more per year	-.57534*	.18333	.027	-1.1153	-.0354
Two times per year	Never	.87202*	.08384	.000	.6251	1.1190
	One time per year	.47626*	.08632	.000	.2220	.7305
	Three times per year	.23005	.13684	1.000	-.1730	.6331
	Four times per year	-.27567	.23471	1.000	-.9670	.4157
	Five times or more per year	-.09908	.19346	1.000	-.6689	.4707
Three times per year	Never	.64196*	.12036	.000	.2875	.9965
	One time per year	.24621	.12210	.662	-.1134	.6058
	Two times per year	-.23005	.13684	1.000	-.6331	.1730
	Four times per year	-.50572	.25009	.653	-1.2423	.2309
	Five times or more per year	-.32913	.21186	1.000	-.9531	.2949
Four times per year	Never	1.14768*	.22550	.000	.4835	1.8119
	One time per year	.75193*	.22643	.014	.0850	1.4189
	Two times per year	.27567	.23471	1.000	-.4157	.9670
	Three times per year	.50572	.25009	.653	-.2309	1.2423
	Five times or more per year	.17659	.28504	1.000	-.6630	1.0162
Five times or more per year	Never	.97110*	.18218	.000	.4345	1.5077
	One time per year	.57534*	.18333	.027	.0354	1.1153
	Two times per year	.09908	.19346	1.000	-.4707	.6689
	Three times per year	.32913	.21186	1.000	-.2949	.9531
	Four times per year	-.17659	.28504	1.000	-1.0162	.6630

Appendix T

The Results of the "One Way ANOVA" of the Difference in General Knowledge of Disaster Preparedness for Mass Gatherings between Different Categories of EMS Providers Based on Number of Training, Workshop, and Drill Last Time Attended.

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 12. When was the last time you attended a trainings/ workshops/ drills about disaster preparedness? - Training	(J) 12. When was the last time you attended a trainings/ workshops/ drills about disaster preparedness? - Training	Mean Difference (I-J)	Std. Error	Sig.
Less than six months ago	Six months ago-A year ago	-.05663	.07871	1.000
	More than one year ago	.27579*	.07745	.002
	N/A	.58551*	.07450	.000
Six months ago-A year ago	Less than six months ago	.05663	.07871	1.000
	More than one year ago	.33243*	.07497	.000
	N/A	.64215*	.07192	.000
More than one year ago	Less than six months ago	-.27579*	.07745	.002
	Six months ago-A year ago	-.33243*	.07497	.000
	N/A	.30972*	.07053	.000
N/A	Less than six months ago	-.58551*	.07450	.000
	Six months ago-A year ago	-.64215*	.07192	.000
	More than one year ago	-.30972*	.07053	.000

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 12. When was the last time you attended a trainings/ workshops/ drills about disaster preparedness? - Training	(J) 12. When was the last time you attended a trainings/ workshops/ drills about disaster preparedness? - Training	95% Confidence Interval	
		Lower Bound	Upper Bound
Less than six months ago	Six months ago-A year ago	-.2649	.1516
	More than one year ago	.0709	.4807
	N/A	.3884	.7826
Six months ago-A year ago	Less than six months ago	-.1516	.2649
	More than one year ago	.1341	.5308
	N/A	.4519	.8324

More than one year ago	Less than six months ago	-.4807	-.0709
	Six months ago-A year ago	-.5308	-.1341
	N/A	.1231	.4963
N/A	Less than six months ago	-.7826	-.3884
	Six months ago-A year ago	-.8324	-.4519
	More than one year ago	-.4963	-.1231

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 12. When was the last time you attended a trainings/ workshops/ drills about disaster preparedness? - Workshop	(J) 12. When was the last time you attended a trainings/ workshops/ drills about disaster preparedness? - Workshop	Mean Difference (I-J)	Std. Error	Sig.
Less than six months ago	Six months ago-A year ago	-.34411*	.08628	.000
	More than one year ago	.01945	.08837	1.000
	N/A	.47210*	.07981	.000
Six months ago-A year ago	Less than six months ago	.34411*	.08628	.000
	More than one year ago	.36356*	.07454	.000
	N/A	.81621*	.06416	.000
More than one year ago	Less than six months ago	-.01945	.08837	1.000
	Six months ago-A year ago	-.36356*	.07454	.000
	N/A	.45265*	.06695	.000
N/A	Less than six months ago	-.47210*	.07981	.000
	Six months ago-A year ago	-.81621*	.06416	.000
	More than one year ago	-.45265*	.06695	.000

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 12. When was the last time you attended a trainings/ workshops/ drills about disaster preparedness? - Workshop	(J) 12. When was the last time you attended a trainings/ workshops/ drills about disaster preparedness? - Workshop	95% Confidence Interval	
		Lower Bound	Upper Bound
Less than six months ago	Six months ago-A year ago	-.5724	-.1158
	More than one year ago	-.2144	.2533
	N/A	.2609	.6833
Six months ago-A year ago	Less than six months ago	.1158	.5724
	More than one year ago	.1663	.5608

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	N/A	.6465	.9860
More than one year ago	Less than six months ago	-.2533	.2144
	Six months ago-A year ago	-.5608	-.1663
	N/A	.2755	.6298
N/A	Less than six months ago	-.6833	-.2609
	Six months ago-A year ago	-.9860	-.6465
	More than one year ago	-.6298	-.2755

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 12. When was the last time you attended a trainings/ workshops/ drills about disaster preparedness? - Drill	(J) 12. When was the last time you attended a trainings/ workshops/ drills about disaster preparedness? - Drill	Mean Difference (I-J)	Std. Error	Sig.
Less than six months ago	Six months ago-A year ago	-.32148*	.08289	.001
	More than one year ago	.03718	.08375	1.000
	N/A	.48065*	.07919	.000
Six months ago-A year ago	Less than six months ago	.32148*	.08289	.001
	More than one year ago	.35866*	.07114	.000
	N/A	.80213*	.06572	.000
More than one year ago	Less than six months ago	-.03718	.08375	1.000
	Six months ago-A year ago	-.35866*	.07114	.000
	N/A	.44347*	.06679	.000
N/A	Less than six months ago	-.48065*	.07919	.000
	Six months ago-A year ago	-.80213*	.06572	.000
	More than one year ago	-.44347*	.06679	.000

