


Experiences of front-line nurses combating coronavirus disease-2019 in China: A qualitative analysis

Yu-E Liu MD¹  | Zhong-Chang Zhai BD² | Yan-Hong Han PhD¹ | Yi-Lan Liu PhD¹ | Feng-Ping Liu MD¹ | De-Ying Hu PhD¹

¹Department of Nursing, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China

²Department of Cardiovascular Surgery, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China

Correspondence

Feng-Ping Liu and De-Ying Hu
Department of Nursing, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, 1277 Jiefang Avenue, Wuhan City, Hubei Province, China.
Email: lfp881206@163.com (F.-P. L.) and hudeying2006@126.com (D.-Y. H.)

Funding information

This work was partially supported by the Program of Emergency science and technology for new coronavirus pneumonia of Huazhong University of Science and Technology (2020kfyXGYJ001).

Abstract

Objective: To explore the experiences of front-line nurses combating the coronavirus disease-2019 epidemic.

Design and Sample: Fifteen front-line nurses caring for COVID-19 patients were recruited from two hospitals in Wuhan, China from January 26 to February 5, 2020. Data were collected through semi-structured individual interviews and analyzed using standard qualitative methods.

Results: Four theme categories emerged from the data analysis: (a) “Facing tremendous new challenges and danger”; (b) “Strong pressure because of fear of infection, exhaustion by heavy workloads and stress of nursing seriously ill COVID-19 patients”; (c) “Strong sense of duty and identity as a healthcare provider”; (d) “Rational understanding of the epidemic—the nurses believed that the epidemic would soon be overcome and would like to receive disaster rescue training.”

Conclusions: Although the intensive rescue work drained front-line nurses, both physically and emotionally, they showed a spirit of dedication and felt a responsibility to overcome this epidemic. Their experiences provide useful insights into implementing a safer public health emergency rescue system in preparation for future outbreaks of infectious diseases. Specifically, psychological support and humanistic care should be provided to front-line nurses to maintain their well-being, and nationwide emergency rescue training and disaster education should be implemented.

KEYWORDS

Coronavirus disease-2019, nurses, pneumonia, public health, qualitative study

1 | INTRODUCTION

At the end of December 2019, a cluster of patients with pneumonia of unknown etiology was identified in Wuhan, China. The causative agent was found to be a previously unknown coronavirus, later named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The virus is extremely contagious and the disease, coronavirus disease 2019 (COVID-19) spread rapidly around the world (Cheng

& Williamson, 2020). By 28 February 2020, within 2 months of the beginning of the outbreak, more than 82,000 confirmed cases of COVID-19 had been reported, with more than 2,800 deaths (Wilder-Smith, Chiew, & Lee, 2020). The COVID-19 outbreak continues to evolve and, by 26 May 2020, the number of confirmed cases of COVID-19 worldwide had reached almost 5,400,000. On 11 March 2020, the WHO officially declared COVID-19 to be a global pandemic.

A growing body of research speaks to the psychological impact of the pandemic and its consequences for mental health services (Bohlken, Schömig, Lemke, Pumberger, & Riedel-Heller, 2020; Davidson, Price, McCauley, & Ruggiero, 2013). Like many other

Yu-E Liu, Zhong-Chang Zhai authors contributed equally to this study.

countries, China has suffered from catastrophic disasters, which have become more common in recent years. Examples include the outbreak of severe acute respiratory syndrome (SARS) in 2003, the Wenchuan earthquake in 2008, and the ongoing epidemic of avian influenza (Jia & Liao, 2017; Qiu et al., 2019). In the face of all types of unexpected national disaster, health care providers are always first in the front-line and nurses, in particular, play a crucial role in managing disaster situations and overcoming difficulties (Pourvakhshoori, Norouzi, Ahmadi, Hosseini, & Khankeh, 2017).

Nurses who have worked in disaster situations experience a number of problems, including safety concerns, anxiety, stress, and fatigue (Shih, Liao, Chan, Duh, & Gau, 2002), as well as ethical challenges (Wenji, Turale, Stone, & Petrini, 2015). During a pandemic, nurses who have closer and more frequent contact with infected patients became afraid and anxious because of concerns that the contagious virus could affect them and their families (Bohlken et al., 2020), especially when they see other health care providers becoming infected. Most studies on the physical and mental health of front-line health care providers during the COVID-19 pandemic have focused on quantitative analysis. A survey that used mental health measurement scales found that front-line nurses facing COVID-19 had increased somatization symptoms and higher anxiety and depression scores (Shen, Zou, Zhong, Yan, & Li, 2020). As well as being important for the nurses themselves, the psychological state of nurses also affects the prognosis of patients and the smooth handling of an epidemic (Zhu, Ji, & Zhou, 2019). It is, therefore, very important to understand the real feelings of front-line nurses combating COVID-19, as well as the demands and challenges that they face.

