



## THE ROLE OF EMERGENCY MEDICAL SERVICES PROVIDERS IN DISASTER PREPAREDNESS AND RESPONSE

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### Abstract:

During emergencies and disasters, emergency medical services (EMS) provide primary medical care to people who need immediate medical attention. Preparedness is the best strategy for effectively managing disaster risk and is critical for emergency medical services (EMS) providers, including paramedics, emergency medical technicians (EMTs) and other emergency responders. This systematic review aimed to examine data on the preparedness levels of emergency medical professionals in emergency and disaster situations through a comprehensive analysis of journal articles. The project analyzed peer-reviewed publications published between 2005 and 2019 to examine the level of preparedness of emergency medical professionals to respond to crises and disasters. A comprehensive search of Scopus, Web of Science, PubMed, and Google Scholar will be conducted to identify published articles on emergency response and disaster preparedness. To the best of our knowledge, there are no rigorous studies evaluating the preparedness levels of emergency service providers in disaster scenarios. This article is a first attempt to address this need. The study will also examine key aspects of disaster preparedness for emergency service providers and ways to improve their preparedness. The first step in creating an effective tool to assess and improve the preparedness of emergency service providers is to identify key aspects of emergency preparedness.

**Keywords:** Medical Technician, Preparedness, Disaster Competencies, Emergency Medical Technician.

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**DOI:** 10.53555/ecb/2022.11.10.180

## 1- Introduction:

Emergency Medical Services (EMS) provides immediate and necessary medical assistance to those in need of urgent medical care during emergencies and disaster situations. According to the World Health Organization (WHO), EMS is considered an important component of a well-functioning and productive healthcare system [1]. Disasters, especially natural disasters, are inevitable, occur almost everywhere in the world, and have an impact on the population [2]. In 2018, 281 climate-related and geophysical events occurred globally [3]. As of the publication of this study on August 22, 2020, the Covid-19 pandemic has resulted in 848,484 deaths globally [4]. A disaster can be defined as any event that exceeds the capacity of the current social structure [1].

According to the United Nations Office for Disaster Risk Reduction (UNISDR), a disaster is a serious disruption to the functioning of a community or society caused by the interaction of hazardous events with conditions of vulnerability and exposure. This will cause significant losses and impacts on people, materials, the economy and the environment [5]. Due to their widespread nature, it is critical to address their impacts, particularly their impact on health. This approach is supported by international organizations such as the Sendai Framework for Disaster Risk Reduction (SFDRR) 2015-2030 [6]. Preparedness is an important aspect of managing and reducing disaster-related risks. The SFDRR 2015-2030 emphasizes the need to strengthen disaster preparedness as one of the primary objectives of disaster risk reduction plans. Preparedness is both the end result and the goal of disaster risk reduction (DRR). Health systems are important building blocks of communities and play a key role in disaster risk reduction. Therefore, close attention must be paid to the preparedness of the healthcare system, especially the emergency medical services (EMS) system, to ensure the successful implementation of the Sendai Framework for Disaster Risk Reduction (SFDRR) from 2015 to 2030 [8].

Emergency services provide essential medical assistance to people affected by emergencies and disasters around the world [1]. The historical commitment of civilians, particularly in caring for those killed in previous conflicts, has greatly influenced the development of contemporary ideas and practices in emergency medical services (EMS) [1]. The American Civil War was an important catalyst for the establishment of the EMS system in the United States [9]. Emergency medical care systems have undergone significant developments globally over the past 50 years and continue to evolve today [1]. The increase in major

disasters and catastrophes globally increases the need for pre-hospital emergency response Nursing services. As a result, we have identified the need for enhanced training and preparation of emergency responders to provide a coordinated and effective response [1].

Emergency medical services (EMS) providers are the first responders to health care in areas with natural and man-made disasters, including chemical, biological, radioactive, nuclear, and explosive materials (CBRNE) sites vulnerable to terrorist attacks [10]. Emergency medical services (EMS) play a critical role in emergency and disaster preparedness, response, and recovery. According to the U.S. Department of Homeland Security (USDHS), EMS is responsible for incident management, triage, prehospital treatment, medical equipment management and distribution, injury prevention and care, and ensuring the safety of affected personnel during a variety of emergency and disaster situations . [11].

