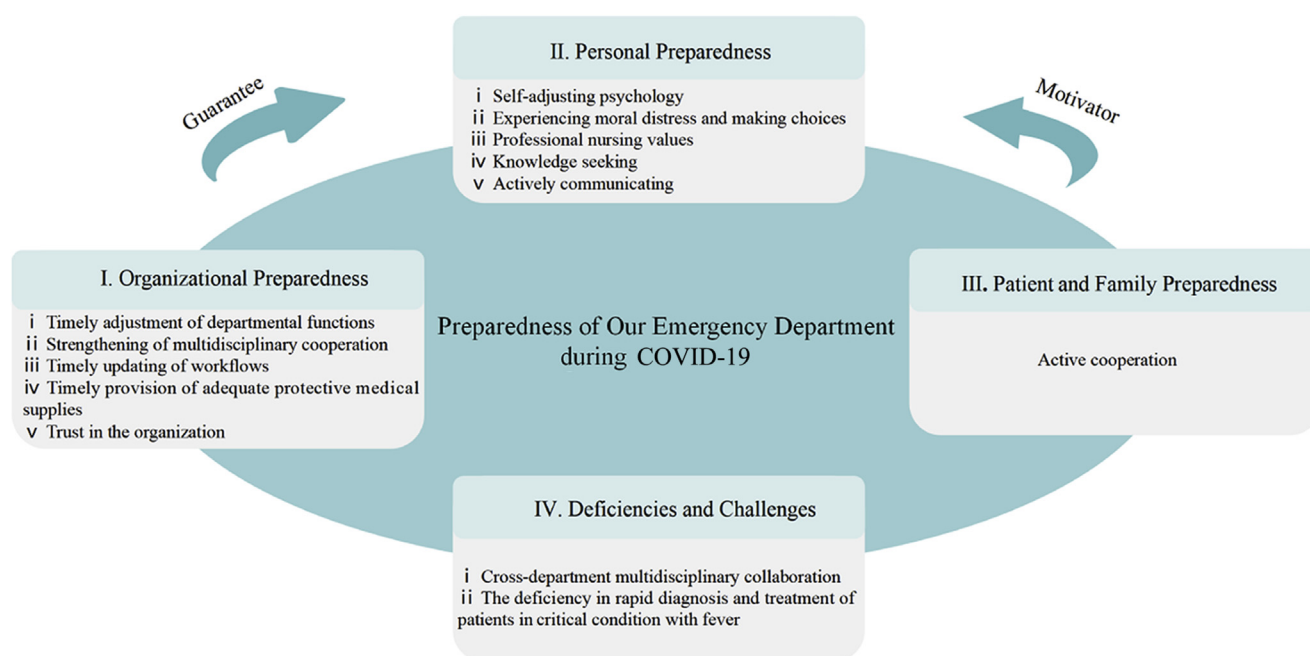




PREPAREDNESS OF OUR EMERGENCY DEPARTMENT DURING THE CORONAVIRUS DISEASE OUTBREAK FROM THE NURSES' PERSPECTIVES: A QUALITATIVE RESEARCH STUDY

Authors: Yongchao Hou, MD, Qian Zhou, MD, Dongzhi Li, BS, Yanhua Guo, MD, Jingjing Fan, BS, and Juzi Wang, MD, Taiyuan, Shanxi, China

Graphical abstract



Yongchao Hou is a Nurse, Emergency Department, Shanxi Provincial People's Hospital, Taiyuan, Shanxi, China. **ORCID identifier:** <https://orcid.org/0000-0002-2068-4978>.

Qian Zhou is a Nurse, Emergency Department, Shanxi Provincial People's Hospital, Taiyuan, Shanxi, China.

Dongzhi Li is a Nursing Student, Graduate School, Shanxi University of Chinese Medicine, Taiyuan, Shanxi, China.

Yanhua Guo is a Nurse, Emergency Department, Shanxi Provincial People's Hospital, Taiyuan, Shanxi, China.

Jingjing Fan is a Nurse, Emergency Department, Shanxi Provincial People's Hospital, Taiyuan, Shanxi, China.

Juzi Wang is Director of Nursing, Emergency Department, Shanxi Provincial People's Hospital, Taiyuan, Shanxi, China. **ORCID identifier:** <https://orcid.org/0000-0001-5045-8632>.

For correspondence, write: Juzi Wang, MD, Shanxi Provincial People's Hospital, Taiyuan, Shanxi, China; E-mail: 972680531@qq.com.

J Emerg Nurs 2020;46:848-61.

Available online 14 July 2020

0099-1767

Copyright © 2020 Emergency Nurses Association. Published by Elsevier Inc. All rights reserved.

<https://doi.org/10.1016/j.jen.2020.07.008>

CE Earn Up to 8.0 Hours. See page 941.**Contribution to Emergency Nursing Practice**

- The current study indicates that the positive preparedness of organizations and individuals contributed to epidemic prevention and control.
- This article contributes the main finding that the organization, individuals, patients, and families made efforts to be prepared in the emergency department during the coronavirus disease outbreak. The organizational preparedness guaranteed personal preparedness, and the preparedness of patients and families was a motivator for personal preparedness.
- Key implications for emergency nursing practice found in this article are that it is necessary to optimize organizational, patient, and family preparedness so that emergency departments can effectively respond to public health emergencies. Improving areas where there are shortcomings and creating effective measures to deal with challenges are urgent necessities.

Abstract

Introduction: This study explores the preparedness of our emergency department during the COVID-19 outbreak from the nurses' perspectives, providing a reference and basis for

our emergency department's response to public health emergencies.

Methods: Using qualitative research methods, semistructured interviews were conducted with 12 emergency nurses who met the inclusion criteria, and Colaizzi analysis was used for data analysis, summary, and induction.

Results: A cluster of 4 themes that involved preparedness of the emergency department during the COVID-19 outbreak was extracted: organizational preparedness, personal preparedness, patient and family preparedness, and deficiencies and challenges.

Discussion: Organizations, individuals, patients, and family members were actively prepared to respond to novel coronavirus pneumonia outbreak in the emergency department. The emergency nurses said that the trusted organization guaranteed personal preparedness, and the active cooperation from patients and families was a motivator for personal preparedness. In addition, our study showed that there were deficiencies in both multidisciplinary collaboration efforts and efforts to rapidly diagnose and treat patients with fever in critical condition.

