


## Original Research

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# Pre-hospital Emergency Service Challenges in the Face of the COVID-19 Pandemic in Iran

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## Abstract

**Objective:** With the outbreak of coronavirus disease 2019 (COVID-19), the workload of the Iran's health-care system along with the Pre-hospital Emergency Service (PHES) increased significantly so that Iranian fledgling emergency system had never experienced such a crisis. With regard to the importance of the function of PHES as the front-line staff of Iran's health system and its role in controlling the recent epidemic crisis, this study was conducted to identify the challenges of PHES function in the face of COVID-19 pandemic.

**Methods:** The study was conducted with qualitative approach through content analysis in 2021. Semi-structured interviews were used to collect data. Sampling was purposive and continued until data saturation. After 24 interviews, the data were saturated. The extracted codes were thoroughly prepared as a data pool. After encoding all available data, the related codes were categorized into a single theme. After extracting the themes, a network of themes, related to the research topic, was drawn, and then, the relationship between the themes was analyzed.

**Results:** Data analysis undertaken for the qualitative study resulted in the identification of 4 main themes included: challenges related to facilities and equipment, living with uncertainty, professional and organizational capabilities, and burnout.

**Conclusions:** PHES personnel have an important and key role in providing care to patients during COVID-19 epidemic period. Individual and systemic challenges were among the most important issues in the experiences of these personnel. These challenges require organizational planning and special attention of health policy-makers to maintain the staff's physical and mental health during the pandemic and the possible crises ahead.

In late 2019, several patients developed respiratory problems of unknown cause. Through investigation, it was revealed that a sort of coronavirus, first reported in Wuhan, China, with an unknown source of transmission was the cause.<sup>1,2</sup> Due to the large spread in geographical areas, many people are not sure how they got the virus.<sup>3,4</sup>

According to the guidelines of the Centers for Disease Control and Prevention (CDC), the incubation period of the disease is approximately 2 wk. The virus infected almost all countries in less than a month.<sup>5,6</sup> Pre-hospital Emergency Service (PHES) is a system for managing all aspects of outpatient care. This system is 1 of the most important components of health and is essential for improving the consequences of time-sensitive accidents and diseases.<sup>7,8</sup> PHES as the first line of care and treatment in dealing with emergency patients is of considerable importance.<sup>9</sup> Approximately 47 y have passed since the foundation of PHES in Iran. Currently, it's more like the Anglo-American model. The provided services are often Basic Life Supports (BLS).<sup>10</sup> PHES staff face different challenges during their working period. In this regard, the results of studies show that emergency staff experience significant stress, because they are the first persons to be involved in accidents, including road and natural disasters.<sup>11</sup> In the study conducted by Shakeri et al., items such as lack and inappropriate distribution of emergency bases, nonstandard bases, lack of standard ambulance and burnout existing ambulances, lack of Standard Operating Procedures (SOPs), imperfect medical direction (10-50 code), and lack of specialized fleet operations (air, rail, and marine) are considered as the most important problems of pre-hospital emergencies service.<sup>12</sup> Due to the special nature of emergency services, they are very important factors in the effectiveness and efficiency of services.<sup>12</sup>

It is important to study how the main providers of PHES view the concept and tasks of prevention and care services, and to what extent, they believe in participating in service integration programs. And finally, what challenges they see in the field of upgrading preventive services at the emergency level. In any case, PHES personnel are one of the groups that have the most

evidence-based information in this field and are very aware of the challenges due to their involvement in executive work.<sup>13</sup> Time constraints in dealing with patients' emergencies, patients' companions' expectations, fear of incompetence in saving the lives of dying people, decision-making in critical situations, and manpower-related factors form conditions that predispose the staff and employees of this unit to tension. Therefore, these challenges affect their quality of work in health threatening situations and the areas covered by them.<sup>14</sup>

With the outbreak of coronavirus disease 2019 (COVID-19) epidemic, the workload of the PHES has also increased so that according to the head of Iranian emergency unit, the number of calls with emergency communication unit has increased 4-fold.<sup>15</sup> During the epidemic, in addition to its usual duties, the PHES is responsible for not only transferring COVID-19 positive patients between medical centers but also transferring suspected patients with COVID-19 symptoms. Therefore, with regard to the importance of the function of PHES as the front-line staff of Iranian health system and its role in controlling the recent epidemic, this study was conducted to identify the challenges of PHES in the face of COVID-19 crisis.

