

Access this article online
Quick Response Code:

Website: www.jehp.net
DOI: 10.4103/jehp.jehp_548_22

Challenges of providing health services to patients with cardiovascular diseases during disasters in Iran: A qualitative study

Shandiz Moslehi^{1,2}, Fahimeh Barghi Shirazi²

Abstract:

BACKGROUND: Cardiovascular diseases are the most common causes of death in the world. Because of the rate of emergencies and disasters in the country, this study was conducted to investigate the challenges of providing health services to cardiovascular patients in emergencies and disasters in Iran.

MATERIALS AND METHODS: This conventional content analysis study was conducted in 2020. Subjects were selected from among 16 Iranian experts) epidemiologists, cardiologists, PhD in Disaster Health, and PhD in Nursing (using purposeful and snowball sampling methods. Data were collected using semi-structured interviews and were analyzed by the content analysis.

RESULTS: The results were obtained after analyzing the data in the pre-emergency phase (lack of training on medication and nutrition, lack of training vulnerable groups, lack of databases of cardiovascular patients, and lack of identification of patients before disasters), the emergency response phase (lack of sleep and rest patterns, lack of health forces, lack of blood pressure control, lack of proper nutrition, increased medication needs, and lack of mental health interventions), and the post-emergency phase (lack of planning, lack of management of patients' mental problems).

CONCLUSION: Developing strategies for planning, training, providing resources, and mental health during the three phases of the emergency management cycle for specific groups such as cardiovascular patients together with empowering these patients in the event of disasters is one of the key strategies which can be used after curbed emergencies and disasters to reduce the rate of mortality.

Keywords:

Cardiovascular diseases, challenges, emergencies and disasters, health services

Introduction

Emergencies and disasters are harmful events of human origin (because of errors or an intent to destroy an individual, a group, or a country) or because of natural disaster (based on the periodic pattern of nature) and disrupt the natural process of human life. Disasters and emergencies are as old as the history of human life, and even today, no society can be considered immune from them.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

Complications as well as human and financial injuries caused by natural and unnatural emergencies and disasters have a very significant and undeniable impact on human life and health to the extent that they seriously disrupt societies in relation to the provision of vital needs.^[1] The International Federation of Red Crescent and the Red Cross Societies reported that in 2002, emergencies and disasters affected the lives of approximately 170 million people worldwide.^[2] In the past decade, nearly 2 billion people in the world, about

How to cite this article: Moslehi S, Shirazi FB. Challenges of providing health services to patients with cardiovascular diseases during disasters in Iran: A qualitative study. *J Edu Health Promot* 2023;12:25.

¹Health Management and Economics Research Center, Health Management Research Institute, Iran University of Medical Sciences, Tehran, Iran, ²Department of Health in Disasters and Emergencies, School of Health Management and Information Sciences, Iran University of Medical Sciences, Tehran, Iran

Address for correspondence:

Dr. Fahimeh Barghi Shirazi,
Department of Health in Disasters and Emergencies, School of Health Management and Information Sciences, Iran University of Medical Sciences, Tehran, Iran.
E-mail: barghishirazi.f@iums.ac.ir

Received: 15-04-2022
Accepted: 25-05-2022
Published: 31-01-2023

one-sixth of the world's population, have been directly and indirectly involved in disasters.^[3]

Providing health services is one of the most vital pillars of disaster management. As a result, effective evidence-based arrangements need to be made to provide health services in the event of an emergency. Health care has its own characteristics and complexities which distinguish it from other organizations and social roles involved in crises. Health care is provided in many various types and in different organizations with different levels of management complexity, all of which require human resources with different specialties and teamwork.^[4]

Although health care systems themselves are one of the most important organizations involved in disaster management, disasters and emergencies can seriously affect these health care delivery systems (by destroying health care facilities or reducing manpower). For example, in the Algerian earthquake, 50% of hospitals and health centers were destroyed, and in Iran, in the Bam earthquake, all hospitals and health centers were destroyed.^[5] This highlights the importance of preparing and organizing health care systems in the face of disasters.^[6]

The response to providing health services in times of disasters and emergencies is generally focused on the management of acute conditions and diseases such as traumatic injuries or infectious diseases.^[7] However, one of the most important challenges in providing health care during disasters and crises is related to neglecting chronic and non-communicable diseases. In such circumstances, the important and essential needs of people with chronic and non-communicable diseases are ignored,^[8] whereas people with chronic diseases are among the most vulnerable groups in disasters and emergencies.

It is clear that in today's world, especially in developing and under-developed countries, non-communicable diseases (NCDs) such as diabetes, cancer, cardiovascular diseases (CVDs), and chronic respiratory diseases are the most important causes of disability and mortality.^[8] NCD management requires continuous provision of efficient and effective health care.^[9] Providing this integrated and ongoing care in emergency situations and disasters will face major challenges. These challenges can be classified into two dimensions, including the health status of people with chronic diseases and the health care delivery system. First, accidents and disasters can directly worsen the condition of patients with chronic diseases by exacerbating stress, and on the other hand, they can indirectly lead to intensification of complications and injuries caused by diseases through breaking the chain of

providing quality and effective services.^[10] In such cases, poor control of chronic diseases may act as a serious threat to the health of people with these diseases. As a result, a comprehensive approach to managing chronic diseases and providing related health services in critical situations and disasters is needed. The importance of this issue in the operational plan of the World Health Organization (WHO) for the prevention and control of non-communicable diseases during the years 2013–2020 was also seriously considered.^[11] The WHO guidelines emphasize that continuous access to health care related to NCDs must be ensured during and after emergencies and disasters.^[11]

