

Original Paper

Factors Affecting the Intention of Healthcare Providers in Responding to Disasters: A Systematic Literature Review



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ABSTRACT

Introduction: A significant challenge in disaster response operations is the willingness of healthcare providers (HCPs) to engage and work in critical situations. Therefore, identifying the factors associated with the intention to participate in disaster response operations will lead to planning better and coping with such situations.

Objective: This systematic literature review aims to determine the factors affecting the intention of HCPs to work in disaster response operations.

Materials and Methods: In this systematic literature review, a search strategy was developed using keywords in relevant articles to obtain relevant studies published between 1950 and November 1, 2020. Those keywords were obtained through consultation with experts' opinions in disaster risk management and a medical librarian. This study was designed as a systematic review, following the PRISMA (the preferred reporting items for systematic reviews and meta-analyses) guidelines. Databases examined included Scopus, PubMed, and Web of Science. The relevant data (title, author/s, year of publication, country, population of HCPs, sample size, response rate, study design, tools, data collection method, and type of disasters) in the included studies were extracted using a checklist designed for this purpose. Then, the factors affecting staff intention were categorized by thematic analysis.

Results: Out of 5721 retrieved articles, 16 were enrolled in this review. Extracted factors affecting the staff intention to work were classified into 3 main categories and 16 subcategories as follows: organizational factors (supply management, risk management, organizational environment, organizational climate, managerial support, financial incentives), personal factors (demographic, familial, beliefs and values, health status, individual experiences, knowledge and education, occupational, self-efficacy), and nature of disaster (type of disaster).

Conclusion: The results of this study showed that the intention and motivation of the HCPs to work in the disaster response phase depends on the type of disaster, the risks affecting their health and their families, commitment to the community, professional and financial issues, and responsibility.

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Highlights

- Disasters challenge the ability of healthcare systems to meet the needs of society.
- In a disaster, healthcare providers are expected to provide care and treatment for the casualties and nonemergency patients while they are concerned about their own families.
- Many factors can affect the intention of healthcare providers to engage in disaster response operations.

Plain Language Summary

A significant challenge in disaster response operations is the willingness of the healthcare providers (HCPs) to operate in critical situations. Therefore, identifying the factors associated with the intention to participate in disaster response operations will lead to planning better and coping with such situations. This study aims to determine the factors affecting the intention of HCPs to work in disaster response operations through a systematic literature review. This study showed that the intention and motivation of the HCPs to work in the disaster response phase depend on the type of disaster, the risks affecting their health and their families, commitment to the community, professional and financial issues, and responsibility.

A

Introduction

According to the United Nations Office for Disaster Risk Reduction (UNDRR), disaster is “a serious disruption of the functioning of a society leading to widespread human, material, economic, and environmental losses that exceed the capacity of a community to cope using its resources” [1]. Disasters challenge the ability of health systems to meet the needs of society. Damage to infrastructure, staff shortages at all levels, and an increasing need for health services will jeopardize the functioning of health systems [2, 3]. Therefore, healthcare providers (HCPs) must be prepared to manage a surge in the number of patients should a disaster occur [4, 5]. Some disasters may be followed by a lack of workforce and loss of equipment and supplies [6-9]. In a disaster, HCPs are expected to provide care and treatment for the casualties and the nonemergency patients while concerned about their families [4].

Most people believe that HCPs, firefighters, and relief workers in general who participate in relief operations tend to work in any disaster. In contrast, these people are not always willing to work. Indeed, their intention to work in disaster relief operations is highly dependent on the type of disaster [10, 11]. Evidence also shows that the intention to work varies between 25% and 80% among HCPs in public health emergencies. Factors associated with the nurses' intention to work in disasters included insufficient knowledge and skills, fear of

contracting infectious diseases, overworking, sense of responsibility, perceived self-efficacy, financial compensation, age, gender, knowledge and attitude, and academic degree [12-16].

As an effective measure in the preparedness phase of disaster risk management, identifying the factors related to the intention to participate in disaster relief operations will lead to planning better and coping with such situations. This study used a systematic literature review approach to find the factors affecting the intention of HCPs to work in disaster response.

Materials and Methods

The protocol of this study is registered in PROSPERO (CRD42021234620). To obtain relevant studies from the databases, all original articles examining the intention of HCPs to participate in disaster response operations were enrolled in the study. There were no restrictions on the language of the publications. It is noteworthy that articles on the intention of other relief workers, such as firefighters, to participate in disasters, as well as those in the form of letters to the editor, literature review, short study or brief communication, and conference papers, were excluded.