Key words: Nurse; Coronavirus disease; Qualitative research; Emergency department; Preparedness

Introduction

Coronavirus disease (COVID-19) is an acute respiratory infectious disease caused by the novel coronavirus,¹ now renamed severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).² On February 11, 2020, the World Health Organization (WHO) announced that NCP was named Coronavirus disease, abbreviated as COVID-19.³ It had been listed as a public health emergency of international concern on January 30, 2020,⁴ and on March 11, 2020, it was declared a pandemic.⁵ COVID-19 is characterized as an acute respiratory infection with symptoms of fever, dry cough, and fatigue, although some patients have atypical symptoms.^{6,7} In addition, a few patients with COVID-19 have nasal congestion, runny nose, sore throat, myalgia, and diarrhea.^{6,7} In severe cases, patients can develop dyspnea and/or hypoxemia, which progress rapidly to acute respiratory distress syndrome, septic shock, metabolic acidosis that is difficult to correct, coagulopathy, multiple organ fail-

ure, and possibly death.⁷ It is worth noting that COVID-19 is transmitted quickly and widely, and often unknowingly. Currently, the accepted transmission routes of COVID-19 are droplets and contact transmission.^{2,8,9}

At present, therapies for COVID-19 are limited because the evidence to support a specific drug treatment or vaccine against SARS-CoV-2 is lacking.^{10,11} According to statistics, as of May 17, 2020, COVID-19 has been spreading worldwide, causing more than 4.5 million cases and more than 300,000 deaths (an approximate fatality rate of 6.79%) across the globe.¹² Furthermore, in China more than 82,000 cases and more than 4,000 deaths (an approximate fatality rate of 5.59%) had been confirmed as of May 17, 2020.¹² In Shanxi province, 134 confirmed cases and 0 deaths were reported; 21 of the confirmed cases were in Taiyuan, a city in Shanxi province.¹³ As a response to the COVID-19 outbreak, the National Health Commission of the People's Republic of China immediately initiated a first-level public health emergency response.

TABLE 1

The Colaizzi 7-step data analysis method performed in our study

Step	Performed in our study
1. Acquiring a sense of each transcript	<ul style="list-style-type: none"> a. Listened to each audiotape and read each transcript repeatedly to gain a sense of each participant's description of their experience. b. Personal thoughts, feelings, and ideas that emerged during this stage were written in the reflective diary. c. Copies of the transcript with a comments sheet were returned to the 12 participants for validation.
2. Extracting significant statements	<ul style="list-style-type: none"> a. Read and reread the transcripts to identify and analyze the participants' experiences that pertain to the phenomenon of preparedness. b. Significant phrases and statements were extracted and highlighted on each page of the transcripts in a Word document. c. Personal thoughts and feelings that arose during this stage were incorporated into the reflective diary. d. Returned to the research team for the first debriefing session and reached a consensus.
3. Formulating meanings from significant statements	<ul style="list-style-type: none"> a. Studied each significant statement carefully and developed a sense of its meaning. b. Formulated meanings were examined in light of the contents of the reflective diary and interview field notes, juxtaposed with each contextual significant statement. c. Returned to the research team for the second debriefing session and reached a consensus.
4. Organizing formulated meanings into clusters of themes	<ul style="list-style-type: none"> a. Significant statements with similar terms and the formulated meanings were grouped together to form theme clusters. Related theme clusters were then aggregated to establish themes. b. Returned to the research team for the third debriefing session to examine the relationship among formulated meanings, theme clusters, and emergent themes, and reached a consensus. c. Finally, 411 formulated meanings were arranged into 13 theme clusters that were then focused into a cluster of 4 emergent themes for the description of ED preparedness.
5. Exhaustively describing the investigated phenomenon	<ul style="list-style-type: none"> a. Achieved by reexamining and incorporating the emergent themes, theme clusters, and formulated meanings into the description to create its overall structure, containing all the elements of the experience. b. Exhaustive descriptions were returned to the research team at the fourth debriefing session, and a consensus was reached.
6. Describing the fundamental structure of the phenomenon	<ul style="list-style-type: none"> a. The fundamental structure of the phenomenon was revealed by reexamination, discussion, and analysis by the research team. b. Depicted as the preparedness of our emergency department during the COVID-19 outbreak from the nurses' perspectives, including a cluster of 4 themes. Organizational preparedness guaranteed the personal preparedness, and the preparedness of the patient and family represented the motivation for personal preparedness.
7. Returning to the participants for validating	<ul style="list-style-type: none"> a. Exhaustive description and fundamental structure of the phenomenon in the paper were returned to the 12 participants for validation. b. All participants considered the findings to be an accurate depiction of their experiences of the phenomenon.

COVID-19, coronavirus disease.

Because COVID-19 is spreading rapidly worldwide, ensuring the preparedness of public health care systems and response operations remains a key line of defense. According to the United Nations International Strategy for Disaster Reduction, preparedness is defined as “the knowledge and capacities developed by governments, professional response and recovery organizations, communities and individuals to effectively anticipate, respond to, and recover from the impacts of likely, imminent or current hazard events or conditions.”¹⁴ To improve the control of COVID-19, proactive and effective preparedness of organizations and individuals in public health systems are therefore required.

Emergency nurses are on the front line in the fight against COVID-19.¹⁵ However, there is a question on how prepared emergency departments are in responding to COVID-19. To answer this question, this study used qualitative research for an exploration of the preparedness of the emergency department in a tertiary hospital in Taiyuan, Shanxi province, from the nurses’ perspectives during the COVID-19 outbreak.

Methods

RESEARCH TEAM AND REFLEXIVITY

All 6 study researchers (YH, JW, QZ, DL, YG, and JF) were women and had received training on qualitative research. Five of the researchers were registered nurses, 4 had master’s degrees (YH, JW, QZ, and YG), 1 had a bachelor’s degree (JF), and 1 had a master’s degree in nursing (DL). The researchers were familiar with the study setting and participants, having practiced nursing in the emergency department for more than 6 months before data collection.

The interviews were conducted by the first author (YH), who had a double master’s degree (master’s degree in nursing from Institute of Technology Tralee, Ireland, and Shanxi Medical University, China) and more than 10 years’ experience in clinical nursing practices.

THEORETICAL FRAMEWORK

Husserl descriptive phenomenological approach¹⁶ and Colaizzi method of data analysis^{17,18} were employed in this study. Colaizzi method of data analysis is a rigorous and robust qualitative method that can be used to identify, understand, and describe the experiences of participants and reveal emergent themes and relationships.

