

Strategies of relief organizations for improvement of disaster risk communication process in Iran

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Abstract

Background: The frequency and severity of disaster occurrence and emergency situation, and the importance of disaster risk communication of relief organizations to increase the readiness of societies in the case of disaster is increasing around the world. This study aimed to identify relief organizations' strategies to improve disaster risk communication in Iran.

Methods: This qualitative study was conducted with the participation of 25 managers, relief workers, and people who had experiences in response to one of the disasters. The data were collected using semi-structured interviews and analyzed using conventional content analysis.

Results: The analysis of the data of this study led to the identification of 3 categories and 9 sub-categories regarding strategies of relief organizations to improve risk communication. These categories are 1) management of information and training communication (facilitation of training processes, diverse training strategies, and integrated informing), 2) management of communication barriers (trust building, managing people's demands and efforts to respect affected people), and 3) Inter-organizational communication management (coordination to meet people's demands, improve communication coordination and strengthen communication platforms)

Conclusion: Relief organizations use different strategies to improve disaster risk communication, and communication barrier management is vital for improving organizations' communication with people. Developing risk communication improvement strategies can help planners and managers design and implement effective risk management programs.

Background

Risk communication is a part of disaster risk management (1) and one of the main elements of emergency planning and response process in disaster and emergencies (2, 3). Furthermore, risk communication is an interactive process for the exchange of information among individuals, groups, and organizations which includes various messages about the nature of risk and information about different hazards provided by experts to target groups (4). Since risk communication moves away from one-way and top-down communication methods (5) and acts as a two-way process, participation of all stakeholders is essential to making the right decisions because it leads to a greater understanding of risks and better acceptance of risk communication strategies (6). This two-way communication occurs among people, local communities, government organizations, and other stakeholders and is one of the main elements of risk communication (7). The growing importance of information flow among organizations, within organizations, and among organizations and people, all levels of organizations participate in risk communication, and failure to do so results in inefficiency of all community efforts to manage disaster and loss of resources (8). Therefore, to succeed to establish two-way communication and efficient flow of information, such communication should be formed with the support of governmental organizations, media, and local leaders and participation of local people (9).

The organizations' disregard for risk communication and information management for disaster causes problems which were reported in various studies (9–13). For example, according to a study, in the case of disaster and emergency, relief organizations should have adequate, accessible, credible, and unambiguous information because the inability to provide credible information leads to uncertainty and anxiety in society, leading people to gossip while credible information makes people avoid illusions and rumors (13). To avoid these problems, organizations need purposeful strategies which were mentioned in various studies (14–16). For example, in a study, inter-organizational communication, maintaining trust between organizations and people, empowering people, uncertainty, stakeholder participation, and identifying at-risk groups were mentioned as risk communication strategies (15).

Although creating public awareness and education about the risk of disasters is widely accepted among experts in this field (17), but this education has not always led to a change in attitudes and behavior in individuals, and therefore has not led to public preparedness of society (18). Solving this problem requires the adoption of various risk communication strategies by related groups and organizations. Although some studies have proposed different strategies for changing people's behavior in disasters (18), but these strategies do not seem to be sufficient and require more comprehensive studies in this area, and relief organizations may use different strategies in this area.

Literature review in Iran in the field of risk communication shows that so far, no study was conducted on strategies used by organizations to improve communication with people in the case of a disaster in Iran. Identifying these strategies can improve communication with people in the case of a disaster and provide useful information for developing guidelines to reduce loss. This study aimed to determine relief organizations' strategies to improve disaster risk communication in Iran.

Methods

Design

Regarding constant communication of relief organizations with the people before and after a disaster and lack of descriptive data on communication strategies of relief organizations with the people, using experiences of executives, relief workers, and people who were present in the case of disaster and experienced closely how relief organizations interacted with the people, a qualitative plan was selected. The qualitative design allows simple narratives to be used to describe the given phenomena (19), and in this study, the strategies which lead to improved risk communication were considered.

