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Roles, responsibilities, and strategies for enhancing disaster risk perception: A quantitative study

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Abstract:

INTRODUCTION: Perception the risk of disasters, is mainly of universal and theoretical nature and is a means of achieving risk understanding/knowledge. In Sendai Framework, the focus is on increasing risk understanding plans in order to achieve community resilience. Therefore, to achieve greater public participation in planning for disaster risk reduction (DRR), this study was conducted primarily to clarify people's expectations from disaster risk management authorities in order to approach managers' and experts' views to people's views.

MATERIALS AND METHODS: This qualitative study was conducted through semi-structured interviews with 22 participants, who were selected using a purposive sampling technique, in three provinces of Iran. Data analysis was performed by qualitative content analysis using open coding, classifying, and abstracting.

RESULTS: By constant, comparison of data, classes, and subcategories were defined. Knowledge, beliefs, practical obligation, respect for human beings, endeavoring for systemic actions in terms of planning, implementation, and evaluation classes. In three more abstract categories, personal, interpersonal, and social commitments were defined.

CONCLUSION: At the preparatory stage, disaster managers need the maximum participation of people in DRR programs. They, in addition to understanding the importance of their managerial positions at individual levels and social interactions, are committed to reducing risk.

Keywords:

Commitment, disaster risk reduction, people's expectations, qualitative study, risk perception

Introduction

Risk and its consequences have increased over the past decade.[1] Risk has been threatened, vulnerable, and exposed. To reduce the risk, each component should be reduced to achieve the final risk reduction.[2] Risk management comprises all the preventive measures for reducing, controlling, and regulating. It refers to the process of identifying, controlling, and minimizing the effects of events that have or may be unknown, or events that are themselves fraught with uncertainty.[3] This involves the exchange of risks received against potential benefits, as well as the equilibrium of scientific judgment against other factors and beliefs.[4] How people behave in an emergency situation depends on their understanding and assessment of risk measures and reducing their risk of injury. What is important is the meaning of risk for them and those who are considering their risk situation.[5]

This term is regarded differently by specialists and the general public in terms of definition, assessment, and suitable response. There is also a difference in risk perception. The perception of disasters risk has been considered to be proportional to the hazards and the negative consequences

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of disasters.[6] Some sources, includes "beliefs, attitudes, judgments, and feelings of the public, as well as the way cultural and social wider ones as threats to things that are of value to us.

In general, there are two types of views on risk perception: experimental and analytic. The analytical system uses patterns and normative rules such as mathematics, probability theory, and fuzzy logic, requiring time, cost, and effort; and ultimately the full assessment of the potential risks is not possible due to lack of empirical data and insufficient theoretical perceptions of beyond risk mechanisms.[5] Therefore, violations of the conclusions of these analyzes occur in the community, leading to the loss of public confidence. Policymakers and experts usually use this method for analyzing risks. However, another method applied by people for risk analysis is an experimental system based on intuition, which is a fast and mostly automatic system.[7] Since the definition and method of risk analysis differ between authorities and people, the implementation of disaster risk reduction (DRR) plans has been disrupted and an important barrier is created against the strategies for improving risk perception.[5,7,8]

Today, societies need to DRR in order to achieve sustainable development. Reducing the risk of disasters requires planners of disasters and managers. Risk reduction programs will be effective if they are based community-based and people's participation approach. Therefore, people and authorities have both a key role in managing the risk of disaster, but the difference in approach to risk perception can lead to a gap between goals and outcomes. On the other hand, it is recommended to plan and implement DRR programs with public participation.[9] Hence, it is difficult or sometimes impossible to attract public involvement due to low level of public perception from risk. Research suggests that people are usually not likely to accept scientific opinions and findings that are shared with them,[7,10-12] raising social turmoil and making policymakers allocate resources that have little to do with DRR.[12] Most of the carried out research has revealed the lack of trust between people and authorities.[13] For instance, Wachinger *et al*. have considered trust as the most effective factor in adopting an active approach to mitigate the risk of disasters.[7] Trust leads people to follow guidelines and regulations, reduces risk, and increases resilience.[7,14] Although studies have been conducted on how to build trust in organizational management, there are limited social science studies on DRR. Since risk management involves a multihazard and participatory approach, it is necessary to target the plans in line with people's expectations. Implementing programs require awareness and understanding of the tendencies and concerns of stakeholders. Therefore, qualitative analysis of data was carried out to explain people's expectations and provide the necessary frameworks and structures to improve people's perception of risk.

