

Hospital crisis management in the epidemic: A qualitative study

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Abstract

Background: Despite the advances in medical science, the epidemic of infectious diseases has faced serious challenges to the health system of countries, so the purpose of this study was to identify obstacles and management strategies to prepare for planning preventive measures and better care in dealing with infectious diseases in hospitals.

Method: The current qualitative research was of the grounded theory type, which was conducted in 2023. The semistructured interview questions were obtained from experts. The initial selection of the sample was made from experts in the field of health and treatment from all over the country. The snowball method was used to increase the sample volume until it reached sufficient Value. After analyzing the data through MAXQDA2020 software, this research reached saturation by interviewing 20 experts.

Results: Four main areas, 15 subthemes, and 93 codes were identified in the management of epidemics, which included leadership and management (planning, physical structure, information management, financial resources, manpower, medicine and equipment, and internal and external coordination), Stewardship (macro policy and syndromic care system), safety and resilience (crisis management and emergency and disaster risk management), management of infectious diseases (instructions, education, infection prevention and control, treatment management).

Conclusion: This study presents the strategies of the health system in dealing with the epidemic of infectious diseases to overcome the obstacles and challenges of preparation and response, which can help health managers in designing future programs, and finally, it shows that hospitals should have a plan for resilience in crises.

KEYWORDS

COVID-19, epidemics, hospitals, infectious diseases

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1 | INTRODUCTION

The 21st century has seen an upward trend in the number of natural disasters followed by an increase in casualties and very heavy economic costs.¹ The novel coronavirus-2019 (SARS-CoV-2),² which in March 2020, the World Health Organization (WHO) declared a pandemic due to the rapid spread of COVID-19³ and its mutations have caused high numbers of infected people and deaths in various countries around the world.⁴ Previous pandemics such as the H1N1 influenza epidemic in 2009 made it important to prepare for future pandemics.⁵ Despite extensive infection control programs, outbreaks of emerging infectious diseases (EIDs) remain a major global threat.⁶ Human mortality attributable to infection is currently projected to remain at the current level of 13–15 million deaths per year until at least 2030.⁷ National and regional health policies play a central role in dealing with the pandemic crisis of COVID-19 and emergency situations in the presence of similar infectious diseases.⁸ The first step to prepare for an epidemic is care, this requires proper preparation and allocation of health and treatment facilities⁹ and it is likely that such a situation emphasizes the importance of having a framework that is properly built to allow users to anticipate.¹⁰ In this regard, based on the strategic crisis management framework (OECD), the elements of the preparedness phase of crisis management through the budget can be used.¹¹ In a crisis, leaders must provide solutions to problems to reduce uncertainty.¹² Developed by the WHO in 2019, the Health Emergency and Disaster Risk Management (EDRM) framework guides countries and partners in developing capacities.¹³ The WHO also suggests that all countries should have a plan, even if the risk of contracting highly contagious conditions seems remote.¹⁴ Orsini et al. stated that hospital preparedness methods for epidemics are to act quickly, identify and engage key stakeholders early, provide accurate information, prioritize staff safety and mental health, promote a fully integrated clinical response, develop escalation plans, prepare for ethical dilemmas, and have a safe exit strategy for postdisaster recovery.¹⁵ Additionally, Rebmann et al. pointed out the lack of a plan to address the gaps in infectious disease disaster planning that includes preparedness indicators.¹⁶ Morton et al. identified some of the major barriers to preparedness against infectious disease outbreaks as lack of government support, financial difficulties, need for disaster specialists, insufficient manpower, and lack of inter-departmental communication, especially at the federal level.¹⁷ Moradi et al. announced some important strategies to overcome the challenges of the Communicable Disease Surveillance System (CDSS) by motivating policymakers to emphasize infectious diseases as a national security issue, pass and amend reporting laws and regulations, involve CDSS in hospital accreditation and license renewal for healthcare professionals, and create incentives for organizations outside the health sector to participate in the program through inter-institutional agreements.¹⁸ Toyokawa et al. stated several areas of concern regarding the readiness of Japanese hospitals to accept and treat infectious diseases, human resource management problems and employment issues, as well as the development of a more practical response protocol to any potential outbreak of new or EIDs and the