Study setting, participants' selection and data collection

This qualitative study was conducted from July 2020 to March 2021 in three Provinces in Iran: Golestan (northern Iran), Lorestan (western Iran), and East Azerbaijan (northwestern Iran). The purposeful sampling method was used for data collection, and theoretical sampling was used as the study progressed. All interviews were conducted in-depth and semi-structured by first author. First, the interview process was explained, informed written consent was obtained from each participant, and then the place and time of

each interview were coordinated with the participants. In total, 25 participants were interviewed who had rich experiences in disaster risk communication (12 participants were interviewed in person, and 13 participants were interviewed by phone). The participants included 9 executives, 7 relief workers, and 9 ordinary people. Of 25 participants, 29 interviews were conducted (25 primary interviews and 4 supplementary interviews). The supplementary interviews were conducted to clarify the ambiguity of the information obtained from primary interviews with 4 participants. All interviews were recorded with the verbal permission of interviewee. The average interview duration was 45 min (20–90 min) for primary interviews and 15 min (10–25 min) for supplementary interviews. The first interview was conducted with a manager who had managerial experiences in several disaster response operations and was also very interested in sharing his experiences in disaster risk communication. Subsequently, the participants were purposefully selected to answer key study-related questions as well as new ones, or clarify existing ambiguity of previous results

To start the interview process and establish relationships with participants, a general question was asked of all interviewees: "Based on your experience with disasters, how have relief organizations communicated with people in the case of disaster?" The rest of interview was followed by the main questions, "What strategies were used to inform the people? Why did you use these strategies?" In addition to using the general question and the main questions presented above, additional questions were asked as the interviewer came up with a new concept. Besides, the words "who", "when", "why" and "how" were used to saturate the concept, as well as "complete your description with an example" was used to saturate the data and the concept. This process continued until data saturation.

Data analysis

Data analysis in qualitative research begins at the same time as data collection begins (20). For this purpose, qualitative content analysis techniques proposed by Graneheim and Lundman were used (21). After interviews, the text of interviews was listened to several times and then transcribed word by word in software Microsoft Office Word™. The transcribed interviews were reviewed several times for a better understanding of data collected. Then, data analysis was started line by line. The words, sentences, or paragraphs which represented important aspects of participants' experiences of risk communication were considered "meaning units", and a label was assigned to each.

In the primary coding process, the participants' words were used, and then the codes were categorized into sub-categories based on their similarities and differences. This inductive process continued until the emergence of last categories and sub-categories. For further explanation, an example of an analytical process from open codes to final categories is provided in Table 1.

To facilitate the analysis of qualitative data, MAXQDA software (version 10.0) was used to facilitate data management in the first round of coding. Other stages of qualitative content analysis were manually done.

Table 1
Example of analysis from open codes to main category

Categories	Sub-categories	Primary concepts	Open codes
Management of information and training communication	Facilitation of training processes	Using ambient advertising	Using environmental advertising banners Use video messages
		dissemination of public education through the media	Media cooperation to publish public education Disaster simulation broadcast from media
		Efforts to promote training content	Update tutorials and trainers Using people who specialize in training
		Efforts to promote training motivation	Establish a close relationship between the coach and the learner Using various training channels
	Diverse training strategies	In-person and understandable training	Close and face-to-face training Teaching in the language of the people
		Practical training	Objective and practical training Making educational documents
		continuous education	Repeat the exercises if necessary Continuous training for disaster preparedness
	Integrated informing	Flexible informing	Using people's suggestions in the informing approach Changing the approach to informing based on the demands of the people in the media
			Integrated informing

Categories	Sub-categories	Primary concepts	Open codes
		Media informing	Providing up-to-date disaster information from the media Quick coverage of the incident by the media
		Use of modern media	Transmitting the organization's messages to people through cyberspace Providing disaster information through social networks