Providing health-care services in a disaster engenders human relationships, emotions, and feelings that cannot be adequately assessed by quantitative approaches. Using qualitative interview methods, it is possible to understand the experience through the eyes of the respondent and also to discover hidden information that would not be otherwise be revealed (Wang et al., 2020). We decided, therefore, to conduct a study to explore the experiences and feelings of nurses who have combated COVID-19 in Wuhan, China to get a better understanding of the real problems and challenges that they faced. Their experiences provide valuable information for capacity-building disaster training and demonstrate that effective measures should be put in place to ensure the good psychological health of nurses. The results of our study will be a valuable resource to establish safer emergency rescue systems that can respond more efficiently and systematically to similar outbreaks in the future.

2 | METHODS

2.1 | Study design

In this study, we used standard qualitative methods, which pay more attention to the experiences and feelings of participants than to personality traits, to explore the research question: "What were the experiences of front-line nurses combating COVID-19?". This method

was selected because it allowed us to more comprehensively understand the experiences of front-line nurses combating COVID-19.

2.2 | Participant selection and preparation

Participants were nurses with experience in providing health care services for COVID-19 patients. Inclusion criteria were: (a) volunteering to participate in the study and provide written informed consent; (b) involvement in front-line rescue work for more than 1 week; and (c) normal cognitive ability and language skills so that the participant can fully express true emotional experiences. To achieve maximum variation, we tried to select nurses of different ages and who had previously worked in different clinical settings. The determination of sample size was based on data repetition and information saturation; saturation is usually explained in terms of "no new themes emerging in later interviews." We finally interviewed 15 clinical front-line nurses. In order to protect the anonymity of the interviewees, the nurses are referred to by the numbers N1–N15.

The 15 participants (5 males and 10 females) were recruited from two hospitals and their average working history as a nurse was 7.30 ± 5.62 years. The majority of the participants were married and their mean age was 27.83 ± 5.4 . Fourteen nurses held a bachelor's degree and one had a master's degree in nursing. Eight of the nurses worked on wards (six on general wards and two on infectious disease wards) and seven worked in intensive care units (Table 1).

2.3 | Ethical considerations

The study was approved by the Ethics Committee and the Departments of Nursing at the two general hospitals. All participants

TABLE 1 Characteristics of participants ($N = 15$)

Characteristic	<i>n</i> or mean \pm SD
Gender	
Male	5
Female	10
Age (years)	27.83 ± 5.43
Working history (years) as a nurse	7.30 ± 5.62
Education	
Bachelor's degree	14
Master's degree	1
Marital status	
Married	11
Unmarried	4
Work setting	
General Ward	6
Intensive care unit	7
Infectious ward	2

were informed of the purpose of the study and provided informed consent before data collection. The confidentiality of all data was ensured. If any participant showed emotional problems during the interview, adequate psychological intervention was provided to prevent secondary psychological harm. The participants had the right to withdraw from the study at any time.

2.4 | Data collection

Data were collected by conducting semi-structured in-depth interviews from 26 January to 5 February 2020. The one-to-one interviews were conducted in a quiet, relaxed environment, in which it was easy to talk without interference. The interviews, which lasted for 45–60 min per person, were recorded with the participant's permission. The interview outline was agreed after consulting relevant experts and selected clinical front-line nurses. The main questions were as follows: (a) please talk about your experiences working in the front-line to combat COVID-2019; (b) please talk about what affected your feelings or experiences in this front-line work; and (c) as a nurse, what did you think of the front-line work? The researchers "set aside" various biases and assumptions, and followed up on the interviewees' responses appropriately.