Scopus, PubMed, and Web of Science (WoS) databases were searched to obtain relevant studies published between 1950 and November 1, 2020. To develop the search strategy, several relevant studies on the intention of HCPs to work in disasters were reviewed to extract

the keywords. Regarding the frequent use of "human resource," all entry terms for this keyword were collected using the MeSH feature. Words were combined using the Boolean search method: AND and the OR operators.

All the retrieved documents using the above syntaxes were imported into EndNote, and duplicates were removed. The articles were screened for titles and abstracts, and the relevant items were selected. Next, the full-text articles were assessed by two authors for eligibility criteria. Any disagreement between the two authors was resolved through group discussion and consensus. In case of disagreement after the group discussion, advice and the opinion of a third party were considered. The references of the included articles were also examined to find possible related articles. Using the Scopus database, key journals in the area of the research title were also reviewed.

After the search was completed, data extraction was provided, and they were imported into Microsoft Excel, version 2010. Each extracted factor affecting the intention of HCPs was entered into Excel, and then the concatenate function was connected to the related article code. All extracted factors were then categorized by thematic analysis, i.e. first, all the affecting factors

were listed and then classified into categories and sub-categories through a group discussion attended by the research authors and using the data validation feature in Excel. The same factors mentioned in different studies were merged, and a common label was chosen for similar factors. Any uncertainty over labeling and categorizing the factors was discussed with the review team.

Results

An initial search in Scopus, PubMed, and Web of Science databases yielded 5721 documents, of which 1818 duplicates were removed after being imported into EndNote, version 9 (Figure 1). The 16 enrolled studies in the systematic review were conducted between 2009 and 2020 in Australia (2), South Korea (3), the United States (4), Israel (3), Yemen (1), China (1), Taiwan (1), and Brazil (1). There was one mixed methods study, and the other 15 were performed using quantitative methods. In total, 13 studies specifically examined the intention of nurses to work in disasters, of which one investigated only nursing students and 3 surveyed a combination of nurses, physicians, physicians and or nurses, and emergency medical technicians (Table 1).

Table 1. Characteristics of studies enrolled in the systematic review

Author(s) and Year of Publication	Department/School	Country	Studied Population	Sample Size	Response Rate	Study Design	Tool	Type of disaster
Arbon et al. 2013 [2]	Nursing and Midwifery	Australia	Emergency department nurses	520	87%	Quantitative exploratory	Researcher-made	Not identified
Oh et al. 2017 [17]	Department of Preventive Medicine	South Korea	Public health nurses	360	96.9%	Quantitative cross-sectional	Instrument for predictive nursing intention for SARS patient care	Epidemic of infectious diseases
Mendes et al. 2013 [18]	Department of Public Health	Brazil	Physicians and nurses	126	Unreported	Quantitative cross-sectional	Researcher-made	Not identified
Barnett et al. 2012 [19]	Disaster Preparedness and Response Research Center	The United States	Public health staff	2993	66%	Quantitative cross-sectional	Researcher-made	Public health emergencies
Rutkow et al. 2014 [20]	School of Public Health	The United States	Prehospital emergency medical technicians	1537	49%	Quantitative cross-sectional (part of a survey study)	Extracted from Hopkins public health infrastructure response survey tool	Influenza pandemic