Rigor

To improve the trustworthiness and rigor of this study, criteria of confirmability, credibility, transferability, and dependability were used (21). For confirmability, all stages of research were clearly written and reported so that other researchers could track and audit the data. The credibility of study was ensured by long-term participation, continuous observation of subject, establishing correct relationships with the participants, review by study colleagues, experts (external check) and participants (member check) and complete immersion in the data. The results of interviews were discussed with interviewees and other experts and the final results were obtained. To determine dependability of data at the beginning of study, the literatures were reviewed in a limited way so as not to cause the researcher to be biased during data collection and analysis. For transferability, in a few sessions, the results were confirmed by two experienced disaster relief workers who did not participate in the study.

Table 2
Characteristics of participants

Participants	Characteristics	Number	(%)
Sex	Male	7	28
	Female	18	42
Age	28–38	6	24
	39–50	14	56
	Over 50	5	20
Marital status	Single	1	4
	Married	24	96
educational degree	diploma degree	3	12
	Bachelor's degree	13	52
	Master's degree	6	24
	General physician	1	4
	PhD	2	8

Results

In this study, 25 people with a mean age of 46 years (29–58) were interviewed. Other information of participants is reported in Table 2.

Based on the participants' experiences, relief organizations use different strategies with different results to improve the risk communication process before and after disasters. The study results present these strategies in three categories and nine sub-categories: management of information and training communication (facilitation of training processes, diverse training strategies, and integrated informing), management of communication barriers (trust building, managing people's demands, and efforts to respect affected people), and Inter-organizational communication management (coordination to meet people's demands, improve communication coordination and strengthen communication platforms) (Table 3).

Table 3
Main final categories and sub-categories

categories	sub-categories
The management of information and training communication	The facilitation of training processes, diverse training strategies integrated informing
The management of communication barriers	trust building managing people's demands efforts to respect affected people

Management of information and training communication

One of the main factors for disaster preparedness is training-oriented approaches of organizations and transparent information about disasters. The participants shared their experiences on how to train and inform people about the disaster by relief organizations which were finally classified into three subcategories: facilitation of training processes, diverse training strategies, and integrated information.

Facilitation of training processes

Relief organizations based on time and place requirements use different training approaches such as Using ambient advertising, dissemination of public education through the media, etc. to prepare people for disasters.

One of the participants stated:

"Early, we started ambient advertising and installed training banners in villages which mostly included the use of safe water, garbage disposal, prevention of carbon monoxide poisoning, etc. Hence, they do not suffer from these problems by increasing awareness" (P15).

Some participants commented on dissemination of training messages via the media, and stated:

"The media helped us a lot in covering the flood and spreading training messages, and without restricting published information we wanted" (P25).

Any training content which is provided for learning should be practical, useful, and appropriate to the demands of learners and constantly reviewed.

"In previous years, it was said that you should run away when an earthquake occurs, but now it is said that we have a triangle of life and you should take refuge under a desk when an earthquake occurs. This shows that even some of our training has changed and we have to constantly update and replace with new training" (P20).

Diverse training strategies

The relief organizations use different methods to deliver training messages to the people. These strategies are selected based on criteria such as the level of literacy of individuals, motivation to learn, etc.

"In the earthquake in Azerbaijan, due to dispersion and different villages affected people lived mostly next to their houses, and inside tents, health training was more in person and video. We had a series of groups go to the tents, find the target and vulnerable groups and train them how to prevent a contagious disease, healthy eating, etc." (P16).

For sustainable learning and application of what was learned in the real setting, it is necessary to provide practical training so that people can use what they have learned in the case of an event.

"Once Red Crescent came to our company to train first aid and relief, both practically and theoretically, until one day we went for a walk somewhere. I saw for a moment that my little child was suffocating at that moment. What I had learned practically in those classes came to my mind, what I should do when suffocating, and I had applied all those teachings to my child and saved him from suffocation." (P5).