Colaizzi method aligns with the assessment of the preparedness of our emergency nurses during the COVID-19 outbreak. The method comprises 7 stages of data analysis

(Table 1), providing clear, logical, and sequential steps that can be used in phenomenological research, which increases the reliability and dependability of the data obtained.¹⁷

PARTICIPANT SELECTION

Face-to-face interviews were conducted using purposive sampling. The sample size was determined by data saturation when no new themes from the participants’ experiences emerged.¹⁹ The inclusion criteria were as follows: (1) registered nurses, aged 18 years or older, working in the emergency department for more than 6 months, and (2) participants working more than 35 hours weekly during the COVID-19 outbreak (whether day duty or shift work). No participants dropped out of the study.

SETTING

The study was conducted in the emergency department of a grade A tertiary hospital in Taiyuan, a city in Shanxi province in mainland China, from February 10, 2020, to March 1, 2020. Grade A tertiary hospitals are recognized as hospitals of the highest classification level in mainland China; they can provide advanced health services and implement tertiary education and scientific research tasks for the region and surrounding areas. These hospitals have a capacity of more than 501 beds and are equipped with a baseline percentage of professionals.²⁰ The study hospital offers comprehensive health services with medical treatment, teaching, scientific research, prevention, rehabilitation, and first aid, and is one of the largest medical institutions in Shanxi province. It has almost 2,500 beds, and employs approximately 2,485 staff, including 1,300 registered nurses. The emergency department has a capacity of 50 beds, and handles an average of 120 patients per day, or 43,000 patients annually. A total of 83 nurses work in the emergency department, with an average of 48 nurses on duty per day. The ED rooms are open 24 hours.

The interviews were conducted in a comfortable and quiet conference room near the hospital, where the outside door had a sign that read “Be quiet, meeting in progress.” Only the interviewer and interviewee were present during the interviews.

HUMAN SUBJECTS’ PROTECTION

Ethical approval for the study was obtained from the research ethics committee of the hospital before the study began ([2020] Provincial Medical Kelun No. 26). Before each interview, each participant received a written informed consent form, the researcher explained the study’s aim and

setup, and the participant was informed that they could withdraw at any time, as described in the informed consent form. To guarantee their anonymity, each participant was given a code name (N1, N2, N3 ... N12) that was used throughout all further data processing. The consent forms and data were stored separately in a computer file accessible only with a password.

DATA COLLECTION

The interview outline ([Supplementary Appendix](#)) was developed by the research team on the basis of hospital policies, literature reviews, and experts' advice on the following lines: (1) During the COVID-19 outbreak, what changes have been made in the emergency department and what are the challenges faced? (2) What personal changes have taken place during the COVID-19 outbreak and how are you responding to COVID-19? (3) In terms of the COVID-19 response, talk about how the hospital and the department have responded, and what are the existing deficiencies? The first 2 interviews pretested the question for language clarity and cultural acceptability;²¹ no changes were made, and the data gathered during the preinterviews were included in the analysis. Two audio recorders were prepared and used during the interviews. Each interview took approximately 40 minutes to 60 minutes and was conducted in Chinese. No repeat interview was carried out.

During the interviews, the researcher used open-ended questions, with the aim of assisting participants to express their answers in their own words rather than give answers to multiple-choice questions. Probing and prompting questions followed to clarify issues and elicit an in-depth description of the participant's experiences. In addition, counterquestioning, questioning, repetition, and summing up were used in the interviews to ensure that the information obtained was true and credible. Throughout the interviews, the researcher kept a neutral attitude and did not express personal judgments, beliefs, or understandings. Furthermore, nonverbal observations during and immediately after the interviews were recorded as part of the field notes. In addition, the researcher maintained a reflective diary throughout the study to record personal reflections, biases, and assumptions.

Data analysis was conducted concurrently with the data collection until data saturation was reached. The interviews were independently transcribed verbatim (pseudonyms were assigned) by 2 researchers (YH and ZQ) within 24 hours after the interviews. Copies of the transcript with a comments sheet were returned to the participants for validation. The feedback showed that all participants felt that their transcript accurately repre-

TABLE 2
Demographic characteristics of the participants
(N = 12)

Variable	n (%)
Sex	
Female	9 (75)
Male	3 (25)
Age, y	
18-30	4 (33)
31-40	8 (67)
Marital status	
Married	9 (75)
Unmarried	3 (25)
Technical title	
Primary nurse	3 (25)
Nurse	4 (33)
Nurse-in-charge	5 (42)
Educational background	
Bachelor's degree	11 (92)
Master's degree	1 (8)
Nursing experience, y	
<1	2 (17)
1-3	2 (17)
4-10	5 (41)
>10	3 (25)
Antiepidemic experience	
Yes	1 (8)
No	11 (92)

sented what was said during the interview and was true to their experience. The quotes given below were translated by 3 researchers (DL, YG, and JF).

DATA ANALYSIS

The Colaizzi 7-step data analysis method was performed in this study ([Table 1](#)).^{17,18} The process was carried out independently by 2 researchers (YH and QZ) using a word processing system.

ENHANCING RIGOR

To enhance rigor, researchers applied the Lincoln and Guba 4 constructs of trustworthiness.^{22,23} To address credibility, the following steps were taken: (1) a data analysis method

that was well established was adopted for the study; (2) a detailed description of the research background was provided; (3) all researchers gained an adequate understanding of the research setting, and the first author was able to establish a relationship of trust with the participants because the author had practiced as a nurse in the emergency department for more than 2 years before data collection; (4) the open-ended questions were followed by probing and prompting questions that were used to gather comprehensive data during the interviews; (5) field notes and reflective diaries were maintained to recognize any personal biases; (6) frequent debriefing sessions involving the researchers and the research team were held to discuss developing ideas; and (7) member checks were undertaken during the course of the data collection and data analysis to enhance data accuracy.

To permit transferability, and to provide a baseline understanding for the comparison of subsequent studies, detailed descriptions of the study setting, organization, researchers, and participants relevant to the phenomenon under study were assessed. In addition, detailed methods of data collection also contributed to the transferability of the study.

To meet the criterion of dependability, researchers provided a detailed report on the research design and its implementation, data collection, and data analysis, thereby enabling reproducibility.

Finally, confirmability was enhanced by developing an audit trail, allowing other researchers to judge the conclusions. In addition, the reflective journal helped the researchers keep biases and prejudgments at bay, opening the possibility of seeing things in a different way.

Results

A cluster of 4 themes was extracted through the process of data analysis: organizational preparedness, personal preparedness, patient and family preparedness, and deficiencies and challenges. Eventually, 12 emergency nurses (3 men and 9 women) with an average age of 30.42 years ($SD = 3.64$) were included. The demographic characteristics in the study are shown in [Table 2](#).

THEME I: ORGANIZATIONAL PREPAREDNESS

Organizational preparedness refers to a variety of measures taken by the organization in response to the COVID-19 outbreak. In the study, 5 subthemes related to organizational preparedness emerged from the data as follows.

