



# Identification of the Gap in Pre-hospital Knowledge and Skills of the Red Crescent Society Rescuers of the Islamic Republic of Iran

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## Abstract

**Background:** Natural and manmade disasters affect public health directly and indirectly. As statistics show, 31 of the 42 types of natural disasters in the world occur in Iran; therefore, preparation is necessary to effectively manage them. To this end, it is essential to train experienced and professional personnel to work in disaster fields.

**Objectives:** This study aimed to evaluate the gaps in pre-hospital knowledge and skills among the rescuers of the Red Crescent Society of the Islamic Republic of Iran to increase the effectiveness of pre-hospital training courses for rescuers across the country.

**Methods:** This study was conducted with a descriptive qualitative method in two months through targeted in-depth interviews with the personnel of aid and relief centers, staff, volunteers, and pre-hospital skills training instructors of the Red Crescent Society. The inclusion criteria were having a bachelor's degree or above and at least seven years of work experience (including teaching and responding to operations), as well as willingness to participate in the study. To determine the gaps in pre-hospital knowledge and skills in the Red Crescent society, the interviews were conducted in a semi-structured manner. A total of 31 interviews were conducted, which were written verbatim, and the codes were extracted manually. Finally, thematic analysis was used to analyze the data.

**Results:** After analyzing the text of the interviews, 98 codes were extracted, which after removing duplicate codes and reanalyzing, were divided into two categories of knowledge and skills, each of which had 10 subcategories.

**Conclusion:** It seems that the pre-hospital theoretical and skill training courses of the Red Crescent Society failed to fill the knowledge and skill gaps identified in this research in terms of content and skills. Therefore, these courses can be revised based on the findings of this study. It is also necessary to identify the weight of each of the themes and investigate their impact on the efficiency of rescuers' performance through a supplementary quantitative study, which we suggest as a topic for future research.

**Keywords:** Knowledge, Pre-hospital, Red crescent, Rescuers, Skills, Training

## 1. Background

Natural and manmade disasters affect public health directly and indirectly (1). Natural disasters are one of the inevitable risks that lead to death, injury, and destruction of human habitats. For example, from 2000 to 2013, more than 12 million people became homeless due to earthquakes (2). Urgency is an event whose management requires processes or facilities other than current management. The International Federation of Red Cross and Red Crescent Societies define a disaster as a sudden catastrophic event that seriously disrupts the functioning of a society or community and causes human, financial, as well as environmental losses beyond the controlling ability of the society. The word "crisis" is not common in health sciences and is commonly used in political, social, and economic issues. Another definition of disaster is the highest level of urgency, compared to society's tolerance (3). The occurrence of natural disasters and accidents can be considered one of the main concerns of human life,

especially in developing countries. According to the statistics published by international organizations, over the past 20 years, more than three million people have lost their lives due to natural disasters in the world, and the lives of more than one billion people have been affected. In a general view, disasters can be divided into two categories: those caused by natural phenomena and those caused by human intervention. The statistics on the occurrence of disasters in developing countries indicate that most disasters belong to the first category, which is a natural disaster. Iran is one of the developing countries that has only 1% of the world's population, but 6% of the world's disaster casualties (4). In the last decade, the intensity and frequency of natural and man-made disasters have increased significantly all over the world. Calamities, such as hurricanes, earthquakes, floods, outbreaks of infectious diseases, nuclear material, and oil spills, have affected countries' economies, destroyed the environment, and caused the emergence of mental illnesses (5-9). Based on statistics, 31 of the 42 types of natural

disasters in the world occur in Iran. The presence of such natural disasters in Iran has made it one of the top 10 countries in the world with the most natural disasters (10). Considering the unpredictability of natural disasters, the unpreparedness of medical centers and hospitals in the country, as well as the need to make quick and correct decisions to implement operations, a branch of theoretical and fundamental knowledge has been created under the title of crisis management. It is an applied science that, by systematically observing crises and analyzing them, seeks to find a tool to prevent crises, and if they occur, prepare for them, deal with them effectively in an organized coordinated manner, make plans, and take action (11). Crises usually have a low probability and high intensity, which can cause unusual demands and chaos in organizational affairs (12). Nowadays, the term preparedness is an important subject in disaster risk reduction (13).

