



Review of Hospital Disaster Preparedness in Arabian Gulf Countries

Abdulmajeed AlShowair^{1*}, Steven Parrillo² and Mostafa Kofi³

¹First Health Cluster in Central Region, Riyadh, Saudi Arabia

²Emergency medicine, Einstein Medical Center Philadelphia, Pennsylvania, USA

³Prince Sultan Medical Military Hospital, Riyadh, Saudi Arabia

*Corresponding Author: Abdulmajeed AlShowair, First Health Cluster in Central Region, Riyadh, Saudi Arabia.

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Abstract

Introduction: Arabian Gulf countries require comprehensive and robust disaster management plans/strategies to cope with untimely, unpredictable, and perceived high impact disasters. In the past decade, there has been a marked increase in the magnitude and frequency of disasters causing public health emergencies, huge economic losses, and irreversible impact on the environment. The impact may affect the community or society to an extent which is beyond its ability to cope with its own resources. Based on global data, there has been approximately 60% increase in disasters around the globe, wherein an estimated 33 million people have become homeless, and 4.2 million were injured. Both man-made and natural disasters had caused over 2 million deaths in the past decade and affected over 3 billion people indirectly.

Methods: This research aims to describe the current challenges in the context of Emergency preparedness in the Gulf region. Authors reviewed published articles that having the key words of disaster preparedness, Arabian Gulf countries, disaster management, emergency management in Gulf, public health emergency, pandemic in the Gulf countries, and crisis response in Gulf countries; that are published between 2007 and 2016; a total of 22 articles were included.

Results: Both qualitative and quantitative assessments to identify key trends associated with disaster preparedness in the Gulf region indicate prepared for terrorism, health/safety accidents, and extreme heat. However, is not prepared for natural disasters.

Conclusions: This paper provides an overview of disaster preparedness in Arabian Gulf countries based on previously published literature. It provides an in-depth review of key themes and trends documented on disaster preparedness and management in Arabian Gulf countries.

Keywords: Emergency Preparedness; Assessment; Gulf Region

Introduction

Disasters cause huge economic and livelihood losses depending on the scope, magnitude, and community. Disasters can be due to man-made or natural causes which could relate to localized events of high impact large-scale events which include public health emergencies. Most disasters may occur without a warning sign can cause huge economic and environmental destruction [1]. The nature of disasters is often unpredictable and could destroy property, chaos, and mass casualties. Natural and man-made disasters are often associated with long-term physical, social, psychological, economic, and environmental consequences on the entire country, state or community. Natural disasters have been known to wipe

out minority communities and even change the geographical aspects of the community [2].

Disasters in Arabian Gulf countries can have both, long-term and short-term health effects on the population which in turn could have a negative impact of stain on the capacity of the healthcare system [1]. Arabian Gulf countries require comprehensive and robust disaster management plans/strategies to cope with untimely, unpredictable, and perceived high impact disasters. In the past decade, there has been an exponential increase in the magnitude and frequency of disasters causing public health emergencies, huge economic losses, and irreversible impact on the physical environment. Based on global data, there has been a 60% rise in disasters

around the globe, wherein an estimated 33 million people have become homeless, and 4.2 million were injured. Both man-made and natural disasters had caused over 2 million deaths in the past decade and affected over 3 billion people [2].

Rising population and pollution have caused global warming and climate change which in turn have contributed to larger and higher impact natural disasters [1]. Thus, there is a need for disaster preparedness and management across countries, specifically those which have high density population and large economies. However, smaller countries with comparatively low income should also develop and participate in disaster preparedness. Disasters in one nation can have an adverse effect on the other, wherein neither natural or man-made disasters are predictable. No community is immune to the effects of a disaster. For example, the Ebola outbreak in West Africa led to loss of many lives and socio-economic downturn, specifically in the regions, Guinea, Liberia, and Sierra Leone. Thus, it has become important to assess the current standard of disaster preparedness and management in Arabian Gulf countries with a focus on coping and managing disasters. Gulf countries have witnessed many natural and man-made disasters, such as earthquakes, oil spills, global warming, wastes from factories, illegal fishing, and many others [3].

Disaster preparedness is a unique platform that helps Health Care planners, researchers, and allied personnel to design and implement strategies for the benefit of the society. Disaster preparedness and management includes coordinated and realistic planning to increase the overall effectiveness of disaster planning. The purpose is to reduce the efforts and increase the overall efficiency of national societies, community, and household members involved in the management and preparedness for disaster. The United Nations Office for Disaster Preparedness and Disaster Risk Reduction defines disaster as 'A serious disruption of the functioning of the society or community which includes, material, environmental, economic, and human losses.