2.5 | Data analysis

The interview data were analyzed qualitatively. Two researchers independently reviewed the interview materials within 24 hr of each interview. Meaningful statements relevant to the experiences and feelings of participants were extracted, they transcribed and coded the meaningful statements and then classified similar codes into themes. Important themes were organized into clusters of themes. The transcripts were repeatedly checked and to ensure that the themes corresponded with the original meaning of the participants, two of the participants were asked to confirm whether these classifications were in line with the meaning of their interview statements. Disagreements about the content of a theme were discussed by a research group consisting of a master of nursing, a doctor of nursing, and a clinical frontline nursing manager.

2.6 | Trustworthiness

Trustworthiness and methodological rigor were established to confirm the validity and reliability of the results of this study (Guba & Lincoln, 1982). Credibility was achieved by confirming interview records during data collection. Transferability was established through a rich description of the context of the research and the saturation of data collection. The results of the analyses, such as codes and categories, were checked by experts for dependability and confirmability. The external check method was used, with two authors (first and corresponding authors) in nursing initially analyzing the data, and their results then being peer-reviewed by two PhD experts with

extensive experience in the research field. The meaning statements, codes, categories, and themes were translated into English and the accuracy of the translation was checked by an English professor and another professor from a Public Health College.

3 | RESULTS

Through semi-structured in-depth interviews and repeated data analysis, the experiences of front-line nurses combating COVID-19 were categorized into 4 theme clusters and 10 themes (Table 2).

3.1 | Facing tremendous challenges and danger

3.1.1 | New challenge

Some participating nurses had previously worked in general wards and had not cared for patients who were critically ill and contagious. During this major epidemic, many COVID-19 patients required mechanical ventilation and some needed advanced life support. It was a huge new challenge for nurses to quickly master these specialized nursing skills while keeping themselves safe.

Dealing with this kind of public health event is very different from normal work, even the steps of putting on and taking off protective clothing are different, so we need to learn again. (N7)

I have been working in a general ward and lack experience of nursing critically ill patients. Most of them receive mechanical ventilation, some needs continuous renal replacement therapy or even extracorporeal membrane oxygenation. Mastering these skills quickly was a huge challenge for me. (N9, N14)

TABLE 2 Front-line nurses' experiences combating coronavirus disease-2019 (COVID-19)

Theme cluster	Themes
Facing tremendous challenge and danger	New challenge Hoping to avoid infection
Strong pressure because of COVID-19	Inevitable fear Exhaustion Extreme stress
Strong responsibility and identity as a health care provider	Responsibility and mission as a health care provider Nursing: Lighting up the dark
Rational understanding of the epidemic	Hopeful Expectation about disaster rescue training Improving rescue preparation system

3.1.2 | Hoping to avoid infection

Although COVID-19 is now known to be a highly contagious respiratory disease with a high mortality rate, this was not fully understood at the beginning of the epidemic. The participants hoped that they had not been infected because they had contacted their families before they knew that the disease was highly contagious and did not want their families to be infected.

I didn't know about the disease at all. I was worried about whether the epidemic was as serious as it was reported to be. There were more and more confirmed patients, and the mortality rate was reported to be higher than for other infectious diseases. I hoped that I hadn't been infected. (N8)

I have had a mild cough and diarrhea recently. I'm worried that I've been infected and whether I've infected my family because I went home last week (sighed deeply)." (N13)

sweat during busy nursing services and the goggles were full of moisture from their own respiration. They were extremely willing to change PPE and drink water to maintain strength, but it was time-consuming and a waste of PPE. They were also not allowed to leave the room because of the patients' poor condition.

Wearing protective clothing, the whole person will feel out of breath; 4–6 hr without water intake, can't go to the toilet midway. After a day, the urine will soon become the color of sauce and oil, exhausted physically and mentally!" (N1, N5)

Because it's an isolation ward, we need to provide all treatment and basic care for the patients. The large amount of protective clothing makes this very difficult but we must ensure that patients are treated precisely and in a timely fashion. If I wanted to use the toilet, I had to take off the PPE and put it on again. So, I decided not to drink until I got off work, and it was too hard to endure. (N4, N12)

3.2 | Strong pressure because of COVID-19

3.2.1 | Inevitable fear

The participants wondered about the effectiveness of personal protective equipment (PPE) because the type and protection level of their PPE was frequently changed. They were afraid of being infected. The participants lacked experience and information about COVID-19 when they had to care for infected patients. Because they were unsure of what nursing operations would be needed and whether they could be carried out safely, the participants became frightened and scared.

