Review Paper: Report of Field Assessment in the Flooded Areas of Iran, 2019

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ABSTRACT

Background: Iran is a disaster-prone country, which in recent years has been affected by heavy rainfall and consequent flooding. In March 26, 2019, heavy rainfall in northern parts of Iran resulted in flooding. The situation became more critical when central and western provinces were affected, finally causing significant damages in 25 provinces. The most affected areas were Golestan, and Khuzestan provinces with significant damages to their infrastructure, killing 76 people.

Materials and Methods: This qualitative study aims to describe the findings and results of field visits in flood-hit provinces of Lorestan, Khuzestan and Golestan. All interviews were held with experts in late April 2019.

Results: Golestan province was in recovery phase and Lorestan and Khuzestan provinces were in response phase. Due to the acute conditions of these two mentioned areas, it was not possible to visit all areas. In Lorestan Province Treatment and Emergency Situations; In Golestan Province Health Status and in Khuzestan Province Pre-hospital Care and Rescue Support were visited and evaluated. The field visited results indicate the presence of government forces and people in the field and provide comprehensive assistance to the flood-affected areas.

Conclusion: There are numerous hazards each year, but few documented lessons are available for researchers. Due to the importance of applying lessons for community development it is imperative that special attention be paid to the discussion of emergency and disaster research and the presence of specialized researchers to record lessons learned. Although organizations make significant efforts during disasters, the specialized research force for recording these achievements in disasters remains neglected. Therefore, it is valuable to document and apply appropriate documentation to promote interventions and responses to possible future events.

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1. Introduction

Natural disasters are inevitable and can affect any country irrespective of size, wealth, or demography. Flood is one major increasing natural disaster that, besides destruction and structural losses, may impose physical, psychological, and social impacts on the affected population [1, 2]. Floods occur for various reasons, including tsunamis, cyclones, heavy waves, heavy rains, and increased seawater volume [3]. A flash flood is a rapid flooding of low-lying areas: washes, rivers, dry lakes, and depressions. It may be caused by heavy rain associated with a severe thunderstorm, hurricane, tropical storm, or meltwater from ice or snow flowing over ice sheets or snowfields and has a destructive nature [4]. Management of flood and its short, medium, and long-term consequences on human health is the major task for a multiagency response approach, which should be advocated through standardization and policy adaptation [5].

Iran is a disaster-prone country [6]. In 2015, natural disasters killed 107 people and injured or affected 26481 in Iran [7]. Recently, the number of floods has increased, affecting different parts of the country. 2019 flooding in Iran has been one of the most severe natural disasters in decades, affecting many provinces. It caused significant financial losses to many cities in Khuzestan Province on January 8, 2019 [8]. A new period of heavy rains starting March 26, 2019, flooded northern parts of Iran and surrounded many cities in Golestan and Mazandaran provinces. Continuous rainfall in central and western parts of Iran finally affected 25 provinces. However, the most severe damages were registered in Golestan, Khuzestan, and Lorestan provinces, with 76 deaths and a cost of over $800000 (350 thousand billion RLL) [9]. Located in the north of Iran, Golestan Province consists of 14 cities with a population of 1.869 million. Although the province is affected yearly by flooding, this year's flooding and its severity were unprecedented. Lorestan Province consists of 11 cities and is located in the west of Iran, with a population of 1.754 million. Finally, Khuzestan Province has a population of 4.711 million and is located in the south-west of Iran, consisting of 27 cities.

Despite its destructive nature, floods impacts, particularly those affecting human health, might be mitigated by adopting preventive policies [5]. Learning from earlier events, and collecting experts' views, and gained knowledge in the post-flood period may pave the way for new approaches, preventive measures, and mitigation policies. This study aims to gather such data by visiting affected areas in Lorestan, Khuzestan, and Golestan provinces in Iran.

2. Methods and Materials

This qualitative and observational study was carried out in the flooded-affected areas of Lorestan, Khuzestan, and Golestan provinces in Iran (March 18-31, 2019). The field assessment was carried out for 15 days, from April 21 to May 2, 2019. During this period, Golestan province was in the recovery phase, while Lorestan, and Khuzestan provinces in the response phase of the disaster management cycle. Field evaluation was conducted in Aq Qala, Simin Shahr, Gonbad Kavous, and Gomishan Districts in Golestan Province, Ahvaz, Hamidieh, Susangerd cities, and Dasht Azadegan villages of Khuzestan Province, and Poldokhtar City of Lorestan Province.