## Methods

### Research Design

This study was conducted from July 2020 to February 2021 using qualitative content analysis to obtain the experiences of participants about PHES challenges during the COVID-19 pandemic in Iran. As a research method for making replicable and valid inferences from data, content analysis was considered.

### Participants

Participants were purposively sampled from PHES personnel who work in PHES during COVID-19 in Chaharmahal and Bakhtiari Province, Iran. The inclusion criteria were PHES personnel who provided direct care to confirmed COVID-19 patients and have rich and in-depth knowledge and experience of the concept under study and agreed to join in this study. A total of 24 personnel were joined in this study.

### Data Collection

Data were collected through semi-structured in-depth interviews from February to June 2020. Preliminary interview outline was drafted based on literature review and experts' opinions, and pre-interview from 2 PHES personnel. The main questions were the following:

1. What challenges did you encounter during COVID-19 outbreak?
2. How did you cope with these challenges?
3. What impact do you think these challenges will have on your work?

After explaining the aim of study and agreement of participant, researchers arranged the time and place of interview based on participants' wishes. In this study, 24 interviews were conducted, including 22 formal interviews, and 2 secondary interviews. Sampling was maintained to the point of data saturation. Data saturation was achieved when no new data could be collected.<sup>16</sup> An attempt was made to determine the place of the interviews by

the participant,s and each interview lasted approximately 60 to 80 min. With participant permission, all interviews were recorded, the statements were recorded and transcribed verbatim at the end of each interview.

### Data analysis

A research team transcribed the audio recordings word-by-word into written materials, also nonverbal information included. All interviews, original transcripts, and data analysis were in Persian version. All quotations were translated forward and backward into English to ensure that they retained meaning. Data analysis was carried out using the content analysis method as follows: (1) Read and re-read the written materials several times to generate their feeling or thought also researchers noticed latent content, such as posture, crying, silence and, etc. (2) Inductive content analysis was used to organize the data, categorizing into a cluster of themes and verifying with the original statement. (3) All the findings were returned to participant to re-check and revise based on the participant' feedback.<sup>17</sup>

### Rigor

To check the rigor of the findings, the credibility, dependability, confirmability, and transferability criteria were used.<sup>18</sup> To ensure the reliability of the research results, data analysis was carried out by 2 researchers at the same time.<sup>19</sup> Peer checking and maximum variation of the sampling attested to the conformability and credibility of the findings and underpinned the effort to obtain as wide and varied an experience of the phenomenon as possible. To ensure the accuracy of the collected data, the researcher used long-term and deep engagement with the data. Also, to increase the validity of the data, sampling with maximum variety and review of manuscripts was used by the participants and supervisors who were experienced qualitative researcher.<sup>20</sup> Transferability was proven by using in-depth interviews to reflect differences in participant characteristics and adequate quotes gathered.<sup>21</sup>

### Ethical Considerations

All participants gave written informed consent to participate in the study. Moreover, the study was approved by the Ethics Committee of Shahrekord University of Medical Sciences (IR.SKUMS.REC.1399.043)

## Results

### Demographic Characteristics

The mean age of the participants was 36.7 y, and all of them were male. It is noteworthy that the PHES in Iran is managed by male operational personnel, and women have not yet entered this field. The demographic characteristics of the participants are presented in [Table 1](#).

After performing the qualitative content analysis steps, the extracted codes formed the categories and similar sub-categories codes, and then, the sub-categories with common concepts were placed in a category and formed the themes. The main themes, extracted in the present study, included challenges related to facilities and equipment, living with uncertainty, professional and organizational capabilities, burnout. The list of the main and sub-categories is presented in [Table 2](#).