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 12. When was the last time you attended a trainings/ workshops/ drills about disaster preparedness? - Drill	(J) 12. When was the last time you attended a trainings/ workshops/ drills about disaster preparedness? - Drill	95% Confidence Interval	
		Lower Bound	Upper Bound
Less than six months ago	Six months ago-A year ago	-.5408	-.1022
	More than one year ago	-.1844	.2588
	N/A	.2711	.6902
Six months ago-A year ago	Less than six months ago	.1022	.5408

	More than one year ago	.1704	.5469
	N/A	.6282	.9760
More than one year ago	Less than six months ago	-.2588	.1844
	Six months ago-A year ago	-.5469	-.1704
	N/A	.2668	.6202
N/A	Less than six months ago	-.6902	-.2711
	Six months ago-A year ago	-.9760	-.6282
	More than one year ago	-.6202	-.2668

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Appendix U

The Results of the "One Way ANOVA" of the Difference in General Knowledge of Disaster Preparedness for Mass Gatherings between Different Categories of EMS Providers Based on duration of the last time attended Training, Workshop, and Drill.

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 13. What was the duration of the last trainings/workshops/drills about disaster that you attended? - Training	(J) 13. What was the duration of the last trainings/workshops/drills about disaster that you attended? - Training	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound
Less than 5 hours	From 5 hours but less than 10 hours	-.28225*	.07169	.001	-.4841
	From 10 hours but less than 20 hours	.03139	.11484	1.000	-.2920
	20 hours or more	-.19835	.11160	.759	-.5126
	N/A	.40203*	.06511	.000	.2187
From 5 hours but less than 10 hours	Less than 5 hours	.28225*	.07169	.001	.0804
	From 10 hours but less than 20 hours	.31363	.12024	.093	-.0250
	20 hours or more	.08390	.11715	1.000	-.2460
	N/A	.68428*	.07422	.000	.4753
From 10 hours but less than 20 hours	Less than 5 hours	-.03139	.11484	1.000	-.3548
	From 5 hours but less than 10 hours	-.31363	.12024	.093	-.6522
	20 hours or more	-.22974	.14755	1.000	-.6452
	N/A	.37064*	.11643	.015	.0428
20 hours or more	Less than 5 hours	.19835	.11160	.759	-.1159
	From 5 hours but less than 10 hours	-.08390	.11715	1.000	-.4138
	From 10 hours but less than 20 hours	.22974	.14755	1.000	-.1858
	N/A	.60038*	.11324	.000	.2815
N/A	Less than 5 hours	-.40203*	.06511	.000	-.5854
	From 5 hours but less than 10 hours	-.68428*	.07422	.000	-.8933

From 10 hours but less than 20 hours	-.37064*	.11643	.015	-.6985
20 hours or more	-.60038*	.11324	.000	-.9193

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 13. What was the duration of the last trainings/workshops/drills about disaster that you attended? - Training	(J) 13. What was the duration of the last trainings/workshops/drills about disaster that you attended? - Training	95% Confidence Interval
		Upper Bound
Less than 5 hours	From 5 hours but less than 10 hours	-.0804
	From 10 hours but less than 20 hours	.3548
	20 hours or more	.1159
	N/A	.5854
From 5 hours but less than 10 hours	Less than 5 hours	.4841
	From 10 hours but less than 20 hours	.6522
	20 hours or more	.4138
	N/A	.8933
From 10 hours but less than 20 hours	Less than 5 hours	.2920
	From 5 hours but less than 10 hours	.0250
	20 hours or more	.1858
	N/A	.6985
20 hours or more	Less than 5 hours	.5126
	From 5 hours but less than 10 hours	.2460
	From 10 hours but less than 20 hours	.6452
	N/A	.9193
N/A	Less than 5 hours	-.2187
	From 5 hours but less than 10 hours	-.4753
	From 10 hours but less than 20 hours	-.0428
	20 hours or more	-.2815

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 13. What was the duration of the last trainings/workshops/drills about disaster that you attended? - Workshop	(J) 13. What was the duration of the last trainings/workshops/drills about disaster that you attended? - Workshop	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval
					Lower Bound

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(I)	(J)	Mean Difference	Std. Error	Sig.	Lower Bound
Less than 5 hours	From 5 hours but less than 10 hours	-.37601*	.07306	.000	-.5817
	From 10 hours but less than 20 hours	-.28212	.10520	.075	-.5784
	20 hours or more	-.51206*	.14093	.003	-.9089
	N/A	.37049*	.06662	.000	.1829
From 5 hours but less than 10 hours	Less than 5 hours	.37601*	.07306	.000	.1703
	From 10 hours but less than 20 hours	.09389	.10297	1.000	-.1961
	20 hours or more	-.13605	.13927	1.000	-.5283
	N/A	.74650*	.06303	.000	.5690
From 10 hours but less than 20 hours	Less than 5 hours	.28212	.10520	.075	-.0141
	From 5 hours but less than 10 hours	-.09389	.10297	1.000	-.3839
	20 hours or more	-.22994	.15852	1.000	-.6763
	N/A	.65261*	.09850	.000	.3752
20 hours or more	Less than 5 hours	.51206*	.14093	.003	.1152
	From 5 hours but less than 10 hours	.13605	.13927	1.000	-.2562
	From 10 hours but less than 20 hours	.22994	.15852	1.000	-.2164
	N/A	.88255*	.13601	.000	.4996
N/A	Less than 5 hours	-.37049*	.06662	.000	-.5581
	From 5 hours but less than 10 hours	-.74650*	.06303	.000	-.9240
	From 10 hours but less than 20 hours	-.65261*	.09850	.000	-.9300
	20 hours or more	-.88255*	.13601	.000	-1.2655

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 13. What was the duration of the last trainings/workshops/drills about disaster that you attended? - Workshop	(J) 13. What was the duration of the last trainings/workshops/drills about disaster that you attended? - Workshop	95% Confidence Interval
		Upper Bound
Less than 5 hours	From 5 hours but less than 10 hours	-.1703
	From 10 hours but less than 20 hours	.0141
	20 hours or more	-.1152
	N/A	.5581

