Original Article

Bull Emerg Trauma 2025;13(2):2-11.

Bulletin of Emergency And Trauma

Challenges in Managing Patients During Biological Emergencies in the Iranian Health System: A Qualitative Study

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Received: December 12, 2024
Revised: January 27, 2025
Accepted: February 26, 2025

ABSTRACT

Objectives: This qualitative study aimed to identify the key challenges of managing patients affected by biological emergencies in Iran.
Methods: This is a part of the Grounded Theory study using the constant comparative analysis method recommended by Corbin 2014. Data was gathered through semi-structured interviews with 25 individuals who had expertise or experience in managing biological emergencies. Purposive following by theoretical sampling was employed based on theoretical saturation. Data collection occurred between April and November 2023, MAXQDA software (2020) was used to help with the analysis.
Results: After several rounds of data analysis and summarization, considering similarities and differences, four main categories and 14 subcategories were extracted from the data. The main categories were grouped into 1) lack of a comprehensive risk communication plan, 2) mismanagement of patient flow, 3) political and governance challenges, and 4) inadequate resource management.
Conclusion: This study highlighted Iran's Health care systems' challenges in managing affected people in biological emergencies. Key issues included mismanagement of patient flow. Addressing these challenges is crucial for enhancing the effectiveness and sustainability of Iran's Health care system. Further investigation is recommended to provide practical Strategies in dealing with biological emergencies in the future.

Keywords: Iran, Delivery of health care, Emergencies, Content analysis.

Please cite this paper as:
Hadinejad Z, Farrokhi M, Ahmadi S, Saatchi M, Khankeh HR. Challenges in Managing Patients During Biological Emergencies in the Iranian Health System: A Qualitative Study. *Bull Emerg Trauma*. 2025;13(2):2-11. doi: 10.30476/beat.2025.105076.1559.

Introduction

Biological hazards and Emergencies pose significant threats to global public health, potentially leading to substantial loss of life and economic consequences [1]. Managing the risks associated with biological emergencies is therefore a national priority and has been addressed in international health regulations and the Sendai Framework [1].

Biological hazards have a biological origin and can result from natural events or intentional or accidental releases [2, 3]. Throughout history, biological emergencies have caused pandemics, epidemics, and significant morbidity and mortality. Historical examples of global threats from emerging pathogens include the Black Death, the Spanish flu, bioterrorism with anthrax, and coronaviruses, to name only a few. Influenza pandemics occur approximately every 1 to 3 years, with the 1918 pandemic being the deadliest recorded in history[4, 5]. Deadly epidemics and life-threatening infections such as Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS), which emerged in 2003 and 2012, respectively, continue to pose challenges to human health [6]. The Severe Acute Respiratory Syndrome Coronavirus 2(SARS-CoV-2) was first identified in Wuhan, China, in late December 2019 [7, 8]. According to the World Health Organization, as of January 21, 2024, this disease has caused approximately 774,395,593 infections and over 7 million deaths worldwide [9].

The 21st century will be remembered in medical history for the profound and devastating effects of the COVID-19 pandemic.A major challenge for countries during a biological emergencies is managing the affected population, which can even lead to the collapse of a country's health system, depending on the government's capacity [10]. At the peak of the COVID-19 pandemic, healthcare infrastructures were overwhelmed and, in some cases, collapsed, both in developed and developing countries [11-13] The recent pandemic has further exposed the weaknesses and fragility of healthcare systems [14, 15]. Moreover, in biological emergencies, effectively balancing limited hospital resources with the increasing demand for care following an unknown and variable influx of patients is a top priority in healthcare policymaking [16].

The challenges created by the mismanagement of affected populations in biological Emergencies can vary across countries depending on cultural, social, and economic factors [17, 18]. In Iran, during the COVID-19 pandemic, widespread sanctions and inadequate resources led to challenges in providing universal access, especially for vulnerable groups, to vaccines, necessary resources, and healthcare services. Therefore, this study aims to explore the experiences of expert managers and policymakers regarding the challenges of managing individuals affected by biological Emergencies in Iran.