People facing crises and disasters must have sufficient knowledge, attitude, skills, and the ability to apply them to save their lives. One of the methods for proper disaster preparedness and response is training with an emphasis on practice, collaboration, and learning, based on the community's needs. The results of such learning are trust, sustainable collaboration, and standardization of efforts to improve the quality of response and its effectiveness among responders, students, managers, and organizations (14, 15). It is necessary to perform continuous medical education and planning for preparedness for crises in a practical way. It is also essential to assess educational needs and plan different training programs based on people's level of knowledge (16). Therefore, radical planning in education and management of emergency situations and crises is one of the most critical issues that society is facing. Considering the vastness of Iran, the lack of academic training programs related to crises and disasters for rescuers, and the skill-based nature of disaster management, the best way to empower rescuers in pre-hospital services is skill training. The lack of opportunities for regular training in skills to maintain skills leads to their reduction, which is one of the serious challenges for many volunteers (17, 18). This challenge has become more intense following the COVID-19 pandemic and the impossibility of the previously-mentioned measures (19). This issue is prevalent in the Iranian Red Crescent Society, as well as centers that provide relief and rescue services in response to accidents and disasters. To increase the efficiency of these skill training courses, it is first necessary to identify the knowledge and skill gap of rescuers and then determine the title of these courses accordingly.

## 2. Objectives

This study was conducted to identify gaps in the

knowledge and skills of Iranian rescuers in pre-hospital services. These gaps mean the knowledge and skills that Iranian Red Crescent rescuers need for the effective and efficient performance of pre-hospital services, but they have not acquired them. Based on the findings of this study, skill training courses in the pre-hospital field can be made more productive.

## 3. Methods

This study was conducted following a descriptive qualitative method between September to November 2022. Data were collected through in-depth and semi-structured interviews with lifeguards serving in aid and rescue centers, employees, volunteers, and trainers of pre-hospital skills of the Red Crescent Society. Interviewees were selected through purposeful sampling, with the inclusion criteria as follows: having a bachelor's degree or higher, a service experience of at least seven years (including teaching and responding to operations), and willingness to participate in the study. In between, people who had a high level of pre-hospital knowledge, a related field of study, or a history of teaching pre-hospital courses, were also included. Moreover, rescuers serving in the bases as the main owners of the process were interviewed according to the inclusion criteria. A total of 31 interviews were conducted with 31 participants. The interviews had reached saturation with 25 participants, but to be sure of data saturation, they continued with six more participants. Two questions were asked during the interviews as the main questions in pre-hospital knowledge and skills. Knowledge-related questions were 1) in your opinion, what content and knowledge do Red Crescent rescuers need to effectively perform pre-hospital services? 2) Have they not studied enough? Skill-related questions include 1) In your opinion, what skills do Red Crescent rescuers need for effectively performing pre-hospital services that they have not learned enough? Which was followed by questions such as why? How?, or please explain more. The interview was developed to obtain more detailed information, and each interview lasted between 20 to 45 min. All the interviews were recorded by two tape recorders and written verbatim on paper, and thematic analysis was used to analyze the data. This analysis is a six-step analysis that includes the following steps: 1) a thorough data review (extracting concepts from the items), 2) the creation of primary codes (or assigning a code to each of the concepts and their main and subcategories), 3) search for categories, 4) revision of categories and sub-categories (in this step, the codes, categories, and sub-categories were reviewed about the data set, 5) definition of categories and sub-categories, and 6) preparation of reports (20). After analyzing the text of the interviews, the interviews were manually

coded, and primary codes were extracted, which were divided into two main categories of knowledge and skills. The subcategories in each category were identified by removing duplicate codes and reanalyzing them. The accuracy of the data was guaranteed by Guba and Lincoln criteria (validity, transferability, trust, and verifiability) (21). The analysis of the interviews was done several times with the help of a qualitative research specialist. The researchers assured the interviewees that all the matters recorded during the interview would remain confidential and would not be shared with anyone. They were also informed that the text of the interviews would be numbered by the researcher without naming the interviewees.

#### 4. Results

The average age of the interviewees was 34, with their ages ranging from 25 to 46 years. In total, 31

people were selected for this study based on the inclusion criteria. There were 3 women, 28 men, 12 people with a bachelor's degree, 13 with a master's, and 6 with a Ph.D. degree. After analyzing the text of the interviews, 98 codes were extracted, which after removing duplicate codes and reanalyzing, were divided into two categories of knowledge and skills. In the category of skills, there were 10 sub-categories with the titles of blood pressure measurement, working team, airway evacuation, venipuncture, stabilization of the injured, carrying the injured at heights, working with ambulance equipment, support skills, advanced cardiopulmonary resuscitation, and bites (Table 1).