From 5 hours but less than 10 hours	Less than 5 hours	.5817
	From 10 hours but less than 20 hours	.3839
	20 hours or more	.2562
	N/A	.9240
From 10 hours but less than 20 hours	Less than 5 hours	.5784
	From 5 hours but less than 10 hours	.1961
	20 hours or more	.2164
	N/A	.9300
20 hours or more	Less than 5 hours	.9089
	From 5 hours but less than 10 hours	.5283
	From 10 hours but less than 20 hours	.6763
	N/A	1.2655
N/A	Less than 5 hours	-.1829
	From 5 hours but less than 10 hours	-.5690
	From 10 hours but less than 20 hours	-.3752
	20 hours or more	-.4996

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 13. What was the duration of the last trainings/workshops/drills about disaster that you attended? - Drill	(J) 13. What was the duration of the last trainings/workshops/drills about disaster that you attended? - Drill	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound
Less than 5 hours	From 5 hours but less than 10 hours	-.26762*	.07514	.004	-.4792
	From 10 hours but less than 20 hours	-.44564*	.07934	.000	-.6691
	20 hours or more	-.55155*	.13489	.000	-.9314
	N/A	.38563*	.06582	.000	.2003
From 5 hours but less than 10 hours	Less than 5 hours	.26762*	.07514	.004	.0560
	From 10 hours but less than 20 hours	-.17802	.08320	.327	-.4123
	20 hours or more	-.28393	.13719	.389	-.6703
	N/A	.65325*	.07042	.000	.4549
From 10 hours but less than 20 hours	Less than 5 hours	.44564*	.07934	.000	.2222
	From 5 hours but less than 10 hours	.17802	.08320	.327	-.0563

(I)	(J)	Mean Difference	Std. Error	Sig.	Lower Bound
	20 hours or more	-.10591	.13954	1.000	-.4989
	N/A	.83127*	.07489	.000	.6204
20 hours or more	Less than 5 hours	.55155*	.13489	.000	.1717
	From 5 hours but less than 10 hours	.28393	.13719	.389	-.1024
	From 10 hours but less than 20 hours	.10591	.13954	1.000	-.2870
	N/A	.93718*	.13231	.000	.5646
N/A	Less than 5 hours	-.38563*	.06582	.000	-.5710
	From 5 hours but less than 10 hours	-.65325*	.07042	.000	-.8516
	From 10 hours but less than 20 hours	-.83127*	.07489	.000	-1.0422
	20 hours or more	-.93718*	.13231	.000	-1.3098

Multiple Comparisons

Dependent Variable: Q15

Bonferroni

(I) 13. What was the duration of the last trainings/workshops/drills about disaster that you attended? - Drill	(J) 13. What was the duration of the last trainings/workshops/drills about disaster that you attended? - Drill	95% Confidence Interval Upper Bound
Less than 5 hours	From 5 hours but less than 10 hours	-.0560
	From 10 hours but less than 20 hours	-.2222
	20 hours or more	-.1717
	N/A	.5710
From 5 hours but less than 10 hours	Less than 5 hours	.4792
	From 10 hours but less than 20 hours	.0563
	20 hours or more	.1024
	N/A	.8516
From 10 hours but less than 20 hours	Less than 5 hours	.6691
	From 5 hours but less than 10 hours	.4123
	20 hours or more	.2870
	N/A	1.0422
20 hours or more	Less than 5 hours	.9314
	From 5 hours but less than 10 hours	.6703
	From 10 hours but less than 20 hours	.4989
	N/A	1.3098
N/A	Less than 5 hours	-.2003
	From 5 hours but less than 10 hours	-.4549

	From 10 hours but less than 20 hours	-.6204
	20 hours or more	-.5646

Appendix V

The Results of the "One Way ANOVA" of the Difference in Hajj Knowledge of Disaster
Preparedness for Mass Gatherings between Different Categories of EMS Providers Based
on Number of Training, Workshop, and Drill EVER Attended.

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 10. How many trainings/workshops/drills about disaster preparedness have you ever been attended? - Training	(J) 10. How many trainings/workshops/drills about disaster preparedness have you ever been attended? - Training	Mean Difference (I-J)	Std. Error	Sig.
Never	One	-.13527	.10095	1.000
	Two	-.33702*	.10576	.015
	Three	-.47849*	.11794	.001
	More than Three	-.42865*	.09770	.000
One	Never	.13527	.10095	1.000
	Two	-.20176	.11200	.721
	Three	-.34322	.12356	.056
	More than Three	-.29339	.10443	.051
Two	Never	.33702*	.10576	.015
	One	.20176	.11200	.721
	Three	-.14146	.12752	1.000
	More than Three	-.09163	.10908	1.000
Three	Never	.47849*	.11794	.001
	One	.34322	.12356	.056
	Two	.14146	.12752	1.000
	More than Three	.04983	.12092	1.000
More than Three	Never	.42865*	.09770	.000
	One	.29339	.10443	.051
	Two	.09163	.10908	1.000
	Three	-.04983	.12092	1.000

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

95% Confidence Interval

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(I) 10. How many trainings/workshops/drills about disaster preparedness have you ever been attended? - Training	(J) 10. How many trainings/workshops/drills about disaster preparedness have you ever been attended? - Training	Lower Bound	Upper Bound
Never	One	-.4196	.1490
	Two	-.6348	-.0392
	Three	-.8106	-.1464
	More than Three	-.7038	-.1535
One	Never	-.1490	.4196
	Two	-.5172	.1136
	Three	-.6912	.0047
	More than Three	-.5875	.0007
Two	Never	.0392	.6348
	One	-.1136	.5172
	Three	-.5006	.2176
	More than Three	-.3988	.2155
Three	Never	.1464	.8106
	One	-.0047	.6912
	Two	-.2176	.5006
	More than Three	-.2907	.3903
More than Three	Never	.1535	.7038
	One	-.0007	.5875
	Two	-.2155	.3988
	Three	-.3903	.2907

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 10. How many trainings/workshops/drills about disaster preparedness have you ever been attended? - Workshops	(J) 10. How many trainings/workshops/drills about disaster preparedness have you ever been attended? - Workshops	Mean Difference (I-J)	Std. Error	Sig.
Never	One	-.34354[*]	.09043	.002
	Two	-.41118[*]	.09519	.000
	Three	-.34678	.13316	.094
	More than Three	-.55624[*]	.11796	.000
One	Never	.34354[*]	.09043	.002
	Two	-.06764	.10724	1.000