Subtheme 1: Timely Adjustment of Departmental Functions

The first subtheme is concerned with the adjustment of departmental functions in a timely manner. In accordance with the National Diagnosis and Treatment Plan for NCP [COVID-19] and the requirements of the Shanxi Provincial Health Commission, the emergency department added a fever preexamination triage office and a transit station for patients with fever in critical condition on the basis of a quick rescue process and green channel for emergencies during the NCP [COVID-19] outbreak. The ED green channel refers to a timely and efficient rescue process of diagnosis and treatment that is provided for urgent and severe cases. This aimed to improve the success rate of the rescue process.²⁴

At the entrance to the emergency department, all patients have to pass through my check first: make a temperature check to see if [they] have a fever and register for it, and then, follow the procedures for treatment. The fever pre-examination triage office was not available before the outbreak of NCP [COVID-19] ... (N4)

Actually, the emergency department is a transit station now. The patient with no fever, no epidemiological record, would [have] been treated in the emergency department; the patient with the symptoms such as fever would go directly to the fever clinic. (N1)

Subtheme 2: Strengthening of Multidisciplinary Cooperation

The second subtheme involved the strengthening of multidisciplinary cooperation. Multidisciplinary cooperation is a patient-centered therapy mode in which the emergency department, respiratory department, infection department, fever retention ward, and fever clinic cooperate to develop standardized, individualized, and comprehensive treatment plans for patients. During the COVID-19 outbreak, multidisciplinary cooperation strengthened significantly.

Patients who come with dyspnea will firstly be consulted by the doctor from the infection department, then consulted by the doctor from the respiratory department. The emergency department will synthesize all the consultation opinions, and then make the diagnosis and treatment plan ... (N2)

When a patient has a cough without any other symptoms, a fever clinic doctor will be consulted or take the patient to the fever clinic directly. (N8)

Subtheme 3: Timely Updating Workflows

The third subtheme concerned timely updating of workflows. In keeping with the latest Diagnosis and Treatment Plan for COVID-19 (currently in its seventh edition),⁷ published by the National Health Commission and updated continually, the hospital updated the ED workflows in a timely manner according to the characteristics of the diagnosis and treatment in different departments and the feedback from the grassroots staff of different departments in accordance with the requirements of the Shanxi Provincial Health Commission.

Each time the country published a new version of the Diagnosis and Treatment Plan for NCP [COVID-19], our department updated the workflows in time. Some special cases or events in the course of our implementation will be improved soon. (N1)

The country publishes a new version of the diagnosis and treatment plan [at] a certain time, [and] our department make[s] [timely] adjustments ... So I check my phone at every work day: is there any change in the workflows today? Is it the same as yesterday? And I come to ask my colleagues if they have a different workflow. (N11)

Subtheme 4: Timely Provision of Adequate Protective Medical Supplies

The fourth subtheme was related to the timely and adequate provision of supplies of protective equipment and material. During the COVID-19 outbreak, there was a shortage of protective medical supplies across the country. As the front line of epidemic prevention, the emergency department was given priority when it came to protective medical supplies. In accordance with the regulations of the hospital, secondary protection was adopted for the fever preexamination triage office and the transit station for patients with fever in critical condition in the emergency department, and primary protection was adopted in other sections of the emergency department. The protective medical supplies were distributed according to the protection level.

One mask [is] distributed to us per shift. We can use a new one (mask) every day, and replace a new one immediately when it is dirty. (N5)

The disposable hand sanitizer in our corridor [is] replaced in time when [it is] used up. (N6)

Disinfectants are always available at the fever pre-examination triage office. And the office [is] disinfected in time after a patient leaves. (N4)

Subtheme 5: Trust in the Organization

Trust in the organization was the fifth subtheme in the study. This is a description of the work atmosphere and is a subjective evaluation by the employees of the safety provided by and friendliness of the organization. The emergency nurses said that the hospital was trusted in both policy formulation and measure implementation during the COVID-19 outbreak.

The decisions made by the hospital whether in the level of protection or in the established workflows can stand the test afterwards. (N6)

The expanded meeting of the deans (who were fully responsible for medical treatment, teaching, scientific research, and administrative management of the hospital) is held every day. No matter what thorny problems we encounter, as long as the problems are feedback to the hospital leaders, there is always a way to solve them and they could be solved very smoothly. (N2)

Whether it is at the national level or at the hospital level, the organization is really very powerful and helpful in dealing with the outbreak of NCP [COVID-19]. And the organization can always implement effective measures to make us feel secure in our work. (N11)

THEME II: PERSONAL PREPAREDNESS

Personal preparedness of the nurses referred to their ability to make changes to cope with the COVID-19 outbreak. Five subthemes associated with personal preparedness for dealing with COVID-19 were identified as follows.

Subtheme 1: Self-Adjusting Psychology

The first subtheme is concerned with self-adjusting psychology, which is a well-known necessity for nurses in responding to public health emergencies and carrying out their work. Self-adjusting psychology means that nurses can actively make psychological adjustments when they are faced with constantly updated workflows and potential COVID-19 threats. Three participants described self-

adjusting psychology in the emergency department during the COVID-19 outbreak.

The workflows keep changing, and I have to adapt, because the workflows [are] designed to protect me. (N2)

Every time my roommates (in another department of the same hospital) asked me: did you encounter a suspected patient with fever in the emergency department? And I answered: no. I don't want them to worry about me and put pressure on them. I'll comfort them in return ... (N7)

During this period of time, I will take the initiative to communicate with others when something is unsatisfactory for the purpose of enlightening myself. (N1)

Return home after work, my son [sees] me and run[s] to me ... and I will say loudly: stay away from me. (worry about infection happening to their family members)...I have to do it for the safety and health of my son, even if it hurts his heart. (N2)

Subtheme 2: Experiencing Moral Distress and Making Choices

The second subtheme involved experiencing moral distress and making choices. Moral distress refers to a psychological disequilibrium and a state of negative feeling that is experienced when a person makes a moral decision but does not follow through by performing the moral behavior.²⁵ To rescue patients in a critical condition is the primary function of the emergency department; however, during the COVID-19 outbreak, COVID-19 screening became the primary work because of the impact of the epidemic. Three nurses stated that a conflict between the patients' personal interests and the workflows emerged in the case of caring for patients with fever in critical condition. As a consequence of the conflict, the nurses experienced moral distress. However, they could make a positive choice immediately after weighing the advantages and disadvantages of the situation.