Integrated informing

The effective communication and accurate information about the type of disasters, the course of event and the possible number of damages, and how to meet the demands of the affected people enables people to have better planning to find out about the fate of their relatives and friends for possible participation for helping their fellow human beings. Despite the inconsistency of relief organizations for informing and lack of information authority in practice, relief organizations have used various strategies for integrated and transparent informing which are also mentioned in experiences and statements of participants.

To provide accurate and fast information to the people, it is necessary for relief organizations to coordinate with each other in an integrated and centralized way so that information is provided to the people in a timely manner.

"To communicate with the people via the governorate, a series of organizations were identified, such as Red Crescent, the health deputy, the radio and television, and the governorate's disaster management. Several units were set up to inform and warn the people, which provided the necessary information to prepare the people against the flood through radio and television, apps, and social networks" (P13).

According to one participant, informing approaches may change based on people's conditions and demands.

"Based on the demands we see in cyberspace or opinions expressed in cyberspace and the media and our monitoring in cyberspace, we may change our approach to informing" (P25).

Today, the media cover events and disasters with great power and speed, both in terms of news and training, and act as a representative of the people in the eyes of public opinion. Therefore, relief organizations use media informing to communicate more with the people.

"In the flood, all news agencies, and the media managers and journalists came, and they covered everything quickly, both on TV and through virtual networks, there was nothing that could be overlooked by them, and all cases were reported moment by moment" (P8).

Management of communication barriers

Managing communication barriers is one of the most challenging strategies that any organization needs to effectively communicate with the people which included three subgroups: trust building, managing people's demands, and efforts to respect affected people.

Trust building

Since risk communication process is two-way and organizations need people's trust to better communicate with people, get feedback from their measures and be aware of people's expectations of relief organizations, so one of the most important and challenging strategies of relief organizations is attracting people's trust. The participants' experiences show that relief organizations use various methods including communicating effectively with people in disaster preparedness and response programs.

"Every day we went to the flood-affected regions and visited accommodation and kitchen, and with close contact with the people, we became aware of problems and needs of people and estimated their needs as much as possible" (P8).

By establishing effective communication between relief organizations and all stakeholders, people believe that relief organizations are by the side of people and that all measures of organizations are to reduce the people's problems in disasters; hence, this issue attracts people's trust.

"They came from the health department several times, examined those who needed them, and gave them medicine if they needed. They talked to people, comforted them, and provided psychological support. Because we had multiple aftershocks about two weeks later, children and women were very afraid so they speak to them and guide them" (P14).

Managing people's demands

One of the other strategies of relief organizations to build trust, establish strong communication with people, and manage communication barriers is to pay attention to the demands and expectations of people from relief organizations in the case of disaster. For this purpose, through opinion polls and

talking to people, thoughts and expectations of the people can be understood, and through media monitoring, expectations of the people from organizations can be informed.

"In Lorestan flood, the university's health deputy, for psychotherapy and psychology, tried to obtain a series of information about expectations and problems of people so that they could be used as lessons learned in other possible disasters. The performance of any organization was immediately determined through public opinion because we have many grievance systems that people call and report" (P13).

Furthermore, since the media is an intermediary between people and organizations and reflects expectations and demands of people from relief organizations, by monitoring the media, organizations can get more in touch with the people and become aware of demands of the people.

"Regarding my responsibilities, maybe it is said that I am free, but at night I check the media for half an hour. I check some of the media that I accept. I watch the news on various TV channels. I will definitely see the media criticizes our programs" (P2).

Efforts to respect affected people

Human dignity is a social and relative concept, and despite its differences in cultures, it is a fundamental right of every human being. Moreover, people should feel valued by authorities' behavior towards themselves (22).

Respecting the affected people of disasters, especially in the response phase, is one of the strategies of relief organizations to communicate more with the people.