Among chronic diseases, cardiovascular ones are of particular importance. CVDs are the leading causes of death and disability worldwide. More than 12% of the global disease burden is related to CVDs.^[12] It is estimated that by 2030, more than 23 million deaths will occur annually because of CVDs worldwide.^[13] In Iran, where 58% of life years are with disability (DALY) related to chronic diseases, CVDs are the deadliest causes of mortality.^[14] 50% of all deaths in the country and 79% of deaths related to chronic diseases are because of cardiovascular ones.^[14] In Iran, as in other less developed countries, CVDs affect people of different age groups.^[14] The burden of CVDs in the country is very significant, and this situation becomes more complicated over time. For example, the results of forecasts indicate that the number of life years with disability attributed to CVDs, which in 2005 was close to 850 thousand years and in 2025 will arrive to more than 1.7 million years.^[14]

Iran is one of the most emergency-prone countries in the world, where the level of disaster risk is calculated to be 8 out of 10. Out of 42 known types of disasters, at least 31 types have occurred in Iran.^[15] For example, given Iran's location in the Alpine-Himalayan earthquake belt, it is one of the top ten earthquake-prone countries in the world, and many of its people have been victims of such events.^[15] Over the past 4 decades, natural disasters have killed nearly 110,000 people in Iran and have affected 53 million people.^[16] Between 2000 and 2018, there were 210 disasters and crises which caused more than 33,000 deaths and affected more than three million people.^[17] Unnatural disasters in Iran, including 8 years of the Holy Defense, road accidents, and fires which occurred in recent decades, have also taken many victims and have caused major damages to the socio-economic system of the country.

CVDs are the main category of NCDs whose incidence and prevalence have an increasing trend because of the changing life style and aging population (8–10). NCDs lead to 40 million deaths in the world each year, and like other NCDs, the incidence and prevalence of CVDs increase after disasters.^[18]

NCDs were the leading causes of mortality and morbidity in the world over the past century, and their incidence and prevalence have an increasing trend. It is expected that the incidence and prevalence of NCDs increase at the time of disasters and the people present in the disaster area are more vulnerable to NCDs.^[19]

Despite these facts and that Iran is an emergency-prone country, the results of studies indicate that the provision of health care in disasters and accidents in the country is undesirable.^[5] In this regard and for effective management of health care delivery in the events of emergencies and disasters, first, it is necessary to identify potential challenges related to the provision of health services in the event of disasters. Adequate studies have not been conducted in the field of health services, and a few studies in this regard have only examined the general state of the health service system^[5,16] so that the challenges of providing health services to special and vulnerable groups of patients, such as ones with cardiovascular disorders, who involve a significant percentage of the country's population, have not been addressed. Therefore, this study aimed to identify the challenges of providing health services in the events of disasters and emergencies in Iran and from the perspective of experts. The results of this study can provide appropriate scientific and practical evidence to relevant policy makers and planners for future planning and preparing the country against disasters.

Materials and Methods

Study design and setting

The qualitative study was approved by the Iran University of Medical Sciences and was conducted in accordance with the principles of the Declaration of Helsinki. Descriptive qualitative research design was used. Because the aim of this study was to provide health services to cardiovascular patients in the events of emergencies and disasters, the information was extracted by content analysis.

Study participants and sampling

The participants of this study were 16 experts in the field of disaster health and service delivery (physicians, nurses, health experts and from other related fields), three managers in the field of disaster health, three nursing managers with key positions in policy making for nursing, three managers in the field of health, two cardiologists, three masters of health, one clinical expert in the field of intensive care, and three epidemiologists [Table 1]. In order to achieve maximum diversity, we selected key informants from both genders, different ages, different levels of management, and the clinical and university environments. Inclusion criteria were having education (minimum a bachelor's degree) and sufficient

information to provide health services to cardiovascular patients in disasters, having at least 5 years of experience in disaster-related health fields, having willingness to participate in the study, and managers with rich experience, who wanted to participate in the interview. The exclusion criterion was people's unwillingness to continue participating in the study.

The interviews were conducted in an unstructured, face-to-face, and in-depth manner. At the choice of the participants, the interviews were conducted at an appropriate time and continued until the data were saturated and a complete description of what was happening about the phenomenon was obtained with "Consent for publication not applicable". At the beginning of the interview, a general question was asked. Prior to the interview, written consent was obtained from the participants, which is the interview guide; then, the questions were directed to more specialized ones with regard to the research and in order to gain in-depth information on their experiences. Interviews ranged from 50 to 20 minutes and averaged 30 minutes. Data collection lasted from August to January 2020. The main question was "Did you have a history of presence at the time of accidents and disasters?" To gain a deeper understanding, interviewees were asked questions such as "why?" and "could you explain more, please?" All interviews were digitally recorded and immediately transcribed into texts.