lack of an effective clinical protocol.¹⁹ Kao et al. stated that in the post-Ebola era, comprehensive clinical and infection control core skills training programs should be developed according to the guidelines of the WHO and other countries in response to future emerging disease epidemics.²⁰ Susanti et al. stated that seven factors influenced hospital readiness: human resources, crisis management, essential health services and support, hospital infrastructure, infection prevention, control and surveillance, equipment, and policies, networking and research.²¹ Sun et al. proposed approaches to empower hospitals to deal with an epidemic by setting up standard fever clinics, providing regular training to medical staff, upgrading infrastructure and equipment, strengthening medical equipment stocks, improving the establishment of the Internet and information technology and creation of an effective primary diagnostic process.²² around the world, during the COVID-19 pandemic, the demand for medical care increased rapidly²³ and because most hospitals act with delay and deficiency in preparing and providing an appropriate response to disasters²⁴ and there is no accepted international standard for hospital preparedness and response to disasters.²⁵ Therefore, it is necessary to strengthen the capacity of hospitals for preparedness, response and recovery to reduce the effects of the epidemic.²⁶ Due to the severity of the disease outbreak; the health system should have an acceptable plan.²⁷ Therefore, the current research was conducted to identify the challenges of hospitals in managing the crisis of infectious diseases and strategies address these challenges and plan preventive programs. The results of this research can play a significant role in the policy-making and development of macro programs of the country's health system in the field of infectious disease crisis management.

2 | METHODS

This qualitative study was conducted based on the theoretical approach from December 2022 to August 2023 to understand the level of knowledge and experiences and thoughts of people about the events and events related to infectious diseases and crisis management during epidemics in hospitals.

2.1 | Sample and data

At first. Interviews with key people were conducted through non-probability and purposeful sampling and then by snowball method of specialists and managers at the level of the Ministry of Health, universities and hospitals in Iran. The criteria for entering the study were knowledge and experience related to crisis management and conducting research in related fields. Interviews continued until saturation when no new concepts or codes were extracted. In total, 20 experts in the country participated in this study. Participants' characteristics are presented in Table 1.

To collect data, a semi-structured interview was conducted from December 2022 to August 2023.

TABLE 1 Demographic characteristics of interview participants.

| Demographic characteristics | Number |
|--|--------|
| Gender | |
| Man | 16 |
| Female | 4 |
| Age | |
| 40–49 | 7 |
| 50 and above | 13 |
| Job position | |
| Employees of the Ministry of Health | 1 |
| University administrators | 4 |
| Hospital managers | 3 |
| Doctor | 6 |
| Employees of the emergency organization | 3 |
| Managers of other organizations | 1 |
| Faculty of Medical Sciences University | 2 |
| Educational level | |
| General practitioner | 3 |
| Specialist in infectious and tropical diseases | 6 |
| Internist | 1 |
| PhD in disaster health | 6 |
| Disaster Health Fellowship | 1 |
| PhD in healthcare management | 2 |
| PhD in health policy and management | 1 |

2.2 | Measures of variable

That is, the interview questions are semistructured, less specific and open, and sometimes the structure is reduced and an in-depth interview is conducted. To conduct interviews, the guide title form, which contained seven general questions to clarify the objectives of the study, was prepared with the help of the research guide professors and after reviewing the articles published from January 1, 2000, to September 25, 2023, in foreign journals indexed in the Medline, Scopus, and ISI databases. According to this, all the key terms were obtained through an initial search, then to improve the search strategy and terms, studies related to the issue of crisis management in hospitals against infectious diseases in the databases mentioned with the keywords infectious disease and crisis management were searched. To determine the validity and ensure the meaningfulness of the questions from the point of view of the respondents, two interviews were conducted with people who were not part of the selected participants, and according to their opinions and the professors, the necessary corrections were made to eliminate the shortcomings. Interview topics included "Describe your

experiences in managing infectious disease outbreaks, what strengths, weaknesses, and challenges have been associated with them? Explain the solutions you propose to overcome the crisis." The interview questions were semistructured, less specific and open, and sometimes the structure was reduced. An in-depth interview was conducted to guide the flow of the conversation, and the interviewee was given more freedom to explain or interpret more about the topic. The time of the interview sessions was predicted in advance and was between 30 and 60 min and coordinated with the desired people by phone or in person. The interviews were recorded through a sound recording device (MP3 Recorder) and simultaneous recording to avoid possible problems. The implementation of the recordings was performed immediately after the end of each session to be aware of the data saturation time and also to increase the accuracy of the implementation of the texts. The interview text was written and typed after listening to the recorded interviews three times. Also, key topics and nonverbal cues of the participants were noted and these points were taken into account when preparing the interview files. Finally, to increase the consistency and accuracy of the data, after the completion of each part of the implementation of the interviews, the typed observations were presented to the interviewees for approval and thus were reviewed (Respondent validity).