The study data were collected and evaluated by a research team consisted of seven disaster-related health professionals with experience in clinical health management. Experts were in the fields of health in disasters and emergencies, search and rescue, general practitioners, and crisis management. In each of the three provinces, 20 experts were selected by purposeful snowball sampling and asked questions about challenges, strengths, opportunities, and flood response threats. Interviews were recorded with a tape recorder and then analyzed. A standardized checklist used in earlier studies was adjusted by the research team in three different treatment areas, public health, and management categories to be used in all interviews. Checklist questions were designed and developed based on the checklists and items mentioned in the Emergency Operation Plan (EOP). Researchers used the checklist during field visits and semi-structured interviews. The research team held two meetings before the trip to finalize the checklists, interview questions, and field visit strategy.

During the observational period and the field study, the researchers interacted with each other through the virtual network. Visits and interviews were conducted with the Red Crescent and the University of Medical Sciences of the three provinces based on the organization and people available (considering the acute phase of disasters in those places). Ethical considerations of confidentiality were also considered. All observations were recorded, and interviews transcribed verbatim. The organizations that were visited in terms of accessibility and participation level included the Red Crescent population, the Health Department, hospitals, treatment centers, and pre-hospital emergencies.

3. Results

Golestan Province was in the recovery phase, and Lorestan and Khuzestan provinces were in the response phase. Due to the acute conditions of these two mentioned areas, it was not possible to enter and visit all areas. We visited and evaluated treatment and emergencies in Lorestan Province, health status in Golestan Province, and pre-hospital care and rescue support in Khuzestan Province. The field visited results indicate the presence of government forces and people in the field and comprehensive assistance to the flood-affected areas.

The distribution of items was done on a large scale. Although basic needs were fully met, there were challenges. Table 1 assesses each region's strengths, weaknesses, opportunities, and threats using the SWOT approach. Table 2 also discusses the proposed challenges and strategies as a lesson learned from this extensive hazard.

4. Discussion

The recent floods have damaged more than 1136 people and caused $8 billion in damage [10]. All provinces in the country with all powers responded to the floods in the three provinces of Golestan, Khuzestan, and Lorestan with all the valuable humanitarian and protective measures they could. People in other parts of the province participated in voluntary support for the flood victims in terms of financial, equipment, and humanitarian aid to reduce the suffering of their compatriots. The main challenges that hinder equitable service delivery accelerate the response and recovery phase of the spending were roughly the same in all three provinces. The main challenge can be divided into two areas of unified command and coordination and people's culture. Although all relief, health, and service organizations were active on the scene and volunteered to help people, the lack of centralized activities, the lack of single umbrella management, and integrated command and service delivery created many challenges, and people in some areas injured rescuers. Besides, the people were dissatisfied with the services provided.

However, Rouhie's study (2019) proposed 8 participatory models for nongovernmental participation in disasters and emergencies based on upstream documents: sphere project, cluster approach, code of conduct, decentralized approach, national disaster response framework, integrated conceptual NGO collaboration framework for

Table 1. Analysis of strengths, weaknesses, opportunities, and threats of Iran's Flood Areas, 2019