Methods

This is a part of the grounded theory study that employs qualitative content analysis, using Corbin's recommended constant comparative method as conceptual ordering, which is an ideal method for studying a new phenomenon or approaching a phenomenon from a novel perspective. Qualitative content analysis is a research method for obtaining a comprehensive and detailed description of a phenomenon, resulting in categories or concepts that describe that phenomenon [19]. Based on the principles of this approach, data was collected directly from participants without any pre-existing assumptions and analyzed simultaneously [20].

Participants were selected using purposive sampling. The participants' demonstrated expertise or familiarity with managing biological emergencies, coupled with their expressed willingness to contribute to the study, served as the primary criteria for inclusion in this study. Study participants had a history of managing disasters and emergencies, including infectious diseases and biological emergencies such as influenza, Ebola, and COVID-19. They were working as senior or middle-level managers in various parts of Iran's Health care system, such as the Ministry of Health's COVID-19 management headquarters, the National Organization for Passive Defense, reference laboratories like Pasteur Institute, the Center for Management of Infectious Diseases, designated referral hospitals for COVID-19 patients, 16-hour comprehensive health centers for these patients, the pre-hospital emergency center, the United Nations High Commissioner for Refugees, the executive management of the Pasteur Covac vaccine project, and virology departments. The location of the interview, as agreed upon by the participants, was their workplace. To ensure maximum diversity, the participants were selected from among individuals with various specialties and work fields, and sampling continued until data saturation was reached. Any participant who expressed unwillingness to continue the study was excluded [21]. The study included 18 men and 7 women. The mean and standard deviation of the participants' ages were 51.8±8.4 years. Purposive sampling by maximum diversity was used, until data saturation was reached after 27 interviews from April to November 2023 (two interviews were repeated from two participants.The participants' specialties and positions are listed in (Table 1).

In-depth, semi-structured interviews were employed to collect data [20, 22]. Semi-structured interviews were selected as the primary data collection method due to their flexibility and depth, which are essential for qualitative research. Data was collected between April and November 2023. The interview lasted from 32 to 89 minutes. Following the acquisition of requisite permissions, the researcher established initial contact with participants, introducing herself and clearly outlining the study's objectives.

Table 1. Demographics of participants in a study on the challenges of managing patients during biological emergencies in the Iranian health system.

Row No.	Specialized Degree	Management Level	Management Experience (Years)	Work Experience (Years)
1	Infectious Disease Specialist	Executive Manager of Vaccine Trial	7	27
2	PhD in Health Services Management	Deputy of Treatment	22	34
3	PhD in Disaster and Emergency Health	University Lecturer	13	29
4	Infectious Disease Specialist	Dean of Medical School	12	24
5	General Practitioner	Deputy of Health	11	21
6	General Practitioner	Health Center Director	8	18
7	PhD in Disaster and Emergency Health	Deputy of Pre-Hospital Emergency Center	6	22
8	General Practitioner	Manager of Network Infectious Disease Control	13	28
9	PhD in Health Services Management	Treatment Manager	16	33
10	PhD in Medical Virology	Virologist	12	32
11	Emergency Medicine Specialist	Deputy of Treatment and Manager of 16-hour COVID Centers	4	18
12	General Practitioner, MPH in Infectious Diseases	Director of Infectious Disease Center, Ministry	5	16
13	Infectious Disease Specialist	Director of Health Education and Promotion, Ministry	4	14
14	Subspecialist in Disaster and Emergency Health	University President	20	30
15	General Practitioner	Representative of the UN High Commissioner for Refugees in the Ministry	24	38
16	Specialist in Disaster and Emergency Health	Member of the National Coronavirus Committee	2	8
17	Anesthesiology Specialist	Deputy of Education	23	35
18	Emergency Medicine Specialist	University Lecturer	8	18
19	General Practitioner, MPH in Disaster and Emergency Health	EOC Head, University	19	29
20	General Practitioner	Head of the Pre-Hospital Emergency Communications Center, University	11	17
21	PhD in Nursing	Head of Pre-Hospital Emergency Center, County	5	16
22	Master's degree in Nursing	Director of Nursing Services, Hospital	8	18
23	Master's degree in Nursing	Director of Nursing Services, Hospital	11	21
24	PhD in Health Services Management	Director of Nursing Services Office, University	19	35
25	Master's in Health Services Management	Director of Nursing Services, Hospital	14	23