Data collection tool and technique

Data were analyzed using 'content analysis' suggested by the method proposed by Graneheim and Lundman,^[20] which uses a systematic and objective method to describe a particular phenomenon. Initially, each recorded interview was immediately typed into a Word file; to comprehend the general meaning of the text and recognize and understand the data, the whole text was read over and over again. Then, the semantic units of the primary codes in the texts were identified, and similar codes were merged one or more times and sub-classes were formed so that there was the greatest similarity between the codes in each class and the greatest difference between the codes between the classes. After repeated discussions among all the researchers, the classes were integrated and the main classes were formed. MAXQ DA 10 software was used for coding and classification. Given that the findings of qualitative research had to be valid, Goba and Lincoln criteria were used for the accuracy of the study.^[21] Memoirs were used to validate the findings during the process of researching and writing regular stories and to verify topics by participants. In order to maintain the acceptability of the data, sufficient time and long-term involvement were allocated and also monitoring was performed by an experienced researcher. The check peer and check expert were used to meet the reliability criterion, and for transferability, a sampling

Table 1: Characteristics of the experts participating in the study

No.	Age	Gender	Degree of education	Position, Organizational post	Work experience
P1	48	Man	PhD in Nursing	Faculty member of the University of Medical Sciences	23
P2	42	Man	Master of Health	Hospital Health Expert	18
P3	40	Woman	PhD in Disaster Health	Faculty member of the University of Medical Sciences	21
P4	46	Woman	PhD in Disaster Health	(Manager in the field of health) Faculty member of the University of Medical Sciences	25
P5	38	Woman	Master of Nursing	ICU Nurse	12
P6	32	Man	Epidemiologist	Faculty member of the University of Medical Sciences	15
P7	34	Woman	Epidemiologist	Faculty member of the University of Medical Sciences	24
P8	47	Woman	Master of Health	Hospital Health Expert	23
P9	31	Woman	Master of Health	Hospital Health Expert	13
P10	43	Man	Cardiologist	Director of the Cardiology Department of the Hospital	16
P11	44	Woman	PhD in Disaster Health	Faculty member of the University of Medical Sciences	24
P12	40	Man	PhD in Nursing	Faculty member of the University of Medical Sciences	22
P13	38	Woman	Cardiologist	Director of the Cardiology Department of the Hospital	26
P14	45	Man	Master of Nursing	Hospital Metron	20
P15	36	Man	Bachelor of Nursing	ICU Nurse	15
P16	33	Man	Epidemiologist	Faculty member of the University of Medical Sciences	12

technique with maximum variety, which helped transmit the findings, was considered.

Trustworthiness

Graneheim and Lundman proposed the credibility, dependability, and transferability of the data to ensure the trustworthiness of the results in the content analysis studies.^[13] Confirmability and credibility of data were enhanced by maximum variation of sampling and prolonged engagement with data. Furthermore, members of the research team talked over the results to reach an agreement on the codes, categories, and sub-categories. Peer checking was carried out by two other researchers who were not members of the research team to enhance the dependability of the results. In addition, to increase the transferability of the results, researchers tried to provide a clear and distinct description of sampling, data collection, data analysis, and reporting of the results.

Ethics approval and consent to participate

This study was approved by the institutional review board of the School of the Health Economics Research Center of the Management and Information Iran University of Medical Sciences (IR.IUMS.REC.1399.513). Participants were informed that participation in the study was voluntary and that they could withdraw from the study at any time. The informed consent included information about the project aims and information about the topic of the interview and voluntary participation in and withdrawal from the research project. The informed consent was obtained from all the participants.

Results

In total, 16 participants (eight men and eight women) were interviewed. Consent was obtained from participants to

provide written information. After analyzing the data, Code System data Extractions in the Maxqda10, four main categories were formed based on the risk management cycle, which were the pre-emergency phase, emergency response phase, and recovery phase [Table 2]. At present, the priority of the WHO is CVDs with high blood pressure, diabetes, and chronic respiratory diseases, which can be considered very important and urgent for global health.^[17]

1) Pre-emergency Phase:

One of the main challenges in cardiovascular patients is the lack of proper nutrition during emergencies and disasters. Evidence from epidemiological studies suggests that unhealthy lifestyles, smoking, physical inactivity, excessive alcohol consumption, poor diets, and the lack of an ideal weight account for approximately 80% of the risk of CVDs.

1-1) Lack of training on medication and nutrition

Nutrition and dietary patterns play a very important role in the prevention of CVDs. There is ample evidence between cardiovascular health and food intake and eating patterns. According to the results of this study, diets containing fruits and vegetables with high fiber, anti-oxidants, and minerals other than sodium along with certain food groups such as legumes, nuts, fish, and low-fat and fermented dairy products are suitable for the prevention of CVDs.^[3]

According to most participants, having a suitable diet for cardiovascular patients is very important, but because access to food is reduced or unavailable at the time of emergencies and disasters, these people will have problems which increase their referrals to medical centers.

Table 2: Challenges of providing health services for cardiovascular patients in three phases of the emergency management cycle

Three phases of the emergency management cycle	Challenges of cardiovascular patients during emergencies and disasters
Pre-emergency Phase	Lack of training on medication and nutrition ^[3,7] Lack of a proper infrastructure ^[22] Patient Identification Program ^[1,6] Lack of manpower ^[4] Lack of training vulnerable groups ^[5] Lack of a database of cardiovascular patients ^[6]
Emergency Response	Problems with sleep and rest patterns ^[6] Lack of health personnel ^[9] Lack of mental health interventions ^[12] Lack of access to medications ^[11] Securing the camps ^[10]
Post-emergency phase	Lack of planning and management ^[13] Patients' psychological problems ^[14] Fatigue of the workforce ^[15] Risk management ^[16]

"If patients are already trained to find out that access to food is reduced during disasters, this can be very effective. Of course, education may be harder for old and middle-aged people, and the type of education and conditions of people should be considered." (p12).