**Table 1.** Individual characteristics of the participants

Participant no.	Age (years)	Work experience (years)	Work place	Educational level	History of coronavirus infection (PCR test)
P1	38	21	Emergency department	Master's degree	No
P2	35	9	Road emergency base	Bachelor's degree	Yes
P3	40	15	Emergency department	Master's degree	No
P4	28	7	Road emergency base	Bachelor's degree	Yes
P5	49	28	Emergency department	Bachelor's degree	No
P6	31	6	Urban emergency base	Bachelor's degree	No
P7	30	7	Urban emergency base	Technician	Yes
P8	27	5	Urban emergency base	Master's degree	Yes
P9	26	6	Urban emergency base	Technician	No
P10	36	10	Road emergency base	Bachelor's degree	Yes
P11	41	15	Road emergency base	Bachelor's degree	No
P12	28	5	Urban emergency base	Technician	Yes
P13	33	5	Emergency department	Bachelor's degree	Yes
P14	35	7	Urban emergency base	Master's degree	Yes
P15	37	9	Urban emergency base	Technician	No
P16	31	8	Road emergency base	Technician	Yes
P17	45	22	Emergency department	Technician	Yes
P18	34	9	Road emergency base	Bachelor's degree	No
P19	37	12	Emergency department	Master's degree	No
P20	30	6	Urban emergency base	Bachelor's degree	No
P21	42	17	Road emergency base	Technician	Yes
P22	57	28	Urban emergency base	Ph.D.	No
P23	46	21	Urban emergency base	Master's degree	Yes
P24	47	21	Urban emergency base	Ph.D.	No

### Theme 1. Challenges Related to Facilities and Equipment

One of the concepts extracted from the PHES personnel experience was the challenges related to facilities and equipment. This theme included 3 main categories of “structural challenges,” “challenges of human resources,” and “challenges of medical equipment.”

#### Category 1. Structural Challenges

According to the data, this category included the subcategory of conflicts in the regulations for pandemic and lack of a clear operations manual for pandemic.

##### Subcategory 1. Conflicts in the Regulations for Pandemic; Subcategory 2. Lack of a Clear Operations Manual for Pandemic

Lack of transmission protocol in the early phase of the epidemic was the most important problem mentioned by participants in most interviews. Confusion in the rules for dealing with pandemic conditions and how to treat COVID-19 patients caused confusion among the staff, especially in the early days of the epidemic.

*“There was no clear protocol for how to transfer the patients in the early phase of the epidemic. Protocols were sent over time, and we did not have clear rules for dealing with those conditions”.* (Patient 22)

#### Category 2. Challenges of Human Resources

Challenges, related to human resources, were 1 of the issues, raised by PHES personnel. It was a challenge that all medical staff somehow struggled with.

##### Subcategory 1. Personnel Shortages; Subcategory 2. Personnel Risk of Infection

Lack of trained personnel to deal with the crisis was a challenge that was mentioned in most interviews. Personnel were not allowed to be absent or on leave, and if several personnel were involved with COVID-19 at the same time, other personnel would be subjected to heavy workload. Emergency headquarters personnel said that the most important challenge for human resource management was the unpreparedness of the personnel to face the situation and the difficulty in replacing COVID-19 infected personnel.

*“We did not have an alternative human power in the emergency medical forces, which is due to the long lasting lack of personnel in the field of emergency medicine for many years in Iran, and unfortunately, this has not been compensated. Almost every day, our EMTs were involved in shifts, and God forbid, if one of them would get sick, not with COVID-19 but with any other diseases, and could not work, we would really have a problem”.* (Patient 21)

#### Subcategory 3. Challenges of Medical Equipment

Lack of adequate personal protection equipment (PPE), such as N95 respirators, medical masks, eye protection, gowns, and gloves, and difficulty in distributing available facilities were some of the challenges that were repeatedly mentioned in the participants' remarks. One of the emergency medical personnel with 22 y of experience and 45 y of age stated:

