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Disaster planning approaches in Iran's health system: A mixed-methods study

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Abstract:

BACKGROUND: Disaster planning and management pose a serious challenge to most countries. These challenges point to insufficient planning to deal with these events. Therefore, it is necessary to pay attention to the methods and characteristics of the decision-making approaches in these events. In this study, we tried to identify most appropriate approaches for the Iranian health system by studying disaster planning approaches.

MATERIALS AND METHODS: This study was conducted using mixed methods in 2020–2021 in two phases: qualitative and quantitative. First, we reviewed at the research literature. Our goal was to identify studies that suggested approaches to disaster planning. The next step in this study was a qualitative study using semi-structured interviews. Participants in qualitative phase included managers and employees from different parts of the Iranian health system from the provinces of Golestan, Fars, Khuzestan, Lorestan, Kerman, Sistan, and Baluchestan.

RESULTS: By combining approaches taken from literature reviews and qualitative study, four main approaches were identified. The results of our study have shown that disaster response planning approaches include function, risk assessment, capability, and futuristic base.

CONCLUSION: This study provides complete overview of disaster planning approaches that enable health professionals to use them to develop response plans. Our findings indicate that in complex and large-scale events such as floods and pandemics, it is necessary to combine the introduced methods for operational planning.

Keywords:

Approach, disaster, function, health systems, plan

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Introduction

Planning is one of the most important pillars of management, connecting the present and the future. Planning a systematic and logical method of future assessment to determine what can be done to obtain the future expected and preventing negative impacts.[1] One type of planning is planning for important issues in society. Preparing for and responding to disasters is one of the most important issues because most disaster-related decisions are critical decisions concerning the survival of people.[1] Studies have shown that the best way to plan for disasters based on lessons from the past is to document, evaluate, and monitor activities that form the basis for future decisions and sustainable development of the country.[2,3] Of course, studying past disasters and events and adapting them to future events is very difficult, time-consuming, and interrelated. This also provides an opportunity to prepare for the next event with sufficient knowledge and information.[4] The history of a scientific and professional approach to disasters responses dates back to the 1950s and 1960s.[5] There are three types of planning: strategic planning, operational planning, and tactical planning. Strategic planning sets

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the context and expectations for operational planning, while operational planning provides the framework for tactical planning. All three tiers of planning occur at all levels of government.[6] Despite this experience in developed countries, most countries face major disaster management challenges, indicating poor disaster response plans.[7] The weakness of these plans in the face of large-scale events (such as the COVID-19 pandemic) has left most countries facing unprecedented management challenges. Most societies are looking for ways to respond and participate in solving their problems.[8,9] The fact is that all countries try to plan to deal with the challenges of such incidents, but it is impossible to prepare for all incidents because most countries have limited adequate response capabilities. In Iran, in 2010, the Ministry of Health adopted a national effort to respond to disasters based on the separation of organizational responsibilities, and the response was carried out within the framework of the national response plan of the Iranian health system at that time.[10-13] However, recent floods in Iran (2019) as well as the COVID-19 pandemic (2020–2021) have revealed some shortcomings in the current disaster response system of Iran. Therefore, it seems necessary to review these programs and to consider their basic and systematic issues. Without understanding the risks and disasters, it is impossible to address the weaknesses in planning and choosing an appropriate response method. Therefore, it is necessary to pay attention to the methods and characteristics of the plans that provide the foundation for decision-making. The purpose of this study is to answer the question, what is the most appropriate approach for disaster planning. To achieve this goal, we studied health system managers and personnel involved in responding to recent incidents in Iran.

Materials and Methods

Study design and setting

This study was conducted using mixed methods in 2020–2021 in two phases and is based on a Sequential Exploration Strategy.[14] In this project, first quantitative data and then qualitative data were collected and analyzed. Our priority in this research was qualitative phase and that quantitative data were used to strengthen qualitative data.

First, a literature review was conducted to extract studies and programs for disaster planning approaches.

Selection of articles and document

A combination of terms defining: Health, health effects, response plan, response approach, impact, disaster plan in PubMed, Springer, Emerald, ProQuest, Science Direct, Google Scholar, Scientific Information Database, and organization web site of Federal Emergency Management Agency (FEMA), Office for the Coordination of Humanitarian Affairs, Japan International Cooperation Agency, National Institute of Disaster Management, the United Nations, and the World Health Organization, were scanned for further references.