1-2) Lack of a proper infrastructure

Another challenge in pre-emergency phase times for cardiovascular patients is the lack of proper planning and infrastructures. Hospital managers are always faced with the challenge of how to provide the highest quality level of treatment in health centers with limited resources. In the recent research, capacity planning has been mentioned as one of the most important ways to reduce costs. Most of the patient treatment process in medical centers is such that during treatment, patients need basic measures. This means that in times of disasters, we will face a shortage of equipment. This potentially puts these patients at risk.^[2]

"In my opinion, hospitals should plan ahead to deal with patients because cardiovascular patients may come to the hospital several hours after the disaster due to stress and lack of medication. That is why there must be proper planning and infrastructures to respond to patients in all hospitals." (p2).

1-3) Patient Identification Program

Another challenge is the lack of identification of cardiovascular patients. Health documents should be prepared for patients in which demographic characteristics, systolic and diastolic blood pressure, blood lipids, blood sugar, and body mass are recorded to have better access to patients' information to provide better services for them in the event of disasters.^[1]

"It is much better if patients are already trained about blood pressure control and the use of drugs." (p4).

"Patients should be familiar with the types of medications they are using and how to take them. It's true that they get stressed at the time of disasters, but if they can manage these situations by training, it will be very good, and it all depends on the previous training given to patients." (p8).

1-4) Lack of manpower

The lack of manpower is another challenge during disasters. Specialized manpower is the main source of production and provision of services in this sector, and it should face a shortage of manpower under no circumstances. Therefore, standardizing the number and how to distribute nursing staff in this ward is necessary to improve the efficiency and quality of services provided to patients and to improve productivity in hospitals. Thus, standardizing the number and how to distribute nursing staff in clinical wards, especially the emergency department, is necessary to improve the efficiency and quality of services provided to patients, to make the best use of available facilities, and to improve productivity in hospitals.^[4,22,23]

"So there's a shortage of human resources everywhere, and this shortage is felt more at the time of emergencies and disasters because we're facing a lot of different patients. We have a crisis plan in our hospital and we have determined who should be present when the crisis occurs and we have planned to have less problems." (p11).

1-5) Lack of training vulnerable groups

One of the challenges at this stage is the lack of training vulnerable groups. All patients have the right to receive appropriate training for maintaining and promoting health and preventing diseases. The more a person knows about his/her illness, the better he/she can deal with it. Training patients can reduce the cost of health care.^[24]

It can also increase the quality of care and ultimately help patients achieve independence and self-sufficiency. In fact, training patients improves and promotes their health. The main purpose of training patients, like other health care processes and as a therapeutic indicator, is to help improve patients' quality of life, promote physical and mental health, and strengthen their self-confidence and ultimately improve the level of health in the society. There are many obstacles in the way of patient training during emergencies and disasters.^[17]

Some factors related to the environment and management of the hospital, such as the lack of a suitable location and the short duration of hospitalization, hinder the training of patients; therefore, nursing managers should analyze

the situation, identify the barriers to adequate training by nurses, and then make appropriate decisions. Studies conducted in the direction of managerial factors are mainly related to elements such as the lack of time, manpower, and scientific and practical competence in the effective implementation of training programs, the need to implement patient training programs in multi-disciplinary and inter-disciplinary ways, coordination of health care staff in presenting these programs, and the need to change the instrumental perspective of health care staff to a humanistic and patient-centered perspective.^[3]

"It's very important to educate the staff who are present during disasters. We hold training classes every 6 months at our hospital, their effectiveness is checked, their strengths and weaknesses are identified and we take steps in this regard." (p14).

"The quality of the services that people give to cardiovascular patients during disasters is very important, and it depends on how able people are to train. Therefore, this skill and capability should be created in health care workers with in-service training." (p3).

1-6) Lack of a database of cardiovascular patients

One of the challenges for patients in the pre-emergency phase is the lack of an information database from patients and their timely identification during disasters. In this regard, cardiovascular patients should be identified. Lifestyle changes in the life of these patients are usually difficult; therefore, it is emphasized that the treatment of vascular risk factors in the form of medication, along with exercise, proper diets, and stress control reduces the prevalence of new vascular accidents and mortality. Cardiovascular training programs emphasize behavioral changes and ask patients to follow medication and other medical instructions to participate in their treatment. However, less attention is paid to the fact that this participation requires patients to be confident that they can make lifestyle changes and take medication for the rest of their lives.^[25]

The link between nutrition and coronary heart diseases has been established, and a healthier diet reduces mortality after heart attacks. Because of the effect of family on the nutritional status of members, family participation in improving eating habits seems necessary. The family-centered approach has a significant effect on improving the eating patterns of patients with heart attacks that can be very helpful in times of emergencies and disasters.^[8]

"In my opinion, not having enough information from patients referring to the hospital makes the service provision very difficult. If there's a system where all the centers are online,

patient information is recorded and it's easy to access their information in times of disasters, it will make it much easier to provide services. By knowing patients, their medical history and many other things, we can provide better and faster services." (p10).