In this strategy, relief organizations also consider the culture and beliefs of the people of region for setting content of training messages, and by respecting these beliefs and correcting wrong beliefs of people, they help them make the right decisions in the case of disaster.

"I was talking to a villager. He said that God knew it was good and that it happened, and if he knew it was good, we would not get any more diseases. Without judging his beliefs, I said that God as considered it good and that this happened to us told us to stand together in hardships and help yourself and each other and observe personal hygiene. I talked to him for a while and saw that he accepted my words to some extent. Moreover, he said, we will do whatever you say" (P17).

Furthermore, the organizations could alleviate the people's suffering to some extent by sympathizing with the people and respecting their demands, and trying to meet the needs of the people.

"The next morning after the earthquake, I saw that the neighbors took tents, and I asked them and I went and took tents from them. They treated us with respect, but I wish they had statistics of the families and gave the equipment to the tents themselves, and people work with them because they are not really beggars and because they have lost everything they have to live with the help of others"(p11).

Some organizations tried hard to get relief workers to treat people with respect, but some participants showed different experiences. The statements and experiences of participants showed that there are serious problems to meet the needs of the people in the case of disaster, there is no specific plan to meet the needs of people, and it causes that demands of the people are not met that causes dissatisfaction of the people.

"They would not respond to our demands, and whatever we wanted, they would say no, it would be better, for example, they had boots, and they would not give them to us. We had to go with ordinary shoes into the mud. Numerous trucks of people's aid came with boots, paddles, and shovels, stored them and did not give them to the people. I do not know if these are not necessary for the flood, so what is the use of it?" (P9).

Inter-organizational communication management

Coordination is one of the major issues and challenges of disaster risk management, largely due to the widespread nature of disaster-related activities (23). Successful disaster management requires cooperation and coordination between responsible organizations, and its final objective is to reduce the damage caused by disasters. Improving the risk communication process also requires coordination and cooperation between organizations. In this regard, based on the experiences of participants, relief organizations have adopted various strategies to achieve it which are: coordination to meet demands of people, increase communication coordination and strengthen communication platforms.

Coordination to meet demands of the people

The relief organizations use different methods for coordination among organizations to meet demands of people which are: identifying information on the demands of people, public announcement of the demands of people, and supplying demands of people.

The strategy to identify the information demands of people focuses on integrated identification of information on the demands of people and prevention of scattered collection of information by various organizations. Although island measures of organizations continue in this regard, Disaster Management Organization tries to prevent this issue by creating coordination between organizations and information sharing of organizations.

"Meetings were held among the managers of relief organizations to coordinate with each other, but in practice, every organization acted like an island. At the end of the flood, they used health information including the information health system, to identify vulnerable groups of people" (P8).

The demands and resources in the case of disaster often do not match, relief organizations with limited resources need the help of other organizations and people. To properly supply demands of the people, they were publicly announced via the media so that they could supply the demands of the people as much as possible.

"We also had close contact with the media, and I myself appeared on the radio, and I gave the necessary messages there. On the radio and television, we informed the people in the earthquake-stricken areas about the needs of the region, how to help the affected people, told the people that we had checked and that people need these items, and if you want to help, please send these to people" (P24).

Increase communication coordination

In most cases, coordination meetings are held before the event to increase communication between relief organizations and their better performance in the operational field.

Based on participants' experiences, organizations have tried to respond to disasters in a coordinated manner by dividing tasks and informal communication among organizations.

"We cooperated in distributing food to Red Crescent, and they helped us move the patients. The roads were blocked and the inter-road transfer was not possible, we transferred the troops through the organization helicopter to other organizations" (P13).

The other way to increase communication among relief organizations was to share information between relief organizations which was done in a limited way among organizations. Due to lack of a clear plan for this work at the highest levels, information between organizations were shared informally and based on the experiences of the relief worker.