After participants' Oral consent to involvement, Written informed consent was obtained to record the interview. Interviews were conducted in a location mutually determined to ensure participant comfort and convenience. The interviews began with a broad, open-ended question to get the answer of Main research question: What are the challenges associated with managing patients in biological emergencies in Iran? Interview questions in semi-structured interviews begin with general questions outlined in the interview guide. However, as the interview progresses, additional probing and prompting questions may be asked based on the interview's flow and context. This process is both exploratory and iterative. other questions were asked. such as: "What has been your experience in managing patients during biological emergencies? What challenges and difficulties have you encountered in managing patients during biological emergencies?" Subsequent questions were more specific, based on emerging themes, and were guided by the research objectives. Probe questions were used when necessary to delve deeper into participants' responses. Sample of Guide to semi-structured interview questions are listed in (Table 2).

To facilitate a comprehensive understanding of the data, the first author conducted multiple readings of each interview, immersing herself in the content. All interviews were subsequently transcribed verbatim following repeated listening. The data was analyzed using the constant comparative method [19]. In the initial stage of analysis, meaning units were identified, followed by open coding.

Subsequently, codes were grouped based on their similarities and differences, resulting in the formation of main categories and subcategories. MAXQDA software (2020) was used to help with the analysis.

Table 2. Guide to semi-structured interview questions.

Participants	Questions
Expert managers/ policymakers	Open-ended Questions
Age:	What has been your experience in managing patients during biological emergencies ?
Sex:	What challenges and difficulties have you encountered in managing patients during biological emergencies ?"
Specialized Degree:	In your experience, what was the role of volunteers, benefactors, and non-governmental organizations in facing biological emergencies ?
Position : Work Experience:	Considering the challenges you mentioned, what is your solution and suggestion for managing these challenges in the face of biological emergencies in the future?
Management Experience:	Exploratory questions
	Why?
	How?
Management Level:	Please Explain more
	Please Give an example

Table 3. Categories, Subcategories, and Conceptual Codes Extracted from the Study of Challenges in Managing Patients During Biological Emergencies in Iran's Healthcare System.

Codes	Subcategories	Categories
• Lack of a unified spokesperson • Absence of clearly categorized information • Numerous unreliable news channels • Non-specialized media production and communication strategies	Shift in trust towards unofficial sources	1. Lack of a Comprehensive Risk Communication Plan
• Failure to provide timely responses to public concerns • Denial and news desperation • Insufficient understanding of the audience by national media • Dissemination of incorrect information by news networks • Intervention of non-experts and disputes among experts	Mass media's loss of news credibility and authority	
• The overwhelming presence of both accurate and inaccurate information from various sources • Contradictory opinions • Confusion regarding the choice of reliable information sources • Delayed establishment of a national coronavirus information system	Failure to control the infodemic	
• Lack of a graded care system • Absence of a separate section for managing biological patients in healthcare centers • Fear of healthcare staff in performing therapeutic procedures on infected patients • Delay in establishing temporary inpatient clinics • Neglect of treatment for a large volume of moderate patients • Lack of planning for discharge and monitoring of patients after returning to the community • Sense of distrust in convalescent homes and intermediate centers	Failure to proceed based on response standards	2. Mismanagement of Patient Flow
• Abandonment of vulnerable groups • Mimicking disease symptoms with underlying conditions in the elderly • Loss of specific groups in large-scale counting and analysis • Lack of an ad-hoc plan for managing illegal immigrants and foreign nationals • Neglect of physically and socially vulnerable groups	Ambiguity in managing specific groups with special needs	
• Weak pharmaceutical system literacy • Leakage of drugs from medical centers and lack of drug management • Unequal distribution and lack of a unified drug price • Ambiguity in drug quality and safety • Lack of alignment between the pharmaceutical system and the healthcare system	Lack of a capable system for drug production, distribution, and security	
• Political disputes and the impact of sanctions on vaccine imports • Delayed production and distribution of domestic vaccines • Limited role of knowledge-based institutions in vaccine production • Delay in determining and locating vaccination sites • Delay in the digital vaccine registration system and tools • Lack of readiness for high-speed and high-volume vaccination • Sinusoidal distribution of vaccines • Delay in selecting the type of vaccine and vaccination guidelines for pregnant women and children	Sinusoidal vaccination	