For example, the patient with cerebral hemorrhage should be entered into the green channel right away if you follow the previous workflows. But now, owing to

his fever ... I especially felt sorry for him. But after the event, especially to think about the situation in Wuhan in the context of the national NCP [COVID-19] outbreak, my mood is getting better. (N1)

I met a patient with acute exacerbation of chronic obstructive pulmonary disease. He was an elderly man with [a] problem lung, who [was] prone to pulmonary infection with fever. Now, it is necessary to screen NCP [COVID-19] firstly ... I can't help it during the special time. (N2)

He will infect a lot of people if he is a patient with NCP [COVID-19], which is no longer a small matter. So, I can't judge him just according to my own feeling (he is not a patient with NCP [COVID-19]). I should set the collective interest above anything else, even if I feel sorry for the patient deep in the heart. (N11)

Subtheme 3: Professional Nursing Values

This third subtheme concerned professional nursing values. Nurses' professional values are the basis of their working attitude and motivation, which have a positive impact on their work enthusiasm and job satisfaction.²⁶ During the COVID-19 outbreak, nurses' professional values played an important role in work motivation and willingness.

When my colleagues went to support Wuhan successfully, I also want[ed] to go. But a[n] inner voice arose: do your job wherever you are to make [a] contribution. It is my duty to defend the rear! (N5)

It seems to be time for the medical staff to be present. And it's time for everyone to need me (laughter). (N6)

I will never refuse and I will do it without any hesitation even if I am required to collect blood sample[s] and pump pleural effusion for a[n] NCP [COVID-19] patient. Because what I do is my job. (N1)

It's never considered what should I do if I get infected accidentally at work. I go to work just because

it's what I should do. No matter how dangerous the infection it is, you should also do it even if the NCP [COVID-19] patients are in front of you. What I feel just like the feeling! (laughs) (N2)

Now, everyone says that staying at home is also a contribution to the country. But thinking of myself, as a nurse, [I] always stick to my position at the front line. It's a feeling that I am different from others. (N4)

Subtheme 4: Knowledge Seeking

The fourth subtheme was related to knowledge seeking. Physicians and nurses across the country lacked knowledge about COVID-19 owing to its sudden outbreak. As for the frontline workers, the participants expressed interest in acquiring relevant knowledge.

I work at the preexamination and triage office. And I often take the initiative to learn from experienced nurses so that I know how to deal with suspected patients. (N4)

I use my phone to learn about NCP [COVID-19] every day, to learn what NCP [COVID-19] is, and how to deal with it at my work. (N6)

I think some properly supplemented courses about knowledge explanation were needed to provide for everyone to learn during this outbreak of NCP [COVID-19], such as shooting some videos. (N1)

Subtheme 5: Actively Communicating

The fifth subtheme was active communicating. Good communication plays an important role in reducing and avoiding conflicts between patients and medical staff, and can improve patients' compliance and increase their satisfaction.²⁷ During the epidemic, the emergency nurses took the initiative to communicate with patients and their families in a targeted manner, which improved the understanding of the patients and their families regarding COVID-19 and subsequently improved the patients' compliance.

I saw some family members play with their phones without washing their hands after cleaning up patients' pee. At this time, I took the initiative to inform [them] that it's very unhygienic, and it's really easy to get infected.

Then, they washed their hands immediately and did it actively after the next pee. Furthermore, when I saw some family members take off masks frequently or wear [them] incorrectly, I explained to them the importance of wearing masks to prevent NCP [COVID-19] and how to wear masks correctly. (N6)

THEME III: PATIENT AND FAMILY PREPAREDNESS

The preparedness of patients and families was reflected in active cooperation. The country has made great efforts to publicize facts about COVID-19 through various channels since the outbreak, which has generally improved the understanding of COVID-19 and the importance of self-protection. Nowadays, the patients and their families who come to the hospital understand and cooperate actively with the medical staff.

Now, the families are not as anxious and impatient as before. The families are highly cooperative with our advice that [they should] go to the fever clinic for screening if they are told clearly, which differs from the past [when] was really difficult to maintain order ... But now, everyone is so conscious and [they take the] initiative to maintain a certain distance [from] each other. And the families understand very easily what I [say]... (N2)

During the outbreak, everyone was very cooperative. If you ask them to fill in a form, they will do it carefully ... Sometimes when they don't know how to fill it out, they will ask us. I haven't met any uncooperative patients or families recently. (N4)

I found that some families are quite good at self-protection. They used the hand sanitizer hung on the hospital walls consciously. (N6)

THEME IV: DEFICIENCIES AND CHALLENGES

Subtheme 1: Cross-Department Multidisciplinary Collaboration

Multidisciplinary collaboration across departments can be a problem. However, in responding to the COVID-19 outbreak, multidisciplinary cooperation increased significantly, although the outbreak resulted in the problems of cross-departmental collaboration gaining prominence.

Sometimes, each department only looks at its own workflow, so that when it comes to cooperation there are some situations outside its own work process [that] occur. Which still need to be solved by the management through negotiation, and the coordination between different departments needs to be improved. (N1)

Before the NCP [COVID-19] outbreak, some departments had less cooperation with the emergency department, but now the cooperation is significantly increased and it is inevitable that some new problems [have] needed to be solved [for] a long time. (N3)

Subtheme 2: The Deficiency in Rapid Diagnosis and Treatment of Patients With Fever in Critical Condition

The diagnosis and treatment of patients with fever in critical condition should be improved. The emergency department has the biggest concentration of patients in critical condition, the most complex types of diseases, and the heaviest task of rescue and management. Generally speaking, patients who come for diagnosis are in severe condition and need timely treatment. During the COVID-19 outbreak, COVID-19 screening became the priority. The challenge we are facing today is how to screen rapidly and treat patients with no delay.

