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# Evaluating the disaster preparedness of emergency medical service agencies in the world: A systematic literature review protocol

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## Abstract:

**INTRODUCTION:** Disasters occur almost everywhere in the world, and preparation is essential. Preparedness is an effective approach for disaster management, and it is crucial for the health systems, especially the Emergency Medical Service (EMS) agencies. This systematic review will be conducted to assess the preparedness levels of EMS agencies in the world for the response to disasters and explore the key dimensions and strategies to enhance it.

**METHODOLOGY:** This systematic literature review will be conducted to search comprehensively the articles published between 2000 and 2019 to explore the disaster preparedness of EMS Agencies. To this end, PubMed, Scopus, Web of Science, and Google Scholar will be thoroughly assessed. The following terms and expression will be used for searching the databases: “EMS” and other keywords “Disaster Preparedness,” “Mass Casualty Incident,” “Mass Gathering,” “Terrorist incident,” “Weapons of Mass Destruction,” and CBRNE, Disaster, included: ‘Emergency Preparedness, Preparedness, Readiness.

**DISCUSSION:** To the best of our knowledge, no systematic review study has been conducted on disaster preparedness of EMS agencies in the world. This is the first study to address this gap. It will also explore the key dimensions of disaster preparedness in EMS services and the strategies to enhance their preparedness.

**CONCLUSION:** Identifying the key dimensions of disaster preparedness is the first step in designing valid assessment tools to evaluate disaster preparedness of EMS service. This study will provide valuable guides for EMS administrators and researchers in an attempt to enhance of preparedness of EMS systems in disasters.

## Keywords:

Emergency medical services, disaster, emergency, preparedness

## Introduction

Disasters, natural or human-made, occur almost everywhere in the world, and preparation is essential.<sup>[1]</sup> Only in the year 2018, the natural disasters caused to 10,733 death and 60 million affected.<sup>[2]</sup> Based on the American College of Emergency Physicians, disaster as “when the destructive effects of natural or manmade forces overwhelm

the ability of a given area or community to meet the demand for healthcare.”<sup>[3]</sup> Health is one of the main concerns of disasters and managing the adverse health impacts is a goal and priority for communities and international organizations such as Sendai Framework for Disaster Risk Reduction 2015–2030.<sup>[4]</sup> Hence, the preparedness of the health systems, especially Emergency Medical Service (EMS) systems, is critical to

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achieve this goal.<sup>[5]</sup> The EMS systems are in the frontline of providing emergency medical care for disaster victims and as the responsibilities, they play a key part during the initial phases of disasters.<sup>[6]</sup> Over 30 years ago, the EMS systems have developed worldwide and they have a strong history of leadership and disaster management measures such as planning, response, and recovery after disasters.<sup>[7,8]</sup> According to the U. S. Homeland Security Department Target Capabilities List, on-scene incident management, emergency triage, and treatment, management of medical supplies and distribution of medical equipment, mass care and sheltering are among the responsibilities of the EMS in various emergencies and disaster.<sup>[9]</sup> Given the widespread occurrence of emergencies and disasters around the world, the need for EMS services has been further strengthened and concluded that EMS agencies need to be more prepared for doing an efficient response to emergencies and disasters.<sup>[6]</sup> Globally, there is a consensus on the preparedness of EMS systems in disasters, and if it well done and especially if the EMS providers well educated with appropriate educational methods, EMS will be effective in decreasing of casualties and mitigate the disasters health impacts with any scenario.<sup>[6,10]</sup> Preparedness of EMS systems causes to enhance of their ability to deliver care for disaster victims and help mitigate the adverse health impacts.<sup>[7]</sup> Review of the literature shown that single studies was concluded about disaster preparedness of EMS agencies worldwide.<sup>[9,11-13]</sup> Hence, a comprehensive literature review with a global lens is needed to explore the main preparedness dimensions of the EMS system for developing reliable ways to measure the preparedness of EMS agencies in disasters. Therefore, this study will be conducted to assess the level of EMS agencies' preparedness in the world for the response to disasters and explore the key preparedness dimensions and strategies to enhance it.

## Methodology

### Inclusion and exclusion criteria

In this research, all initial and secondary studies will be considered for review if; the aim of the study is to measure the preparedness of EMS agency for response to disasters, published in the English language and published between 2000 and 2019. The book chapters, dissertations, conference papers and all studies that are not relevant to the research question, as well as the studies that did not report findings on the preparedness of EMS agencies in emergency and disasters and are not published or do not have abstract and full text will be excluded.