*“We really had a problem because our staff did not have enough emergency equipment, and the personal equipment, needed for the patient, were not available and a new barrier was created for us in the first days. We had almost as many personal protection kits as a mission because we did not need more than that before, but now the situation was like a shock”.* (Patient 17)

**Table 2.** Summary of themes and subthemes

Themes	Main category	Subcategory
Challenges related to facilities and equipment	Structural challenges	<ul style="list-style-type: none"> <li>• Conflicts in the regulations for pandemic</li> <li>• Lack of a clear operations manual for pandemic</li> <li>• Issuing successive and delayed and sometimes contradictory instructions by health authorities</li> <li>• Inefficient information system</li> <li>• Lack of prediction and practice and maneuvering about the epidemic conditions of the disease</li> <li>• Unpreparedness of the country to control the disease</li> <li>• The community's and officials' shock resulted from epidemic</li> </ul>
	Challenges of human resources	<ul style="list-style-type: none"> <li>• personnel shortages</li> <li>• Personnel risk of infection</li> </ul>
	Challenges of medical equipment	<ul style="list-style-type: none"> <li>• Lack of financial resources to purchase equipment</li> <li>• Lack of ambulances to transport COVID-19 patients</li> <li>• Increasing the price of medical equipment and low quality of personal protective equipment</li> <li>• Lack of personal protective equipment</li> </ul>
Living with uncertainty	Inability to overcome fears	<ul style="list-style-type: none"> <li>• Fear of getting sick</li> <li>• Fear of death</li> <li>• Fear of transmitting the disease to family members and friends</li> <li>• Fear of cross contamination, made by emergency service providers</li> </ul>
	Inability in psychological adjustment	<ul style="list-style-type: none"> <li>• Anxiety due to separation and quarantine and lack of communication with others</li> <li>• Psychological turmoil</li> <li>• Anger and irritability</li> <li>• Confusion and wondering</li> <li>• Feeling frustrated with the situation/getting to the end of the line</li> <li>• Feeling empty</li> <li>• Lack of motivation to work</li> </ul>
Professional and organizational capabilities	Poor organizational and financial support	<ul style="list-style-type: none"> <li>• No financial support of the pre-hospital</li> <li>• Lack of planning of financial support for the personnel</li> <li>• Doing injustice in payments</li> </ul>
	Personnel lack of knowledge and skills related to pandemic	<ul style="list-style-type: none"> <li>• Lack of staff's knowledge about the dimensions of the disease</li> <li>• Lack of knowledge about how to use personal protective equipment</li> </ul>
Burnout	Conflict between patient and family needs	<ul style="list-style-type: none"> <li>• Decreased work motivation among personnel</li> <li>• Forced separation and distancing from the friends and family members</li> <li>• Fatigue and burnout due to epidemic persistence</li> <li>• Increased feelings of hopelessness about disease control</li> </ul>
	Inequality	<ul style="list-style-type: none"> <li>• Lack of necessary support from the authorities</li> <li>• Insufficient attention to the psychological status of the operational personnel</li> <li>• Different levels of exposure to infectious agents among official and operational personnel</li> </ul>

## Theme 2. Living With Uncertainty

Living with uncertainty was another challenge emphasized by participants. This theme consisted of 2 subthemes of “inability to overcome fears” and “inability in psychological adjustment”.

Fear of disease and death along with fear of transmitting the disease to family members and friends was one of the common feelings of all emergency personnel, which along with the anxiety of the separation and quarantine caused anger and irritability of the personnel and their confusion and wondering about staying at work or resigning.

*“It had a bad psychological and physical effect on us. We lost a lot of weight due to stress. We were very worried about not getting sick at home and we were worried about our family and parents. It was our biggest challenge”.* (Patient 9)

## Theme 3. Professional and Organizational Capabilities

Another concept extracted from PHES personnel experiences was the organization's inefficiency in providing support for personnel.

This theme included 2 subthemes of “poor organizational and financial support” and “personnel lack of knowledge and skills related to pandemic”. According to data analysis, no financial support of the hospital and personnel's, failure to rewarding the personnel, discrimination (injustice) in payments were important subcategories of this subtheme.