Previously, patients in critical condition with fever were immediately sent to the green channel for rescue, but now multidisciplinary consultation is needed to check [for] NCP [COVID-19], which will increase waiting time ... (N2)

Discussion

Emergency preparedness is key when responding to any health crisis, and it refers to the knowledge and capacity to effectively anticipate, respond to, and recover from the impacts of a likely or current crisis.^{28,29} Recently, increasing attention has been paid to emergency preparedness because unanticipated disasters are increasing in frequency. The spate of declarations and agreements made by the global community underlines the need for all countries to be prepared to meet emerging threats to public health.³⁰ In 2007, the second edition of Veenema's *Disaster Nursing and Emergency Preparedness for Chemical, Biological, and Radiological Terrorism and Other Hazards* was published to call on nurses to advance preparedness and develop mastery of the knowledge and skills needed to respond to emergencies.³¹ In addition, in 2010, the WHO regional office for Europe developed and revised a standardized toolkit

for assessing a health system's capacity for preparing for and managing crises.³⁰ The main objectives of the assessment were to identify gaps in the overall capacity for emergency preparedness with the aim of developing a plan of action to address these gaps and strengthen capacity. Moreover, in 2014, the US Department of Health and Human Services released a revised version of the Emergency Preparedness Checklist to help state agencies and health care providers achieve an improved level of preparedness.³²

As COVID-19 continues to rapidly spread worldwide, there is no doubt that the global economy, social structure, and people's health have been threatened. Simultaneously, the COVID-19 pandemic has placed additional stress on public health care systems. It is therefore crucial to intensify the preparedness and response operations to control the COVID-19 pandemic. On February 3, 2020, the COVID-19 Strategic Preparedness and Response Plan was drafted by WHO to provide public health measures to support all countries to prepare for and respond to COVID-19.³³ Accordingly, each public health system was encouraged to plan its preparedness and response actions.³⁴ Health care workers—emergency nurses in particular—play an important role in controlling the spread of the COVID-19 pandemic. Therefore, understanding the individual perspectives of emergency nurses and the public health systems' experience of preparedness in responding to the COVID-19 pandemic can provide valuable additional information on the successes and challenges, which will assist in preparing these systems for current and future disasters.³⁵

In our study, a cluster of 4 themes was extracted related to emergency nurses' preparedness during the COVID-19 outbreak: organizational preparedness, personal preparedness, patient and family preparedness, and deficiencies and challenges.

Regarding organizational preparedness, the study indicated that the organization was fully prepared to respond to the COVID-19 outbreak in the emergency department, including the timely adjustment of departmental functions, strengthening of multidisciplinary cooperation, timely updating workflows, and timely provision of adequate protective medical supplies. As a consequence of these measures, the emergency nurses trusted the organization to protect them, which prompted an increased willingness to work during the COVID-19 pandemic. This finding was consistent with the study by Baduge et al,³⁶ in which the nurses believed that the organization made sufficient preparation for Ebola virus disease and protected them when they were at work. Similarly, the study also supported the work of a previous qualitative study in which positive occupational preparedness was associated with health care workers' willingness to remain on duty during an influenza pandemic.³⁷

Conversely, inadequate organizational preparedness of public health systems was related to a lower willingness to work among health care professionals and an increased loss of lives during an epidemic.³⁸⁻⁴⁰

This study indicated that nurses had positive personal preparedness for dealing with COVID-19, as shown by the adjustment of self-psychology, response to moral dilemmas, actively seeking knowledge, and active communication with patients and their families. It has been shown that positive personal preparedness is important when responding to public health emergencies.⁴¹ The finding was in agreement with recent reports that nurses made adjustments by using psychological techniques to promote self-psychological balance when feeling stressed by the pressure of dealing with the epidemic.^{35,42} In addition, it indicated that the professional responsibility of nurses was related to their willingness to work.³⁷ In our study, all participants were committed to work during the COVID-19 pandemic owing to their professional responsibility even when fearing infection or the transmission of the infection to their families, in line with previous studies.^{35,42}

Moreover, the participants stated that patients and their families cooperated actively during the COVID-19 outbreak, which made emergency nurses feel understood, respected, recognized, and supported, in line with the finding in a recent study.⁴² In turn, the support from patients and society provided encouragement for emergency nurses to actively prepare to overcome difficulties and challenges at work during the COVID-19 pandemic.^{35,42}

In fact, there is a relationship between organizational, individual, and patient and family preparedness. The positive preparation of the organization provided ED staff with guaranteed personal preparedness during the COVID-19 outbreak, whereas the positive preparation of patients and their families was a motivator for emergency nurses to be prepared when responding to the COVID-19 outbreak, which made the nurses feel respected and recognized, leaving them feeling positive.

The participants in the study also noted that there were some deficiencies in cross-department multidisciplinary collaboration and also in the rapid diagnosis and treatment of patients with fever in critical condition during the COVID-19 outbreak, which aligned with those of earlier studies.^{35,43-45} It has been proposed that emergency operations collaboration forms a primary capability and challenge during the response to emergencies and is the area of focus most recommended for future emergency preparedness.⁴³ In our study, the problem of multidisciplinary collaboration usually existed in the workflow connections across departments. Therefore, it is necessary for relevant organizations to actively play a role in leadership,

and cross-department cooperation is necessary to improve workflow connections. In addition, clear guidelines on coordinating resources across departments could also help improve future disaster preparedness and responses.⁴³ In view of the deficiency with regard to rapid diagnosis and treatment of patients with fever in critical condition, it is recommended that the relevant departments of the hospital should strengthen training and professional knowledge to improve the medical staff's ability to diagnose and treat these patients. At the same time, in the future, there should be guidelines for the rapid diagnosis and treatment of patients with fever in critical condition. Furthermore, accelerating priority research and innovation should be encouraged.³⁰

Limitations

A limitation of the study is that it is a purposive sample involving 12 emergency nurses within a single hospital in Taiyuan. Therefore, the research results are not generalizable beyond this current emergency department. In addition, the participants in our subject pool were skewed toward a large number of emergency nurses in charge, which also influenced the results.

Implications for Emergency Nurses

Emergency nurses should recognize the impact of different cultures and classification levels of hospitals on their preparedness. Further research should be conducted in different regions and at different levels in hospitals, which will provide more comprehensive information for responding to public health emergencies in emergency departments. In addition, the relevant organization needs to take the initiative to seek solutions to the shortcomings in cross-department multidisciplinary collaboration and in the diagnosis and treatment of patients in critical condition with possible SARS-CoV-2 infection. Therefore, the following links and resources of tools are provided to strengthen emergency preparedness and collaboration:

- The Revised Emergency Preparedness Checklist: <https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/SurveyCertificationGenInfo/Downloads/Survey-and-Cert-Letter-14-12.pdf>
- Disaster Nursing and Emergency Preparedness for Chemical, Biological and Radiological Terrorism and Other Hazards, 2nd Edition: <https://www.elsevier.com/books/readym/veenema/978-0-323-06361-6>
- Toolkit for Assessing Health-System Capacity for Crisis Management: http://www.euro.who.int/__data/assets/pdf_file/0008/157886/e96187.pdf

Moreover, a standardized system aiming to support institutional preparedness could also help to effectively communicate and align preparedness activities during a pandemic.²⁸

Conclusions

In the emergency department, during the COVID-19 outbreak, the organization, individuals, patients, and their families were actively prepared. Emergency nurses indicated that they trusted the organization to provide guaranteed personal preparedness. In addition, the active cooperation from patients and their families was a motivator for the nurses for personal preparedness. Therefore, it is necessary to optimize the preparedness of the organization, patients, and their families so that the personal preparedness of the nurses is fully mobilized to effectively respond to this public health emergency.