Methods

The authors conducted a review of articles that discussed disaster preparedness in Arabian Gulf countries; Kuwait, Bahrain, Iraq, Oman, Qatar, Saudi Arabia and the United Arab Emirates (UAE). The objective was to identify the various trends associated with disaster preparedness and management in these countries. The authors performed the primary research; one identifies relevant articles by using pre-determined search keys while the other short-listed those articles. Some of the key words used to search articles include disaster preparedness, Arabian Gulf countries, disaster management, emergency management in the Gulf, public health emergency, pandemic in Gulf countries, and crisis response

in Gulf countries. Only papers published in English 2007-2016 were included in the review. Articles whose full-text was freely available over the database and external sources were included in the review. Systematic reviews, cohorts, and reports from international organizations were included in the study. Articles published in Arabic, Persian, Hebrew or languages other than English (whose copy was not available in English) was excluded from the review. Abstracts or single person reviews were not included for the review. Case reports and reviews from single authors or unrecognized agencies were not included in the review. Authors searched PubMed and Cochrane Library, but only found relevant work in PubMed.

A total of 30 articles were reviewed in this article, 5 of which were International reports on disaster management and health disaster preparedness from the World Health Organization, International Federation of Red Cross, and United Nations International Strategy for Disaster Reduction. Since there were only about eleven systematic reviews on disaster preparedness or health disaster preparedness in all the Arabian Countries, key themes, trends, and components that were repetitive in both reports and articles were identified and reviewed in the paper. Key themes based on the attitudes, knowledge, and practice of nurses towards disaster preparedness were identified from 3 systematic reviews while the review on health disaster preparedness in Arabian Gulf countries was based on information gathered from 2 systematic reviews and 1 International report. The article emphasized on the evaluation and analysis of hospital Disaster preparedness including the hospital disaster preparedness indicators (HDPI) based on information gathered from three review articles and three international reports.

Results

Unified emergency plans to combat large-scale disasters or crisis

In the past decade, most Gulf countries have focused on developing and implementing a unified emergency or disaster preparedness plan to combat large scale disasters. The unified contingency plan aims to protect the economy, the physical environment, and the population from disasters such as flooding, fires, and pandemic scenarios. All seven countries of the Arabian Gulf region have developed and implemented key disaster preparedness and emergency management plans to combat large-scale disasters. However, the efficiency and reliability of each plan has not been proven, at least in published literature. In this section, we discuss the unified emergency plans among the Gulf Arabian countries with a preview of each country's disaster preparedness plan.

Abosuliman., *et al.* 2013 [4] provided information on the disaster preparedness and management in Saudi Arabia. The authors

stated that Saudi Arabia had lost many lives and faced a large economic loss due to floods. There is clear evidence that this nation had a lack of flood management protocols or experience in handling floods. The researchers reported that most the participants in the survey emphasized five key areas as follows: (a) Training of response teams (b) Community awareness (c) Identification of organizational responsibilities (d) Improvement in coordination during disasters and (e) Community preparedness. There is a growing demand among the public to combat natural and man-made disasters with a focus on risk or disaster mitigation. Most participants in the survey reported that they preferred personal training to disaster management [4]. This is one of the few studies that focus on how the people of Saudi Arabia are focused on developing a unified emergency plan to combat large-scale disasters.

Khaili and Patriage reported disaster preparedness and management in the Emirati energy sector in UAE [5]. It is the only study that provides insights on the disaster preparedness in the energy sector of UAE. The authors performed both qualitative and quantitative assessments to identify key trends associated with disaster preparedness in the UAE. Most participants reported that the sector was prepared for terrorism, health/safety accidents, and extreme heat. However, the energy sector in the UAE is not prepared for natural disasters based on the responses from all participants. Based on a review of responses of all participants, the energy sector in the UAE is least prepared for Tsunami, earthquake, flooding, landslides, or chemical/oil spills. However, there is a need for developing a unified emergency plan to combat large-scale disasters in the energy sector of UAE [5].