2.3 | Data analysis procedure

During data collection, in addition to interviews, other complementary methods were used such as observation of actions and performance, scenes, situations and researcher's personal notes, participants' notes or a combined method. It should be noted that the depth and concentration of sampling increased over time. The coding process was used to analyze and conceptualize the data and finally put them together in a new way. Therefore, coding started when the first text or data were obtained. In this way, we obtained several topics and perhaps one or two themes. Finally, by comparing the relationships, concepts, contradictions, and theories observed, the desired topics were extracted by the researcher through MAXQ-DA2020 software, and the data analysis ended with theoretical saturation. To improve the accuracy of the study, the methods proposed by Guba²⁸ were used with criteria such as validity, reliability, confirmability, and transferability. Additionally, member control or the credibility of the respondent was one of the methods of accreditation and confirmation of the researcher's interpretations, by which the researcher checked his findings with the research team and one or more knowledgeable people in two steps.

2.4 | Ethical considerations

This qualitative study was approved by the Ethics Committee of Sari Islamic Azad University (code: IR.IAU.SARI.REC.1401.186). The target persons were contacted by phone or in person, and after announcing the purpose of the study, they were assured of the

TABLE 2 Theme and subthemes of hospital crisis management.

| Theme | Subtheme | Example code |
|-----------------------------------|---|--|
| Leadership and management | <ul style="list-style-type: none"> • Planning • Physical structure • Medicines, supplies, and equipment • Data management • Financial resources • Human resources • Internal and external coordination | <ul style="list-style-type: none"> • Infectious disease crisis management planning • Lack of isolation room • Necessity of proper supply chain and distribution of facilities • Designing a single information system • Optimal management of financial resources • Weakness in providing the required manpower and redistributing the force • The need for communication between health and treatment departments for optimal disease management |
| Stewardship | <ul style="list-style-type: none"> • Syndromic care system • Macro policy | <ul style="list-style-type: none"> • Insufficient care system • Macro planning and strategic view of the health system • Failure to estimate resources by policymakers |
| Safety and resilience | <ul style="list-style-type: none"> • Crisis management team • Emergency and disaster risk management | <ul style="list-style-type: none"> • The need to predict the crisis • Program for hospital resilience against infectious diseases • Assessment of hospital readiness |
| Management of infectious diseases | <ul style="list-style-type: none"> • Education • Protocol and instructions • Infection prevention and control • Treatment management | <ul style="list-style-type: none"> • Compilation of lessons learned • Using the successful experiences of other countries and organizations • The role of vaccination in reducing mortality • Screening of patients at the entrance of the hospital • Reduction of hospital workload due to outpatient treatment and timely screening • Timely diagnosis |

confidentiality of the information and they signed an informed consent form, although they could stop the interview at any time.

3 | RESULTS

By analyzing the data, 93 primary codes were extracted. Information was identified and placed in four themes, including leadership and management, stewardship, safety and resilience, and treatment management, and 15 subthemes. Based on this, the problems and strategies that can be presented by the interviewees were presented (Table 2).

4 | LEADERSHIP AND MANAGEMENT

4.1 | Planning

To ensure that the hospital has the necessary preparation to deal with the epidemic of infectious diseases, health managers must first plan, forecast and allocate the necessary resources and coordination. Based on the opinions of the interviewees, planning, resource management (physical space, information, finance, manpower, medicine, supplies, and equipment), and inter- and intradepartmental coordination in the field of leadership and management are important strategies in managing the crisis of infectious diseases. In the conducted interviews, planning was mentioned as one of the tasks of managers at different levels, and one of the factors of success in the

management of infectious disease crises. Based on the interviews conducted, there is no specific program for the management of infectious disease crises in hospitals.