A staff member of the road emergency base with more than 200 h of not-paid overtime during the corona outbreak stated: *“Our staff expected (and are yet expecting) that when they all leave their homes and work hard, the system financially would help them, which unfortunately, did not happen”.* (Patient 4)

Lack of knowledge about the nature of the disease and inability to use PPE were the most important professional incompetences of personnel.

Continuation of pandemic in Iran and experience of multiple waves of COVID-19 disease outbreak has caused double fatigue along with psychological effects among emergency personnel, so that people and medical personnel believe that the disease is uncontrollable. They are not optimistic about the future.



#### Theme 4. Burnout

Burnout was another concept extracted from data analysis. Based on the participants' experiences, conflict between patient and family needs and inequality were important factors that led to some complications including burnout. PHES expressed the following items as exhaustive challenges that lead to conflict between patient and family needs: reduced willingness and motivation among personnel, forced separation and distance from friends and family members, excessive fatigue and exhaustion due to epidemic persistence, and increased sense of hopelessness about disease control.

*"Our technician was also concerned about the mission and how to protect himself from the disease, and on the other hand, he wanted to provide services to the patients. He was worried that his services would be disrupted as well. The conflict between doing his job and supporting his family was his other concern". (P23)*

#### Discussion

In the results section, 4 themes, extracted from the participants' remarks, were mentioned in detail, which included the challenges related to facilities and equipment, living with uncertainty, professional and organizational capabilities, burnout. challenges related to facilities and equipment were 1 of the important issues, raised in the participants' statements. With the onset of the COVID-19 epidemic in Iran, PHES personnel, like other members of the health-care team, faced challenges related to the lack of equipment and facilities, especially PPE such as masks and shields, etc. In similar studies, conducted in other countries, lack of PPE and officials' shock when faced with the epidemic were mentioned among the experiences of medical staff, including nurses.<sup>22,23</sup>

Lack of experienced and skilled personnel as well as the weakness in managing the available forces, after a large number of personnel were involved with COVID-19 disease, were among the managerial and human resource challenges during the COVID-19 epidemic. Lack of preparatory programs to deal with epidemic conditions and lack of adequate training of personnel to deal with these conditions, as in many countries, caused managers to be shocked by the vast spread of disease and not to be ready to face the situation and challenges related to staff and human resources shortages in Iran.

In the study of Moradi et al., nurses in intensive care units with regard to their care experiences during the COVID-19 period stated that lack of facilities and financial resources to purchase PPE was a major challenge that caused inefficiency of care providers and hospitals in providing efficient and effective care during the epidemic period.<sup>24</sup> The experience of living with fear and doubt during COVID-19 period included fears of death and transmitting the disease to family members and also the fears associated with the unknown nature of the disease (ie, a shared experience that participants in a present study described as the worst psychological experience of their career). In a similar experiment, participants in the Bijani et al. study stated that fear of infection negatively affected their accuracy in doing their work and how they provided services, and that their fear of spreading the disease sometimes overwhelmed them, even in diagnosis and treatment. This fear did not allow them to thoroughly examine the patient.<sup>25</sup>

The inability to adapt psychologically to the stress, created during the COVID-19 period, caused the staff to develop anger and irritability, as well as confusion and wondering in their decision makings. Lack of motivation to continue working and feeling frustrated and reaching the end of the line were among the sentences

that were heard the most of the participants in the interviews. In addition to the patients' care and physical needs, the medical staff had to support the patients mentally and psychologically. But how could the staff (who themselves had the stress of transmitting the disease to their family members, and due to multiple shifts and wearing special clothes for long hours mentally were very upset physically and psychologically and were thinking of resigning) take adequate physical and mental care of their patients?