Cyclones are a common natural disaster that causes severe damage to property and incurs millions of dollars lost in Oman. In the 2010 cyclone Gonu, 24 lives were lost while many economic sectors were adversely affected. These same authors assessed healthcare personnel's perspective on the disaster preparedness and management for cyclones in Oman [6]. The researchers reported that there was clear evidence on the lack of coordination and governmental support for cyclones. In Oman, there is a lack of an organized or well-planned mechanism to combat natural disasters such as cyclones, flash floods, or sand storms. Furthermore, there is no clear mechanism or management protocol to warn people about an ongoing disaster for rapid evacuation. The disaster preparedness for cyclones or any other natural disaster is poor in Oman and needs immediate ratification. The healthcare personnel recommends the need for developing a unified emergency plan to combat large-scale disasters in Oman [6].

Health disaster preparedness in Arabian Gulf Countries

Healthcare professionals such as physicians, nurses, and emergency care personnel claimed to be trained and experienced to handle patients during a natural or man-made disaster, but there are actually no adequate training provided for such specific cases, which is alarming. Most Arabian Gulf countries have an emergency response team or a healthcare disaster management team to help patients in disasters. However, it is important to review common natural and man-made disasters in these countries and how they were managed based on the health disaster preparedness and management.

Ibrahim assessed the knowledge, practices, attitudes, and familiarity among nurses in Saudi Arabia with respect to disaster and emergency preparedness [7]. He conducted a cross-sectional descriptive study to review the perceptions of nurses with respect to disaster preparedness. Most respondents felt that knowledge of disaster preparedness among nurses was poor, with an estimated 15% of nurses having basic knowledge on disaster management.

In a similar study design, Ebrahim assessed the attitude, knowledge, and practice of nurses towards disaster preparedness in Bahrain. A majority of the nurses reported to have moderate knowledge of disaster preparedness, wherein 29% of nurses were familiar with the skills required for disaster planning. With respect to the level of preparedness, 59% of nurses agreed that they have formal education and training while only 6% were not familiar with disaster training. Using Pearson's correlation, the years of experience had a moderate impact on level of disaster preparedness knowledge and practice. The researcher also reported that 50% of nurses did not attend disaster management education while only 46% of nurses were involved in formal disaster mitigation drills during their work experience [8].

Hospital disaster preparedness: evaluation and analysis

Disaster preparedness in hospitals is of key importance and signifies how the healthcare industry in the Arabian Gulf countries have fared with respect to disaster preparedness and management. A review was conducted to assess the disaster preparedness and management of hospitals in the Arabian Gulf countries. However, there were only select few articles that assessed and reviewed the disaster preparedness of hospitals in these countries.

The WHO and Western Pacific Region reviewed the hospital disaster preparedness in Saudi Arabia. Since there are only eleven articles on Gulf Region hospital disaster preparedness, the article

is considered by the authors to represent the current hospital disaster preparedness in Arabian Gulf countries [9]. Heidarlanlu, et al. state that, the hospital preparedness and management are inadequate in Arabian Gulf nations [10]. The lack of policies and governmental support has led to an unorganized and unstructured hospital disaster preparedness in some of the Arabian Gulf countries such as Oman, Iraq, Qatar, and Saudi Arabia [11]. There is a lack of structural and functional infrastructure in hospitals to support response to large-scale disasters. Previous natural disasters such as flash floods in Saudi, cyclones in Oman, sand storms in Iraq, and man-made oil spills in Qatar and Kuwait identified the poor hospital disaster management and preparedness [11]. The lack of published data on how hospitals or the healthcare system cope with natural or man-made disasters seems to indicate that preparedness and management are unorganized. There is limited information on how hospitals have coped with large-scale disasters while previous news articles and reports have indicated discrepancies and lack of disaster preparedness among hospitals in these countries [11]. However, based on these reports, the overall valuation of hospital preparedness in these countries cannot be effectively evaluated and that key hospital disaster preparedness indicators (HDPI) are required to be reviewed [10].