2) Emergency Response:

At the beginning of an emergency, pre-emergency data and rapidly available data from the field are used to estimate the number of people affected, likely impact on health and health services, expected evolution of the situation, and external assistance needed.^[26,27] The next step is to do rapid health assessments according to a standardized approach. These secondary assessments focus on acute events³⁶ and do not fully address the needs of patients with CVDs.^[28,29]

2-1) Problems with sleep and rest patterns

Sleep is one of the important biological periods in a repetitive and regular manner in human beings, which is associated with the restoration of physical and mental strength. One third of a person's life is spent in sleep, and deprivation of it will endanger one's health. Changes in sleep patterns and the lack of food, healthy drinking water, proper hygiene, and medication are some of the challenges evident in cardiovascular patients at the time of accidents and disasters. Disruptive environmental factors including the lack of proper camps, people's commuting, noisy environments, and so on can disrupt patients' sleep patterns.^[9]

"In times of disasters, because cardiovascular patients get stressed, their sleep is reduced. Therefore, a peaceful environment should be provided for these people. Although it may be difficult to provide these conditions in times of disasters, families or companions should be with the patients and not leave them alone so that they do not feel lonely and terrified, and that gives them some comfort." (p9).

2-2) Lack of health personnel

Another challenge when responding is the lack of experienced manpower to provide health services. According to the WHO, a skilled and experienced workforce in the event of a disaster is someone who has the knowledge, skills, and ability to meet the needs of patients. In the event of an unforeseen event, manpower is one of the most important elements in providing care and services. As much as the rational and experienced combination of this force can have a great impact on the advancement of clinical services, it can provide optimal health services to patients in the event of accidents and disasters.^[10]

"In my opinion, having highly skilled and experienced human resources is very important to provide medical services to cardiovascular patients, and this increases patients' trust in staff and provides better quality services to people." (p1).

2-3) Lack of mental health interventions

Psychological problems are another challenge in patients during disasters. Excitement and extreme stress play an important role in the severity of the disease. Patients will suffer the most at this stage. Problems such as depression and post-emergency stress disorders can be very effective on patients in emergencies, which by taking measures and preparing patients in this regard can be reduced to some extent.^[13]

"One of our most important problems in disasters is the psychological problem and we need to train patients in advance to control their anxiety. Cardiovascular patients need to be treated so that we can manage these psychological problems. In times of disasters, most people go to the centers because of this psychological problem." (p14).

2-4) Securing the camps

One of the challenges during emergencies and disasters for cardiovascular patients is the lack of suitable accommodation centers. The security of the camps and the appropriate space for rest provide conditions for patients to suffer less stress and mental disorders, and as a result, problems such as high blood pressure in these patients are reduced. Living in a camp can lead to poor quality of sleep because of both lifestyle changes and the lack of privacy. Poor quality of sleep in a camp may be directly related to an increase in BP, and as a result, the risk of high blood pressure because of disasters occurs. High salt intake is strongly associated with increased blood pressure. Large-scale natural disasters often lead to poor food availability. In addition, people with high blood pressure have an imbalance between salt intake and salt excretion, which leads to salt retention in the body and increases blood pressure.^[11]

"In times of emergencies and disasters, if the infrastructure and people's homes are destroyed, the situation for patients will be more difficult because we must provide shelter for them as soon as possible to rest, reduce their stress and anxiety, and calm down as soon as possible." (p6).

2-5) Lack of access to medications

Another problem at the time of emergencies and disasters for cardiovascular patients is the lack of access to medications. After disasters, access to prescribed drugs may be limited or they may be inaccessible. Drug distribution methods must be planned before disasters. Medication information for cardiovascular patients helps take immediate actions to get the medicine. To get a complete list of important medications which may be needed after a disaster, several data sources are important, including data on drug sales to hospitals, clinics, and nursing homes as well as information provided by patients.^[12]

"Access to medicines for cardiovascular patients is reduced during disasters as infrastructures are destroyed. So, it is much better to teach people to have a medicine bag and take the medicine with them for the first few days so that they do not get into trouble." (p8).

3) Post-emergency phase:

The post-emergency phase could also offer opportunities to improve cardiovascular patient care from the baseline, including planning for management into the primary health care system, patients' psychological problems, fatigue of the workforce, and risk management.

3-1) Lack of planning and management

One of the challenges at this stage for cardiovascular patients is the lack of management and planning. Resource planning and emergency operation management are very important. Alarm systems are very important to inform people about weather conditions, evacuation orders, and the closure of roads and medical centers. Family physicians can play an important role in responding to cardiovascular patients in disasters. Principles of care in the event of accidents and disasters must follow a set of standards for the provision of resources, and these standards are established before disasters to follow a specific principle in times of disasters.^[14]

"In my opinion, there should be management and planning in the event of disasters, and this also depends on how much we have already planned and what steps we have taken to prepare ourselves for the provision of health services to patients." (p9).

3-2) Patients' psychological problems

Depression, anxiety, and physical isolation are strongly associated with CVD including coronary heart diseases, strokes, and heart failure at the time of emergencies and disasters. Unprecedented psychological stress occurs in cardiovascular patients during emergencies and disasters. A mental health crisis requires both large-scale psychological interventions and disaster management programs in terms of mental health. Adequate training of health care personnel and the optimal use of the information system are of great importance to provide acute interventions of the mental health care.^[15]

"It is important to use information systems to educate patients. Education can also be done through media and social networks, it can be more attractive to patients and it can reduce the psychological stress of cardiovascular patients." (p13).

3-3) Fatigue of the workforce

A workforce with the knowledge, skills, and ability is required to promptly respond for providing services to cardiovascular patients in disasters. This requires that all nurses and health care providers have high-quality, evidence-based, and merit-based training programs.

We must use all available resources to strengthen the health care workforce. To strengthen and learn health care personnel, evidence-based training opportunities must be provided to make them prepared for disasters.^[16]

“Because the centers face a large number of patients during emergencies and disasters, the staff will suffer from physical and mental fatigue after a while. So, having a predetermined plan can greatly manage this situation. Of course, there is a lot of workload and fatigue for all employees in times of emergencies and disasters.” (p16).