Author Disclosures

Conflicts of interest: none to report.

Supplementary Data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.jen.2020.07.008>.

REFERENCES

1. National Health Commission of People's Republic of China. Notice of the National Health Commission on the temporary naming of new coronavirus pneumonia. National Health Commission of People's Republic of China. Accessed March 7, 2020. http://www.gov.cn/zhengce/zhengceku/2020-02/08/content_54762487.
2. Cemal B, Yasuyuki K. Epidemiology of COVID-19. *Turk J Med Sci*. 2020;50(3):563-570. <https://doi.org/10.3906/sag-2004-172>
3. World Health Organization. WHO director-general's opening remarks at the media briefing on COVID-19. Published February 11, 2020. Accessed May 18, 2020. <https://www.who.int/dg/speeches/detail/who-director-general-s-remarks-at-the-media-briefing-on-2019-ncov-on-11-february-2020>.
4. World Health Organization. Global Surveillance for human infection with novel coronavirus (2019-nCoV): interim guidance, 31 January 2020. Accessed May 18, 2020. <https://apps.who.int/iris/handle/10665/330857>.
5. World Health Organization. WHO director-general's opening remarks at the media briefing on COVID-19. Published March 11, 2020. Accessed May 18, 2020. <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19-11-march-2020>.
6. Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China [published correction appears in *Lancet*. 2020]. *Lancet*. 2020;395(10223):497-506. [https://doi.org/10.1016/S0140-6736\(20\)30183-5](https://doi.org/10.1016/S0140-6736(20)30183-5)
7. National Health Commission. National administration of traditional chinese medicine. diagnosis and treatment protocol for novel coronavirus Pneumonia (Trial version 7). *Chin Med J*. 2020;133(9):1087-1095. <https://doi.org/10.1097/CM9.0000000000000819>
8. Jin YH, Cai L, Cheng ZS, et al. A rapid advice guideline for the diagnosis and treatment of 2019 novel coronavirus (2019-nCoV) infected pneumonia (standard version). *Mil Med Res*. 2020;7(1):4. <https://doi.org/10.1186/s40779-020-0233-6>
9. World Health Organization. Modes of transmission of virus causing COVID-19: implications for IPC precaution recommendations. Published March 29, 2020. Updated July 9, 2020. Accessed May 18, 2020. <https://www.who.int/news-room/commentaries/detail/modes-of-transmission-of-virus-causing-covid-19-implications-for-ipc-precaution-recommendations>.
10. Zhao JY, Yan JY, Qu JM. Interpretations of "diagnosis and treatment protocol for novel coronavirus pneumonia (trial version 7)". *Chin Med J (Engl)*. 2020;133(11):1347-1349. <https://doi.org/10.1097/CM9.0000000000000866>
11. Zhao N, Zhou ZL, Wu L, et al. An update on the status of COVID-19: a comprehensive review. *Eur Rev Med Pharmacol Sci*. 2020;24(8):4597-4606. https://doi.org/10.26355/eurrev_202004_21046
12. World Health Organization. Coronavirus disease (COVID-19) situation report-118. Published May 17, 2020. Accessed May 18, 2020. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200517-covid-19-sitrep-118.pdf?sfvrsn=21c0d4fe_6.
13. The epidemic situation of novel coronavirus pneumonia in Shanxi Province on May 18, 2020. Shanxi Provincial Health Commission. Published May 18, 2020. Accessed May 18, 2020. <http://wjw.shanxi.gov.cn/wjyw02/25885.hrh>.
14. International Strategy for Disaster Reduction. 2009 UNISDR terminology on disaster risk reduction. Published May 2009. Accessed May 18, 2020. https://www.unisdr.org/files/7817_UNISDRTerminologyEnglish.pdf.
15. Whetzel E, Walker-Cillo G, Chan GK, Trivett J. Emergency nurse perceptions of individual and facility emergency preparedness. *J Emerg Nurs*. 2013;39(1):46-52. <https://doi.org/10.1016/j.jen.2011.08.005>
16. Husserl E. *Cartesian Meditations: An Introduction to Phenomenology*. Springer Netherlands; 1960. Accessed May 18, 2020. <https://b-ok.asia/book/2244889/871f6e?regionChanged>.
17. Wirihana L, Welch A, Williamson M, Christensen M, Bakon S, Craft J. Using Colaizzi's method of data analysis to explore the experiences of nurse academics teaching on satellite campuses. *Nurse Res*. 2018;25(4):30-34. <https://doi.org/10.7748/nr.2018.e1516>