Person (15)¹⁵ stated, "The ministry has a separate strategic plan for zoonotic diseases, dangerous diseases that are the first priority, and we can write a plan for the whole country and for each of these separately by province, based on common diseases, we can have a strategic plan and identify 5 infectious diseases. Let us plan what to do in the phases of intensity and severity in order not to spread in the long term." Person (9)⁹ said, "The Ministry of Health, as the main trustee, should compile and communicate a biohazard management policy under the title of infectious diseases and provide training. Prepare a series of infrastructures so that if we face such an event again, we will have a good Preparedness."

4.2 | Physical structure

Another thing that should be addressed in the field of leadership and management is resource management. One of the hospital resources is the physical structure suitable for managing infectious diseases.

Person (8)⁸ said, "We tried to work on the Structure system. However, because we had a progressive demand and our needs were constantly increasing and our resources were limited, it made us unable to provide proper service to some provinces and some centers."

Person (5)⁵ said, "A section that actually has proper air drainage should be designed so that if the number of infected patients increases, which we see every year, the healthy person who is waiting

for service in the section will not get infected." This means that our clinics should not be an environment for the spread of disease.

4.3 | Medicines, supplies, and equipment

In the field of resource management, the supply of medicine, supplies, and equipment as one of the challenges of hospitals during an epidemic requires the creation of a proper and principled supply chain.

Person (7)⁷ said, "Management of pharmaceutical operations is not in a favorable situation. The drugs that were being used, we were faced with a severe shortage of drugs at times. This is only in our own function, there are also external functions, how should political decision makers behave." If something like this happens, they should comply with the health and treatment departments.

Person (11)¹¹ stated, "The use of benefactors was a strong point, this can be planned, and according to the experience of COVID-19, we were able to see what deficiencies we have, the equipment that was worn out, oxygen generators, etc., the use of benefactors should be highlighted."

Person (9)⁹ stated, "There were challenges in the first days, the simplest issue was personal protective equipment, which naturally, a hospital where the risk of epidemic is one of the main risks should have increased capacity for this, first of all, it is about personal protection. We are supposed to take care of patients and not get infected ourselves."

4.4 | Financial resources

To provide sufficient resources at the right time, financial resources are needed to ensure the possibility of responding to the increased need in the hospital.

Person (15)¹⁵ said, "For the implementation of programs, heavy financial resources are needed. For respiratory ICUs, billions of financial resources are needed. Does the country have the capacity?" For this, we need to write a plan and perform a future study for the next 10 years, 20 years, how many respiratory ICU beds we want, and until the plan is determined, it will not be fully implemented.

4.5 | Human resources

During the epidemic of infectious diseases due to increased needs, to provide quality services and other services in the hospital, there should be a proper mechanism for human resource management (provision of qualified and capable human resources, psychological and emotional support for employees, appropriate incentive system to increase employee motivation and satisfaction).

Person (7)⁷ said, "The strengths of the coordination of all the doctors and nurses in this area and their readiness to serve, who put their lives in their hands." According to Person (10)¹⁰ "In the second

and third wave of COVID-19, some hospitals could not compensate for the amount of service that was created by adding a lot of work to the shoulders of the personnel and they did not have a plan to compensate for the psychological, economic and family problems of the employees."

Person (9)⁹ said, "The hospital should know that if an epidemic happens, it needs manpower, who can it hope for outside of the hired forces." He should go to the volunteer forces. My advice is what we did in Qazvin and it worked. The best forces that could help us were the final year nursing and medical students and even the faculty members helped us.

4.6 | Internal and external coordination

Another management function in times of crisis is to create inter- and intradepartmental coordination to facilitate an effective response to the epidemic of infectious diseases.

Person (7)⁷ said, "During the time of COVID-19, we encountered a hospital where all 300 beds needed oxygen and they did not have the infrastructure to supply oxygen." Immediately, with the coordination we did with the governorate, we identified all the factories that produce oxygen, and the hospitals to support the next hospital, so that if the hospital needs oxygen, Azizi Joibar Hospital will come and give oxygen to Razi Qaimshahr Hospital." Person (11)¹¹ stated, "The most important weakness of ours is the low interaction of the health and medical assistant, both at the level of the Ministry of Health and at the level of the university, which extends to hospitals. We have a non-active defense headquarters. In times such as an epidemic of infectious diseases, different organizations must be involved. They must be in full interaction with the country's emergency organization, health deputy, non-active defense organization, and medical deputy."