3-4) Risk management

Risk reduction measures are a part of the preparedness strategy of risk management at the time of disasters and emergencies. Having an integrated risk assessment approach and analysis in specific situations is important for cardiovascular patients. Integrated patient assessment in accident-prone areas makes it possible to identify patients and to take appropriate actions in the event of an emergency or a disaster. Also, combining the best traditional and modern approaches, fostering community interactions and relationships, investing in preparedness, improving the use of knowledge in practice, and ensuring adequate human and financial resources are among the useful programs for patients in times of disasters.^[17]

“Risk management in each facility should be carried out according to the geographical conditions of the area. All medical centers should be aware of the dangers threatening them and should prioritize and plan for equipment, manpower and preparatory measures to provide medical services to patients.” (p12).

Discussion

Disasters are situations in which damages are so severe that it is impossible to control them with available resources. NCDs such as CVDs, diabetes, chronic respiratory diseases, and cancer, with 38 million deaths (68%), are the leading causes of death worldwide, and only about a quarter (28 million) of deaths are because of contagious diseases which also occur in low- and middle-income countries. During disasters, cardiovascular patients increase and patient management plays a major role in reducing disaster casualties.^[21,30] According to the research findings, in times of accidents and disasters, there are challenges for cardiovascular patients, of which management, training, and resources can be cited based on the priority.

Management of cardiovascular patients is one of the main pillars in times of accidents and disasters. Resource management is important in the event of a sudden increase in the number of patients in centers. Increasing

manpower, creating physical spaces, and increasing medicine and equipment can also be effective. In most programs of the health system, the treatment needs of these cardiovascular patients and their management are a priority.^[31]

Disasters often damage the health infrastructure needed to maintain the well-being of people with CVDs. This increases the risk of complications and potentially leads to a long-term prognosis or even death of patients. Because of stress, changes in the pattern and lifestyle of unstable patients occur in areas prone to disasters. However, there is now an urgent need to expand public health responses in cardiovascular patients.^[32] Similarly, in a 2019 study by Benjamin Ryan *et al.*,^[33] key managerial impacts after a disaster, including access to medicine, medical services, water, treatment and care, energy, and food, were assessed. Specific management of patients, including those with CVDs, diabetes, mental disorders, and respiratory diseases, will be the major concern after a disaster. Stress and anxiety, loss of sleep, weakness or fatigue, and shortness of breath are common concerns for all NCDs. Access to medicine and medical services is a priority for all patients after a disaster.

The link between nutrition and coronary heart diseases has been established, and a healthier diet reduces mortality after a heart attack. Because of the lack of access to adequate food for cardiovascular patients at the time of emergencies and disasters, they may have high blood pressure because of the consumption of canned foods; subsequently, these patients may need anti-hypertensive drugs. In patients, the mean of blood pressure increases and peaks in the first week and then decreases and returns to the baseline within 6 weeks after a disaster.^[34-37] In 2014, Trento and Allen.^[38] stated that patients including those with CVDs and diabetes as well as those with kidney problems are among the most vulnerable and at a high risk because of the type of food they receive. A comprehensive post-emergency plan is essential for both patients and home care providers to ensure that their special needs are met. Home care providers can help patients plan for emergencies at home. On the other hand, it is difficult to intake enough food to provide enough protein during accidents and disasters. The problem is not only food supply but also the distribution of food between families, the elderly, and the sick. The main nutritional disorders are protein malnutrition, iron deficiency, anemia, obesity, and high blood pressure. A nutritional program which includes water supply, waste disposal, cooking utensils, and energy as well as equitable distribution of food during accidents and disasters must be managed. During disasters, patients pay more attention to their eating and health habits, and this may affect their nutritional status in the future.^[34]

Another challenge which plagues patients during emergencies and disasters is the lack of proper hygiene, which is very important for public health, especially in emergency situations. In 2005, Noji *et al.*^[35] stated that all natural disasters were unique in that each affected region in the world had different social, economic, and health contexts. There are some similarities between the health effects of various natural disasters, which, if identified, can ensure that health and urgent medical assistance is well managed with limited resources.

Training cardiovascular patients is crucial to reduce the severity of the disease. In 2017, Peron *et al.*^[17] stated that intervention focus for patients in need of treatment in acute crises and acute condition management was difficult, whereas under stable conditions, infectious disease management heavily focused on preventive activities which were not possible in critical situations. A patient-centered approach is very important. This includes training patients on self-management, providing an essential medication, and information on self-care. Interventions should be monitored using simple indicators to evaluate their effectiveness. For ongoing health interventions in emergencies, safe access to care and support for health care workers are required. Also, because of the great importance of psychological training interventions in the prevention of CVDs, it is necessary that preventive interventions for CVDs include psychological aspects. Also, because of the low cost of training interventions compared to many other ones, more training people of the society will be very useful to prevent CVDs.^[36]

Proper management during emergencies and disasters regarding cardiovascular patients is very important to reduce their stress and anxiety. Supporting vulnerable groups can play an important role. Socio-economic factors are important and have an influence on cardiovascular patients at the time of emergencies and disasters. In 2017, Wang Zhang *et al.*^[37] designed and investigated a health management survey. This survey reported lifestyle adjustments, job loss and income reduction, headache exacerbation, dizziness, palpitations, and shortness of breath from the questionnaires. They concluded that living outside the home was more likely to exacerbate cardiovascular symptoms among migrants. Job loss was another risk factor related to exacerbated headaches and dizziness.