Author(s) and Year of Publication	Department/School	Country	Study Population	Sample Size	Response Rate	Study Design	Tool	Data Collection Method	Type of Disaster
Arbon et al. 2013 [21]	Disasters Research Center	Australia	Nurses	41	Nonreportable (quantitative, qualitative study)	Quantitative, qualitative study (survey, focus group discussion, interview)	Group discussion, interview	Recording, transcription, and content analysis of the interviews	Not identified
Al-Hunishi et al. 2019 [4]	Social medicine and prevention	Yemen	Physicians and nurses	1093	63%	Quantitative cross-sectional	Researcher-made	Questionnaire completed by the study participants in person	Natural and biological disasters
Shapira et al. 2019 [22]	Disasters Preparedness Research Center	Israel	Physicians, nurses, paramedical staff	2400	35%	Quantitative cross-sectional	Adapted questionnaire from assessment tool for health care workers' preparedness for disasters	Questionnaire completed by the study participants in person	Earthquake
Li et al. 2020 [23]	Guangzhou Institute of Respiratory Diseases	China	Nurses	420	100%	Quantitative cross-sectional	Intention to response instrument (as one of the questionnaires used in the study)	Online assessment tool	Covid-19
Melnikov et al. 2014 [24]	Department of Nursing	Israel	Nurses	260	93%	quantitative cross-sectional	Researcher-made	Questionnaire completed by the study participants in person	Not identified
Choe et al. 2017 [25]	School of Nursing	South Korea	Nursing students	1094	75%	Descriptive-comparative (two groups)	Researcher-made	Questionnaire completed by the study participants in person	Natural and man-made disasters
Grimes et al. 2010 [26]	School of Nursing	The United States	Nurses	313	93.2%	Quantitative	Intention to response instrument (as one of the questionnaires used in the study)	Questionnaire completed by the study participants in person	Bioterrorism and the epidemic of infectious diseases
Kagan et al. 2017 [27]	School of Nursing	Israel	Nurses	152	93%	Quantitative cross-sectional	Intention to report for work in an emergency	Questionnaire completed by the study participants in person	Not identified
Liou et al. 2020 [28]	School of Nursing	Taiwan	Nurses	102	88%	Quantitative cross-sectional	Motivation for disaster engagement questionnaires (as one of the questionnaires used in the study)	Postal survey	Not identified

Author(s) and Year of Publication	Department/School	Country	Study Population	Sample Size	Response Rate	Study Design	Tool	Data Collection Method	Type of Disaster
Oh et al. 2012 [29]	School of Medicine	South Korea	HCPs who were members of the Korean Disaster Medical Association	180	38.9%	Quantitative cross-sectional	Researcher-made	Online assessment form	Earthquake
Goodhue et al. 2012 [30]	Children's hospital	The United States	Pediatric nurses	6608	40%	Prospective survey	Questions of intention to work in disasters (as a part of the questionnaire on personal preparedness in disasters)	Online assessment form	Not identified

HCPs: Health care providers

Regarding data collection tools, four studies used specific tools to assess the intention of HCPs in disasters, and the remaining 11 employed researcher-made tools based on the review of previous studies or modification of other non-specific questionnaires of staff intention to work. Only one study approached the issue in a qualitative design using interviews and focus group discussions.

As explained in the study methods, using the concatenate function in Excel, every factor affecting the intention of HCPs was imported into Excel and then connected to the study with the related article code. Next, all extracted factors were categorized by thematic analysis. First, all the affecting factors were listed and then classified through a group discussion attended by the research authors and using the data validation feature in Excel into the following categories and subcategories: Organizational factors (supply management, risk management, organizational environment, organizational climate, managerial support, financial incentives), personal factors (demographic, familial, beliefs and values, health status of HCP, individual experiences, knowledge and education, occupational, self-efficacy), and nature of the disaster (type of disaster, prevention, and treatment). The same factors mentioned in different studies were merged, and a common label was chosen for similar factors. The review team discussed any uncertainty over labeling and categorizing the factors (Table 2).

Considering the results of the articles, 75 factors affecting the intention of HCPs were identified and classified into 3 categories and 16 subcategories.

Discussion

In the present study, 13 studies explicitly examined the intention of nurses to participate in disasters, of which one investigated only nursing students, and three surveyed a combination of nurses, physicians, or nurses, physicians, and emergency medical technicians. This finding revealed that health systems had focused on assessing nurses' intentions as one of the critical health professions. Nurses, as the largest part of the HCPs, are the frontline responders in an emergency or disaster. During disasters, especially in non-conventional ones, nurses experience considerable anxiety [34]. Although caring for irradiated patients in radiological incidents poses the least risk for the HCPs [35-37], such anxiety could have a significant impact on their performance. As a practical solution, training can be used to increase the intention of HCPs in this regard. In most cases, the reluctance of HCPs was due to insufficient knowledge of the nature of disasters [38], leading to delays or refusal to provide care to the patients in disasters, especially chemical, biological, and radiological incidents [38, 39].