Seeing all healthcare providers wearing full body protective clothing and masks, I felt that the ward was full of virus everywhere and I was scared. (N2)

COVID-19 was a novel disease. I didn't know enough about it. We were frightened and scared. The number of confirmed cases and deaths was increasing greatly. I was worried about what we should do if we faced a pharyngeal strip test or a cardiopulmonary resuscitation situation. (N15)

3.2.2 | Exhaustion

The physical strength of the participants became drained because they had to wear PPE, including two pairs of gloves and goggles, every time they went into the isolation ward. The PPE made them

3.2.3 | Extreme stress

The patients' condition changed rapidly and some deteriorated. The number of confirmed patients also continued to increase. Moreover, special vaccines had not yet been developed. Some participants reported being unable to sleep after a day working on the front-line.

In the morning, the patient's breathing was still stable but, the next day, the patient couldn't breathe, the condition developed so rapidly. There were more and more confirmed patients, many of them couldn't be hospitalized in time, special vaccines have not yet been developed, so I was very stressed. (N3)

After taking care of a COVID-19 patient, my sleep became severely disordered. I couldn't sleep for more than four hours. I was not sure whether this was a post-traumatic syndrome. (N6)

3.3 | Strong responsibility and identity as a health care provider

3.3.1 | Responsibility and mission as a health care provider

The participants described it as their duty to provide health care services for COVID-19 patients, even though the patients were carrying

a very contagious virus. As nurses, they thought that these tasks were unavoidable. They were also an inevitable responsibility and mission of a Communist party member or a soldier. Most of the participants were members of the Communist Party of China and some nurses held military ranks. Like other nurses, the soldiers volunteered to participate in epidemic rescue work in front-line hospitals because of patriotic enthusiasm.

As a Communist party member, in the face of this kind of emergency crisis, it was natural to have the courage to go to the front-line, what's more, our duty was life-saving; this task was our responsibility and mission. (N2)

Now is the Spring Festival reunion, we have only one mission, which is to fight the virus to the end, so that more families can be reunited. It was a unique sense of mission that belonged to the healthcare provider. (N6)

3.3.2 | Nursing: Lighting up the dark

The participants considered their nursing career to be very important in this epidemic. Patients would praise the nurses for their efforts and services because they really felt that the nurses were taking risks to save their lives. This praise and affirmation became a recognition of their effort from patients and other colleagues. When COVID-19 patients recovered and were discharged from hospital, the participants felt especially proud of nursing and their job as nurses.

Many medical experts publicly praised nurses in the mass media; they praised the quality of nursing and talent, the attitude and team-work of the nurses in the time of crisis. (N10)

In this sudden outbreak, tens of thousands of nurses fought on the front-line. I have been proud of nursing. On reporting the discharge of a patient from hospital, the media said < People said the stars were bright because they had not seen the eyes of a nurse > (N2)

3.4 | Rational understanding of the epidemic

3.4.1 | Hopeful

The vast majority of participants expressed great confidence in overcoming the epidemic. With the concerted efforts of citizens and the national government, together with the help of some international organizations, they felt that victory was inevitable.

The government has issued a series of effective policies, provided a large amount of protective materials, and allocated a number of medical staff to the front-line. Many senior and experienced medical experts were also available to guide the work. I believed the epidemic would be overcome soon. (N7)

Our nation has experienced so many difficulties and finally won. Some experts said that we were the heroic people of Wuhan. I believed this time we would succeed. (N13)

3.4.2 | Expectation about disaster rescue training

Most of the participants had not received adequate training in disaster relief. Although some had experience of working in earthquake relief or in the SARS epidemic, the vast majority recognized that they had insufficient knowledge and skills to handle a sudden infectious epidemic and expected to receive professional rescue training.

Although I had participated in the fight against SARS in 2003 and the Wenchuan earthquake in 2008, I still felt my skills were inadequate in this epidemic and I hoped to receive systematic disaster relief training. (N5)

I have worked for more than 10 years and nursed many critically ill patients, but this was the first time I had contact with patients in this kind of public health emergency and I lacked the knowledge to deal with this infectious disease. (N7)

3.4.3 | Improving rescue preparation system

The participants believed that great progress had been made in the public health emergency response during this sudden epidemic, but felt that more needed to be done and that the infectious disease reporting system needed to be changed.