### Information sources and the search strategy

The PRISMAP guidelines will be used for concluding this study, and a search strategy will be designed to access the

relevant papers. Electronic databases such as PubMed, Scopus, Web of Science Core Collection, and Google Scholar will be searched to access the relevant studies. For searching each database, the Mesh terms will first be used to extract the keywords and their synonyms associated with the phrase "EMS" and other keywords included: "Emergency Preparedness, "Disaster Preparedness," Disaster, Preparedness, Readiness, "Terrorist incident," "Mass Casualty Incident," "Mass Gathering," "Weapons of Mass Destruction," and CBRNE. Databases will be searched using following syntax:

### PubMed

("Emergency Medical Service\*" [tiab] OR "Medical Emergency Service\*" [tiab] OR "Emergency Prehospital Service\*" [tiab] OR "Prehospital Emergency Care" [tiab] OR "Emergency Service\*" [tiab] OR "Emergency Health Service\*" [tiab] OR "Medical Emergency\*" [tiab] OR "Ambulance agency\*" [tiab]) AND (Disaster\* [tiab] OR Emergency\* [tiab] OR "Mass casualty incident\*" [tiab] OR "Mass Casualty\*" [tiab] OR CBRNE [tiab] OR Chemical [tiab] OR Biological [tiab] OR Radiological [tiab] OR Nuclear [tiab] OR Explosive [tiab] OR Terrorist\* [tiab] OR "mass gathering\*" [tiab] OR "Weapons of Mass Destruction" [tiab]) AND ("Emergency Preparedness" [tiab] OR "Disaster Preparedness" [tiab] OR "disaster readiness" [tiab] OR readiness [tiab] OR preparedness [tiab]).

### Web of science

TS = ("Emergency Medical Service\*" OR "Medical Emergency Service\*" OR "Emergency Prehospital Service\*" OR "Prehospital Emergency Care" OR "Emergency Service\*" OR "Emergency Health Service\*" OR "Medical Emergency\*" OR "Ambulance agency\*") AND TS= (Disaster \* OR Emergency \* OR "Mass casualty incident\*" OR "Mass Casualty\*" OR CBRNE OR Chemical OR Biological OR Radiological OR Nuclear OR Explosive OR Terrorist \* OR "mass gathering\*" OR "Weapons of Mass Destruction") AND TS= ("Emergency Preparedness" OR "Disaster Preparedness" OR "disaster readiness" OR readiness OR preparedness).

### Scopus

(TITLE-ABS-KEY ("Emergency Medical Service\*" OR TITLE-ABS-KEY ("Medical Emergency Service\*" OR TITLE-ABS-KEY ("Emergency Prehospital Service\*") OR TITLE-ABS-KEY ("Prehospital Emergency Care") OR TITLE-ABS-KEY ("Emergency Service\*") OR TITLE-ABS-KEY ("Emergency Health Service\*") OR TITLE-ABS-KEY ("Medical Emergency\*") OR TITLE-ABS-KEY ("Ambulance agency\*") AND TITLE-ABS-KEY (Disaster\*) OR TITLE-ABS-KEY (Emergency\*) OR TITLE-ABS-KEY ("Mass casualty incident\*") OR TITLE-ABS-KEY ("Mass Casualty\*") OR TITLE-ABS-KEY

(CBRNE) OR TITLE-ABS-KEY (Chemical) OR TITLE-ABS-KEY (Biological) OR TITLE-ABS-KEY (Radiological) OR TITLE-ABS-KEY (Nuclear) OR TITLE-ABS-KEY (Explosive) OR TITLE-ABS-KEY (Terrorist\*) OR TITLE-ABS-KEY ("mass gathering\*") OR TITLE-ABS-KEY ("Weapons of Mass Destruction") AND (TITLE-ABS-KEY ("Emergency Preparedness") OR TITLE-ABS-KEY ("Disaster Preparedness") OR TITLE-ABS-KEY ("disaster readiness") OR TITLE-ABS-KEY (readiness) OR TITLE-ABS-KEY (preparedness)).

### Study registration

#### Selection process

After searching all databases, the selected studies will be inserted into EndNote, and duplicates studies will be removed. Then, the study titles and summaries will be reviewed to find relevant studies. Subsequently, the full text of relevant studies independently will be studied by the two well-informed reviewers specializing in the field. Any disagreement between the two reviewers will be resolved through a group discussion and consensus. Moreover, a third reviewer will be invited for assistance in the case of unresolved disagreement. Furthermore, the references of the finally selected articles will be inspected to find other potentially relevant articles. Using the statements of specialists in this field, the specialized journals related to this field will also be manually

reviewed to find relevant papers published between 2000 and 2019 [Figure 1].

### Data collection process

After completing the process of searching the literature, data will be extracted by full-text review of the finally selected articles. Each person will extract the original data independently based on a predesigned form. The study variables to be extracted include specific details about, (1) study originated country, (2) study methodology, (3) study instruments, (4) level of disaster preparedness EMS agencies, (5) the main preparedness component and dimensions, and (6) the strategies to increase EMS agencies' preparedness for response to major emergency and disasters. Moreover, through reviewer's consensus, other data's will be extracted from the selected article.