An examination of the current state of preparedness and the ability of emergency service providers to handle emergencies and disasters may be an important step in improving outcomes and recovery from such events. Lack of preparedness among emergency service providers can have adverse consequences and hinder effective disaster recovery within communities [12]. Therefore, this systematic study aimed to investigate the degree and nature of emergency medical professionals' preparedness to respond to severe crises and disasters. The aim is to better understand their preparedness for a disaster event.

## 2- Materials and Methods:

### 1.1. Search Strategy

Relevant studies can be obtained by searching electronic databases such as PubMed, Web of Science Core Collection, Scopus, and Google Scholar. To search each database, keywords were first identified and then their synonyms were provided using MESH. Then the title tags, abstracts and keywords from 2005 to 2019 were used to query English keywords and their combinations in the above database. The syntax used to search relevant research databases is as follows.

### 1.2. Criteria for Inclusion and Exclusion

This study included English-language studies conducted between 2005 and 2020, including primary studies (e.g. qualitative studies, observational studies and intervention studies) and secondary studies (e.g. systematic reviews, narrative reviews and meta-analyses). The primary focus of these studies is to assess the level of preparedness of emergency service providers.

Inclusion criteria included high-quality post-event reviews and action reports of major incidents and disasters identified in the gray literature. This includes conference proceedings, theses and dissertations, websites of recognized authorities, and other gray literature sources. Publications must be the result of independent research. The following studies will be excluded: those that do not report the preparedness outcomes of EMS providers, those that include EMS providers as part of a sample of other professionals, those that report the preparedness outcomes of EMS providers in non-emergency settings and the content of research reports on disasters that are unpublished or lacking abstracts and full texts, as well as the content of book chapters, theses/theses, and conference papers.

### **3-The degree of readiness of EMS to effectively respond to crises and catastrophes:**

The results of this analysis indicate that emergency services in the countries examined in the selected studies are generally ill-equipped to respond to disasters. Nonetheless, a study by Jadidi et al. The study showed that Iran's emergency medical services (EMS) had a high average preparedness score of  $63.73\% \pm 12.77\%$  in response to the Ebola outbreak. [3] Alotaibi and Khan assessed the level of emergency medical services (EMS) preparedness in 13 regions of Saudi Arabia to effectively respond to mass casualty incidents (MCI). This study shows that Saudi Arabia's overall emergency services capabilities are insufficient to respond to mass casualty incidents (MCIs). The number 16 is in square brackets. Maguire et al. Examined the level of preparedness of emergency services in selected U.S. states to effectively respond to large-scale pandemic events. The authors say most emergency services in the state lack a comprehensive and formal strategy for responding to a large-scale bioterrorism or pandemic event. [2] Phelps conducted another survey to examine the preparedness of emergency services in managing casualties and responding to the threat of a Massive Chemical Weapons Terrorist Attack (MTCWA). According to the survey, only six emergency services agencies in the region, or 12 per cent, have provided personal protective equipment (PPE) to their staff. The study authors stated that EMS providers are not equipped to respond effectively to MTCWA. [1] Hilm et al. In 1932, emergency medical services organizations in the United States were randomly selected to assess their preparedness to care for children after a mass casualty situation. The survey found that the majority (72.9%) of emergency services had a written strategy for responding to a mass casualty

incident (MCI), but only 248 (13.3%) had a strategy specifically developed for pediatric cases. Additionally, the investigation found significant deficiencies in the U.S. emergency medical services (EMS) preparedness plan for the medical care of children during a mass casualty incident (MCI). [14]

Jama and Kuisma conducted a study in Finland to assess the level of preparedness of emergency medical services systems in the prehospital phase to respond to a large-scale chemical incident (MCI). Their findings indicate that Finland's capacity to deal with large-scale chemical incidents (MCIs), particularly those involving cyanide gas exposure, is insufficient. However, with the availability of bronchodilators, supplemental oxygen, and inhaled corticosteroids, there is great interest in monitoring and treating people involved in chemical accidents. The text is attached in the label. Furby et al. An assessment of 768 rural emergency services organizations in the United States was conducted to assess the level of rural emergency services preparedness to respond to crises and disasters. Findings indicate that some rural emergency services have limited resources and emergency response capabilities and are not equipped to deal with incidents involving 10 or more patients. In addition, there is a lack of preparedness to deal with terrorist bombings. [15]