Materials and Methods

The current study is part of a PhD thesis on disasters and emergencies, with the general purpose of designing a model for perceiving the natural disaster risk of Iranians people, which has begun since 2015 with grounded theory approach. One of the objectives of the project was to identify people's expectations from a society's proper risk management system to enhance its perception. This research was carried out qualitative content analysis (QCA) to obtain valid inferences from the data, generate knowledge based on a new insight, and present facts, practical guide for the function being used.[15] The fieldwork was carried out in three provinces; Tehran (7 participant), Khorasan Razavi (10 participant) due to availability, and Kermanshah (5 participant) due to the earthquake (M 7.3) in November 12, 2017. The semi-structured interviews were conducted from January 2017 to February 2018, after explaining the purpose of the study, clarifying the questions and obtaining their satisfaction. Sampling begins purposefully and continues with theoretical sampling. At the same time, when the theory evolved, the researcher chose the samples and the sampling and gathering of information until the saturation of all categories and code, the main category, continued under the themes of the theme, and then another category was added. The selection of participants initially began with prior knowledge of the researcher, she was looking for people who have the ability to present their experiences. The requirement to have a deep understanding of the subject and willingness to participate in the study was. It was attempted to consider diversification in sampling from the viewpoint of the community of ordinary and ordinary urban and rural people as well as faced and unexposed. Participants from various fields of science (Psychology, Sociology, Philosophy, Medicine, Disaster Management, Management, Islamic Science and Education) based on the results of the analysis Data and continuous comparison were selected. We also tried to use informed participants for this purpose in participating in relevant international and national seminars and conferences, and from among the speakers or participants in conferences and congresses, the participants were targeted and interviewed. The location and time of the interviews were selected based on the participants' preferences. All interviews were conducted by one person. Each interview lasted about 45 min and data collection was continued until saturation was reached. The criterion for the exposed hazard was based on the self-disclosure of the participants about a relatively severe hazard

they were faced with. The interviews guide include probing question such as "What is your experience of individual management in disaster? What do you expect from a disaster risk management system to increase the perceptions of disaster risk? What changes should be occurred to help people perceive risks? What managers can do to contribute people to perceive risk?" The interviews were recorded and then transcribed into written form.

A directed QCA based on an inductive approach was conducted to compile and analyze the interview data, following guidelines suggested by Assarroudi *et al*.[15] An abstraction process that includes open coding and creating categories derived from the data is more suitable. For that reason, the coding was primarily done by the first author and afterward the coauthors checked the coding to ensure reliability. The units of analysis considered were the interviews as a whole. Data analysis began after conducting the first interview, then transcripts were read several times and meaningful units were gradually identified and open-coded. The codes were then formulated into subcategories and overarching categories were created out of the subcategories. Finally, with long-term involvement and continuous comparison of data, main themes were identified.

The study was approved by the University Research Ethics Committee. Before initiating the study, the participants were informed about the objectives of the study and informed consent was obtained from each of the participants. Before conducting the interview, participants were reminded of the confidentiality of the information discussed by all participants and researchers during the interviews and the right to withdraw from the study at any time.

Results

From 22 participants, 6 women and 16 men were interviewed who were in the age range of 16–59 years old and had early high school education to postdoctoral education. Mostly, the participants were married except for two. Most of the participants faced a variety of hazards, including earthquakes, floods, storms, endemic malaria, and war, which is because Iran is prone to disasters and is one of the most disaster-prone countries in the world. Most of the participants did not have management experience. Only four participants had disaster managerial experience [Table 1]. Following the initial analysis, 250 codes were obtained, which were categorized into 53 subcategories. After classification of the data and reduction of the categories, the central variable of "commitment" was appeared. For commitment, three levels were considered; namely, personal, interpersonal, and social levels, each of which had main and subcategories [Table 2].