"At the University Health Deputy, we designed a newspaper, which was an A4 page. We sent the daily performance of the University Health Deputy to all relief organizations, which, of course, reached the organizations with a delay of a few days. This was done to inform and communicate with other organizations" (P16).

Strengthen communication platforms

The weak communication infrastructure of relief organizations caused to disrupt the communication of organizations with stakeholders in the case of disaster. Based on the experiences, the organizations first have tried to identify the places where there is a possibility of disruption in the communication infrastructure.

"Because it was possible that communication would be cut off after the heavy flood, we set up all radios in the city canal. We talked to the telecommunications and redirected 115 telephones to the telephones of provincial center, and the telephones of provincial center to my personal telephone, and we were connected to the Pre-hospital emergency stations wirelessly" (P22).

They also used alternative communication platforms to prevent continuous non-communication among them to establish communication among organizations and operational teams as soon as possible.

"During the first two days, when communication infrastructure was cut off, and no news was revealed, mobile phones and telephones were cut off, so there was no cyberspace and no other media from inside

the city. Later, the Ministry of Communications deployed an air balloon, and communications were established. Then, the media were able to inform the people" (P15).

Discussion

The careful exchange of information and effective communication is essential for coordination among various branches of organizations involved in disasters and international organizations (24) as well as among organizations and the people, and neglecting this may lead to parallel measures, reducing efficiency and increasing costs (8). To prevent this, relief organizations have considered different strategies at different stages of disaster risk management cycle to determine the direction of activities and process chains and avoid confusion.

Few studies around the world have considered strategies of relief organizations to improve the disaster risk communication process. In Iran, for the first time, the present study has addressed this subject. The most important strategies of Iranian relief organizations in this field identified in this study are management of information and training communication, management of communication barriers, and Inter-organizational communication management.

Based on this study's results, management of information and training communication was mentioned as one of the major strategies of the participants. It is now clear to everyone that policy-making and disaster risk management programs would not have been possible without training the personnel involved in disaster response and disaster-affected communities (25) and training plays an important role in the public awareness of disasters (26, 27), improving risk perception and disaster preparedness (28–30); therefore, one of the priorities of disaster risk management programs is public education (25). Relief organizations, depending on the type of audience and purpose and based on demands, available time, and resources, consider different methods for public education (31). Moreover, according to other studies, relief organizations use different media-based (32), and school-based (33–36) approaches for public training. Although most countries have started disaster risk reduction training activities, these measures are not enough and there is a long way to reach the desired process. Several effective and efficient learning strategies are required to increase disaster preparedness and disaster risk reduction activities at all levels of society (37). The integrated informing on disasters is another sub-category of information management and training communication that the results of other studies emphasize this concept and show the role in responding to disasters and maintaining public preparedness. Among these studies are Granell (38) and Guo (39) whose results show that dissemination of credible and structured information promotes disaster response, and publishing them on social networks and accurate information about the current situation can play an important role in epidemic management and control. By the rapid development of communication technologies and rapid dissemination of information, accurate and credible information should be made available to the people (40). The researchers have also focused on disaster information dissemination models. Shan et al. proposed an emergency information dissemination model based on the information entropy method, which is useful to predict the occurrence of disasters and improving disaster response (41). For better information management, in

addition to traditional media, social networks can distribute information and inform to better communicate with people (42–44).