The destructive effects of COVID-19 on the physical and mental health of health-care and treatment staff were mentioned in most of the studies. Ferron et al. and Qureshi and Al Rajhi in their studies pointed to the psychological effects of the COVID-19 epidemic on their staff.<sup>26,27</sup> Sun et al. noted in his study that most caregivers and nurses experienced many negative emotions during the COVID-19 period, and that these emotions and their psychological effects, including fear and anxiety, were very significant in the early days of the epidemic.<sup>28</sup>

The individual competencies of the staff and the organization's ability to manage the crisis was another major theme, extracted from the statements of the participants in the present study. The emergency headquarters personnel of the PHES, participating in the present study, believed that the quantity and quality of emergency unit services underwent many changes during the COVID-19 period because, in addition to the issue of providing a sufficient number of staff, their skills in providing quality services should also be considered. And this was challenging due to the lack of sufficient skills and work experience of young personnel in the operational departments.

In his study of the ethical challenges of nurses during the COVID-19 period, Rezaee et al. concluded that, according to the experience of the participants, the care of patients with COVID-19 put additional pressure on nurses, and this led to a deficiency in providing appropriate services to patients. In the end, the researcher suggested that it is better for hospital managers to hire experienced nurses in addition to providing just a sufficient number of them.<sup>29</sup>

Having effective coping skills and adapting to the situation, decision-making and evidence-based prioritization, coordination and ability in teamwork, work commitment, self-sacrifice, and courage were among the abilities that participants mentioned in their experiences. They expressed that according to the high volume of work and the complexity and unpredictability of the situation, the challenge of unskilled and incapable manpower in the PHES unit made the situation much more difficult and increased the number of errors and diagnostic problems in their missions.

In the Jia et al. study, which aimed to examine nurses' experiences of ethical challenges in providing care to patients with COVID-19, professional competence and effective coping skills were among the factors that could affect the way nurses provided care. Participants expressed that nurses needed special knowledge and skills to adapt to the ethical challenges that arose during the COVID-19 period, so that they could choose the most effective strategy and make the right decisions with the help of critical thinking.<sup>30</sup>

Another challenge from the participants' perspective is burnout. Conflict between patient and family needs and inequality were 2 challenges that all PHES personnel experienced in different types and to different degrees. Decreased work motivation among staff due to forced separation and distancing from family members and extreme fatigue, made by the continuation of the epidemic, caused burnout in staff, and this had a negative impact on staff's performance and morale. Participants compared and described

the conditions, created during the epidemic, with those of the imposed Iran-Iraq war. They narrated that, during this period, they also experienced a feeling like the soldiers in the war in the out-of-town bases due to long days away from the family and heavy shifts resulted from load of work. However, they tried to endure the difficult conditions. Khasne *et al.* in a descriptive cross-sectional study investigated the prevalence of burnout in health-care workers during COVID-19 pandemic in India and reported a prevalence of burnout of approximately 45%. The routine prevalence of burnout was reported as only 27%, while the rest of the burnout cases were related to pandemic. Younger men, and women experienced more burnout in this study.<sup>31</sup>

Based on the experience of the participants, injustice was one of the most important factors that exacerbated the rate of burnout. They emphasized that lack of necessary support from the authorities and insufficient attention to the mental and psychological condition of the operational personnel caused dissatisfaction and reduced work motivation. Worst of all, despite the different levels of exposure to the infectious agent between the staff and the operational personnel, there was no difference in the amount of the payment received by the personnel. This caused dissatisfaction among operational personnel.

In their article, Mehtarpour and Jaafari-pooyan mention the injustice and discriminations as the main factors that can negatively affect the performance of nurses. Nurses' complaints were mainly about discrimination in payment, job benefits, and high workload (due to insufficient nursing staff) leading to consequences such as fatigue and burnout, lack of knowledge and motivation and severe stress.<sup>32</sup> Participants in Moradi *et al.* study pointed to the difference in the amount of payment to physicians and nurses in Iran during the COVID-19 period and stated that, despite less exposure of physicians to virus-infected patients, compared with nurses, injustice in receiving PPE and salaries and benefits occurred as an unpleasant experience, which reduced their motivation to work and intensified their sense of exhaustion. They considered this to be rooted in the doctor-dominant policies in Iran and believed that the management system should provide adequate support to nursing staff during an epidemic and high pressure of workload.<sup>24</sup>