Participants expected "commitment" from a disaster management system in order to perceive disaster risk.

Table 1: Demographic characteristics of participants

Participants	Sex	Age (year)	Job	Managerial experience	Exposed disasters	Education
1	Female	51	Homemaker	No	Earthquake	Diploma
2	Female	41	Homemaker	No	Earthquake	Bachelor
3	Male	50	Village teacher	No	Flood	Bachelor
4	Female	47	Faculty member	No	Storm	Master's degree
5	Male	55	Military	Yes	War, earthquake, and flood	Associate degree
6	Male	46	Village teacher	No	Flood	Bachelor
7	Male	55	Surgeon	No	-	PhD
8	Female	48	Anesthesiologist	No	Malaria epidemic	PhD
9	Male	57	Anesthesiologist	No	-	PhD
10	Male	47	Faculty member	Yes	Earthquake	Postdoctoral
11	Male	52	Faculty member	No	Earthquake	Postdoctoral
12	Male	47	Faculty member	No	-	PhD
13	Female	48	Teacher	No	Flood	Master's degree
14	Female	16	Student	No	Earthquake	Early high school education
15	Male	59	Responsible in Association for the disabled	No	Earthquake	PhD
16	Male	55	Cultural University Member	No	Flood	Seminary Education
17	Male	47	Member of WHO	No	Earthquake	Postdoctoral
18	Male	53	Faculty member Anthropologist	No	Earthquake	Postdoctoral
19	Male	47	Planning manager	Yes	Earthquake	PhD
20	Male	50	Faculty member of the Islamic Sciences Academy	No	-	PhD in Religious Sciences
21	Male	50	Responsible in red crescent	Yes	Earthquake/Flood	Master's degree
22	Male	45	Teacher	No	Earthquake	Master's degree

Table 2: Main and subcategories and some of participants' quotes about the role of the crisis management system in the perception of disaster risk according to public's point of view

Different levels	Categories	Subcategories	Sample of quotation
Individual level	Knowledge	Update and sufficient knowledge	"At the individual level, we must first instigate the people and then give them information; we should provide right information"
	Beliefs	Correct beliefs of the authorities	"Unfortunately, many of our officials do not believe in reducing risk, and defeatism thoughts are also common among them"
	Practical obligation	Fulfillment of the obligation	"People learn more from the behaviors and the type of authorities' encounters than what they say. We need authorities who have reached this stage of risk perception; therefore, whatever they do, people do"
Interpersonal level	Compliance with human dignity	Valuing	"When authorities don't value a person, the person himself does not value himself"
		Compliance with human dignity	". When a community does not respect a person for any reason, that person will not respect himself; Consequently, he lowers his value and does not strive for his life"
		Governments' demands	The government should scare people . I do not know, they afraid of people's excitement, they do not act to prevent people's panic . Why do they behave in such a way. people should be scared now or later they will experience very bad horror
		Authorities' attention	"The importance of materiality, money-driven society, and having materiality approach for administrations and family evaluation have led to these events . which strongly influence the perception of danger"
Social level	Endeavor	Planning	". We should promote thinking, educate, institutionalize, have strong universities in order to guide the movements . we also should promote meritocracy and long-term education and research. a society cannot proceed without a scientific and ethical pattern"
		Implementation	"Visualizing the risk, policy making, and financial support are the responsibility of managers and people should launch a campaign"
		Evaluation	"These events are repeated over and over and people are losing their lives because of authority's misconductions; but they do not care and re-implement their policies without getting to know their previous actions and changing their methods of managing"

They believed that the system should have commitment at different levels of personal, interpersonal, and social.