Evaluation and analysis of hospital disaster preparedness are based on the review of key hospital disaster preparedness indicators (HDPI) [12]. The most vital HDPI include control of communication/coordination, development of emergency or disaster plans/protocols, surge capacity, utility maintenance, hospital location and access to vulnerable areas, the safety of lifeline facilities, and the overall furnishing and architecture of the hospital [12]. International Strategy for Disaster Reduction (ISDR) and WHO reports provided information for this evaluation. The acute response to disasters in most hospitals was poor compared to the Western countries such as the US and the UK [12]. The number of injury-related and in-patient deaths in hospitals in most of the Arabian Gulf countries reflects poor planning and preparedness of hospitals. Further, the ISDR and WHO have stated that developing countries such as Qatar, Oman, and Iraq have poor contingency plans towards natural or man-made disasters. The number of inpatient admissions during a natural or man-made calamity is often beyond the scope of the emergency medical response teams at hospitals. The disaster preparedness and management plans in Oman, Saudi Arabia, Iraq, and Qatar are poorly developed [12]. Since there is no gold standard for disaster preparedness in hospitals around the globe, the healthcare sector in all the Arabian Gulf countries should focus on developing a comprehensive plan depending on

the size, location, and level of management in each hospital. The number of immigrants and local inhabitants at the time of disaster plays a key role in the development of disaster preparedness or management plan. Based on the review from the ISDR and WHO report, there is clear evidence on the lack of policy making, guidelines, and infrastructure to disaster preparedness among hospitals in Arabian Gulf countries.

Hospital disaster preparedness indicators (HDPI)

Hospital disaster preparedness is a critical component of the healthcare system. Most healthcare professionals and researchers recommend that hospital and allied healthcare centers/organizations personnel be aware of disaster preparedness and management. The Hospital Disaster Preparedness Indicators (Figure 2) [12] would help assess the overall development of disaster preparedness in Arabian Gulf countries [12].

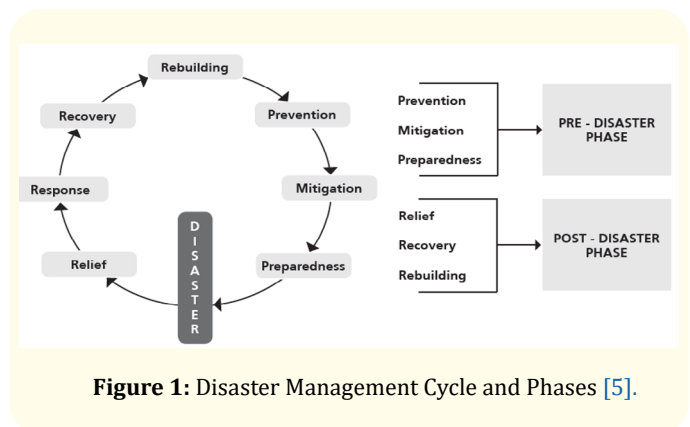


Figure 1: Disaster Management Cycle and Phases [5].

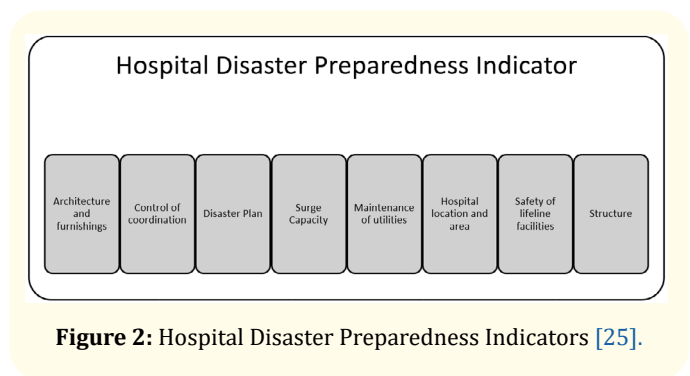


Figure 2: Hospital Disaster Preparedness Indicators [25].

Pandemic/Epidemic preparedness and management in Arabian Gulf countries

In the past decade, the Arabian Gulf countries witnessed a plethora of pandemic and epidemic situations that were associated with chaos and fear among the public and the healthcare system. The

lack of poor healthcare disaster preparedness in these countries contributed to public outrage, fear, and preventable deaths. Thus, it is important to review the various pandemic/epidemic crisis in these countries and the type of disaster preparedness or management plans deployed [12].