Codes	Subcategories	Categories
• Lack of prioritization of health • Conflict of interest among managers and specialists • Rapid and unplanned management changes • Emotional senior management • Multiple factors influencing the healthcare system • Lack of supportive and aligned government policies with the Ministry of Health	Conflict of interest in the healthcare system	3. Political and Governance Challenges
• Breakdown of the biological defense structure • Neglect of the capacity of the national crisis management organization • Inability to utilize the potential of the national civil defense organization • Multiple stakeholders in crisis management • Inability of the crisis management organization to address the issue • Overlapping work of executive and managerial organizations	Non-implementation of upper-level documents	
• Delayed formation of specialized committees during the pandemic • Neglect of the audience of guidelines in the scientific committee • Development of non-native and consensual protocols • Lack of scientific analysis of the color-coding score • Influence of famous figures and imposition of reasoned opinions • Constant change in membership and management of the scientific committee • Autonomy and authority of specialists in therapeutic and pharmaceutical interventions • Insufficient legal support for decisions • Lack of attention to the scientific principles of risk management in accidents and disasters	The scientific committee's susceptibility to governing considerations	
• Shortage of diagnostic and therapeutic devices and supplies • Delay in supplying medical equipment and standard personal protective equipment • Shortage of disinfectants • Lack of infection control facilities in healthcare settings and urban communities	Shortage of standard medical equipment and supplies	4. Inadequate Resource Management
• Weak knowledge and skills of various levels of specialized forces • Lack of multi-disciplinary rapid response teams • Shortage of skilled and pandemic-responsive human resources • Lack of timely performance evaluation and appropriate feedback • Neglect of mental health and occupational burnout of healthcare staff • Wasted capacity of volunteers and charities • Lack of effective training, the Achilles' heel of the healthcare system • Decay of training of specialized forces	Inefficient development of human resources	
• Lack of reorganization of operational and clinical processes • Lack of an integrated approach from identification to discharge of patients • Unstable interdisciplinary and interdepartmental therapeutic cooperation • Lack of continuous support from the private sector • Inability to convert hospitals into multi-specialty centers	Inefficient process facilitation	
• Weakness in the physical infrastructure of centers/facilities • Insufficient ICU units and hospital beds • Worn-out ambulance fleets • Lack of review of the logistics structure • Non-standard spaces • Non-compliance with modern hospital engineering principles	Weak and aging healthcare infrastructure	

To ensure the credibility and trustworthiness of the data, Lincoln and Guba's criteria were employed [23]. To ensure the validity of the findings, participants were selected to ensure a diversity of experiences.

Results

This study aimed to explore the experiences and perceptions of experts and stakeholders in Iran's healthcare system regarding the challenges of managing victim's biological emergencies in Iran. Participants' experiences led to the extraction of four main categories: lack of a comprehensive risk communication plan, mismanagement of patient flow, political and governance challenges, and inadequate resource management (Table 3).

This category encompasses three subcategories: Shift in trust towards unofficial sources, Mass media's loss of news credibility and authority, Failure to control the infodemic

Shift in Trust towards Unofficial Sources

Participants in this study highlighted a critical lack of timely and transparent risk communication with the general public as a major challenge during biological emergencies.

One participant noted: "*We lacked a communication strategy, and our strategic communication was also problematic. We didn't know if we were at the peak or the beginning of the outbreak. People trusted cemetery officials more than high-ranking officials*" (Participant 13).

Another interviewee stated: "*Lack of transparency and inadequate communication with patients and*

their families caused fear and anxiety among patients and their families, creating a swamp of uncertainty. Uncertainty in all aspects, and this swamp engulfed people, causing them to prefer obtaining the information they wanted from other sources, not us. We still need a proper risk communication system" (Participant 7).

Loss of News Credibility and Authority of National Media

The second subcategory of challenges in risk communication management is the loss of news credibility and the authority of national media. According to one of the participants: *"The national media had become a place for settling scores, and mass media was damaging its key position. We had non-experts entering the national media and engaging in debates with experts, leading to a loss of credibility for the national media"* (Participant 19).