This epidemic reflected the improvement of China's emergency rescue system, but the management of protective materials still needed further improvement. We have a long way to go. (N8)

Though facilities and human resources were much better than before, I think it is not enough. From the early stage of the epidemic to the establishment of the cabin hospital for centralized isolation, tens of thousands of confirmed patients were added during

this period. We need a system to respond quickly in a similar situation. (N9)

4 | DISCUSSION

This study used standard qualitative methods to deeply and holistically analyze the experience of front-line nurses combating COVID-19. We recognized the psychological and physical difficulties that they experienced, the crucial role they played during this epidemic, and their rational understanding of this outbreak.

COVID-19 was a new infectious disease that spread rapidly. The participants in this study were afraid of COVID-19 and regarded front-line work as a risky challenge. Front-line nurses were challenged by working in a totally new setting, just as they were in the SARS and (MERS) outbreaks (Kim, 2018; Maunder et al., 2006). With only brief training, most participants recognized that they did not have sufficient knowledge and skills for emergency infectious disease rescue; they worried that they or their families may become infected. Even with correct PPE, lack of knowledge, and the closed working environment meant that they still suffered huge psychological pressure (Shen et al., 2020). A training strategy for improving the emergency rescue capabilities of nurses should, thus, be implemented. The most up-to-date procedures for the prevention of infection and use of PPE should be shared with front-line nurses (Brooks et al., 2020). Research has shown that disaster rescue training can improve nurses' first aid awareness, the quality of their response, and their ability to handle the situation (Mayinuer, Patiman, & Li, 2019). Practical aspects of the job that should be taken into consideration for front-line workers include adequate PPE, goggles, and shorter working hours, which would all provide better support and protection for the nurses.

Although most of the nurses in this study were either soldiers or Communist party members who felt a strong sense of responsibility as health care providers, they still showed the effects of severe pressure, such as high levels of anxiety and fear, and even psychological trauma. Other studies have also reported that nurses feel high psychological pressure during outbreaks of infectious diseases (Khalid, Khalid, Qabajah, Barnard, & Qushmaq, 2016; Shen et al., 2020) since the nurses' concern for their own safety often conflicts with their responsibilities as health care providers (Kim, 2018). Psychological support and humanistic care can enhance the nurses' sense of identity and belong to the profession (Tan, 2015), which has a positive effect on their enthusiasm and physical ability to carry out the work (Chen et al., 2020). Mental health and humanistic care services, including a counseling hotline provided by either the government or the hospital, guaranteed food and daily living supplies, and a comfortable rest area for nurses, are thus, essential to relieve the psychological pressure and trauma of nurses who care for COVID-19 patients (Kang et al., 2020; Liu et al., 2020). Such services should also be provided retrospectively for nurses no longer working on the front-line.

The participants had a strong identification with nursing during the COVID-19 epidemic. Praise from discharged COVID-19 patients, as well as encouragement from other team members, made the participants feel more responsible and confident in their work (Alsaifi & Cheng, 2016). Other studies have shown that the experience of caring for infected patients can increase the sense of responsibility and morale of health care workers (Schwartz, Shapira, & Bar-Dayyan, 2014). Nurses who have experienced disaster rescue could play an important role in similar situations in the future. With the concerted efforts of the citizens and the national government, the vast majority of participants were hopeful for victory in this epidemic. Front-line nurses should, therefore, be regarded as valuable rescue personnel and treated with great respect.

Although the COVID-19 outbreak demonstrated the strengths of the health care rescue system, at the same time it also exposed problems and deficiencies. In this study, the nurses caring for COVID-19 patients felt overwhelmed because of the lack of appropriate knowledge and skills in emergency disaster rescue. The general public flocked to the hospital for examination because of the lack of awareness of public health prevention. The public health rescue preparation system must, therefore, be upgraded to prevent the spread of infectious disease at all stages of infection. A training and education strategy for disaster rescue should also be developed and implemented to improve the emergency rescue capacity of nurses. Health care services in disaster situations can only be successful when the nurses have sufficient capacity to respond effectively (Horrocks, Hobbs, Tippett, & Aitken, 2019). Information about emergent infectious diseases should also be popularized so that members of the public understand the actions that are needed to prevent the rapid spread of disease.