Lessons from Cholera epidemic in Iraq: Fundamental humanitarian disaster response

In a recent systematic review, a team of researchers reported how Iraq deployed its emergency medical services with respect to disaster preparedness for the cholera outbreak in 2015. The researchers evaluated over 5007 individuals and 1,226 households to assess the impact of disaster relief or emergency medical response with respect to the cholera outbreak. Iraq Ministry of Health (MoH) was involved with non-governmental organizations for the activation of the Cholera Control and Command Center to combat cholera. The Iraq Ministry of Health (MoH) along with its robust emergency medical team coordinated with 4 international groups to combat cholera in Iraq. These 4 groups include Médecins Sans Frontières; International Federation of Red Cross and Red Crescent Societies; United Nations Children's Fund; and WHO [13]. The intervention deployed by the rapid response teams in Iraq include Oral cholera vaccines (OCVs) and intervention of safe water, sanitation, and hygiene (WaSH) measures as recommended by the WHO. This is one of the large-scale studies that depict the use of vaccination as a fundamental tool to prevent the large-scale crisis. The cholera prevention and control programs served as a humanitarian mission which estimated to save thousands of lives from cholera in Iraq in 2015 [13].

Lessons from Viral hepatitis in Saudi Arabia: Focus on disaster preparedness

Hepatitis B virus (HBV) has affected over 400 million people worldwide while over a thousand in Saudi Arabia. HBV was known to be a hyper-endemic in Saudi in the early 1990s. However, the Saudi government has implemented many vaccination programs to combat HBV among children and pregnant women. Most programs have been funded and supported by the Saudi government with an objective to completely eradicate HBV. The General Directorate for Communicable Diseases, MOH, in Riyadh is responsible for conducting and reviewing epidemiological data on epidemics or endemics in Saudi to combat and prevent large-scale disasters [14]. The Saudi Aramco Medical Services Organization (SAMSO) has also participated in epidemiological surveillance to combat HBV endemic in Saudi Arabia. In the past decade, the National

Guard Health Affairs (NGHA) hospitals have been evaluating and implementing disaster preparedness plans against epidemics in Saudi Arabia. Thus, there is clear evidence on the presence of a robust and comprehensive plan to combat endemic-like situations in Saudi Arabia [14].

Development and implementation of emergency medicine in UAE

Wide-scale disasters account for many lives and account for millions of dollars in the UAE. In recent years, the government of UAE has developed and implemented many emergency or disaster response programs/protocols to combat disaster. The government of UAE has focused on improving its medical emergency response systems, wherein the prehospital care and emergency medical services (EMS) would coordinate with the police department to combat wide-scale disaster relief operations such as flash floods, cyclones, or epidemics. The UAE government has deployed ambulances with advanced life support (ALS/Type 3) or at least basic life support (BLS/Type 2) as a means for disaster preparedness [15].

Equipping, training and preparing for international humanitarian missions

In the past 2 decades, many international organizations have come together to focus on international disaster or epidemic issues. Most of the organizations have a humanitarian mission to control, prevent, or manage large-scale disasters. The Arabian Gulf countries have been proactive in humanitarian missions which would not only help them combat disasters but also assess and implement new collaborative approaches to combat disasters. In the past few years, Saudi Arabia has been part of the Global Coherence Initiative (GCI) which has a humanitarian mission for global peace and universal disaster preparedness and management. The GCI aims to unite all leading global economies for disaster preparedness and management [16].

Telemedicine or telehealth services have been widely adopted and implemented in most Arabian Gulf countries to combat wide-scale disasters. Tele-health services are a critical component in disaster relief operations since they help in communication and coordination between physicians and patients from remote locations. Tele health services have been implemented in Iraq and Kuwait for disaster preparedness and management but on a lower scale [17]. In the past decade, many Iraqi hospitals have adopted tele-health services to combat disaster relief operations such as flash floods, terrorism, fires, storms, and cyclones. Telehealth services is a form

of humanitarian mission to combat disasters across the globe with the help of technology and highly experienced healthcare professionals based in remote locations [18]. There has been wide-scale support for disaster relief operations in developing nations including those of the Arabian Gulf countries. In the past decade, more than 200,000 healthcare workers have volunteered in international humanitarian missions to combat disasters. In Arabian Gulf countries, the United Nations (UN), the Red Cross/Red Crescent and international non-governmental organizations (NGOs) have played a key role in disaster preparedness and management. Most of these humanitarian missions have been implemented for flash floods, cyclones, epidemic diseases, storms, landslides, fires, and other man-made disasters [19].