Failure to Control the Infodemic

Another communication problem mentioned by the participants was the inability to control the infodemic during biological emergencies. One participant stated: "*We experienced a severe infodemic in Iran. Both correct and incorrect information was abundant. For example, people were very confused about whether or not to get vaccinated in the first few months. People were waiting for a vaccine and wanted a specific type of vaccine, and the media was creating a political atmosphere regarding the choice between foreign vaccines and waiting for domestic vaccines to be produced. This caused people to be confused between science and news, which was very disturbing.* " (Participant 3).

Mismanagement of Patient Flow

The second and most significant challenge extracted was the category of challenges related to the mismanagement of patient flow. This category includes four subcategories: Failure to proceed based on response standards, Ambiguity in managing specific groups with special needs, Lack of a capable system for drug production, distribution, and security, and Sinusoidal vaccination.

Failure to Proceed Based on Response Standards

Based on the views and experiences of the interviewees, the surveillance system should initially proceed based on response standards. A syndromic surveillance system alongside a routine surveillance system should be able to detect and confirm sudden emergencies and epidemics in the shortest possible time and with full sensitivity. For example, one participant stated: *"Given that the disease reporting system for managing infectious diseases in the country is based on a syndromic system, we unfortunately lost the index case. Also, when an individual arrived at the hospital, there was still no standard treatment for patients. Treatments were arbitrary, and it was unclear where the thresholds were. Guidelines were only written but not implemented. Physicians and treatment teams didn't act in a uniform, coordinated, and standardized manner*" (Participant 1).

Ambiguity in Managing Specific Groups with Special Needs

Participants underscored the particular challenges faced in the clinical management of vulnerable groups, including children, the disabled, the elderly, pregnant women, individuals with psychological, social, or physical disabilities, and migrants, during biological emergencies. These groups require specialized care and must be explicitly considered in contingency plans and training programs to ensure their needs are adequately addressed. One participant noted: "*Our healthcare system was not a strong one and couldn't cover specific groups with special needs because these individuals are usually small in number, don't appear in the counts of large cities, and get lost. In Iran, we have groups of illegal migrants who are not registered anywhere "* (Participant 15).

Lack of a Capable System for Drug Production, Distribution, and Security

Participants believed that the proper control of those affected by biological emergencies requires a capable drug system for production, distribution, and security. The issue of drug mafias and the unfair distribution of drugs was also a contributing factor in the clinical management of patients. One participant noted: "*There was a shortage of drugs, and in some cases, drugs were smuggled and sold at different prices. In some medical centers, drugs were also leaked outside the hospital. On the other hand, the lack of pharmaceutical system literacy also created problems in clinical management*" (Participant 4).

Sinusoidal Vaccination

The weakness of domestic institutions in producing domestic vaccines, as well as the late importation of various vaccines due to political struggles and sanctions-imposed limitations, were factors that increased the number of cases and mortality rate at the beginning of the COVID-19 pandemic, according to participants. Regarding the vaccination program, one participant noted: "*People saw vaccination as their only salvation, and our experience was the same, but there were some problems. We didn't have a vaccine, and it was not being imported. After a long delay, and after the importation of the vaccine, due to multiple and phased entries, the distribution of the vaccine was sinusoidal. Moreover, the system's unpreparedness for vaccine registration and rapid vaccination in large numbers had caused problems in the location of vaccination sites and their implementation*" (Participant 6).

Political and Governance Challenges

This category consists of three subcategories:

conflict of interest in the health system, non-implementation of upper-level documents, and the scientific committee's susceptibility to governing considerations.

Conflict of Interest in the Health System

One participant stated: "*Despite all its problems, the scientific community had one opinion, but the prevailing conditions dictated something else. There were contradictions and conflicting opinions with different levels of resources, and issues other than health and science were prioritized by managers and decision-makers*" (Participant 14).

Non-implementation of Upper-level Documents

Based on the experiences of the participants, using upper-level documents and implementing them in decision-making can be effective in managing affected individuals and preventing duplication of efforts in supervisory and executive bodies. On the other hand, ignoring the capacity of the country's crisis management organization and the inability to utilize the potential of the country's passive defense organization were among the challenges experienced during the management of the COVID-19 pandemic. One participant said: "*We have a crisis management organization. In fact, we have a biological defense headquarters called 'Shafa'. Instead of forming additional committees, the existing Shafa biological defense headquarters should've been fully utilized to respond to the COVID-19 pandemic.* " (Participant 2).