Limitation and recommendation

Because of the implementation of this study among hospital staff, the generalization of results had to be performed with caution. Also, because of the time constraints of the participants, the meeting time was short and about 30 minutes virtually, and although this

is a qualitative study based on Iranian experts, as is well known, generalizing from qualitative research is based on analytical and inferential generalizability and not statistical-probabilistic generalizability.

Conclusions

CVDs are the leading causes of death in most countries of the world, including Iran, and there is ample evidence showing the relationship between the severity of CVDs and emergencies. The findings of this study also showed that at the time of accidents and disasters, cardiovascular patients faced several challenges; according to the risk management cycle, the necessary arrangements had to be performed to deal with these challenges. Therefore, the research findings generally showed the high importance of training in the pre-emergency phases. In this regard, training cardiovascular patients on nutrition, medications, and lifestyle changes as well as psychological support and resource management can be key strategies to reduce morbidity and mortality in the emergency response and post-emergency phases. Thus, training, resource management, and planning in various areas improve the health of the society. Therefore, it is suggested to emphasize the role of training with the aim of increasing awareness, information, and psychological support of cardiovascular patients in the events of emergencies and disasters and the existence of planning to provide health services which can be useful.

Abbreviation list

Cardiovascular, CV

World Health Organization, WHO

Health care, HC

Cardiovascular diseases, CVDs

Non-communicable diseases, NCDs

Acknowledgments

Health Economics Research Center of the Management and Information School of Iran University of Medical Sciences Research Code 17172, And The authors thank the participants for taking part in this study.

Authors' contributions

The authors confirm contribution to the paper as follows: study conception AND design: SHM; data collection: FBS; analysis and interpretation of results: SHM AND FBS; draft manuscript preparation: FBS AND SHM. All authors reviewed the results and approved the final version of the manuscript.

Financial support and sponsorship

This study was financially supported by the Health Economics Research Center of the Management and Information School of Iran University of Medical Sciences.

Conflicts of interest

There are no conflicts of interest.

Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available due to participant confidentiality but are available from the corresponding author on reasonable request.