5 | STEWARDSHIP

5.1 | Macro policy

The results indicate that the managers of the health system do not have a strategic view of the epidemic management of infectious diseases in hospitals, and therefore hospitals are facing many challenges in terms of providing resources and structure.

Person (10)¹⁰ said, "Any society that wants to develop needs healthy people and a healthy health system." Therefore, investment and spending in the health system, if it is going to be developed and we consider the most important development factor as humanity, we should not consider it as a cost, let us look at investment. Perhaps we need to create this perspective in the macro as well, of course, the fact of the matter is that the economic cycle of the health system is flawed and needs to be corrected. The health system must have a stable credit input and not be dependent on oil, which can provide the needs of development, equipment, training and personnel.

Person (2)² stated, "One of our big problems is that the program and budget organization cannot establish a proper relationship with the health sector because it sees the indicators based on the indicators of all the usual departments and we we have a lack of manpower here."

5.2 | Syndromic care system

Additionally, the results showed that the warning systems to the hospitals regarding the number of infected cases in the country did not work properly and the hospitals were not prepared to provide services to a large number of patients.

Person (8)⁸ stated that "the current care system of our country, which was a passive care system and needed to be actively followed up, a series of changes happened and sentinel sites were designed." After that investigation, they saw that the country's current care system, which was based on Disease Base, is not sufficient to detect an epidemic and an outbreak of an infectious disease in specific conditions and to prevent an epidemic.

6 | SAFETY AND RESILIENCE

6.1 | Crisis management team

It is a story that our conditions have changed from normal to abnormal conditions or many visits of patients with a specific clinical symptom and suspicion of disease. The previous management structure cannot work and there should be a structure under the title of an incident command system that switches from a normal to an abnormal state. This incident command system is on paper.

Person (17)¹⁷ stated, "In the discussion of risk assessment and risk management, which is one of the most important points of hospital accreditation, all hospitals work. We perform analyses in both structural and non-structural discussions and we are evaluating 5 factors, including floods, earthquakes, etc., which may affect us, but if we go to prepare there, we will face the barrier of not having strong resources, we must have resources to prepare." Person (10)¹⁰ said, "Risk Assessment is the most important thing to do when preparing for all risks and let us see how likely it is that we will be involved in pandemics or epidemics again, and then we have to write a program for it, not only the All Hazard program, also, based on Risk Assessment, there is a serious risk."

6.2 | EDRM

The results of the study indicated that the hospital does not have a comprehensive plan for resilience in crisis situations and in some cases, the plans are not fully implemented and the managers do not have enough information in the field of managing the risk of accidents and disasters.

Person (9)⁹ stated that "the discussion that exists in the management structure to have a process for management in emergency situations has not yet taken place in hospitals in the field of accident and disaster management."

7 | MANAGEMENT OF INFECTIOUS DISEASES

7.1 | Education

Regarding the management of infectious diseases in hospitals, the results of the study showed that the key dimensions in the control of the epidemic of infectious diseases in hospitals are education, instructions and guidelines, infection prevention and control, and treatment management.

Person (11)¹¹ said, "Health personnel received more training than hospitals." The health personnel were trained for syndromic cases, but this training was not given in the hospital. Training personnel on how to deal with infectious diseases, personal protection, using gloves, and removing gloves was one of the weak points, and they should be trained not to be surprised.

7.2 | Protocol and instructions

Person (4)⁴ stated, "The documents of the by-laws must be implemented, we are weak in the implementation, you can now go to who, it will give you a 200-page guideline on how to manage the COVID-19 pandemic in the hospital, detailed information has been given, human resources How should the planning be, how should the disinfection equipment be, there are guidelines but they are not implemented. Now, why are we weak, it should be investigated, an autopsy should be done, and its pathophysiology should be found. Uninformed people were placed in the wrong places. Professional competence is not respected. People who are educated in that profession are not consulted."

7.3 | Infection prevention and control

Person (8)⁸ said, "The entrances of the hospital should be modified. The entrance routes of the hospital should be modified toward the target departments. Let us put an initial barrier to separate the noninfectious from the infectious."