	Three	-.00325	.14203	1.000
	More than Three	-.21271	.12789	.967
Two	Never	.41118*	.09519	.000
	One	.06764	.10724	1.000
	Three	.06439	.14511	1.000
	More than Three	-.14507	.13130	1.000
Three	Never	.34678	.13316	.094
	One	.00325	.14203	1.000
	Two	-.06439	.14511	1.000
	More than Three	-.20946	.16097	1.000
More than Three	Never	.55624*	.11796	.000
	One	.21271	.12789	.967
	Two	.14507	.13130	1.000
	Three	.20946	.16097	1.000

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 10. How many trainings/workshops/drills about disaster preparedness have you ever been attended? - Workshops	(J) 10. How many trainings/workshops/drills about disaster preparedness have you ever been attended? - Workshops	95% Confidence Interval	
		Lower Bound	Upper Bound
Never	One	-.5982	-.0889
	Two	-.6792	-.1431
	Three	-.7218	.0282
	More than Three	-.8884	-.2241
One	Never	.0889	.5982
	Two	-.3696	.2344
	Three	-.4032	.3967
	More than Three	-.5728	.1474
Two	Never	.1431	.6792
	One	-.2344	.3696
	Three	-.3442	.4730
	More than Three	-.5148	.2247
Three	Never	-.0282	.7218
	One	-.3967	.4032
	Two	-.4730	.3442
	More than Three	-.6627	.2438

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 10. How many trainings/workshops/drills about disaster preparedness have you ever been attended? - Drills	(J) 10. How many trainings/workshops/drills about disaster preparedness have you ever been attended? - Drills	Mean Difference (I-J)	Std. Error	Sig.
Never	One	-.36133[*]	.09049	.001
	Two	-.54158[*]	.10102	.000
	Three	-.66464[*]	.12864	.000
	More than Three	-.64040[*]	.10051	.000
One	Never	.36133[*]	.09049	.001
	Two	-.18025	.10429	.844
	Three	-.30331	.13123	.211
	More than Three	-.27908	.10380	.073
Two	Never	.54158[*]	.10102	.000
	One	.18025	.10429	.844
	Three	-.12307	.13870	1.000
	More than Three	-.09883	.11310	1.000
Three	Never	.66464[*]	.12864	.000
	One	.30331	.13123	.211
	Two	.12307	.13870	1.000
	More than Three	.02424	.13833	1.000
More than Three	Never	.64040[*]	.10051	.000
	One	.27908	.10380	.073
	Two	.09883	.11310	1.000
	Three	-.02424	.13833	1.000

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

95% Confidence Interval

(I) 10. How many trainings/workshops/drills about disaster preparedness have you ever been attended? - Drills	(J) 10. How many trainings/workshops/drills about disaster preparedness have you ever been attended? - Drills	Lower Bound	Upper Bound
Never	One	-.6161	-.1065
	Two	-.8261	-.2571
	Three	-1.0269	-.3024
	More than Three	-.9234	-.3574
One	Never	.1065	.6161
	Two	-.4739	.1134
	Three	-.6729	.0662
	More than Three	-.5714	.0132
Two	Never	.2571	.8261
	One	-.1134	.4739
	Three	-.5136	.2675
	More than Three	-.4173	.2197
Three	Never	.3024	1.0269
	One	-.0662	.6729
	Two	-.2675	.5136
	More than Three	-.3653	.4138
More than Three	Never	.3574	.9234
	One	-.0132	.5714
	Two	-.2197	.4173
	Three	-.4138	.3653

Appendix W

The Results of the "One Way ANOVA" of the Difference in Hajj Knowledge of Disaster Preparedness for Mass Gatherings between Different Categories of EMS Providers Based on Number of Training, Workshop, and Drill Attended.

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 11. Which of the following best describes your attendance at a trainings/workshops/drills about disaster preparedness? If not select N/A - Training	(J) 11. Which of the following best describes your attendance at a trainings/workshops/drills about disaster preparedness? If not select N/A - Training	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Never	One time per year	-.24634*	.07807	.025	-.4763	-.0164
	Two times per year	-.63205*	.10776	.000	-.9495	-.3146
	Three times per year	-.57782*	.13277	.000	-.9689	-.1867
	Four times per year	-.97454*	.25356	.002	-1.7214	-.2277
	Five times or more per year	-.35745	.23685	1.000	-1.0551	.3402
One time per year	Never	.24634*	.07807	.025	.0164	.4763
	Two times per year	-.38571*	.10973	.007	-.7089	-.0625
	Three times per year	-.33148	.13438	.208	-.7273	.0643
	Four times per year	-.72821	.25440	.065	-1.4775	.0211
	Five times or more per year	-.11111	.23775	1.000	-.8114	.5892
Two times per year	Never	.63205*	.10776	.000	.3146	.9495
	One time per year	.38571*	.10973	.007	.0625	.7089
	Three times per year	.05423	.15354	1.000	-.3980	.5065
	Four times per year	-.34249	.26503	1.000	-1.1231	.4381
	Five times or more per year	.27460	.24909	1.000	-.4591	1.0083
Three times per year	Never	.57782*	.13277	.000	.1867	.9689
	One time per year	.33148	.13438	.208	-.0643	.7273
	Two times per year	-.05423	.15354	1.000	-.5065	.3980
	Four times per year	-.39672	.27614	1.000	-1.2101	.4166

(I)	(J)	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
	Five times or more per year	.22037	.26089	1.000	-.5480	.9888
Four times per year	Never	.97454*	.25356	.002	.2277	1.7214
	One time per year	.72821	.25440	.065	-.0211	1.4775
	Two times per year	.34249	.26503	1.000	-.4381	1.1231
	Three times per year	.39672	.27614	1.000	-.4166	1.2101
	Five times or more per year	.61709	.33871	1.000	-.3805	1.6147
Five times or more per year	Never	.35745	.23685	1.000	-.3402	1.0551
	One time per year	.11111	.23775	1.000	-.5892	.8114
	Two times per year	-.27460	.24909	1.000	-1.0083	.4591
	Three times per year	-.22037	.26089	1.000	-.9888	.5480
	Four times per year	-.61709	.33871	1.000	-1.6147	.3805