In the present study, safety-related issues, categorized into personal and organizational factors, affected the staff's intention to work during a disaster. Concerns about the safety of family, colleagues, and HCPs were among the most frequent barriers to staff intention to work during disaster [2, 11, 40-45]. HCPs are vulnerable to many occupational hazards and experience a great deal of emotional stress as a result of working in healthcare settings [2, 46]. HCPs are concerned about their safety against illnesses, injuries, and even death,

Table 2. Categories, subcategories, and affecting factors on the intention of health care providers to work in the event of a disaster

Category	Subcategory	Criteria
Organizational factors	Supply management	Availability of personal protective equipment in the workplace [4, 20, 23, 24, 26, 30]
		Availability of pharmaceutical countermeasures [20, 30]
	Risk management	Availability of vaccines for widespread diseases [30]
		Sufficient resources for responding to disaster [17, 30, 31]
		Facilities to contact family members [2, 25]
	Organizational environment	Existence of a disaster plan in the workplace [2, 21]
		Scenario-based risk assessment in the workplace [19]
	Organizational climate	Organizational capacity for responding to disaster [22]
Organizational resiliency for disaster [22]		
Participating in workplace disaster plan [2]		
Hygienic status of workplace [30]		
Managerial support	Level of safety in the workplace [4, 23, 29, 30, 31]	
	Level of security in the workplace [29, 30, 32]	
	Team spirit in the workplace [24, 28, 29]	
Financial incentives	Level of stress in the workplace [30]	
	Organizational solidarity [24]	
	Organizational trust [23]	
Personal factors	Demographic	Overworking [23, 30]
		Shared organizational values [23]
	Familial	Liability protection for HCP [20]
		Organizational support from HCP [24, 26, 28, 29]
		Status of HCP's insurance [30]
	Beliefs and values	Facilities for transportation to the workplace [24, 32]
		Fringe benefit [23, 29, 30]
		Income [30]
		Age [4, 22, 24, 27, 29, 30]
	Health status of HCP	Being immigrant [27]
		Gender [4, 21, 22, 26, 27, 30]
		Marital status of HCP [22, 23, 30]
Individual experiences	Existence of a family disaster plan in HCP's family [21, 30, 32]	
	Existing another HCP in the family [23]	
Knowledge and education	Health status of HCP's family members [2, 22]	
	Living with a child [21-24, 26, 30]	
	Living with an elder [4, 21, 22, 24]	
Occupational	Living with a pet [21, 24]	
	Occurrence of disaster in the area where HCP lives [25]	
Self-efficacy	Safety and security of HCP's family [22]	
	Understanding by family [30]	

Category	Subcategory	Criteria
Nature of disaster	Type of disaster	Biological disaster [17, 23, 26] Conventional vs non-conventional disasters [4, 21, 22] Natural disasters [4, 23, 30] Man-made disaster [4, 29, 30]
	Prevention and treatment	Curability of the disease in an epidemic [21, 23, 26] Knowing the pathogen in an epidemic [21, 26] Knowing the signs and symptoms of widespread disease [23] Preventability of the disease in an epidemic [21, 26] Transmissibility of pathogen [26] Uncertainty about fatality rate [26]

HCPs: Health care providers

and this issue will ultimately lead to reluctance to work during a disaster [47-50]. The availability of appropriate treatments, prophylaxis, and infection control may increase their willingness to work in such conditions [2,41, 49, 51, 52]. Lack of trust in employers to provide safe conditions for employees during a disaster could be associated with a decrease in willingness to work [2, 40, 43, 53]. Providing none or contradictory information to HCPs can also cause some degrees of distrust in employers in the health system [2, 54, 55]

In this study, individual factors were demographic, familial, beliefs and values, the health status of HCPs, individual experiences, knowledge and education, occupational, and self-efficacy. Previous experience working in disasters was one of the factors affecting the willingness of HCPs to work during disasters. Nurses with prior disaster experience can play an important role in a crisis and perform triage and life-saving measures [21]. Other studies emphasized the experience of working in difficult situations [2, 17, 22, 23, 30] and prior experience of responding to a disaster [4, 17,23, 24, 26, 27, 30]. Gaining experience is always beneficial, and by increasing a person's experience in the natural disaster response team, HCP can be better present in the following events.

A higher level of knowledge and education due to increasing age obtaining more information and improving knowledge about accidents and disasters can increase the level of preparedness of nurses to respond to natural disasters [21, 23-25, 28, 30, 33].

Gender was another important individual factor [4, 21, 22, 26, 27, 30]. A man's gender is one factor that relates to people's physical and psychological condition. Since male nurses have more resilience and emotional control, they can perform better in this field. Special needs of female nurses in dealing with disasters can be a challenge that needs attention to reduce their psychological and emotional problems in these situations [56].