18. Sanders C. Application of Colaizzi's method: interpretation of an auditable decision trail by a novice researcher. *Contemp Nurse*. 2003;14(3):292-302. <https://doi.org/10.5172/conu.14.3.292>
19. Saunders B, Sim J, Kingstone T, et al. Saturation in qualitative research: exploring its conceptualization and operationalization. *Qual Quant*. 2018;52(4):1893-1907. <https://doi.org/10.1007/s11135-017-0574-8>
20. Fang H, Zhao X, Yang H, et al. Depressive symptoms and workplace-violence-related risk factors among otorhinolaryngology nurses and physicians in Northern China: a cross-sectional study. *BMJ Open*. 2018;8(1), e019514. <https://doi.org/10.1136/bmjopen-2017-019514>
21. Doody O, Maria N. Preparing and conducting interviews to collect data. *Nurse Res*. 2013;20(5):28-32. <https://doi.org/10.7748/nr2013.05.20.5.28.e327>
22. Shenton AK. Strategies for ensuring trustworthiness in qualitative research projects. *Educ Inf*. 2004;22(2):63-75. <https://doi.org/10.3233/EFI-2004-22201>
23. Eileen T, Magilvy Joan K. Qualitative rigor or research validity in qualitative research. *J Spec Pediatr Nurs*. 2011;16(2):151-155. <https://doi.org/10.1111/j.1744-6155.2011.00283.x>
24. Chen F, Wen JP, Wang XP, Lin QM, Lin CJ. Epidemiology and characteristics of acute poisoning treated at an emergency center. *World J Emerg Med*. 2010;1:154-156. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4129745/>.
25. Wolf LA, Perhats C, Delao AM, Moon MD, Clark PR, Zavotsky KE. It's a burden you Carry": describing moral distress in emergency nursing. *J Emerg Nurs*. 2016;42(1):37-46. <https://doi.org/10.1016/j.jen.2015.08.008>
26. Caricati L, Sala RL, Marletta G, et al. Work climate, work values and professional commitment as predictors of job satisfaction in nurses. *J Nurs Manag*. 2014;22(8):984-994. <https://doi.org/10.1111/jonm.12079>
27. Hermann RM, Long E, Trotta RL. Improving patients' experiences communicating with nurses and providers in the Emergency Department. *J Emerg Nurs*. 2019;45(5):523-530. <https://doi.org/10.1016/j.jen.2018.12.001>
28. de Rooij D, Belfroid E, Eilers R, Roßkamp D, Swaan C, Timen A. Qualitative research: institutional preparedness during threats of infectious disease outbreaks. *Biomed Res Int*. 2020;5861894. <https://doi.org/10.1155/2020/5861894>
29. Goodman A. The global impact of the Zika virus pandemic: the importance of emergency preparedness. *Health*. 2020;12(2):132-140. <https://doi.org/10.4236/health.2020.122012>
30. World Health Organization. Strengthening health-system emergency preparedness: toolkit for assessing health-system capacity for crisis management. Published 2012. Accessed May 18, 2020. http://www.euro.who.int/__data/assets/pdf_file/0008/157886/e96187.pdf
31. Veenema TG. *Disaster Nursing and Emergency Preparedness for Chemical, Biological, and Radiological Terrorism and Other Hazards*. 2007 Springer Publishing Company; 2007. Accessed May 18, 2020. <https://b-ok.asia/book/1006725/0d37d6?regionChanged>.
32. Centers for Medicare and Medicaid Services. Survey and certification emergency preparedness initiative: S&C emergency preparedness checklist revision. Department of Health and Human Services. Published February 28, 2014. Accessed May 18, 2020. <https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/SurveyCertificationGenInfo/Downloads/Survey-and-Cert-Letter-14-12.pdf>.
33. World Health Organization. 2019 Novel Coronavirus (2019-nCoV): strategic preparedness and response plan. Published February 3 2020. Accessed May 18, 2020. <https://www.who.int/docs/default-source/coronaviruse/srp-04022020.pdf>.
34. World Health Organization. COVID-19 strategic preparedness and response plan country preparedness and response status for COVID-19 as of 14 May 2020. Accessed May 28, 2020. https://www.who.int/docs/default-source/coronaviruse/covid-19-sprp-country-status-14may2020.pdf?sfvrsn=20678868_1&download=true
35. Liu Q, Luo D, Haase JE, et al. The experiences of health-care providers during the COVID-19 crisis in China: a qualitative study. *Lancet Glob Health*. 2020;8(6):e790-e798. [https://doi.org/10.1016/S2214-109X\(20\)30204-7](https://doi.org/10.1016/S2214-109X(20)30204-7)
36. Pincha Baduge MS, Moss C, Morphet J. Emergency nurses' perceptions of emergency department preparedness for an ebola outbreak: a qualitative descriptive study. *Australas Emerg Nurs J*. 2017;20(2):69-74. <https://doi.org/10.1016/j.aenj.2017.02.003>
37. Wong EL, Wong SY, Lee N, Cheung A, Griffiths S. Healthcare workers' duty concerns of working in the isolation ward during the novel H1N1 panemic. *J Clin Nurs*. 2012;21(9-10):1466-1475. <https://doi.org/10.1111/j.1365-2702.2011.03783.x>
38. Mackler N, Wilkerson W, Cinti S. Will first-responders show up for work during a pandemic? Lessons from a smallpox vaccination survey of paramedics. *Disaster Manag Response*. 2007;5(2):45-48. <https://doi.org/10.1016/j.dmr.2007.02.002>
39. Tzeng HM. Fighting the SARS epidemic in Taiwan: a nursing perspective. *J Nurs Admin*. 2003;33(11):565-567. <https://doi.org/10.1097/00005110-200311000-00005>
40. Li X, Huang J, Zhang H. An analysis of hospital preparedness capacity for public health emergency in four regions of China: Beijing, Shandong, Guangxi, and Hainan. *BMC Public Health*. 2008;8:319. <https://doi.org/10.1186/1471-2458-8-319>
41. Melnikov S, Itzhaki M, Kagan I. Israeli nurses' intention to report for work in an emergency or disaster. *J Nurs Scholarsh*. 2014;46(2):134-142. <https://doi.org/10.1111/jnu.12056>
42. 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. <https://doi.org/10.1016/j.ajic.2020.03.018>

43. Shipp Hilt A, Mack S, Eidson M, Nguyen T, Birkhead GS. New York state public health system response to hurricane Sandy: lessons from the field. *Disaster Med Public Health Prep.* 2016;10(3):443-453. <https://doi.org/10.1017/dmp.2016.69>
44. Lowery R, Robinson C, Taylor M. Readiness near and far: regional hospital emergency preparedness during the 2016 republican national convention. *J Emerg Nurs.* 2017;43(3):284-288. <https://doi.org/10.1016/j.jen.2017.03.010>
45. Swaan CM, Öry AV, Schol LGC, Jacobi A, Richardus JH, Timen A. Ebola preparedness in the Netherlands: the need for coordination between the public health and the curative sector. *J Public Health Manag Pract.* 2018;24(1):18-25. <https://doi.org/10.1097/PHH.0000000000000573>

Supplementary Appendix

INTERVIEW OUTLINE

1. During the outbreak of NCP [COVID-19], what changes have been made in the emergency department and what are the challenges faced?
 - a. What changes have been made in the content of your work? And what is your attitude towards it?
 - b. What do you think of your current workload?
 - c. What is the impact of the changes in your workload?
 - d. What challenges did you encounter and how did you deal with them?
2. What personal changes have taken place during NCP [COVID-19] and how are you responding to NCP [COVID-19]?
 - a. What do you think of your work as for an ED nurse during the NCP [COVID-19]?
 - b. What changes have been made in response to the NCP [COVID-19]?
 - c. Work during the NCP [COVID-19], what happened to your life? And how did you deal with it?
 - d. What changes happened to your mental state when working during the NCP [COVID-19]? And did you deal with them?
 - e. What other changes will you make to response to the NCP [COVID-19]?
3. In terms of NCP [COVID-19] response, talk about how the hospital and the department have responded and what are the existing deficiencies?
 - a. What has the hospital done when responding to the NCP [COVID-19]? How do you feel about the hospital's response?
 - b. How do you feel about the current protective framework and protective equipment?
 - c. What are the deficiencies in terms of organization? And what is your opinion about them?
 - d. What other changes do you expect from the organization?