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 11. Which of the following best describes your attendance at a trainings/workshops/drills about disaster preparedness? If not select N/A - Workshop	(J) 11. Which of the following best describes your attendance at a trainings/workshops/drills about disaster preparedness? If not select N/A - Workshop	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Never	One time per year	-.39683*	.07790	.000	-.6263	-.1674
	Two times per year	-.57012*	.10898	.000	-.8911	-.2491
	Three times per year	-.42271	.21022	.671	-1.0419	.1965
	Four times per year	-.88683*	.27346	.019	-1.6923	-.0814
	Five times or more per year	-.79289	.28644	.087	-1.6366	.0508
One time per year	Never	.39683*	.07790	.000	.1674	.6263
	Two times per year	-.17329	.11697	1.000	-.5178	.1712
	Three times per year	-.02588	.21447	1.000	-.6576	.6058
	Four times per year	-.49000	.27674	1.000	-1.3051	.3251
	Five times or more per year	-.39606	.28957	1.000	-1.2490	.4568
Two times per year	Never	.57012*	.10898	.000	.2491	.8911
	One time per year	.17329	.11697	1.000	-.1712	.5178
	Three times per year	.14741	.22761	1.000	-.5230	.8178

		Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
	Four times per year	-.31670	.28705	1.000	-1.1622	.5288
	Five times or more per year	-.22276	.29943	1.000	-1.1047	.6592
Three times per year	Never	.42271	.21022	.671	-.1965	1.0419
	One time per year	.02588	.21447	1.000	-.6058	.6576
	Two times per year	-.14741	.22761	1.000	-.8178	.5230
	Four times per year	-.46411	.33869	1.000	-1.4617	.5335
	Five times or more per year	-.37018	.34925	1.000	-1.3989	.6585
Four times per year	Never	.88683*	.27346	.019	.0814	1.6923
	One time per year	.49000	.27674	1.000	-.3251	1.3051
	Two times per year	.31670	.28705	1.000	-.5288	1.1622
	Three times per year	.46411	.33869	1.000	-.5335	1.4617
	Five times or more per year	.09394	.39060	1.000	-1.0565	1.2444
Five times or more per year	Never	.79289	.28644	.087	-.0508	1.6366
	One time per year	.39606	.28957	1.000	-.4568	1.2490
	Two times per year	.22276	.29943	1.000	-.6592	1.1047
	Three times per year	.37018	.34925	1.000	-.6585	1.3989
	Four times per year	-.09394	.39060	1.000	-1.2444	1.0565

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 11. Which of the following best describes your attendance at a trainings/workshops/drills about disaster preparedness? If not select N/A - Drill	(J) 11. Which of the following best describes your attendance at a trainings/workshops/drills about disaster preparedness? If not select N/A - Drill	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Never	One time per year	-.44976*	.07431	.000	-.6686	-.2309
	Two times per year	-.79734*	.10993	.000	-1.1211	-.4735
	Three times per year	-.28027	.15782	1.000	-.7451	.1846
	Four times per year	-1.25467*	.29568	.000	-2.1256	-.3838
	Five times or more per year	-.90282*	.23887	.003	-1.6064	-.1992
One time per year	Never	.44976*	.07431	.000	.2309	.6686
	Two times per year	-.34758*	.11318	.033	-.6809	-.0142

	Three times per year	.16949	.16010	1.000	-.3021	.6410
	Four times per year	-.80491	.29690	.103	-1.6794	.0696
	Five times or more per year	-.45306	.24038	.898	-1.1611	.2550
Two times per year	Never	.79734*	.10993	.000	.4735	1.1211
	One time per year	.34758*	.11318	.033	.0142	.6809
	Three times per year	.51706	.17943	.061	-.0114	1.0455
	Four times per year	-.45734	.30776	1.000	-1.3638	.4491
	Five times or more per year	-.10549	.25367	1.000	-.8526	.6417
Three times per year	Never	.28027	.15782	1.000	-.1846	.7451
	One time per year	-.16949	.16010	1.000	-.6410	.3021
	Two times per year	-.51706	.17943	.061	-1.0455	.0114
	Four times per year	-.97440*	.32793	.046	-1.9403	-.0085
	Five times or more per year	-.62255	.27779	.380	-1.4408	.1957
Four times per year	Never	1.25467*	.29568	.000	.3838	2.1256
	One time per year	.80491	.29690	.103	-.0696	1.6794
	Two times per year	.45734	.30776	1.000	-.4491	1.3638
	Three times per year	.97440*	.32793	.046	.0085	1.9403
	Five times or more per year	.35185	.37375	1.000	-.7490	1.4527
Five times or more per year	Never	.90282*	.23887	.003	.1992	1.6064
	One time per year	.45306	.24038	.898	-.2550	1.1611
	Two times per year	.10549	.25367	1.000	-.6417	.8526
	Three times per year	.62255	.27779	.380	-.1957	1.4408
	Four times per year	-.35185	.37375	1.000	-1.4527	.7490

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Appendix X

The Results of the "One Way ANOVA" of the Difference in Hajj Knowledge of Disaster
Preparedness for Mass Gatherings between Different Categories of EMS Providers Based
on Number of Training, Workshop, and Drill Last Time Attended.