It is noteworthy that a main and impactful challenge in the Iranian relief system, includes the lack of the same telephone number (SOS response) for emergency rescue services such as PHES, as well as firefighting, Iranian Red Crescent Society, and police departments. If implemented, the system will reduce response time and inter-organizational inconsistencies.<sup>12,33</sup>

### Limitations

One of the limitations of this study was the working conditions of the emergency staff in such a way that, whenever there was a possibility of an emergency mission, interviews had to be left incomplete. To address this, the interview schedule was coordinated with participants during leisure and nonworking hours as much as possible. Another limitation of the study was the possibility of transmission of COVID-19 disease between the researchers and the study participants, for which it was tried to conduct the interviews outdoors as much as possible and in accordance with health guidelines.

### Conclusions

Regarding the fact that PHES personnel are among the front-line health workers in any disaster, including the COVID-19 outbreak,

so they encounter different personnel and organizational challenges that make them exhausted; therefore, it is essential to consider their health and wellbeing through psychological and mental support services, suitably allocating resources such as PPE, and using experienced personnel to care for patients with COVID-19. Such efforts can provide safe care and can facilitate PHES personnel adaptation to the existing situation and optimize their performance. Sharing the experiences of participants in the recent study helps PHES managers, staff, and other members of the health-care team to learn from the challenges posed and avoid problems and errors in similar cases by addressing weaknesses.

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**Conflicts of interest.** None.

**Ethical standards.** Written informed consent was gained from all participants and they were assured that their provided information will remain confidential. The present study was approved by Ethical Committee Medical Sciences University of Shahrekord (Ethics code: IR.SKUMS.REC.1399.043).

### References

1. Wang D, Hu B, Hu C, *et al.* Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. *JAMA*. 2020;323(11):1061-1069.
2. Zhou F, Yu T, Du R, *et al.* Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *Lancet*. 2020;395(10229):1054-1062.
3. Zhai Y, Wang Y, Zhang M, *et al.* From isolation to coordination: how can telemedicine help combat the COVID-19 outbreak? In: Wang Y, Wang WYC, Yan Z, Zhang D, eds. *Digital Health and Medical Analytics*. DHA 2020. Communications in Computer and Information Science, Vol 1412. Springer. doi:10.1007/978-981-16-3631-8\_12
4. Kucharski AJ, Russell TW, Diamond C, *et al.* Early dynamics of transmission and control of COVID-19: a mathematical modelling study. *Lancet Infect Dis*. 2020;20(5):553-558.
5. Stratton SJ. COVID-19: not a simple public health emergency. *Prehosp Disaster Med*. 2020;35(2):119.
6. Lai C-C, Shih T-P, Ko W-C, *et al.* Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): the epidemic and the challenges. *Int J Antimicrobial Agents*. 2020;55(3):105924.
7. Jadidi A, Safarabadi M, Irannejhad B, *et al.* Level of patients' satisfaction from emergency medical services in Markazi province; a cross sectional study. *Iran J Emerg Med*. 2016;3(2):58-65.
8. Saghafinia M, Motamedi MHK. Iranian EMS system. *Prehosp Disaster Med*. 2014;29(4):437.
9. Yang W, Cao Q, Qin L, *et al.* Clinical characteristics and imaging manifestations of the 2019 novel coronavirus disease (COVID-19): a multi-center study in Wenzhou city, Zhejiang, China. *J Infect*. 2020; 80(4):388-393.
10. Bidgoli HH, Bogg L, Hasselberg M. Pre-hospital trauma care resources for road traffic injuries in a middle-income country—a province based study on need and access in Iran. *Injury*. 2011;42(9):879-884.
11. Dadashzadeh A, Rahmani A, Hassankhani H, *et al.* Iranian pre-hospital emergency care nurses' strategies to manage workplace violence: a descriptive qualitative study. *J Nurs Manage*. 2019;27(6):1190-1199.