The subcategories of knowledge included oxygen therapy, pharmacology, serology, knowledge of anatomy, infant and child care, pregnant mother and fetus care, trauma, cardiac and pulmonary resuscitation, bandaging, and familiarity with pre-hospital terms (Table 2).

**Table 1.** Subcategories and codes extracted in the skill category

Stated Gaps (codes)	Subcategory	Main Category
Rescuers' inability to use analog blood pressure measuring devices Rescuers can only use digital sphygmomanometers Absence of digital pressure gauges in the bases	Blood pressure measurement	
The lack of sufficient skills of an external organizational working team Interference in the duties of the medical and emergency staff by rescuers	Working team	
Rescuers do not have enough skills to use suction to evacuate the airway	Evacuation of the airway	
Rescuers usually do not have enough skills in intravenous injection. Usually, rescuers do not have enough skills in serum therapy.	Intravascular injection in serum therapy	Skill
Some rescuers do not have enough skills to stabilize the head and neck. Some rescuers do not have enough skills to stabilize the spine. Some rescuers injure other vital organs due to a lack of immobilization skills.	Stabilization of the injured	
Most of the rescuers do not have enough skills to carry the injured and move them to the heights Some rescuers do not have the physical ability to navigate the mountain and carry out operations Some rescuers do not have enough skills in how to move in the mountains with the injured.	Carrying the injured in high altitudes	
Rescuers are not skilled enough to use the ambulance equipment they know.	Use of ambulance equipment	
The rescuers do not have enough skills to communicate with the patient. Rescuers do not have enough skills in psychological interventions.	Supportive skills	
Most rescuers do not have enough skills to recognize the symptoms before and after a heart attack. Most rescuers do not have enough skills in advanced cardiopulmonary resuscitation. Most of the rescuers do not have enough skills in electronic shock therapy for a heart attack patient.	Advanced cardiopulmonary resuscitation	
Rescuers have not acquired the ability to provide aid to people suffering from animal and insect bites in mountainous and inaccessible areas.	Bite	

**Table 2.** Sub-categories and extracted codes in the knowledge category

Stated Gaps (codes)	Subcategory	Main Category
Rescuers do not have enough information to help babies and children. Lack of sufficient knowledge of human anatomy	Baby and childcare	
Failure to accurately diagnose the injury and its location due to insufficient knowledge of anatomy Lack of familiarity of rescuers with emergency medicine Inadequate familiarity of rescuers with indications, medication interactions, and medication use cases	Knowledge of anatomy Pharmacology	
Usually, rescuers do not have enough knowledge to care for injured pregnant women and fetuses.	Medical emergencies of fetuses and pregnant mothers	Knowledge

Table 2. Continued

Rescuers do not have enough knowledge to correctly evaluate and diagnose pelvic and abdominal traumas.	
Rescuers do not have enough knowledge to properly assess and diagnose chest trauma.	
Rescuers do not have enough knowledge to correctly assess and diagnose head and neck trauma.	Trauma
Rescuers do not have enough knowledge to correctly assess and diagnose traumas in the muscles, bones, and blood vessels.	
Some rescuers do not have enough knowledge in diagnosing the need for cardiopulmonary resuscitation.	
Some rescuers do not have enough knowledge to recognize the type of resuscitation needed, both basic and advanced.	Cardiopulmonary resuscitation
Some rescuers do not have enough knowledge of when and how to use electric shock.	
Our (rescuers) knowledge about oxygen therapy is not enough.	
Rescuers do not know enough about what injuries require oxygen therapy.	Oxygen therapy
Some rescuers are not familiar enough with the categorifications and types of serums.	
Some rescuers are not familiar enough with the use of each type of serum.	Serology
It has been observed that some rescuers do not know the types of dressings and their uses.	Bandage and dressing
We have the problem of a lack of familiarity with medical emergency terminology, which causes communication problems when delivering the injured to the hospital or emergency room.	Pre-hospital and emergency medical terminology

## 5. Discussion

The necessary knowledge and skills for pre-hospital service providers consist of technical and non-technical types, with the second type being very critical in providing the mentioned services (22). This study identified and introduced the gap between the two mentioned types of knowledge and skills.

One of the non-technical gaps identified in this study was the gap in teamwork skills, which was emphasized in the study conducted by Peran et al. in 2022 under the headings of teamwork and leadership, team morale, adaptation, anticipation priorities, and tasks skill (22).