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 12. When was the last time you attended a trainings/ workshops/ drills about disaster preparedness? - Training	(J) 12. When was the last time you attended a trainings/ workshops/ drills about disaster preparedness? - Training	Mean Difference (I-J)	Std. Error	Sig.
Less than six months ago	Six months ago-A year ago	-.01227	.10312	1.000
	More than one year ago	.22452	.10147	.163
	N/A	.43376*	.09761	.000
Six months ago-A year ago	Less than six months ago	.01227	.10312	1.000
	More than one year ago	.23679	.09821	.097
	N/A	.44603*	.09422	.000
More than one year ago	Less than six months ago	-.22452	.10147	.163
	Six months ago-A year ago	-.23679	.09821	.097
	N/A	.20924	.09241	.143
N/A	Less than six months ago	-.43376*	.09761	.000
	Six months ago-A year ago	-.44603*	.09422	.000
	More than one year ago	-.20924	.09241	.143

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 12. When was the last time you attended a trainings/ workshops/ drills about disaster preparedness? - Training	(J) 12. When was the last time you attended a trainings/ workshops/ drills about disaster preparedness? - Training	95% Confidence Interval	
		Lower Bound	Upper Bound
Less than six months ago	Six months ago-A year ago	-.2851	.2606
	More than one year ago	-.0439	.4930
	N/A	.1755	.6920
Six months ago-A year ago	Less than six months ago	-.2606	.2851
	More than one year ago	-.0231	.4966
	N/A	.1967	.6953

More than one year ago	Less than six months ago	-.4930	.0439
	Six months ago-A year ago	-.4966	.0231
	N/A	-.0353	.4537
N/A	Less than six months ago	-.6920	-.1755
	Six months ago-A year ago	-.6953	-.1967
	More than one year ago	-.4537	.0353

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 12. When was the last time you attended a trainings/ workshops/ drills about disaster preparedness? - Workshop	(J) 12. When was the last time you attended a trainings/ workshops/ drills about disaster preparedness? - Workshop	Mean Difference (I-J)	Std. Error	Sig.
Less than six months ago	Six months ago-A year ago	-.08582	.11693	1.000
	More than one year ago	.12167	.11977	1.000
	N/A	.43324*	.10817	.000
Six months ago-A year ago	Less than six months ago	.08582	.11693	1.000
	More than one year ago	.20749	.10103	.242
	N/A	.51907*	.08696	.000
More than one year ago	Less than six months ago	-.12167	.11977	1.000
	Six months ago-A year ago	-.20749	.10103	.242
	N/A	.31158*	.09074	.004
N/A	Less than six months ago	-.43324*	.10817	.000
	Six months ago-A year ago	-.51907*	.08696	.000
	More than one year ago	-.31158*	.09074	.004

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 12. When was the last time you attended a trainings/ workshops/ drills about disaster preparedness? - Workshop	(J) 12. When was the last time you attended a trainings/ workshops/ drills about disaster preparedness? - Workshop	95% Confidence Interval	
		Lower Bound	Upper Bound
Less than six months ago	Six months ago-A year ago	-.3952	.2236
	More than one year ago	-.1952	.4386
	N/A	.1470	.7194
Six months ago-A year ago	Less than six months ago	-.2236	.3952
	More than one year ago	-.0598	.4748

		Lower Bound	Upper Bound
	N/A	.2890	.7491
More than one year ago	Less than six months ago	-.4386	.1952
	Six months ago-A year ago	-.4748	.0598
	N/A	.0715	.5517
N/A	Less than six months ago	-.7194	-.1470
	Six months ago-A year ago	-.7491	-.2890
	More than one year ago	-.5517	-.0715

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 12. When was the last time you attended a trainings/ workshops/ drills about disaster preparedness? - Drill	(J) 12. When was the last time you attended a trainings/ workshops/ drills about disaster preparedness? - Drill	Mean Difference (I-J)	Std. Error	Sig.
Less than six months ago	Six months ago-A year ago	-.17778	.10940	.628
	More than one year ago	.14678	.11053	1.000
	N/A	.50623*	.10452	.000
Six months ago-A year ago	Less than six months ago	.17778	.10940	.628
	More than one year ago	.32457*	.09389	.003
	N/A	.68401*	.08673	.000
More than one year ago	Less than six months ago	-.14678	.11053	1.000
	Six months ago-A year ago	-.32457*	.09389	.003
	N/A	.35944*	.08815	.000
N/A	Less than six months ago	-.50623*	.10452	.000
	Six months ago-A year ago	-.68401*	.08673	.000
	More than one year ago	-.35944*	.08815	.000

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 12. When was the last time you attended a trainings/ workshops/ drills about disaster preparedness? - Drill	(J) 12. When was the last time you attended a trainings/ workshops/ drills about disaster preparedness? - Drill	95% Confidence Interval	
		Lower Bound	Upper Bound
Less than six months ago	Six months ago-A year ago	-.4672	.1117
	More than one year ago	-.1457	.4392
	N/A	.2297	.7828
Six months ago-A year ago	Less than six months ago	-.1117	.4672

	More than one year ago	.0762	.5730
	N/A	.4545	.9135
More than one year ago	Less than six months ago	-.4392	.1457
	Six months ago-A year ago	-.5730	-.0762
	N/A	.1262	.5927
N/A	Less than six months ago	-.7828	-.2297
	Six months ago-A year ago	-.9135	-.4545
	More than one year ago	-.5927	-.1262

Appendix Y

The Results of the "One Way ANOVA" of the Difference in Hajj Knowledge of Disaster Preparedness for Mass Gatherings between Different Categories of EMS Providers Based on duration of the last time attended Training, Workshop, and Drill.

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 13. What was the duration of the last trainings/workshops/drills about disaster that you attended? - Training	(J) 13. What was the duration of the last trainings/workshops/drills about disaster that you attended? - Training	Mean Difference (I-J)	Std. Error	Sig.
Less than 5 hours	From 5 hours but less than 10 hours	-.15038	.09389	1.000
	From 10 hours but less than 20 hours	-.02837	.15039	1.000
	20 hours or more	.12667	.14615	1.000
	N/A	.31159*	.08527	.003
From 5 hours but less than 10 hours	Less than 5 hours	.15038	.09389	1.000
	From 10 hours but less than 20 hours	.12200	.15746	1.000
	20 hours or more	.27704	.15341	.714
	N/A	.46196*	.09720	.000
From 10 hours but less than 20 hours	Less than 5 hours	.02837	.15039	1.000
	From 5 hours but less than 10 hours	-.12200	.15746	1.000
	20 hours or more	.15504	.19323	1.000
	N/A	.33996	.15248	.261
20 hours or more	Less than 5 hours	-.12667	.14615	1.000
	From 5 hours but less than 10 hours	-.27704	.15341	.714
	From 10 hours but less than 20 hours	-.15504	.19323	1.000
	N/A	.18492	.14830	1.000
N/A	Less than 5 hours	-.31159*	.08527	.003
	From 5 hours but less than 10 hours	-.46196*	.09720	.000

	From 10 hours but less than 20 hours	-.33996	.15248	.261
	20 hours or more	-.18492	.14830	1.000