Communicating with family members was another influential factor that can improve the willingness of HCPs to be involved in disaster response operations, so one of the barriers was their perceived disability to communicate with their family members while working in such situations [40, 57, 58]. Working long shifts away from family members could cause concern for HCPs, who must be quarantined[40, 57]. Providing various communication methods with family members and friends might increase staff satisfaction and willingness to work in the event of a disaster.

Professional commitment was another important factor that persuaded the staff to work in times of disaster. Evidence suggests a strong sense of professional duty among HCPs worldwide [2, 43, 47, 51, 52, 55]. In some cases, HCPs stated that concerns for their personal or family's safety might be overlooked in their desire to take on professional responsibilities [2, 40, 43]. Even some studies found the sense of professional duty to be the most influential factor in the intention of the emergency department staff to work during a disaster. However, some evidence predicated that HCPs felt compelled to work during a disaster [42, 47, 52].

The type of disaster was another factor affecting the staff's intention. HCPs were more inclined to work in case of natural disasters such as earthquakes, floods, and storms, while their willingness to work diminished in non-conventional disasters such as biological, chemical, radiological, and nuclear incidents. A study on the desire of firefighting program students also yielded similar results, where more than 90% of the students were interested in participating in fire incidents and earthquake relief operations. In comparison, about 40% preferred not to be involved in nuclear disasters [59]. Smith et al. depicted that prehospital emergency technicians were more concerned about working in radiological and nuclear incidents [60]. Such a mentality could reduce human resources and disrupt response operations in radiological and nuclear incidents [61].