Increasing interaction between the private and public sector

In the past 5 decades, the Arabian Gulf countries have faced many large-scale natural and man-made disasters which have taken many lives and led to huge economic losses. The damage to property and the physical environment has caused losses in millions in Kuwait, Oman, Saudi Arabia, and the UAE. Many researchers and healthcare activist have reported the emergence of disaster preparedness and management in these countries through effective collaborations between private and public sector. In Saudi Arabia, the Ministry of Health (MoH) has collaborated with Saudi Humanitarian Emergency Aid and Response Team (Saudi HEART) and the Saudi Red Crescent Authority for disaster preparedness and management [19]. In Iraq, the MoH has collaborated with Médecins Sans Frontières; International Federation of Red Cross and Red Crescent Societies; United Nations Children's Fund; and WHO to combat large scale epidemics and natural disasters. In the UAE, the government has developed a robust and comprehensive disaster preparedness and management plan with the help of the National Emergency Crisis and Disaster Management Authority (NCEMA) and the Supreme Council for National Security. Both organizations are aimed to operate large-scale disasters such as flash floods, terrorism, fires, storms, cyclones, landslides, earthquakes, and man-made disasters. All the 7 Arabian Gulf countries have a collaboration with their local disaster relief departments and the following international/private sector organizations: United Nations International Strategy for Disaster Reduction (UNISDR), World Health Organization (WHO), and the Relief Organizations for Natural Disasters (NAIS) [19].

Awareness and education programs for the public to mitigate risks

Many healthcare professionals such as physicians, nurses, and emergency response personnel seek education and training for disaster preparedness and management in Arabian Gulf countries. The scope of knowledge and experience of nurses and allied healthcare professionals may impact the level of awareness on disaster preparedness and management. However, due to the adverse effects of large-scale natural disasters such as flash floods, storms, cyclones, and earthquakes, special emphasis is being given to awareness and educational programs for public to mitigate risks [19].

Savoian., et al. emphasized the need for communications in public health emergency preparedness. The review was based on public awareness programs around the globe with a focus on public health disaster. The researchers stated that public awareness on disaster planning and management is associated with lower rates of causality and mortality. Training the public on basic life-saving techniques and strategies can lower the incidence of injury-related deaths during large-scale disasters. Protocol and simulation-based training of people in community centres and commercial units help in assessing a real-life situation. Communication and training during disaster-like situations is empirical for a structured and efficient management system [20].

The International Federation of Red Cross and Red Crescent Societies noted that, there is huge demand for public education and awareness in Arabian Gulf countries. As per the report people in Iraq require general awareness on earthquake relief operations, sand storms and rains in Qatar, flash floods in Saudi Arabia, cyclones in Oman, and earthquake/ landslides in Qatar. Many people lack basic knowledge on disaster preparedness and management due to which chaos, anger, and riots occur [20]. It is important for the public to stay calm during healthcare or other disasters. Preference to treatment for pregnant women, children, and the elderly is essential during a healthcare epidemic since they are the most susceptible to infections or contaminations. Public awareness through print or electronic communication in the Arabian Gulf countries is highly recommended [21].

Gamboa-Maldonado., et al. emphasized on the development and implementation of community-based disaster preparedness. It is

important to engage the people in the community towards mock or disaster drills including man-made disasters and healthcare epidemics. The inclusion of community engagement would help in the facilitation of disaster preparedness and management [2].

Developing better legislation and policy

Based on current evidence, both public and private sector organizations focus on modifying and implementing key policies to improve the disaster preparedness and management in Arabian Gulf countries. One such policy includes collaboration between public environmental health and emergency preparedness and response programs for faster and efficient disaster relief operations [2]. New policies on public health awareness among graduate healthcare professionals and community-based engagement have been implemented in developing countries [22]. Bayntun, et al. review policy changes towards disaster preparedness, a team of researchers have emphasized on the inclusion of an early warning system for disasters within healthcare organizations [23]. The WHO has focused on implementing healthcare policies wherein a universal toolkit was developed for healthcare systems for disaster preparedness and crisis management [24].

Summary

Disasters in Arabian Gulf countries can have both, long-term and short-term health effects on the population which could have a negative impact of strain on the capacity of the healthcare system [1]. Arabian Gulf countries require comprehensive and robust disaster management plans/strategies to cope with untimely, unpredictable, and perceived high impact disasters [25].