Consent for publication

Not applicable

References

1. Zayeri F, SADEGHI NR, Noorkojuri H, Bagheri J, Ghazanfari E. Application of classification tree model for determining the effective factors of mortality after coronary bypass surgery in dialysis-independent patients. 2012.
2. Brakel P. Bed Blocking in Hospitals: Simulation of the Transmural Care Chain. University of Twente; 2010
3. Karkhah A, Karkhah M, Ghadimi R. An overview on the role of nutrition and food groups in the prevention of cardiovascular diseases. *J Babol Univ Med Sci* 2017;19:66-73.
4. Yin P-Y, Chao C-C, Chiang Y-T, editors. Multiobjective optimization for nurse scheduling. International Conference in Swarm Intelligence, Springer, 2011.
5. Khaleghparast S, Mayelafshar M, Hanifi Z, Sari L, Kalaei M, Ghanbari B. Barriers to patient education from the perspective of patients, nurses and doctors in Rajae cardiovascular medical and research center. *Iran J Cardiovasc Nurs* 2018;7:14-23.
6. Islam SMS, Purnat TD, Phuong NTA, Mwingira U, Schacht K, Fröschl G. Non-communicable diseases (NCDs) in developing countries: A symposium report. *Global Health* 2014;10:1-8. doi: 10.1186/s12992-014-0081-9.
7. Nasiri Ziba F, Barghi Shirazi F. Effect of nurses' awareness on myocardial infarction pain management. *Crit Care Nurs* 2017;10. Available from: <http://jcnursing.com/article-1-364-en.html>.
8. Sadeghzadeh V. Comparison of the Effect of Teaching Cardiopulmonary Resuscitation by means of Traditional and on Knowledge & Practice of Nursing Students of Zanjan Branch, Islamic Azad University. Nejadsha ee M, Sarhangi F, Rahmani A, Salari MM Necessity for learning the knowledge and skills required for nurses in disaster Education strategies in medical sciences. 2016;9(5):328-34.
9. Nejadshafiee M, Sarhangi F, Rahmani A, Salari MM. Necessity for learning the knowledge and skills required for nurses in disaster. *Educ Strateg Med Sci* 2016;9:328-34.
10. Aoki T, Takahashi J, Fukumoto Y, Yasuda S, Ito K, Miyata S, et al. Effect of the Great East Japan earthquake on cardiovascular diseases—Report from the 10 hospitals in the disaster area. *Circ J* 2013;77:490-3.
11. Lavery AM, Patel A, Boehmer TK, Lee L, Bhavsar T, Thomas J, et al. Notes from the field: Pharmacy needs after a natural disaster—Puerto Rico, September–October 2017. *MMWR Morb Mortal Wkly Rep* 2018;67:402-3.
12. Ranjbar F, Akbarzadeh F, Kazemi B, Ranjbar A, Sharifi Namin S, Sadeghi-Bazargani H. Increased likelihood of arrhythmic events associated with increased anxiety in patients with implanted cardiac defibrillators after the Ahar-Varzeegan earthquake in East Azarbaijan, 2012. *Bull Emerg Trauma* 2016;4:202-10.
13. Chacko S, Randolph R, Morsch G. Disaster medicine: Public health preparedness for natural disasters. *FP Essentials* 2019;487:17-22.
14. Bana T, Hoare J, Letuka P, Ntusi NA. COVID-19 and impact of psychological stress on cardiovascular disease. *SA Heart* 2020;17:282-6.
15. Iserson KV. Augmenting the disaster healthcare workforce. *West J Emerg Med* 2020;21:490-6.
16. Généreux M, Lafontaine M, Eykelbosh A. From science to policy and practice: A critical assessment of knowledge management before, during, and after environmental public health disasters. *Int J Environ Res Public Health* 2019;16:587. doi: 10.3390/ijerph 16040587.
17. Perone SA, Martinez E, Du Mortier S, Rossi R, Pahud M, Urbaniak V, et al. Non-communicable diseases in humanitarian settings: Ten essential questions. *Confl Health* 2017;11:1-11.
18. Hunter DJ, Reddy KS. Noncommunicable diseases. *N Engl J Med* 2013;369:1336-43.
19. Ryan B, Franklin RC, Burkle FM, Jr., Aitken P, Smith E, Watt K, et al. Identifying and describing the impact of cyclone, storm and flood related disasters on treatment management, care and exacerbations of non-communicable diseases and the implications for public health. *PLoS Curr* 2015;7. doi: 10.1371/currents.dis.62e9286d152de04799644dcca47d9288.
20. Lindgren B-M, Lundman B, Graneheim UH. Abstraction and interpretation during the qualitative content analysis process. *Int J Nurs Stud* 2020;108:103632. doi: 10.1016/j.ijnurstu.2020.103632.
21. Paladino L, Silverberg M, Charchaflieh JG, Eason JK, Wright BJ, Palamidessi N, et al. Increasing ventilator surge capacity in disasters: Ventilation of four adult-human-sized sheep on a single ventilator with a modified circuit. *Resuscitation* 2008;77:121-6.
22. Endacott R, Bogossian FE, Cooper SJ, Forbes H, Kain VJ, Young SC, et al. Leadership and teamwork in medical emergencies: Performance of nursing students and registered nurses in simulated patient scenarios. *J Clin Nursing* 2015;24:90-100.
23. Delshad V, Shirazi FB. The effectiveness of participation-based education on nurse performance in hospital Triage at disaster. *Med Sci* 2019;23:404-9.
24. Yi P, George SK, Paul JA, Lin L. Hospital capacity planning for disaster emergency management. *Socio-econ Plann Sci* 2010;44:151-60.
25. Putra A, Kamil H, Yuswardi Yuswardi BS, Kamil IH, Abee T, Kuala S, et al. Knowledge and practice among public health nurses in disaster response phase. *J Liaquat Uni Med Health Sci* 2022. doi: 10.22442/jlumhs.2022.00918.
26. Limbu M, Wanyagi L, Ondiek B, Munsch B, Kiilu K. Kenya inter-agency rapid assessment mechanism (KIRA): A bottom-up humanitarian innovation from Africa. *Procedia Eng* 2015;107:59-72.
27. Organization WH. Managing WHO humanitarian response in the field. Managing WHO humanitarian response in the field: World Health Organization (WHO); 2008
28. Inter-Agency Standing Committee. Operational Guidance for Coordinated Assessments in Humanitarian Crises. 2012.
29. Chan E, Sondorp E. Medical interventions following natural disasters: Missing out on chronic medical needs. *Asia Pac J Public Health* 2007;19 (1_suppl):45-51.
30. Moslehi S, Barghi Shirazi F, Adibi Larijani H, Haj Ahmadi M. Challenges of providing health services to cardiovascular patients during the COVID-19 pandemic in Iran. *J Health Admin* 2022;24:95-104.
31. Feizolahzadeh S, Vaezi A, Mirzaei M, Khankeh H, Taheriniya A, Vafaenasab M, et al. Barriers and facilitators to provide continuity of care to dischargeable patients in disasters: A qualitative study. *Injury* 2019;50:869-76.
32. Horn RB, Kirsch TD. Disaster response 2.0: noncommunicable

- disease essential needs still unmet. American Public Health Association; 2018. p. S202-S3.
33. Ryan BJ, Franklin RC, Burkle FM, Smith EC, Aitken P, Leggat PA. Determining key influences on patient ability to successfully manage noncommunicable disease after natural disaster. *Prehosp Disaster Med* 2019;34:241-50.
 34. Kianoush S, Al Rifai M, Patel J, George J, Gulati M, Taub P, *et al.* Association of participation in cardiac rehabilitation with social vulnerability index: The behavioral risk factor surveillance system. *Prog Cardiovasc Dis* 2022;16. doi: 10.1016/j.pcad.2022.02.003.
 35. Noji EK. Public health issues in disasters. *Crit Care Med* 2005;33:S29-33.
 36. Fujiwara T, McManus R, Kario K. Management of hypertension in the digital era: Perspectives and future directions. *Hipertens Riesgo Vasc* 2022;39:79-91.
 37. Zhang W, Ohira T, Yasumura S, Maeda M, Otsuru A, Harigane M, *et al.* Effects of socioeconomic factors on cardiovascular-related symptoms among residents in Fukushima after the Great East Japan Earthquake: A cross-sectional study using data from the Fukushima health management survey. *BMJ Open* 2017;7:e014077. doi: 10.1136/bmjopen-2016-014077.
 38. Trento L, Allen S. Hurricane Sandy: nutrition support during disasters. *Nutrition in Clinical Practice*. 2014;29(5):576-84.