Scientific Committee's Susceptibility to Governing Considerations

The scientific committee's position was compromised by political, logistical, and governance considerations, according to participants. One participant stated: "*The scientific committee's decision-making was compromised by the inclusion of individuals whose personal opinions and unreviewed studies were given equal weight to expert evidence. The scientific committee was formed with the presence of famous people, and the fame of the individual influenced the opinions and decisions of this committee"* (Participant 16).

Inadequate Resource Management

Challenges in resource management included four subcategories: Shortage of standard medical equipment and supplies, inefficient development of human resources, inefficient process facilitation, and Weak and aging healthcare infrastructure.

Shortage of Standard Medical Equipment and Supplies

According to participants, proper management of medical equipment and supplies is essential in managing a biological emergencies. The shortage of up-to-date diagnostic and therapeutic devices and delays in supplying standard personal protective equipment negatively impact the service delivery of frontline healthcare workers. One participant noted: "*The problems in hospitals were related to the equipment infrastructure. If we want to mention three pillars or tripods for surge capacity and increasing hospital capacity, they would be staff, stuff, and structure. In terms of structure, our hospitals had a major problem with the lack of proper infrastructure, such as oxygen supply and the provision of standard and sufficient medical equipment and PPE for use in healthcare centers*" (Participant 22).

Inefficient Human Resource Development

Based on the participants' experiences, a specialized and multi-skilled workforce is needed to combat pandemics and biological emergencies. One participant stated: *"We didn't have a ready workforce to respond to the pandemic. Our specialized training and rapid response teams were depleted. Although we took forces from other departments such as psychology and nutrition to respond, they did not have the skills and were simply filling the gap. These preparations should've been done before. Some hospitals canceled surgeries and converted operating rooms that had oxygen into ICUs and COVID-19 wards, meaning they increased the space, but they didn't think about the manpower and the skills of the manpower to work in these prepared spaces. We didn't have enough staff for this.*" (Participant 9).

Inefficient Process Facilitation

Participants noted that there was no sustained interdepartmental or interdisciplinary collaboration to create a new clinical approach and reorganize clinical and operational processes for biological emergencies in Iran. For example, one participant added: "*In the process of improving the management of patients with biological emergencies, certain processes could be changed. For example, conducting team visits by specific groups like internal medicine, anesthesia, and infectious diseases, is necessary. These three groups play a major role in patient management. Or it is possible to conduct a two-level triage in an environment outside the hospital, contrary to the usual hospital triage process. But there was a lot of resistance in treatment centers to change these processes."* (Participant 24)

Weak and aging Healthcare Infrastructure

The biggest challenge in resource management during biological emergencies was identified as the weak and aging healthcare infrastructure. In this respect, one specialist stated: "*Our biggest challenge is the aging healthcare infrastructure. You know that hospitals are mostly old facilities, and unfortunately, there is no possibility of renovating them or creating conditions for these infrastructures. On the other hand, it requires a lot of resources that we currently don't have. Therefore, the shortage of*

resources in these circumstances seems to be the most important factor for us to be able to renovate the aging infrastructure." (Participant 11)

Discussion

This qualitative study examined the challenges of managing patients during biological emergencies in Iran's healthcare system. Based on the findings, four main categories and 14 subcategories were extracted, which are discussed below:

Lack of a Comprehensive Risk Communication Plan: The study revealed that public confusion regarding reliable information sources was exacerbated by the absence of clear, organized information and the proliferation of both accurate and inaccurate information from diverse sources, contributing to a challenging information landscape. During disasters and emergencies, where conditions are constantly changing and information is rapidly evolving and being revised, the focus should be on the role of appropriate and effective risk communication [24]. In these situations, emergency organizations must have sufficient, accessible, and credible information. The inability to provide credible information leads to uncertainty and anxiety in the community and drives people toward rumors [25, 26]. According to previous studies, disaster risk communication management and improving its process are vital for Iran and should be considered the first step in reducing disaster risk based on the disaster management cycle [27]. By developing strategies to improve risk communication in Iran, planners and managers can be helped to design and implement effective risk management program,