Inclusion and exclusion criteria

Because there are many types of disaster response programs, this review reviewed studies demonstrating an approach for developing disaster response programs, whether natural or man-made. To assess the quality of printed studies, each study was evaluated by at least two people. Studies in which the approaches, strategies, patterns, and challenges of different countries in response plan to disaster were addressed were included in the study and other studies were excluded from the study. Resources that have obtained the minimum necessary credentials were further examined to collect data and extract information related to the purpose of the research, and the information required for analysis was extracted.

Collection tool and technique

Data were collected using data extraction forms. These forms are used to maintain integrity, reduce bias, and increase the validity and reliability of the review. Approaches to response planning from various articles were extracted and entered into the data extraction form. The data analysis was performed using a content analysis method based on a response planning approach.

Second, due to the novelty of the research object, it was decided to use semi-structured interview to enrich the results in qualitative phase. This decision is due to the fact that the purpose of this study is to explore the initial approaches to disaster planning.

Collection tool and technique

We gathered information through semi-structured interviews. The general framework of the question was determined based on an extensive review of the research literature.

Study participants and sampling

A combination of purposeful methods and snowballs was used to select interviewers. In this method, the interviewer coordinates the samples to determine the time of the interview and contacts the samples directly for the interview. During the interview, the first person was asked to introduce other experts in the field. Thus, some samples were selected directly by the researcher on the basis of desired criteria (judgmental sampling), and some samples were introduced by previous interviewees in addition to expert criteria (snowball sampling). All of the samples were managers and employees from different parts of the Iranian health system. Due to the

variations in the locations of different provinces in terms of geographical, cultural, social, and facility differences, attempts were made to sample from 6 provinces to obtain the greatest diversity in the samples. Therefore, samples were selected from the provinces of Golestan, Fars, Khuzestan, Lorestan, Kerman, Sistan, and Baluchestan.

Inclusion and exclusion criteria

The inclusion criteria were having more than 2 years of job experience before the research and experience with disaster management in the health sector. Those who did not match the qualifying criteria or who withdrew during the study were excluded.

After each interview, the collected data will be sorted and prepared as a Word file and coded for analysis. This was done for each of the interviews using MAXQDA Software (version10,Berlin, Germany). After 19 interviews, the data and codes reached theoretical saturation and the interviews were stopped. We used a round-trip process to identify the codes when extracting data. First, the basic and general concepts of planning approaches were extracted by reviewing the research literature. After conducting interviews and the introduction of new and more detailed concepts, we returned to literature again to seek the equivalent of the discussions in the literature. With this round-trip process from literature to interview and from interview to literature, 363 codes were finally identified. To analyze, combine, and integrate the codes into single concepts, we classified and mixed the identified codes based on the degree of conceptual similarity. We also used the intuition and understanding of the researcher.[15] In subject, for integrate the findings, to ensure the scientific accuracy and validity of the data, the following criteria were used: credibility, transferability, consistency or dependability, and confirmability. To verify the credibility of the results, adequate time was allotted for data collection, and the subject was studied from various perspectives. Besides, the viewpoints of other colleagues were used. All stages of data analysis are recorded to ensure consistency and confirm ability. For confirmability, the texts of the interviews were given to another researcher (one of the project collaborators) as well as an external observer who had no relation to the study, and the results were compared to their findings. The study's results were discussed several times within the research team to ensure a uniform understanding of the data.

Results

In the initial search, 960 possible sources related to the response were identified. After removing duplications, articles, documents, and procedures not related to the disaster response plan, 64 articles and plan or guidelines were obtained. A total of 12 articles or guidelines based on an explicit planning approach were identified. The contents of all these articles were reviewed and planning approaches were extracted [Table 1].

To enrich the results, we conducted a qualitative study to identify planning approaches based on the perspectives of health system managers and staff. An analysis of the information obtained from interviews with people involved in the recent Iranian disaster [Table 2] shows that they believe that planning should be adopted through methods such as performance, future research, risk occurrence requirements, organizational task, and risk assessment.