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 13. What was the duration of the last trainings/workshops/drills about disaster that you attended? - Training	(J) 13. What was the duration of the last trainings/workshops/drills about disaster that you attended? - Training	95% Confidence Interval	
		Lower Bound	Upper Bound
Less than 5 hours	From 5 hours but less than 10 hours	-.4148	.1140
	From 10 hours but less than 20 hours	-.4519	.3951
	20 hours or more	-.2849	.5382
	N/A	.0715	.5517
From 5 hours but less than 10 hours	Less than 5 hours	-.1140	.4148
	From 10 hours but less than 20 hours	-.3214	.5654
	20 hours or more	-.1550	.7091
	N/A	.1883	.7357
From 10 hours but less than 20 hours	Less than 5 hours	-.3951	.4519
	From 5 hours but less than 10 hours	-.5654	.3214
	20 hours or more	-.3891	.6992
	N/A	-.0894	.7693
20 hours or more	Less than 5 hours	-.5382	.2849
	From 5 hours but less than 10 hours	-.7091	.1550
	From 10 hours but less than 20 hours	-.6992	.3891
	N/A	-.2327	.6025
N/A	Less than 5 hours	-.5517	-.0715
	From 5 hours but less than 10 hours	-.7357	-.1883
	From 10 hours but less than 20 hours	-.7693	.0894
	20 hours or more	-.6025	.2327

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 13. What was the duration of the last trainings/workshops/drills about disaster that you attended? - Workshop	(J) 13. What was the duration of the last trainings/workshops/drills about disaster that you attended? - Workshop	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound
Less than 5 hours	From 5 hours but less than 10 hours	.02343	.09947	1.000	-.2567
	From 10 hours but less than 20 hours	.00097	.14324	1.000	-.4024
	20 hours or more	-.12652	.19189	1.000	-.6669
	N/A	.41945*	.09070	.000	.1640
From 5 hours but less than 10 hours	Less than 5 hours	-.02343	.09947	1.000	-.3035
	From 10 hours but less than 20 hours	-.02246	.14020	1.000	-.4173
	20 hours or more	-.14995	.18963	1.000	-.6839
	N/A	.39602*	.08582	.000	.1543
From 10 hours but less than 20 hours	Less than 5 hours	-.00097	.14324	1.000	-.4043
	From 5 hours but less than 10 hours	.02246	.14020	1.000	-.3723
	20 hours or more	-.12749	.21583	1.000	-.7353
	N/A	.41847*	.13412	.019	.0408
20 hours or more	Less than 5 hours	.12652	.19189	1.000	-.4138
	From 5 hours but less than 10 hours	.14995	.18963	1.000	-.3840
	From 10 hours but less than 20 hours	.12749	.21583	1.000	-.4803
	N/A	.54597*	.18518	.033	.0245
N/A	Less than 5 hours	-.41945*	.09070	.000	-.6749
	From 5 hours but less than 10 hours	-.39602*	.08582	.000	-.6377
	From 10 hours but less than 20 hours	-.41847*	.13412	.019	-.7961
	20 hours or more	-.54597*	.18518	.033	-1.0674

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 13. What was the duration of the last trainings/workshops/drills about disaster that you attended? - Workshop	(J) 13. What was the duration of the last trainings/workshops/drills about disaster that you attended? - Workshop	95% Confidence Interval
		Upper Bound
Less than 5 hours	From 5 hours but less than 10 hours	.3035
	From 10 hours but less than 20 hours	.4043
	20 hours or more	.4138
	N/A	.6749
From 5 hours but less than 10 hours	Less than 5 hours	.2567
	From 10 hours but less than 20 hours	.3723
	20 hours or more	.3840
	N/A	.6377
From 10 hours but less than 20 hours	Less than 5 hours	.4024
	From 5 hours but less than 10 hours	.4173
	20 hours or more	.4803
	N/A	.7961
20 hours or more	Less than 5 hours	.6669
	From 5 hours but less than 10 hours	.6839
	From 10 hours but less than 20 hours	.7353
	N/A	1.0674
N/A	Less than 5 hours	-.1640
	From 5 hours but less than 10 hours	-.1543
	From 10 hours but less than 20 hours	-.0408
	20 hours or more	-.0245

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 13. What was the duration of the last trainings/workshops/drills about disaster that you attended? - Drill	(J) 13. What was the duration of the last trainings/workshops/drills about disaster that you attended? - Drill	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval
					Lower Bound
Less than 5 hours	From 5 hours but less than 10 hours	-.03286	.10101	1.000	-.3173
	From 10 hours but less than 20 hours	.00298	.10666	1.000	-.2974
	20 hours or more	-.07810	.18132	1.000	-.5887
	N/A	.52742*	.08848	.000	.2783

(I) 13. Duration - Drill	(J)	Mean Difference	Std. Error	Sig.	95% CI Lower Bound
From 5 hours but less than 10 hours	Less than 5 hours	.03286	.10101	1.000	-.2516
	From 10 hours but less than 20 hours	.03584	.11185	1.000	-.2791
	20 hours or more	-.04524	.18442	1.000	-.5646
	N/A	.56027*	.09467	.000	.2937
From 10 hours but less than 20 hours	Less than 5 hours	-.00298	.10666	1.000	-.3033
	From 5 hours but less than 10 hours	-.03584	.11185	1.000	-.3508
	20 hours or more	-.08108	.18757	1.000	-.6093
	N/A	.52444*	.10067	.000	.2409
20 hours or more	Less than 5 hours	.07810	.18132	1.000	-.4325
	From 5 hours but less than 10 hours	.04524	.18442	1.000	-.4741
	From 10 hours but less than 20 hours	.08108	.18757	1.000	-.4471
	N/A	.60551*	.17786	.007	.1046
N/A	Less than 5 hours	-.52742*	.08848	.000	-.7766
	From 5 hours but less than 10 hours	-.56027*	.09467	.000	-.8269
	From 10 hours but less than 20 hours	-.52444*	.10067	.000	-.8079
	20 hours or more	-.60551*	.17786	.007	-1.1064