Only nurses, who may not have experienced the full demands of COVID-19 on other front-line clinical staff, participated in this study. The physical and emotional effects on nurses who cared for SARS, H1N1, and MERS patients were, however, very similar to those on other health care workers during these epidemics (Honey & Wang, 2013; Kim, 2018; Maunder et al., 2006). In addition, this study not only highlights the experiences and perceptions of nurses who served during the COVID-19 outbreak in China but also identifies their very real problems and the challenges they faced.

5 | CONCLUSIONS

This study explored the experiences of front-line nurses working to combat COVID-19. The results suggest that capacity-building education and disaster training should be put in place, together with effective measures to maintain the well-being of health care providers. The examples of real problems and training needs faced by front-line nurses provide reliable data for establishing a safer health care rescue system, which would be better prepared for future national disasters.

CONFLICT OF INTEREST

No conflict of interest is declared by the authors.

ORCID

Yu-E Liu  <https://orcid.org/0000-0002-1626-5041>

REFERENCES

- Alsahafi, A. J., & Cheng, A. C. (2016). Knowledge, attitudes and behaviours of healthcare workers in the Kingdom of Saudi Arabia to MERS coronavirus and other emerging infectious diseases. *International Journal of Environmental Research and Public Health*, 13(12), 1214. <https://doi.org/10.3390/ijerph13121214>
- Bohlken, J., Schömig, F., Lemke, M. R., Pumberger, M., & Riedel-Heller, S. G. (2020). COVID-19 pandemic: stress experience of healthcare workers – A short current review. *Psychiatrische Praxis*, 47(4), 190–197. <https://doi.org/10.1055/a-1159-5551>
- Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *Lancet*, 395(10227), 912–920. [https://doi.org/10.1016/s0140-6736\(20\)30460-8](https://doi.org/10.1016/s0140-6736(20)30460-8)
- Chen, Q., Liang, M., Li, Y., Guo, J., Fei, D., Wang, L., ... Zhang, Z. (2020). Mental health care for medical staff in China during the COVID-19 outbreak. *Lancet Psychiatry*, 7(4), e15–e16. [https://doi.org/10.1016/s2215-0366\(20\)30078-x](https://doi.org/10.1016/s2215-0366(20)30078-x)
- Cheng, A. C., & Williamson, D. A. (2020). An outbreak of COVID-19 caused by a new coronavirus: What we know so far. *The Medical Journal of Australia*, 212(9), 393–394.e391. <https://doi.org/10.5694/mja2.50530>
- Davidson, T. M., Price, M., McCauley, J. L., & Ruggiero, K. J. (2013). Disaster impact across cultural groups: Comparison of Whites, African Americans, and Latinos. *American Journal of Community Psychology*, 52(1–2), 97–105. <https://doi.org/10.1007/s10464-013-9579-1>
- Guba, E. G., & Lincoln, Y. S. (1982). Epistemological and methodological bases of naturalistic inquiry. *Educational Technology Research and Development*, 30(04), 233–252. <https://doi.org/10.1007/BF02765185>
- Honey, M., & Wang, W. Y. (2013). New Zealand nurses perceptions of caring for patients with influenza A (H1N1). *Nursing in Critical Care*, 18(2), 63–69. <https://doi.org/10.1111/j.1478-5153.2012.00520.x>
- Horrocks, P., Hobbs, L., Tippett, V., & Aitken, P. (2019). Paramedic disaster health management competencies: A scoping review. *Prehospital and Disaster Medicine*, 34(3), 322–329. <https://doi.org/10.1017/s1049023x19004357>
- Jia, W. X., & Liao, M. (2017). Current situation of H5 and H7 subtype avian influenza in China and suggestions for prevention and control. *Chin Poultry*, 39(16), 1–4.
- Kang, L., Li, Y. I., Hu, S., Chen, M., Yang, C., Yang, B. X., ... Liu, Z. (2020). The mental health of medical workers in Wuhan, China dealing with the 2019 novel coronavirus. *Lancet Psychiatry*, 7(3), e14. [https://doi.org/10.1016/s2215-0366\(20\)30047-x](https://doi.org/10.1016/s2215-0366(20)30047-x)