### Risk of bias in the individual studies

Due to a lack of restrictions on the type and methodologies of initial selected studies, there are no specific tools for quality assessment in this step. Hence, to evaluate the methodological quality of the initial studies, the quality assessment tools introduced in STROBE will be used tailored to the type of study. In this stage, the included studies will be assessed by two independent reviewers in accordance with its proper assessment tool for determining the eligibility of the articles for inclusion. In this stage, the included studies will be evaluated by

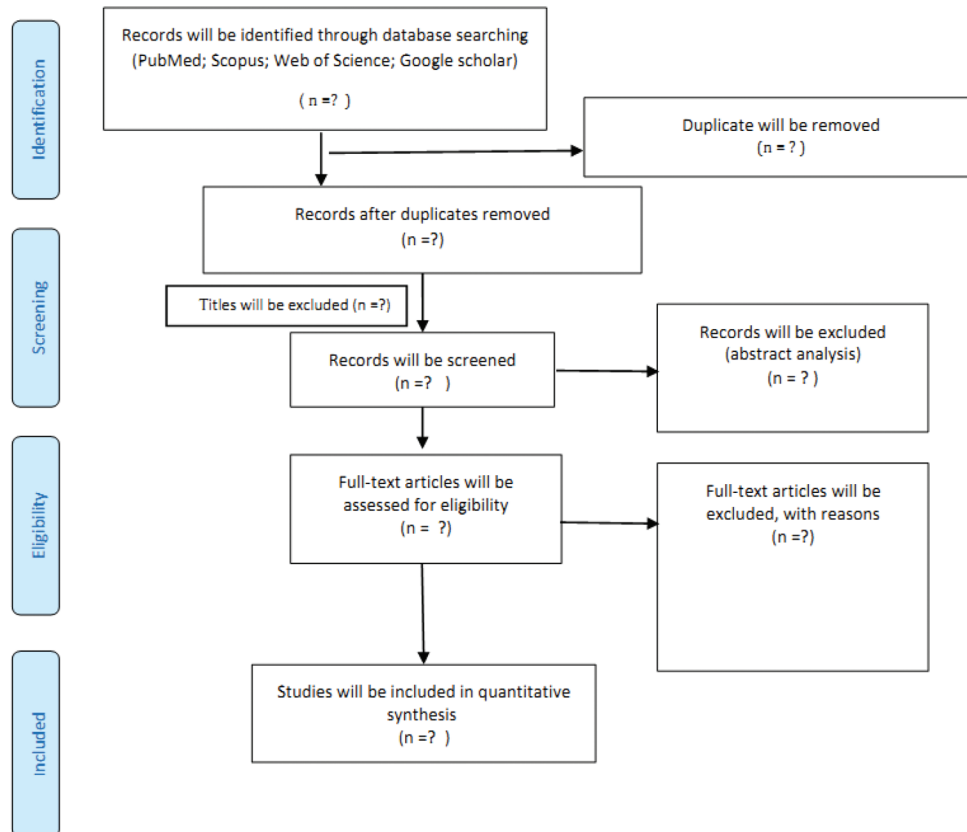


Figure 1: Selection process flow char

two independent reviewers in accordance with their suitable assessment tool. Any disagreements will be resolved through a CONSENSUS method or by using of a third reviewer.

### Data analysis and data synthesis

The present study explores disaster preparedness statuses of EMS agencies in the world. Given the current knowledge of the literature and diversity of the type and methodology of the included studies, the use of quantitative meta-analysis for the analysis of the data would not be possible. Therefore, the thematic analysis technique (Center for Reviews and Dissemination, 2008) will be used for the analysis of the extracted data.

### Discussion

Based on Sendai Framework for Disaster Risk Reduction 2015–2030, preparedness is one of the most important strategies for disaster risk reduction.<sup>[4]</sup> Health is one of the main components of the communities and the preparedness of health systems, especially the EMS systems, is essential. Review of the literature shows that extensive studies have been conducted on disaster preparedness of other health-care systems and health-care providers<sup>[1,14-18]</sup> in disasters. For example, Labrague *et al.*, in a systematic review of literature, evaluated the disaster preparedness statuses of the nurses in the world.<sup>[1]</sup> Furthermore, Kaji,<sup>[14]</sup> Paganini *et al.*,<sup>[15]</sup> Beyramijam *et al.*<sup>[18]</sup> and Farajzadeh *et al.*<sup>[16]</sup> have evaluated the disaster preparedness of hospitals in their research areas. However, to our knowledge, except for a systematic review protocol that recently was published to assess the preparedness of EMS providers in emergencies and disasters,<sup>[19]</sup> there is no comprehensive study conducted on disaster preparedness of EMS systems through a global lens. This study will address this gap by doing a systematic review of the literature in this area. It will also explore the key dimensions of disaster preparedness of EMS systems and the strategies to enhance their preparedness. Identifying the key dimensions of disaster preparedness is the first step in designing valid assessment tools to evaluate disaster preparedness of EMS service.

### Conclusion

The results of this study will provide valuable knowledge for researchers to developing reliable EMS disaster preparedness tools and also it will be the suitable guide for EMS administrators in an attempt to enhance of preparedness of EMS systems in emergency and disasters.

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### Conflicts of interest

There are no conflicts of interest.

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