Finally, we categorize the concepts identified in the literature review and the results of the qualitative research according to the researcher's intuition and understanding of the subject studied and according to general concepts, into main themes or, if necessary, sub-themes. We continued this process until all concepts were assigned to related topics. The process continued until a satisfactory thematic map was finally obtained from the data. This thematic map includes four main planning approaches [Table 3].

Discussion

In this study, disaster planning issues were addressed from a multidimensional holistic perspective, identifying four

Table 1: Planning approaches extracted from research literature review

Source	Years	Approach
The National Response Plan: Health and Human Services The Lead for Emergency Support Function[16]	2005	Function
National Response Plan[17]	2004	Function/phasing
National Disaster Response Plan 2009[18]	2009	All hazard/staging
Developing and Maintaining Emergency Operations Plans[19]	2010	Function/scenario/ capability
A Case Study of The Health System Response Operation to Flood In Chaldoran Township on July 2011[20]	2011	Function
National Disaster Response Plan. Manual and Guideline. Philippine: Japan[21]	2014	Roles/ responsibility
The Preparation and Integration of Turkey's National Disaster Response Plan. Management of Natural Disasters[22]	2016	Comprehensive/ all hazard/roles/ staging
Initial Floods Response Plan (August to December 2015). Report. Myanmar: OCHA[23]	2015	Responsibility/ staging
National Health Response a Program in Disaster and Emergencies[11]	2014	function/all hazard/roles/ Responsibility
Flooding: managing health risks in the WHO European Region[24]	2017	Specific/ separation of activities
National Disaster Response Plan 2019. Pakistan[25]	2019	Roles/ responsibility
National Response Framework[6]	2019	Separation of function/hazard

Table 2: Planning approaches extracted from the qualitative study

Themes	Sub-themes
Function	Specialist
	Nonspecialized
Based on organizational levels	Managerial
	Operational
	General
Legal requirements	Upstream documents
	Executive requirements
Phase	Time based
	Accident level based
	Before and after the accident
	Based on the disaster management cycle
Futuristic	Scenario based
	The prognosis
Based on the description of organizational tasks	Legal responsibilities of operational units
Accident requirements	Needs assessment results
Risk assessment	Priority risks
	Risk analysis and prioritization
	Hazard zoning
	Spatial requirements and features
To be comprehensive	All units are involved
	Meet all needs
	Include from the beginning to the end of the response process
	Demographic characteristics
Hazard type	Common needs of all hazard
	Special for each hazard
	Event leveling

Table 3: Combining the findings of literature review and qualitative study

Key approach	Description
Based on Function and Needs	General and specific duties that a constituency must perform during an emergency
Based on Forecasts for the Future	When creating scenarios for hazards or threats, planners analyze the impact of the scenario to determine an appropriate time frame for operations
Based on Risk and Needs Assessment	Risk assessment thoroughly examine cases, situations and processes that may involve harm, and then decided what actions should be taken to eliminate or control harm
Based on Capability	Capability-based planning will enable an organization to
	Identify its capabilities
	Assess the level of change required to each capability
	Prioritize the changes required
	Develop a plan for making the changes

general areas: function, risk assessment, capability, and futuristic base approaches. In the following, each of these four general areas will be discussed and concluded in detail.

The first approach identified in this study; planning is function-based. This approach defines general tasks that a field should perform in an emergency. Function-based planning defines the function to be performed and the combination of government agencies and departments responsible for that function. The guidelines provided by FEMA also emphasized this finding.[19] However, some of the interviewees in the study believe that there should be a distinction between this approach and the organization's job description-based planning approach. The National Response Program of the Iranian Health System[11] has been developed based on the same approach. Most interviews believe that the approach used in this program cannot meet the usual needs in light of recent events in Iran and that changes are needed in this regard. In Abbaszadeh study, the functions of the Iranian health system in response to sudden floods include Rapid Assessment, Warning and Event Confirmation, Establishing Incident Command Posts, Codifying the Incident Action Plan, Command and Control, Logistics, Public Communication, and Information Management.[26] However, the important point of using this method is that in the planning process of large-scale events, especially biological events related to public health, any decision, no matter how small, must be carefully considered. However, research by Frederick[27] shows that some functions, including the incident command system, are not capable of handling the complexity of major health disasters, especially epidemics. Especially in situations where unprecedented decisions are made at any level (such as monitoring, triage protocols, capacity building, isolation, quarantine, healthcare personnel, deployment) to review, control, and prevent the spread of disease.