- Khalid, I., Khalid, T. J., Qabajah, M. R., Barnard, A. G., & Qushmaq, I. A. (2016). Healthcare workers emotions, perceived stressors and coping strategies during a MERS-CoV outbreak. *Clinical Medicine & Research*, 14(1), 7–14. <https://doi.org/10.3121/cmr.2016.1303>
- Kim, Y. (2018). Nurses' experiences of care for patients with Middle East respiratory syndrome-coronavirus in South Korea. *American Journal of Infection Control*, 46(7), 781–787. <https://doi.org/10.1016/j.ajic.2018.01.012>
- Liu, S., Yang, L., Zhang, C., Xiang, Y. T., Liu, Z., Hu, S., & Zhang, B. (2020). Online mental health services in China during the COVID-19 outbreak. *Lancet Psychiatry*, 7(4), e17–e18. [https://doi.org/10.1016/s2215-0366\(20\)30077-8](https://doi.org/10.1016/s2215-0366(20)30077-8)
- Maunder, R., Lancee, W., Balderson, K., Bennett, J., Borgundvaag, B., Evans, S., ... Wasylenki, D. (2006). Long-term psychological and occupational effects of providing hospital healthcare during SARS outbreak. *Emergency Infectious Diseases*, 12(12), 1924–1932. <https://doi.org/10.3201/eid1212.060584>
- Mayinuer, T., Patiman, M., & Li, P. (2019). Training practice and effect of disaster-relief training that based on competency for primary nurses. *Journal of Nursing Administration*, 19(3), 184–187.
- Pourvakhshoori, N., Norouzi, K., Ahmadi, F., Hosseini, M., & Khankeh, H. (2017). Nurse in limbo: A qualitative study of nursing in disasters in Iranian context. *PLoS One*, 12(7), e0181314. <https://doi.org/10.1371/journal.pone.0181314>
- Qiu, J. J., Cao, S. R., Chen, Y. Q., Xu, T. X., Sun, X., & Wang, L. X. (2019). Avian influenza epidemic situation and its monitoring and prevention in 2013–2018. *Agricultural Development & Equipments*, 11, 93–95+92.
- Schwartz, D., Shapira, S., & Bar-Dayyan, Y. (2014). Health care workers' knowledge and confidence in personal protective equipment during the H1N1 pandemic in Israel. *Disaster Medicine and Public Health Preparedness*, 8(2), 150–157. <https://doi.org/10.1017/dmp.2014.25>
- Shen, X., Zou, X., Zhong, X., Yan, J., & Li, L. (2020). Psychological stress of ICU nurses in the time of COVID-19. *Critical Care*, 24(1), 200. <https://doi.org/10.1186/s13054-020-02926-2>
- Shih, F. J., Liao, Y. C., Chan, S. M., Duh, B. R., & Gau, M. L. (2002). The impact of the 9–21 earthquake experiences of Taiwanese nurses as rescuers. *Social Science & Medicine*, 55(4), 659–672. [https://doi.org/10.1016/s0277-9536\(01\)00194-0](https://doi.org/10.1016/s0277-9536(01)00194-0)
- Tan, J. P. (2015). Introduction and enlightenment of humanistic caring and nurse promotion system in Taiwan hospitals. *Chinese Journal of Nursing Education*, 12(4), 305–307.
- Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C. S., & Ho, R. C. (2020). Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *International Journal of Environmental Research and Public Health*, 17(5), 1729. <https://doi.org/10.3390/ijerph17051729>
- Wenji, Z., Turale, S., Stone, T. E., & Petrini, M. A. (2015). Chinese nurses' relief experiences following two earthquakes: Implications for disaster education and policy development. *Nurse Education in Practice*, 15(1), 75–81. <https://doi.org/10.1016/j.nepr.2014.06.011>
- Wilder-Smith, A., Chiew, C. J., & Lee, V. J. (2020). Can we contain the COVID-19 outbreak with the same measures as for SARS? *Lancet Infectious Diseases*, 20(5), e102–e107. [https://doi.org/10.1016/s1473-3099\(20\)30129-8](https://doi.org/10.1016/s1473-3099(20)30129-8)
- Zhu, Y. P., Ji, B. J., & Zhou, J. Z. (2019). A study on the influencing factors and correlation of nurses' psychological capital, coping style and work performance. *Journal of Nursing Train*, 34(15), 1382–1385+1414.

How to cite this article: Liu Y-E, Zhai Z-C, Han Y-H, Liu Y-L, Liu F-P, Hu D-Y. Experiences of front-line nurses combating coronavirus disease-2019 in China: A qualitative analysis. *Public Health Nurs*. 2020;37:757–763. <https://doi.org/10.1111/phn.12768>