Commitment

One of the important issues in valuing individual is their commitment and accountability. Literally, commitment means an obligation that limits a person's freedom and is parallel to conscientiousness, willingness, and responsibility. However, in management, organizational commitment means the individual's attitude and orientation toward the organization that links the individual's identity to the organization.

Commitment at personal level

Participants regarded "belief reformation," "the increase of authorities' level of knowledge," and "practical obligation" as important factors for risk perception. On the other hand, they attributed inefficacy of the crisis management system to belief deviations, lack of knowledge, and improper behavior of managers.

In this regard, one of the participants said:

"Mostly, crisis management working groups consist of traditional people with traditional attitudes who are in middle age; therefore, their interventions are not scientific and evidence-based." P11

Another participant said:

"When managers. do not have adherence, understanding, or even knowledge about this issue. so we should not expect people." P12

Commitment at interpersonal level

At this level, people expect "compliance with human dignity" from authorities. Human dignity is a social and relative concept, and it is usually different within each society, depending on the traditions and customs of a community. Even though the concept of "compliance with human dignity" is not unified across different nations, it naturally exists in each person according to human rights principles. Participants believed that people should get a sense of being valued from authorities' behaviors. In other words, authorities were suggested to create and invest for society's values.

In this regard, one of the participants said:

"When a community does not respect a person for any reason, that person will not respect himself. Consequently, he lowers his value and does not strive for his life." P19

They assumed that risk reduction culture should be initiated by the authorities. Although public movements are possible, they are demanding and time-consuming; in other words, a top-down approach can be less demanding and faster.

One of the participants said:

"If people want something, the community managers do it for them, but it's very difficult and time-consuming. However, if we start from authorizes, we will move much faster." P10

Commitment at the social level

Social commitment was presented with a central theme of endeavor. Endeavor includes three subthemes of "planning," "executive action," and "evaluation." Participants expected government to perform objective measures using special structure without colluding with other values of society. Participants expected planning and executive actions along with evaluation, and believed that maladministration should be identified and settled. Choosing right time and place, for notification people was another expectation posed by the participants. In planning subcategory, rules were emphasized as controlling factors. Disaster managers should do their best through "setting rules," "updating rules," "enforcing rules" and "persisting/continuing rules." In addition, planning had two approaches; namely, proprietary and time-based. The time-based approach was divided into short- and long-term phases. Short-term planning focused on early warning and prevention programs; whereas, long-term planning involved a change in attitudes and perspectives, as well as culturalization of risk perception. The proprietary approach toward planning focused on rules and regulations, employment of specialists, and attention to family. Executive actions/measures were raised in the four subareas of "educational actions," "supportive actions," "capacity building," and "trust building." Executable actions covered a wide range of activities, including effective educational interventions, strong supportive actions based on needs, as well as capacity building to reduce damages through promotion of environmental and community capacities, and actions to build trust between people and authorities to comply with DRR plans.

Discussion

The main challenge of disaster managers is building public trust, which was examined in this study. Trust in people is one way of gaining people's trust. Since trust is mutual, governmental managers should trust people in order to be trusted.[16] Considering people's expectations and implementing their views in DRR programs is an example of trust in people. In this study, special attention was paid to trusting people as the main goal of the present study; therefore, it seems that the findings of the study can be used to gain public confidence concerning disaster risk perception.

Another way to gain people's trust is being accountable. Fulfillment of the obligation/promise makes people trust authorities. Morgan and Hunt tested the theory of commitment-trust in marketing. They acknowledged that the relationship between trust and commitment is a direct and positive one and presented this relationship as a key mediating variable. They stated that commitment and trust directly lead to participatory behaviors and marketing success. Trust is created, when individuals are committed to continue the relationship.[17] Commitment variable found in our study is in line with trust and can lead to the promotion of risk perception; therefore, it can be considered as a major variable in risk perception programs. Many studies have confirmed a direct relationship between risk perception and the level of trust in risk perception.[9,10-13,18,19] Levels of commitment were presented for the first time in this article. Commitment at the individual level involves authorities' attitudes and personality, which affects public risk perception and increases their trust in the authorities.