7.4 | Treatment management

Person (17)¹⁷ stated, "In the discussion of COVID-19, it was a pandemic and it was global. In the city of Babol, when we got involved, a good coordination was done with the telecommunications and a very good hall was provided to the university "that we were doing

outpatient treatment of covid-19 patients there and it had a very good result, it had prevented the excessive pressure of the hospitals.”

Person (12)¹² stated, “The work pressure was very high in treatment, although we were able to reduce the workload with health and prehospital discussions, counseling teams, counseling hotlines. However, it was still in hospital treatment areas, and now that we can use health much better, so that they can control the cases and not go to the hospital.”

8 | DISCUSSION

This study was conducted with the aim of determining strategies for managing the crisis of infectious diseases in hospitals. In this study, the results were analyzed and categorized using qualitative methods and content analysis. Finally, the research findings were classified into four main themes of leadership and management, supervision, safety and resilience, and management of infectious diseases and 15 subthemes in different dimensions (planning, resource management, inter- and intradepartmental coordination, macro-policy, syndromic care system, EDRM, training, protocol and guidelines, infection prevention and control, and treatment management) that are effective in the management of epidemics of infectious diseases in hospitals. The interviewees in this study stated that one of the important agents in the achievement of the successful management of epidemics of infectious diseases that health officials and managers should pay attention to having a special plan for the risk of epidemics, Resource management (manpower, financial resources and their optimal management, information management, supplies, medicine and medical equipment) is the need for inter- and intradepartmental coordination to facilitate the provision of hospital services. In this regard, the results of the study by Hui et al. showed that to increase preparedness to deal with infectious diseases of urgent importance, hospitals should review/update their emergency plan in time, hospitals must be prepared to respond not only to infectious diseases of immediate importance, but also to diseases that occur infrequently and appear suddenly, accurate and timely identification, isolation and identification of an unknown pathogen is essential for choosing appropriate preventive and treatment measures, hospitals should have continuous training of manpower and conduct disaster maneuvers, improve diagnostic capacities and have sufficient drugs, equipment, and personal protective equipment (PPE) and have better communication with other hospitals and public health organizations.²⁹ Wichmann et al. identified important and necessary prerequisites for the successful management of an epidemic by admitting many critically ill patients, in a short period of time, definitely the appropriate spatial capacities (single rooms, special isolation sections if necessary), appropriate personnel, materials (PPE, etc.), drugs and equipment (ventilation, dialysis machine). Other related aspects are known.³⁰ Most of the interviewees stated that the prepared plans, and the incident command chart were not operational and that the hospitals did not fully follow the protocols and instructions. However, in Kanwar et al.'s study, all the responding hospitals stated that to

respond to the epidemic of infectious diseases, the full implementation of the infection control program, the existence of incident command structures and the employee health protection program are necessary.³¹ One of the solutions presented by the interviewees in the field of leadership and management during the epidemic of infectious diseases is human resource management. In this regard, Shamshiri et al. stated that issues related to labor management, including the lack of manpower, the fear of becoming infected with COVID-19 and leaving the service and the burnout of employees due to the long-term crisis are among the main challenges in providing clinical care for patients with COVID-19 and recruiting, training, developing and retaining personnel. The use of volunteer labor, considering physical and mental motivations and the transfer of labor from less involved areas and most importantly, creating an atmosphere of solidarity among employees, were effective solutions address with the shortage of labor related to the crisis.³²

The results of our study showed that one of the effective factors in leadership and management is the creation of internal and external coordination, and one of these coordination factors is creation of better communication between the health sector and treatment. In this regard, Rooij et al. stated in their study that health facilities and hospitals need better communication when preparing for a crisis because it is clear that there is no uniform terminology among professionals, for example in healthcare the term “scaling” is used to respond to an actual patient. But used in public healthcare during preparedness, the lack of uniform terminology hinders communication between the two sectors, while communication between the two is essential during a threat or outbreak.³³

The results of the present study showed that hospitals should have a plan to manage the risk of accidents and disasters as well as increase capacity in the waves of infectious diseases and organize specialized meetings. Additionally, in their study, Koka et al. stated that to promotion the capacity of hospitals in responding to disasters, the number of specialized staff should be increased, there was no disaster response planning in the investigated hospitals, and they did not have plans for capacity building, such as discharging stable patients from the wards, canceling elective surgeries and manpower call.³⁴ In their study, Jang et al. stated that hospitals should monitor staff safety by providing appropriate PPE and mental health support during outbreaks and the role of the hospital in relation to the staff, response to the safety and care of the staff during the outbreak of infectious disease is very important.³⁵