The second approach known in this study is the approach based on Forecasts for the Future. Our research results introduce the use of scenario-based methods and future predictions as one of the important methods of disaster planning. The use of this method has been proven in other studies. In Imani study recommended, in future research; based on scenario planning, implement regional balanced development. Based on this, they predicted 41 possible situations in the future.[28] Alizadeh *et al*. also used scenario-based planning methods for energy planning. They concluded that there are three scenarios for an uncertain future: pessimistic, optimistic, and moderate.[29] When using this method to design a sustainable plan, uncertainties must be identified and managed because not all uncertainties can be eliminated in the future. Ignoring uncertainty will result in the organization's inability to take corrective action and achieve sustainable development. Furthermore, ignoring uncertainty can lead to missed chances and future opportunities, ultimately leading to unsustainable plans.[30] FEMA also introduces the use of scenario-based methods as one of the disaster planning methods. This approach begins by constructing scenarios for dangers or threats. Then, planners analyze

the impact of the scenario to determine the appropriate time frame for the operation. Planners often use this planning concept to develop planning assumptions for specific risks or threats.[19] Furthermore, the findings of the Allahbakhshi *et al*. research suggest that the operational plan of the disaster in the health system may be examined by modeling the future.[31] Sharififar also used this method to prevent and respond to threats to marine life.[32] Another advantage of this approach is that it may be used in exercises activities. According to the Sheikhbardsiri *et al*. study, performing these exercises enhances the health system's preparedness.[33] The wide range of uses for this approach makes it one of the most effective disaster planning approaches.

The third known approach in this study is risk-based planning. Our research results show that one of the ways to plan for potential risks is to use risk assessment and plan for priority risks. The results of Williams' study show that using data from past events is useful in assessing floodplain risk.[34] They believe that one of the effective methods in this approach is to use historical data to use for future planning. The reason for using this approach is that focusing on risk and investing to reduce risk is the top priority introduced by Sendai from 2015 to 2030.[35] Therefore, all countries need to take action in this regard.

The fourth approach known in this study is the Capabilities-based planning (CBP) approach. FEMA: This approach focuses on a jurisdiction's capacity to take a course of action. CBP answers the question, "Do I have the right mix of training, organizations, plans, people, leadership and management, equipment, and facilities to perform a required emergency function?" Some planners view this approach as a combination of scenario-and function-based planning because of its "scenario-to-task-to-capability" focus.[19] The results of our study have shown that using several methods at the same time is suitable for planning complex events. Johnson and William used this method to plan internal security in Colorado.[36] The use of this approach is also apparently more popular among military organizations.[37] CBP is an analytical method that improves the quality of information available to decision-makers. The capabilities created reveal the future impact on the organization and prepare it to execute its mission and become more agile and adaptable. One of the strengths of capacity-based planning is that it focuses on emerging threats rather than traditional analysis.[38] This approach is rooted in defense and military planning[39] and will be more widely used in the future.

Limitation and recommendation

Lack of national flood response plan and the occurrence of the COVID-19 pandemic and the need to follow health protocols during the interview was one of the limitations of this study. We proposing that future research focuses on comparing the disaster planning approach to other areas including social, political, cultural, and economic.

Conclusion

This study provides complete overview of disaster planning approaches that enable health professionals to use them to develop response plans. Our findings indicate that disaster response planning approaches include function, risk assessment, capability-based and futuristic methods. However, as mentioned in discussion, in complex and large-scale events such as floods and pandemics, it is necessary to combine the introduced methods for operational planning. The hybrid planning approach helps to identify the pathways that a responsive domain can take and the necessary actions based on a comprehensive risk analysis. This is one of the must-haves for properly responding to complex and large-scale events such as the 2019 floods and the 2021 Iranian epidemic.

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Ethical issues

This article is an extract of a Ph.D. thesis approved at Isfahan University of Medical Sciences and was found to be in accordance with the ethical principles and the national norms and standards for conducting Medical Research in Iran. Code of Ethics: https://ethics.research.ac.ir/IR.MUI.RESEARCH.REC.1399.498.

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Conflicts of interest

There are no conflicts of interest.

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