Flood-hit Province	Strengths	Weaknesses	Opportunities	Threats	Flood date 2019
Golestan	- Relief from other provinces - Creating warehouses for material packages - Excellent coordination between organizations involved in flood response	- The lack of inter-organizational and intra-organizational command unity - Lack of bathrooms and baths -Inappropriate distribution of relief goods to people - Mixing of sewage and flood - Lack of specialist forces to evaluate homes	- The sympathy of neighboring countries for relief - Communities and solidarity with locals	- Poor environmental health of flooded areas - Vector-borne diseases and insect growth - Possible contagious diseases	March 27
Khuzestan	- Good involvement of certain provinces - The participation of volunteer specialists - Understand the importance of the pediatric group and psychological interventions	- Environmental health challenge - Not enough bathrooms - Distribution of services - Lack of support of the medical staff in the area of permanent hospital activation - Lack of coherent planning for vulnerable groups	- The sympathy and assistance of the Iraq country - The interest of indigenous people and peers to participate - Professors interested in Jundishapur University of Medical Sciences	- The lack of integration and unity of command to lead volunteer and auxiliary forces - Re-work some services - Not centralized management of health services - Poverty of native people	April 14
Lorestan	- Untimely warning and evacuation - Effective pre-hospital emergency function - Increase the effective capacity of hospital emergencies - Establishment of a field hospital in the area	- Failure to report infectious and epidemic diseases - Failure to cooperate in the equitable distribution of relief supplies - Inappropriate behavior in receiving auxiliary items - The psychological distress of the injured	- Ethnic participation and support of the region - Public assistance to flood victims - Participation of surrounding villages for resettlement of the flooded	- Trust in the organizations that distribute the items - Life safety of paramedics in high-risk behaviors of the injured - Specific ethnic behaviors	April 12

Table 2. Challenges and Solutions of Iran's Flooded Areas, 2019

Flood-hit Province	Challenges	Suggested Solutions
Golestan	- Extend the accommodation time - Long-term application of food packages - Risk of demolition of residential buildings - Creating a phenomenon of gondabas in the region - Leakage of municipal sewage in Mandab - Prevalence of infectious and skin diseases	- Guiding people to their homes - Coordination between organizations to meet people's needs - Empowering people
Khuzestan	- Lack of operational interaction of the implementation team with university specialists for needs assessment and service coverage - Fingerprint calculations and disregard for people's meticulous needs assessment - Scattering of villages in the vicinity of livestock - Securing evacuated villages - Lack of syndrome and health care system	- Consider the University of Medical Sciences and specialists as the capacity and support arm of the provincial forces and with a full call to coordinate voluntary and expeditionary provinces to cover the entire area - People's needs, especially hygiene (bathroom - mobile toilet)
Lorestan	- Concrete walls break down north to south of Poldokhtar City - Construction on the river	- Monitor new construction - Examine all areas built-in river privacy and discharge orders - Public education on danger perception and warnings

Health in Emergencies and Disasters Quarterly

community post-disaster reconstruction, model of temporal coordination of disaster response activities, and Collabit application [11]. But there is a lack of organization and confusion among the group of volunteers, which results in a decline in the productivity of these institutional capacities. The promotion and efficiency of services at the time of disasters depend on the unity of command and reform decision-making infrastructures under the highest authority of the country. Culture and stressful reactions, which originated from poverty, had their roots before the disaster [12].

The main challenge was the fair distribution of humanitarian aids and the provision of health services [13]. The second challenge in the light of the management and command challenge correction can be partly mitigated because it gives confidence to the affected groups and their trust in the responsible organizations creates psychological well-being and controls excessive behaviors, aggression, and behavior of relief and servicing in disaster. However, radical reform requires individual and organizational training by disaster sociologists, psychologists, and health professionals to prepare the community for emergencies in natural conditions. On the other hand, sending out old-fashioned used clothing by some citizens to help the flooded was the challenge of distributing humanitarian aid, which requires a significant change of culture.

There are numerous hazards in the country each year, but few documented lessons are available for researchers. Due to the importance of applying lessons for community development, special attention must be paid to emergency and disaster research and the presence of specialized researchers to record lessons learned. Although organizations make significant efforts during disasters, the specialized research force for recording these achievements in disasters has remained forgotten. Therefore, it is valuable to document and apply appropriate documentation to promote interventions and responses to possible future events.

Ethical Considerations

Compliance with ethical guidelines

All ethical principles are considered in this article. The participants were informed of the purpose of the research and its implementation stages. They were also assured about the confidentiality of their information and were free to leave the study whenever they wished, and if desired, the research results would be available to them. A written consent has been obtained from the subjects. principles of the Helsinki Convention was also observed.

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Authors' contributions

All authors contributed equally in designing, evaluating, discussing, and eventually in writing, correcting, and approving the final manuscript.

Conflict of interest

The authors declared no conflict of interest.

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