Some of the interviewees mentioned the inadequacy of the country's syndromic care system as one of the effective reasons for the hospital not being ready to manage a large number of visiting patients, if, based on the results of the study by Cha et al., South Korea has four infectious disease crisis warning systems, the first stage is the emergence of new epidemics abroad, the warning stage is when there are few cases of disease transmission, and in this stage, medical centers take measures for increase preparedness, and the third stage was to upgrade to the “red” level during the outbreak, this course is a stage of “preventing the spread and ensuring the safety of employees,” the main keywords were “confirmed patients,”

"trajectories," "PPE," "new coronavirus infections," "announcements," "interviews," "situation rooms," "protective equipment," "change," "movement," "doctors," and "support," the fourth step is "improving the management system based on the revision of the guidelines," the keywords of this course were "new coronavirus infections," "entries," "changes," "processes," "interviews," "management processes," "guidelines," "responses," "operations," "visitors," "notices," and "mobile devices," medical centers should be ready for confirmed patients and hold meetings to design the care plan, operation and use of resources, provide necessary facilities, provide human resources, define job descriptions and train employees, these institutes should compile the methods of caring for patients during the epidemic and periodically organize trainings related to the guidelines.³⁶ Dehcheshmeh et al. stated that for the infectious disease care system to be effective in hospitals, it is necessary to pay attention to policies and macro plans, provision of resources, organization, interaction, and the existence of monitoring programs, also, the existence of manpower and information resources are other influencing factors on the care system. The effective care system identifies and responds to the occurrence and spread of the disease in time.³⁷

In the conducted interviews, on the issue of macro policy, the necessity of inviting experts in meetings and participation in macro decisions and formulation of guidelines was mentioned by most of the interviewees. In Nhan et al.'s study, the doctors were dissatisfied with the type of decision-making system from top to bottom, also the doctors pointed out the absence of a transparent and independent decision-making system and suggested involving more specialists in decision-making and having more independence.³⁸

Another key point in better and timely response to the epidemic of infectious diseases, which was mentioned by the interviewees, is the implementation of disaster risk management standards, four stages of crisis management including prevention, preparedness, response, and recovery, hospital risk assessment and interventions based on them, and coordination between members of the crisis team in the hospital. In this regard, the results of the study by Dehghani et al. showed that there are no risk assessment tools for hospitals in the field of epidemics, and it should be one of the priorities of health managers, by evaluating the level of preparedness in dealing with possible disasters, the probability and severity of damage can be reduced, which is one of the important aspects of safety in hospitals is functional safety in epidemics that can reduce the prevalence in society and the bad clinical conditions of patients by improving infrastructure, training health workers, using new methods of rapid warning, reducing workload and financial pressures, and finally the health system will adapt.³⁹

Additionally, Zhong et al. stated that there are eight important areas in hospital resilience, four key areas were extracted, the most important of which is rapid medical care, while safety and disaster management methods and resources support this feature to ensure its continuity and improvement, this resilience framework seeks resilience before disasters and speeding up response and recovery, therefore, they should be more resilient to disasters to provide health services and have better conditions for preparing and responding to disasters in the above fields.⁴⁰

To control the spread of infectious diseases in hospitals and better manage of infected patients, many of the interviewees suggested compliance with infection prevention and control standards such as separating the entrance of infectious and noninfectious patients to prevent the internal spread of the disease and reduce exposure. In this regard, Magro et al. stated vital factors for maintaining performance in crisis situations as follows⁴¹: Accurate patient triage is critical, diagnosis of COVID-19 cases no later than hospital admission is needed to maintain patient and employee safety, patients whose disease was not diagnosed should be treated as potentially infected until proven otherwise and² the hospital must be able to function as two separate hospitals, one COVID-19 hospital and one non-COVID-19 hospital, with well-defined and defined pathways that never intersect.⁴¹