12. **Shakeri K, Jafari M, Khankeh H, et al.** History and structure of the fourth leading emergency medical service in the world; a review article. *Arch Acad Emerg Med.* 2019;7(1):e17.
13. **Farahmandnia B, Hamdanieh L, Aghababaeian H.** COVID-19 and unfinished mourning. *Prehosp Disaster Med.* 2020;35(4):464.
14. **Mastaneh Z, Mouseli A.** Investigating challenges of pre-hospital emergency services information system with a systemic approach: case study from the south of Iran. *J Modern Med Inf Sci.* 2019;5(1):41-49.
15. National Medical Emergency Organization, Ministry of Health & Medical Education. Accessed June 17, 2022. <https://www.115.ir>.
16. **Hesse-Biber S.** Qualitative approaches to mixed methods practice. *Qual Inq.* 2010;16(6):455-468.
17. **Sandelowski M.** Whatever happened to qualitative description? *Res Nurs Health.* 2000;23(4):334-340.
18. **Graneheim UH, Lundman B.** Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Educ Today.* 2004;24(2):105-112.
19. **Elo S, Kyngäs H.** The qualitative content analysis process. *J Adv Nurs.* 2008;62(1):107-115.
20. **Kyngäs H.** Qualitative research and content analysis. *The Application of Content Analysis in Nursing Science Research.* Springer; 2020:3-11.
21. **Speziale HS, Streubert HJ, Carpenter DR.** *Qualitative Research in Nursing: Advancing the Humanistic Imperative.* Lippincott Williams & Wilkins; 2011.
22. **Chang D, Xu H, Rebaza A, et al.** Protecting health-care workers from sub-clinical coronavirus infection. *Lancet Respir Med.* 2020;8(3):e13.
23. **Sun N, Wei L, Shi S, et al.** A qualitative study on the psychological experience of caregivers of COVID-19 patients. *Am J Infect Control.* 2020;48(6):592-598.
24. **Moradi Y, Baghaei R, Hosseingholipour K, et al.** Challenges experienced by ICU nurses throughout the provision of care for COVID-19 patients: a qualitative study. *J Nurs Manag.* 2021;29(5):1159-1168.
25. **Bijani M, Abedi S, Karimi S, et al.** Major challenges and barriers in clinical decision-making as perceived by emergency medical services personnel: a qualitative content analysis. *BMC Emerg Med.* 2021;21(1):1-12.
26. **Ferron R, Agarwal G, Cooper R, et al.** The effect of COVID-19 on emergency medical service call volumes and patient acuity: a cross-sectional study in Niagara, Ontario. *BMC Emerg Med.* 2021;21(1):1-8.
27. **Qureshi MN, AlRajhi A.** Challenge of COVID-19 crisis managed by emergency department of a big tertiary centre in Saudi Arabia. *Int J Pediatr Adolesc Med.* 2020;7(3):147-152.
28. **Sun N, Wei L, Shi S, et al.** A qualitative study on the psychological experience of caregivers of COVID-19 patients. *Am J Infect Control.* 2020;48(6):592-598.
29. **Rezaee N, Mardani-Hamooleh M, Seraji M.** Nurses' perception of ethical challenges in caring for patients with COVID-19: a qualitative analysis. *J Med Ethics Hist Med.* 2020;13:23.
30. **Jia Y, Chen O, Xiao Z, et al.** Nurses' ethical challenges caring for people with COVID-19: a qualitative study. *Nurs Ethics.* 2021;28(1):33-45.
31. **Khasne RW, Dhakulkar BS, Mahajan HC, et al.** Burnout among health-care workers during COVID-19 pandemic in India: results of a questionnaire-based survey. *Indian J Crit Care Med.* 2020;24(8):664-671.
32. **Mehtarpour M, Jaafaripooyan E.** Discrimination and dissatisfaction among nurses is a threat for objectives of policies? *Iran J Public Health.* 2020;49(4):800-801.
33. **Haddadi M, Sarvar M, Soori H, et al.** The pattern of pre-hospital medical service delivery in Iran; a cross sectional study. *Emerg (Tehran).* 2017;5(1):e57.