Regarding the measurement of blood pressure, most interviewees believed that the rescuers of Red Crescent Society are not familiar enough with how to measure blood pressure using a manual analog blood pressure device. They also referred to the rescuers' inability to stabilize the neck and spine, which caused many injuries to the injured during transportation. In the field of serum therapy services for the injured, the findings showed that the rescuers do not have the necessary skills for intravenous injection and fluid therapy, and they also face some legal obstacles, including the directive prohibiting intravenous injection by rescuers of the Red Crescent Society, which can cause problems. The interviewees frequently mentioned that "Rescuers should not give intravenous injections, but they do because they have to do it". Concerning cardiopulmonary resuscitation, rescuers' lack of familiarity with resuscitation guidelines has decreased their efficiency in identifying the symptoms of cardiac arrest and performing resuscitation maneuvers. According to the findings, due to the rescuers' lack of skills in communicating with the injured and their companions, as well as their failure in psychological support, sometimes verbal and physical conflicts occur between the injured, their companions, and the rescuers of the Red Crescent Society. The conflict not

only lead to the lack of efficiency in providing services and endangers the health of the injured but also challenge the social capital of the Red Crescent Society. One of the most important measures performed by the rescuers in operational scenes is support measures to open the patient's airway, which requires sufficient skills in how to use suction, ventilation, and other airway management devices. However, in some interviews, the interviewees implied that most rescuers do not have enough skills in performing suction operations and opening the airways of the injured. Due to the importance of breathing in the life of the injured and the urgency of opening it in the least possible time, this is one of the central skills lacking in rescuers. Another important pre-hospital topic is providing aid to newborns, children, as well as pregnant mothers and fetuses, which has not been seen or has been discussed little in the pre-hospital courses of the Red Crescent Society. The participants who had attended these courses stated that "We have rarely witnessed the teaching of this content in the courses" or "We have not seen the necessary and sufficient training in this regard", and they specified children. The lack of familiarity with human anatomy and insufficient knowledge of anatomy sometimes increases the severity of these problems. Rescuers might face problems they are unable to solve due to not knowing the exact location of the injury and the damaged organs. Another important action that the rescuers must take for some of the injured in accidents is oxygen therapy (23), which needs sufficient knowledge of how to use oxygen therapy equipment, as well as the amount of oxygen given to the injured. However, the knowledge is quite rare among rescuers. In traumatic incidents, the discussion of bleeding control and fluid therapy of the injured is critical due to the volume of blood they lose and the state of shock they experience. (23). This is while the interviewees believed there is sufficient knowledge about bandages, dressings, and bleeding control. The

interviewers yet mentioned they do not know about serum therapy and different types of serums, and they have not even been given legal permission to perform this procedure. The rescuers' lack of familiarity with the common terms of the medical emergency has in some cases caused a misunderstanding of the mentioned cases by the medical staff. It also created inappropriate communication with medical centers and interrupted the chain of transmitting the injury history. During this study, it was found that one of the central problems of the rescuers of the Red Crescent Society in pre-hospital discussions is the mismatch of the topics of pre-hospital training courses with their operational needs in accidents, which has caused gaps between their knowledge needs and their existing knowledge. On the other hand, the non-compliance of most of their academic fields with pre-hospital fields has strengthened this gap. The provision of educational services to them has mostly been in the form of theoretical courses, which has led to their insufficient skills in providing pre-hospital services.

The limitations of this research are classified as follows:

1. This type of study is highly dependent on the experiences of the participants, and because the data is not small, validations and conclusions are difficult to control.

2. It is very difficult to remove mental tendencies (researcher).

3. Since individual experiences are unique, generalization of the data is definitely not possible.

4. Dispersion of participants in relief bases across the country makes it difficult to collect data.

5. The in-depth interview method takes a lot of time.

## 6. Conclusion

Designing training courses for the rescuers of the Red Crescent Society with a skill-learning approach and based on the findings of this study can significantly fill their knowledge and skill gaps. It can also increase the productivity of the pre-hospital services of the Red Crescent Society. Furthermore, removing the legal obstacles mentioned in the statements of the participants can improve the effectiveness of the aforementioned services and create legal immunity for the rescuers. In the end, we suggest that interested researchers check the weight of each of the identified gaps and fix them about the efficiency of pre-hospital services as a subject for future research. Moreover, considering the fluidity of accidents and disasters on the one hand, and the change in services, as well as the knowledge and skills necessary to respond to them on the other hand, we suggest that this gap should be continuously monitored.

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