### **4-Methods to improve the readiness of EMS services in the face of catastrophes:**

Various methods to improve the preparedness of emergency services in the event of a disaster have been proposed in the literature. Alotaibi and Khan recommended ensuring there are enough qualified emergency medical services staff, including medical directors and graduates with nursing training. Competent responders receive disaster response training and actively contribute to the development of standards and preparedness strategies. [16] Alotaibi and Khan also recommended the implementation of strategies such as improving infrastructure, improving the pre-hospital care system, increasing public awareness and notification, and establishing an effective evaluation system to evaluate the performance of first responders and the quality and supply of pre-hospital medical care. Develop and implement a comprehensive disaster preparedness plan. [16]. Maguire et al. One method suggested to improve emergency medical services (EMS) response to disasters is to establish close collaboration between local EMS agencies and state or national EMS organizations to develop EMS rules, standards, and procedures. [2]

Maguire et al. (2007) proposed several strategies, including: ensuring the safety and support of first responders and their families, using alternative transportation and treatment methods prior to hospitalization, expanding emergency medical services personnel responsibilities to include additional treatments and prescriptions of medications, and coordination. Developing relief plans locally with public health programs, training people in different professions not usually involved in disaster relief (such as teachers, artists and business people), coordinating with hospitals and local health officials to develop alternative treatment plans and triage methods and care closures with the local community. Relationships with health authorities, emergency management and key managers. [2] Jadidi et al. (2007) suggested that improvements in staff motivation, resources, instructional programming, management, and IT infrastructure have the potential to improve emergency medical services (EMS) preparedness. [2] Phelps proposed the idea of expanding the responsibilities of EMS personnel to include providing additional medical care and dispensing medications (2007). [13] Phelps stated that in order to improve EMS preparedness, it is important to provide adequate personal protective equipment (PPE) and allocate funds to provide necessary tools and staff training. [13]

Hilm et al. [14] conducted a study specifically looking at prehospital care of children in crisis situations. Hilm et al. Several strategies to improve child victim disaster preparedness are proposed. These include developing detailed written plans specifically for the care of children during disasters, actively involving pediatricians in community-level disaster planning, coordinating with local schools and day care centers to discuss emergency plans, implementing triage protocols specifically for pediatric victims, and incorporating emergency response. Planned measures incorporate local harmonization plans into overall disaster plans and integrate pediatric casualties into community and regional disaster drills to gain expertise in handling children during emergencies. Jama and Kuisma advocate two key preparedness strategies: increasing decontamination preparedness and strengthening emergency service capabilities to treat patients injured by chemicals. [17] Furthermore, Furbee et al. Proposes a number of measures to improve the efficiency and effectiveness of daily EMS operations. These include maintaining an integrated approach to disaster response, improving communication skills and capabilities between different agencies, increasing the involvement of local emergency services in regional planning, and clarifying the

role of local emergency services in communicating and collaborating with other local, state and responsibility. - Agencies and Regional Authorities Federal EMS Agencies. [15]

### Discussion

As outlined in international publications such as SFDRR 2015-2030, preparedness is an important approach to dealing with disaster-related risks [6]. Therefore, the preparedness of health workers, especially first responders, is critical. An analysis of the existing literature shows that several comprehensive studies have been conducted on the level of preparedness of health professionals for crisis scenarios [2, 14-18]. Currently, no comprehensive studies have been conducted to assess the preparedness levels of emergency service providers. The purpose of this review is to fill this knowledge gap by integrating existing research in this specific area.

This study also explores fundamental aspects of disaster preparedness among emergency service providers and strategies to improve their preparedness. The first step in developing effective tools to assess and improve the preparedness of EMS providers is to identify key aspects of preparedness. Therefore, the results of this study will provide important insights to EMS officials, managers, and researchers aimed at improving the preparedness of EMS providers and the overall effectiveness of EMS systems in emergency and disaster situations.

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