Disaster preparedness in Arabian Gulf countries would benefit from disaster relief operations including those from wide-scale natural disasters such as flash floods, earthquakes, landslides, storms, and cyclones. It would also help in managing man-made disasters such as fires, oil spills, and road accidents. In the past decade, most Gulf countries have focused on developing and implementing a unified emergency or disaster preparedness plan to combat large scale disasters. The unified contingency plan aims to protect the economy and physical environment from disasters such as flooding, fires, and pandemic scenarios. All the seven countries of the Arabian Gulf region have developed and implemented key disaster preparedness and emergency management plans to combat large-scale disasters [24]. Disaster preparedness in hospitals is of key importance and signifies on how the healthcare industry in the Arabian Gulf countries have fared with respect to disaster preparedness and management. The evaluation and

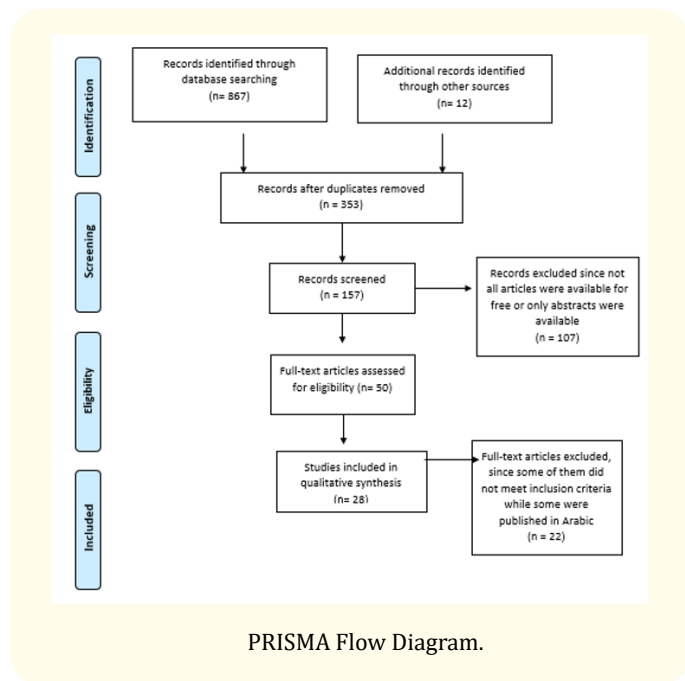
analysis of hospital disaster preparedness is based on the review of key hospital disaster preparedness indicators (HDPI). The most vital HDPI include control of communication/coordination, development of emergency or disaster plans/protocols, surge capacity, utility maintenance, hospital location and access to vulnerable areas, safety of lifeline facilities, and the overall furnishing and architecture of the hospital [12]. In the past decade, the Arabian Gulf countries witnessed a plethora of pandemic and epidemic situations that were associated with chaos and fear among the public and the healthcare system. The lack of poor healthcare disaster preparedness in these countries contributed to public outrage, fear, and preventable deaths. Health disaster preparedness with respect to cholera epidemic in Iraq, hepatitis B control and prevention in Saudi Arabia, and the development and implementation of emergency medicine in UAE was also reviewed [25].

In Saudi Arabia, the Ministry of Health (MoH) has collaborated with Saudi Humanitarian Emergency Aid and Response Team (Saudi HEART) and the Saudi Red Crescent Authority for disaster preparedness and management. In Iraq, the MoH has collaborated with Médecins Sans Frontières; International Federation of Red Cross and Red Crescent Societies; United Nations Children's Fund; and WHO to combat large scale epidemics and natural disasters. All the 7 Arabian Gulf countries have a collaboration with their local disaster relief departments and the following international/private sector organizations: United Nations International Strategy for Disaster Reduction (UNISDR), World Health Organization (WHO), and the Relief Organizations for Natural Disasters (NAIS) [26]. It is important for nations of the world to assess, review, develop, implement, and maintain disaster preparedness and management services. In the past decade, Arabian Gulf countries. i.e. Kuwait, Bahrain, Iraq, Oman, Qatar, Saudi Arabia and the United Arab Emirates (UAE) have been subject to many natural and man-made disasters which has caused both economic and physical environment losses [27].

In Conclusion, its mandatory to estimate Emergency preparedness in each country using the framework advised by the WHO [28]. Elements of Emergency preparedness which consists of Logically arranged Twelve elements arranged in three main themes which are : Governance, Capacities and Resources; these 12 elements are Governance: National Policies, Plans for emergency preparedness and coordination mechanisms; second theme is Capacities which are assessment of risks; surveillance, access to diagnostics, basic health and emergency services, risk communication and research

development; and third theme which is Resources the elements are financial resources, logistics mechanisms and dedicated and trained human resources.

Appendix 1



PRISMA Flow Diagram.

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