According to our participants, these characteristics included having sufficient knowledge and strong beliefs as well as being aligned with goals and obligation commitment. Sufficient knowledge allocated the lowest level of expectation to itself at individual level of commitment followed by correction of belief in authorities that is in line with the results of other studies, including Goddard.[20] Another finding related to this commitment level, that has not been yet, is the commitment of the authorities to reduce disaster-induced damages. Since society needs objective models/patterns to guide public performance, people expected crisis management authorities to have proper performance to promote safety and reduce risk. People's expectation for proper behavior of authorities is one of the key issues affecting people's trust in the authorities, which needs to be addressed and studied. For commitment at interpersonal level, "human dignity" was extracted. Human dignity constitutes a set of inalienable and nontransferable human rights, and it is the basis of human rights. People should feel that laws and regulations are set to preserve their dignity and value; therefore, the interpersonal commitment of the authorities to people will be enhanced by resorting to this approach. People expected crisis management authorities to consider human value in all their plans so that it can be spread throughout the society as well. This finding is consistent with the results reported by Young on role of citizenship and human valuing approach to encourage citizen participation.[15] At the social level, commitment and objective endeavor were extracted. People expected governments to increase disaster risk perception based on the principles of systematic process. Systematic performance expectation means to keep the programs running, carry out targeted and planned actions, and to evaluate and review the plans. They expected direct activity to reform traditional approaches through "planning," "implementation," and "evaluation." Planning comprised two subcategories of time and expertise/planning had two approaches; namely, proprietary/specialized and time-based. Time-based planning involved the need for both short-and long-term risk perception plans, especially preventive and damage

reduction domains. Proprietary planning had paid special attention to laws and regulations as executive standards of risk perception, employment of experts and specialists in different areas for setting rules, and to family for forming and promoting public perceived risk, which is in line with the recommendations of the second priority of Sendai framework for disaster risk management at national and local levels. Our finding concerning "proprietary planning with special attention to family" was also consistent with the results of a systematic review, who proposed family-based education.[21] At implementation subcategories, people's expectations were mostly in educational, supportive, capacity-building, and confidence-building domains, which are consistent with the first priority of Sendai framework, emphasizing disaster risk perception at the national, local, and regional levels and also in line with the fourth priority of this framework, insisting on "building better than the past" through integration of DRR with measures related to development and resilience of communities. At evaluation subcategories, people expected evaluation and revision of the plans and performances of the authorities and correction of maladministration.

Recurrent maladministration, without major changes in the crisis management organization, reduces people's trust in authorities and public risk perception. Certainly, more research is needed to clarify what maladministration is and how to settle it out based on people' point of view. This study examined an important factor that can help improve community resiliency, getting closer stakeholders' perspective, and improve disaster risk perception. The International Council of Governance has suggested "social risk assessment" as a risk assessment complementary for assessing risk perception and acceptance,[22] therefore, sociological and cultural studies on risk perception can reduce the consequences of disasters. More research on different levels of commitment is suggested to unravel the correct operational methods for increasing risk perception.

Conclusion

In this study, Iranian people's expectations from authorities to promote risk perception highlighted certain dimensions of disaster risk perception. Therefore, it can be said that the findings of this study depicted specific features of disaster risk assessment programs that can contribute to the promotion of potential and actual management of crisis management and improvement of public health. Commitment plays a major role in the perception of disaster risk and it is thought to be a social, political, and cultural variable. Commitment has personal, interpersonal, and social levels. Therefore, it seems that building trust in society by articulating commitment at different levels is the responsibility of managers of DRR.

Ethical considerations

The study was approved by the University Research Ethics Committee. Before initiating the study, the participants were informed about the objectives of the study and informed consent was obtained from each of the participant. Before conducting the interview, participants were reminded of the confidentiality of the information discussed by all participants and researchers during the interviews and the right to withdraw from the study at any time.

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Conflicts of interest

There are no conflicts of interest.

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