The management of communication barriers, focusing on trust building between organizations and people, was the most important strategy used by the participants to improve communication between relief organizations and people. Previous studies showed that people's trust in relief organizations is one of the main factors affecting risk perception (45–49). The main challenge of disaster managers is to build public trust and most studies indicate lack of trust between people and managers (50, 51). A study by Seddighi in Iran also mentioned distrust as the main problem of recent disasters in Iran and addressed its causes and organizations' strategies to gain people's trust (52). Therefore, managers use different methods to solve this challenge. Trusting people is one way to gain people's trust. In this regard, government managers should trust the people in order to be trusted (53). Keeping promises strengthens people's relationship with organizations, and ignoring the promises prevents communication and distrust in managers of organizations. Morgan and Hunt pointed to a direct relationship between trust and commitment in their study (54). Management of people's demands is another finding of the present study, which is under the category of management of communication barriers. Studies showed that people expect to use hospitals for non-life-threatening demands in the case of disaster. To manage this, managers should direct people to appropriate resources to provide non-emergency medical care in the case of a disaster. Therefore, disaster managers should consider demands and expectations of society (55). Moreover, according to a study by Lam, people had higher expectations of relief groups for evacuation, temporary displacement, housing and health management (56). One of the findings of the present study is the efforts to respect affected people, which can be one of the main facilitators of organizations' relationship with the people. In a study by Samadipour et al., human dignity was considered as a fundamental right of the people and it was considered as one of the important influential factors in the relationship between people and organizations. According to the study results, people should feel that laws and regulations are set to preserve their dignity. Therefore, resorting to this approach, managers' interpersonal commitment to people increases (22). But according to another study, people have a different view of relief organizations' strategy in providing humanitarian assistance to the people. Some people expect that this assistance will be accompanied by respect, but other people only expect to meet their needs and do not expect respect from relief organizations in disaster (57). However, to improve the relationship between organizations and people, it is necessary to respect thoughts, opinions and beliefs of the people, so that by maintaining the human dignity of individuals, people's trust can be gained to improve the relationship between organizations and people.

Inter-organizational communication was another result of the present study, which was obtained based on the experiences of participants. According to studies, people's demands affected by disasters are supplied by various organizations involved in disaster management (58) and this has made operational coordination among relief organizations a major challenge (59). The results of a study conducted in Iran by Abolghasemi et al. also showed a lack of coordination among health service organizations (60) which has led to inadequate use of resources and inefficient responses (61). In this regard, organizations have mentioned various strategies to improve the communication of organizations and create coordination. A

study by Bahadori showed that providing and developing required training in the field of health, sharing resources and information, paying attention to public participation, and having a systematic and national view were important factors of coordination among organizations (14). According to a study by Aaron, information is the most common factor in disaster coordination, followed by human and financial resources (62). According to a study by Yaghoubi, holding joint meetings between organizations and scenario-based practice can improve coordination between organizations (63).

To establish communication among organizations in the case of disaster when no communication is likely, strengthening information platforms was one of organizations' strategies to improve communication. According to a study, one of the main causes of no communication among individuals, groups and organizations in the case of disaster is failure or lack of communication equipment, and the strategy of governments to establish better communication with individuals and organizations is using up-to-date and multi-layer technologies and their proper use and accessibility for all people (64). The Japanese government used multi-layered information channels such as digital broadcasting, smartphones, SNS, and mobile broadband Internet access to news media after the 2011 earthquake, in which data dissipation through conventional channels was disrupted due to infrastructure damage and network congestion (65).

Conclusion

This study identifies different strategies used by relief organizations to improve communication among relief organizations with each other and the people based on the participants' experiences. These strategies lead to the proper use of resources and prevention of their loss and improve the process of risk communication. The three main strategies to improve risk communication were the management of information and training communication, management of communication barriers, and inter-organizational communication management. Developing risk communication strategies based on the experiences of managers, operational forces, and people can help planners and managers to design and implement effective programs to use resources accurately and in a timely manner, and people have access to accurate and reliable information, the readiness of people and organizations and reduce disaster damages.

Declarations

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Author contribution

AF, IS and MM were involved in the study conception and design, data collection, data analysis, manuscript writing, its revision and editing. MKH and JB and HF were involved its revision and editing. All authors read and approved the final manuscript.

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Ethical considerations

Ethics Committee of Shahid Sadoughi University of Medical Sciences approved the study in with IR..SSU.SPH.REC.1399.110 code. All participants were ensured confidentiality of their personal information, and they permitted recording of the conversations.

Conflict of Interests

None

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