Multiple Comparisons

Dependent Variable: Q18

Bonferroni

(I) 13. What was the duration of the last trainings/workshops/drills about disaster that you attended? - Drill	(J) 13. What was the duration of the last trainings/workshops/drills about disaster that you attended? - Drill	95% Confidence Interval Upper Bound
Less than 5 hours	From 5 hours but less than 10 hours	.2516
	From 10 hours but less than 20 hours	.3033
	20 hours or more	.4325
	N/A	.7766
From 5 hours but less than 10 hours	Less than 5 hours	.3173
	From 10 hours but less than 20 hours	.3508
	20 hours or more	.4741
	N/A	.8269
From 10 hours but less than 20 hours	Less than 5 hours	.2974
	From 5 hours but less than 10 hours	.2791

		20 hours or more	.4471
		N/A	.8079
20 hours or more		Less than 5 hours	.5887
		From 5 hours but less than 10 hours	.5646
		From 10 hours but less than 20 hours	.6093
		N/A	1.1064
N/A		Less than 5 hours	-.2783
		From 5 hours but less than 10 hours	-.2937
		From 10 hours but less than 20 hours	-.2409
		20 hours or more	-.1046

CURRICULUM VITAE

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EDUCATIONAL BACKGROUND

Ph.D., Health Sciences Management   **Expected May 2018**

- University of Louisville, Louisville, KY   G.P.A 3.65
- Dissertation: AN ASSESSMENT OF THE DISASTER PREPAREDNESS KNOWLEDGE OF EMS PROVIDER IN THE HAJJ 2016.

M.S. Health Services Administration   **May 2011**

- University of Evansville, Evansville, IN   G.P.A.   3.9

B.S. Emergency Medical Care   **May 2009**

- Eastern Kentucky University, Richmond, KY   Dean list, two terms, G.P.A. 3.8

Diploma Emergency Medical Technician   **December 2005**

- Prince Sultan Military College of Health Sciences, Saudi Arabia   G.P.A 3.47/5.0

TEACHING EXPERIENCE

Teaching Assistant, Health Science Management Dept.   **Fall 2017**

School of Public Health Sciences Informatics, University of Louisville

- Taught master level health management classes (15 students)
- Instructor of AHA at Medical Education in Hospital of Louisville

Adjunct Professor, Prince Sultan Bin Abdalziz College for EMS (PSACEMS)

   January 2011- Present

King Saudi University, Saudi Arabia

- Instruct advanced emergency medical care, Public health, and health management courses.
- Teach undergraduate level EMS track (50 students)
- Serve as advisor for EMS undergraduate level
- Coordinate AHA certification courses.
- Supervise the Student Affairs office in organizing student-centered program.

Graduate study department at University of Evansville   **2011**

King Fahd Armed Forces Hospital   Jeddah, Saudi Arabia   **1997-2006**
<u>Health Coordinator</u>

- Coordinated the screening process of new military and navy recruits
- Assisted screening physicians and performed clerical duties.

Advance Medical provider   **2005- 2006**

- Performed assessment and emergency care to patients admitted in emergency room.
- Instructed a First Aid and CPR courses at the hospital for staff and local community.
- Worked for Saudi Red Crescent as part of an internship in ambulance to provide emergency medical treatment during transport to hospital.

<u>**SKILLS**</u>

- Emergency Medical Response Management
- Critical Care Transport
- Airway Management
- Disaster planning
- Emergency Public Health
- ECG skills
- Strong problem solving and analytical abilities
- Microsoft Office Package
- SPSS and Data analysis
- Research Methods
- Quantitative Methodology
- Clinical Research
- Experience in hands on training of other
- Fluent in English and Arabic Language
- Healthcare Management
- Public Health Sciences
- Health policy

<u>**RESEARCH**</u>

- Researched, prepared and presented an overview of the incidence of health care medical error in Emergency Room treatment in the United States

- Led health care statistics lesson on the prevalence and treatment of diabetes in the U.S.
- Evaluated the current state of health care delivery system in the Kingdom of Saudi Arabia; strengths, weaknesses, opportunities and threats.
- Book reviewer: *Transformation of EMS for Red Crescent Authority*.

COURSES
- Advance Topics in Health Analysis
- Complex Health Organization and Leadership
- Complexity and Health Systems
- Epidemiology Methods
- Methods in Health Service Research
- Public Budgeting and Finance
- Public Health Data Management using SPSS
- Public Health and the built Environment
- Research Methods
- Human Recourses Management
- Organizational Behavior in Health care
- Seminar in Public Health Management

CONFERENCES & WORKDHOPS
Mass gathering Medicine Summit 2018
- Poster and Speaker in conference

Kentucky EMS Conference and Expo 2017

- Leading, motivating, and Evaluating Employees.
- The pentagon Attack Lessons Learned: An eye witness account and lessons learned.
- KBEMS Educator Orientation
- Stop sweating it! 15 action steps to reduce the stress from living the Ambulance industry life style.
- Legislative Update
- If life is worth saving it must be worth living
- KBEMS EMS Evaluator course.
- Hot car death & treating heat stroke.
- Enhanced Medicaid reimbursement project- The overview
- Your off-duty behavior could impact you while on duty
- Bridging the Gap-changes in EMS education.
- Research for EMS: Investigation 101.

2nd EMS Education Conference in Riyadh, Saudi Arabia   **2014**

- Attended the conference and update last method for teaching.

1st EMS Education Conference in Riyadh, Saudi Arabia   **2012**

- Scientific committee of the conference and head of public relation.

Emergency Medical Care Conference   **2004**

- Reviewed and updated emergency response skills and practice, medical technology.

Asthma day   **2003**

- Attended Asthma Day conference learning to properly care for patients with asthma in emergency setting.

Workshop of Porter Starke Services
    2010

- Team building
- Time management
- Leadership

VOLUNTEER EXPERIENCE

President, Saudi Student Association, University of Louisville   **2016- Present**

- Organizing social events.
- Advise new students
- Introduce the culture of Saudi Arabia in campus

Vice President, American International Relation Club   **2017**

- Organizing social events
- Many activities in UofL campus

Simulation center at Medical Education (School of Medicine at UofL)   **2016-Present**

- Serve as simulation technician
- Preparing lab activities and simulation
- Prepares equipment, supplies, and physical set-up and breakdown for lab and simulation exercises with students
- Works with faculty to create simulation activities