Some of the patients declared that the teaching of preventive instructions and precautions of infectious diseases to employees is effective in dealing with the epidemic of infectious diseases in the hospital. In the study of Tago et al., Japanese hospitals that had the experience of COVID-19 also stated that for better preparation and response in future epidemics, infection control topics should be taught to the staff, In this regard, they stated that on a regular basis, academic and governmental bodies, including general medical associations, including general medical societies such as the Japanese Society of Hospital General Medicine and the Japan Society of Internal Medicine, should regularly educate the Japanese on epidemic crisis management for better preparedness.⁴²

Another result of the interview was the role of valid and scientific guidelines, and teaching guidelines in the management of infectious diseases. As shown in the study by Markiewicz et al., public health epidemiologists actively monitor admissions, laboratory, and death reports for their hospital systems, which account for 39% of general/acute care beds in North Carolina, north Carolina's syndromic care efforts are increasing in the state, although epidemiologists do not run infection control programs, they can use hospital information to investigate unusual cases and clusters of infectious disease in a hospital, additionally, the results of this study show that epidemiologists are improving the management of infectious diseases in North Carolina by completely improving the reporting of infectious diseases, the North Carolina Department of Public Health staff then uses the information provided by epidemiologists, along with federal guidelines, to develop guidance (e.g., definitions, testing guidelines, isolation, and quarantine protocols) for healthcare providers, this guide was communicated to hospitals through epidemiologists, who distributed it to appropriate hospital staff and helped develop H1N1-related hospital protocols and policies.⁴³

Another problem related to the instructions that was mentioned in the interviews was the confusion of the employees due to the communication of serial and numerous instructions. In Nhan et al.'s study of clinical practice guidelines, respondents found that the content of these guidelines was inconsistent between different levels of epidemic management and advisory committees. Doctors were confused about which to follow, especially when it was contradictory, and the changing nature and slow dissemination of these guidelines

were considered problematic and too rigid to adapt to specific regional and local situations.³⁸ Koka et al. also showed that valid triage protocols and training are essential to ensure effective care and appropriate use of resources. While the knowledge and performance of hospital staff were not directly assessed, their findings also indicate the existence of a potential gap in the readiness and ability of hospital staff to respond, and future studies should focus on studying and addressing this gap.³⁴

9 | STRENGTHS AND LIMITATIONS

Although this qualitative study, due to the participation of managers and professionals in the health field, has addressed the basic problems of hospitals that were dealing during the epidemic of infectious diseases, on the other hand, due to the scope of the issue, all the vital aspects and strategies that can be presented for preparing to address the epidemic of infectious diseases were not reported. Therefore, we suggest focusing on other issues of hospitals in dealing with infectious diseases for future research.

10 | CONCLUSION

The results of this research showed that due to the unpredictability of epidemics, the strategies of the health system in dealing with the epidemic of infectious diseases to overcome the obstacles and challenges of preparation and response in the fields of stewardship, leadership and management, safety and resilience, and management of disease treatment. Infectious diseases are facing many challenges and to prevent such situations, the health service delivery system, both at the level of the health system and at the executive level, should formulate and implement a disaster preparedness plan for each unit. In this regard, health managers. They can use the solutions presented in this research in future policies and planning to respond better to the epidemic of infectious diseases in hospitals. The implications of the study include the following: First, by examining the challenges faced by hospitals during the COVID-19 pandemic, this study can help health managers design preparedness and response plans. Second, it shows that for proper response during the epidemic of infectious diseases, the Ministry of Health, universities of medical sciences and affiliated hospitals should have multiway communication to consider all aspects. Third, the key factor in the success and operationalization of disaster preparedness and response programs is the formulation of principles and science with the participation of experts and the justification of its beneficiaries. Finally, this study shows the importance of designing a hospital crisis management model that makes hospitals resilient in such situations.

AUTHOR CONTRIBUTIONS

Shahrzad Mahmoudjanlou collected the data. Shahrzad Mahmoudjanlou and Mohammad-Ali Jahani analyzed and interpreted the data and wrote the original draft of the manuscript. Ghahraman

Mahmoudi conceived and designed the study. Ghahraman Mahmoudi and Mohammad-Ali Jahani supervised data collection and analysis. All authors contributed to reviewing and editing the manuscript.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The corresponding author had full access to all the data in this study and takes complete responsibility for the integrity of the data and the accuracy of the data analysis. The data can be made available upon reasonable request from the corresponding author.

TRANSPARENCY STATEMENT

The lead author Ghahraman Mahmoudi affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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