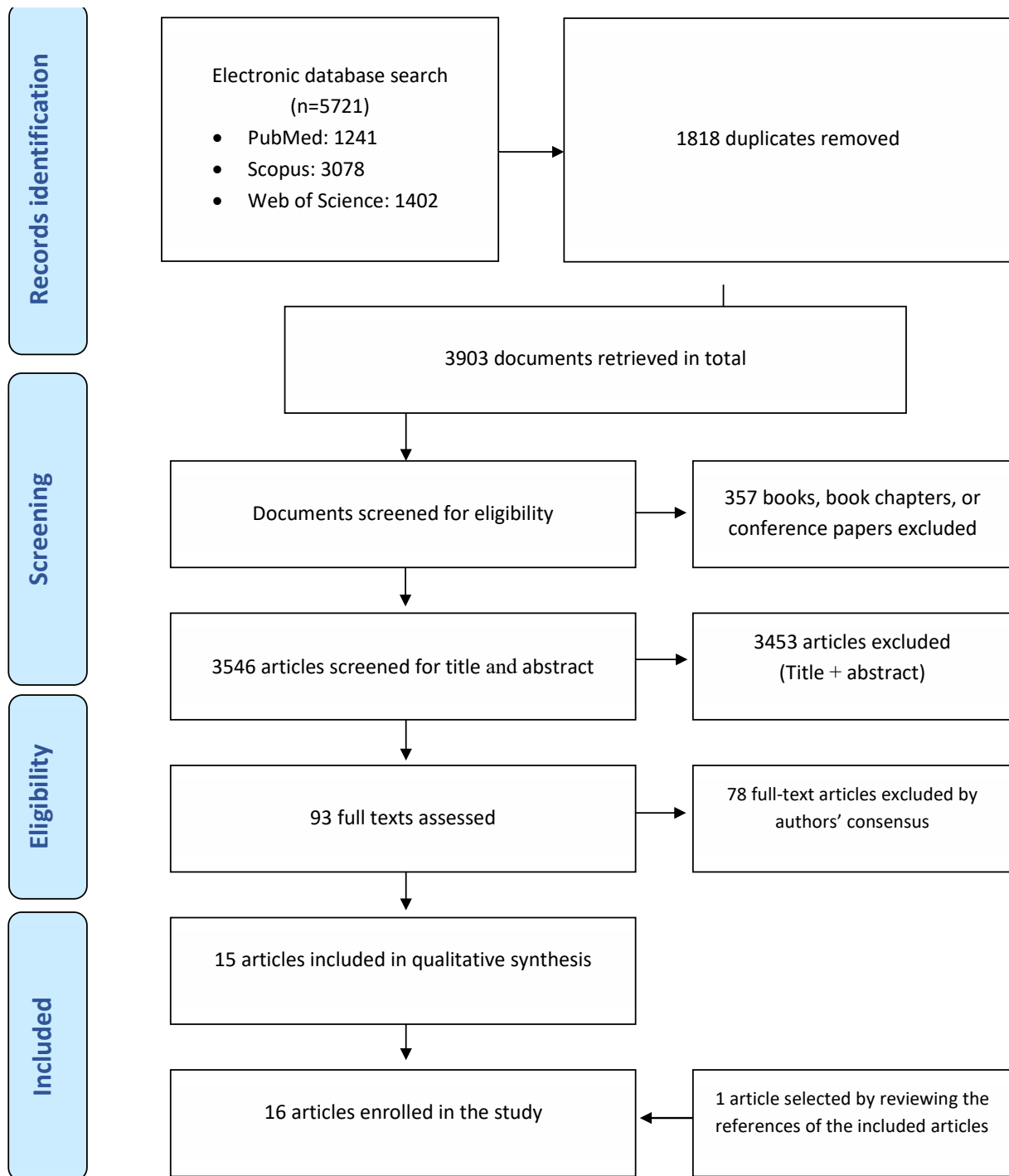


Figure 1. PRISMA flow diagram

Epidemic of infectious diseases is another disaster the HCPs were less inclined to get involved in. HCPs experience severe psychological distress during the outbreak of infectious diseases [2, 62]. During the outbreak of MERS (the Middle East respiratory syndrome) as a contagious disease epidemic, evidence shows that more than 90% of HCPs in Saudi Arabia, nearly half of whom

were nurses, had a negative attitude towards suspected or infected patients [63]. With the onset of reports on morbidity and mortality of such diseases, the level of anxiety and stress rise among HCPs, as they are likely to be called to the front line to fight against the disease due to a lack of manpower. Furthermore, if HCPs involved in managing the disease become infected or die from the

disease, HCPs are more likely to avoid suspected or infected patients [64].

Evidence from previous studies suggested that factors related to the willingness of HCPs to work after public health disasters could be placed into four categories: Personal, professional, organizational, and safety (threat-related) factors; among the personal factors, the findings revealed that women were less willing to work in such situations than men [61, 62]. Concerns about family members, friends, pets, and personal commitments such as caring for a child or older adults were reported as powerful barriers to intention to work in times of disaster [16, 65, 66]. Among the professional factors, evidence indicates that clinical staff are more willing to work than non-clinical staff [65]. Belief in duty to care, knowledge, and a sense of efficiency were described as facilitators of intention to work in the event of a disaster. Organizational factors have not been widely discussed. Apparently, confidence in the employer's ability to meet the basic needs of the staff (such as food, water, etc.) and other concerns was a key factor in this regard. Findings on safety-related factors depicted a lower tendency to work for disasters, posing a greater personal risk to the practitioners, such as infectious disease epidemics and biological, chemical, and radiological incidents compared to natural and other man-made disasters [16, 65, 67].

In addition to high morbidity and mortality that jeopardize the health of a community, epidemics of infectious diseases are considered a significant threat to the health system and especially the HCPs for being the frontline responders in such situations [12, 68, 69].

Studies have shown that the intention to work during a disaster might be associated with the nature and type of the event, professional needs, individual needs, work environment, atmosphere, knowledge about the incident, and a perception of efficacy [4, 16, 66]. Contrary to the popular belief that HCPs tend to work in any disaster, their intention to work highly depends on the type of disaster, the risk to their health and that of their families, their commitment to the community, professional and financial issues, responsibility, and so on.

Ethical Considerations

Compliance with ethical guidelines

The study was approved by the Ethics Committee of [Shahid Sadoughi University of Medical Sciences](#) and Health Services.

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Authors' contributions

Study design: Mohammad Reza Khajehminian, Mehdi Raadabadi, and Maryam Nikfard; Search strategy: Mohammad Reza Khajehminian and Mehdi Raadabadi; Databases search: Mehdi Raadabadi, Maryam Nikfard, and Mahnaz Eider; Analysis and interpretation of data: Mohammad Reza Khajehminian, Mehdi Raadabadi, and Maryam Nikfard; Drafting of the manuscript: Mehdi Raadabadi and Mahnaz Eider; Critically revision of the article: Mohammad Reza Khajehminian and Maryam Nikfard; Supervision: Mohammad Reza Khajehminian; Final approval: All authors.

Conflict of interest

The authors declared no conflict of interest.

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