Mismanagement of patient flow: This was identified as the Main category of challenges in this study. It appears that patient flow was not managed effectively during biological emergencies in this study. Inefficient internal processes, such as poor patient flow management, may have led to delays in care and overcrowding of healthcare facilities, consequently affecting patient safety, patient and staff satisfaction, and the overall quality of care. The occurrence of public health-threatening biological emergencies, due to the high number of patients, highlights the importance of a coordinated patient flow approach throughout the entire health system to manage health resources and reduce the risk of overcrowding in healthcare facilities. Previous studies have highlighted the mismanagement of resources and equipment, inadequate contact tracing guidelines, and poor patient flow management as significant challenges during the COVID-19 pandemic in Iran. Additional challenges in managing COVID-19 patients included weak leadership, ineffective prioritization of problems, insufficient intersectoral cooperation, and poor coordination between health sectors, hindering the implementation of an integrated response.

Political and governance challenges: According to participants' experiences, delays in coordination between managerial and executive organizations led to duplication of efforts and a failure to enforce the decisions issued by the Iranian Ministry of Health's National Corona Committee, which was responsible for health during COVID-19. During biological emergencies, close cooperation between political and scientific structures is necessary. The different units of the health system, being located in a complex political, economic, social, and environmental structure, must be well coordinated to continue providing health services in such situations [28]. The dominance of a government-centric paradigm in the health system's policy-making processes became more prominent during the COVID-19 pandemic [29]. Furthermore, the populist approach of managers was one of the challenges of Iran's health system, especially in the early days of the pandemic in the country.

Inadequate resource management: The study revealed that despite the need for adequate resources and equipment, the management of requests, strategic supply chain, and distribution during biological emergencies was highly inefficient. Some hospitals and even frontline healthcare workers lacked adequate resources. These challenges were exacerbated by shortages of skilled and pandemic-responsive personnel, temporary and short-term specialized training, and the departure of trained professionals from service. Put in a nutshell, the deteriorating healthcare infrastructure, coupled with the imposition of sanctions, severely hindered Iran's ability to procure essential medical equipment and supplies, exacerbating the challenges faced by the healthcare system. Studies have shown that the lack of adequate resources, including human resources, equipment, and medical supplies, caught Iranian managers off guard [17, 18]. Providing financial incentives, continuous monitoring, sufficient protective equipment, and skilled personnel is essential for effective epidemic management [30].

Some key individuals were unavailable for interviews due to managerial responsibilities or changes in position, which was considered a research limitation.

This study providing valuable information for policymakers to plan for the proper management of patients during future biological emergencies. The selection of various managerial positions was another strength of this study.

The findings of this study show that the management of patients during biological emergencies in Iran is multi-dimensional and that necessary interventions by policymakers and health system managers are required to strengthen the governance of the health system, eliminate multiple competitors within the healthcare system, implement upper-level documents, and identify the effective political, social, and economic factors for the integrated management of patients during biological emergencies.

Declaration

Ethics approval and consent to participate: The license for this study has been issued by the Ethics Committee of the University of Social Welfare and Rehabilitation Sciences under the number IR.USWR.REC.1400.326. The researcher contacted the participants by phone, e-mail, or in person to get their written consent to participate in the interview.

Consent for publication: All authors have expressed their consent to the publication of this study.

Conflict of Interest: None declared.

Funding: The authors received no financial support for the research, authorship, and/or publication of this article.

Authors' Contribution: ZH: Conducted the research, leading the interviews, analyzed the data, secured ethical approval and drafted the manuscript; MF: Coordinated and transcribed interviews, assisting with participant feedback and edited the final draft; SA: Analyzed the data, secured ethical approval and drafted the manuscript; MS: Contributed to the study design, data collection and analysis. All authors approved the final manuscript; HKH: Supported the study design, conducted the research, data analysis and edited the final draft.

Acknowledgments: This article is part of a doctoral dissertation conducted at the University of Social Welfare and Rehabilitation Sciences. The researchers thank all participants in this study and the Health in Emergency and Disaster Research Center for their assistance and support in conducting this research. We sincerely thank the participants who participated in this study and generously shared their insights and experiences.

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