


Experiences of clinical first-line nurses treating patients with COVID-19: A qualitative study

Rong Tan MN, RN, Nurse Researcher¹  | Ting Yu MN, RN, Nurse Researcher² | Kaiyan Luo RN, Head Nurse¹ | Fen Teng MN, RN, Nurse Researcher³ | Yilan Liu PhD, RN, Nursing Director⁴ | Jian Luo MN, RN, Nursing Director⁴ | Deying Hu PhD, RN, Nursing Director⁴

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

²School of Nursing, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China

³Department of Nursing, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China

⁴Department of Nursing, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China

Correspondence

Deying Hu, Department of Nursing, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, 1277 Jiefang Dadao, Wuhan, Hubei Province 430022, China.
Email: hudeying2006@126.com

Funding information

This study was supported by the National Natural Science Foundation of China (grant number: 71673100).

Abstract

Aim: To explore the work experience of clinical first-line nurses treating patients with coronavirus disease 2019 (COVID-19).

Background: COVID-19 has been listed as an international public health emergency. Clinical first-line nurses are at a high risk of infection, and they face a lack of experience and inadequate preparation for COVID-19, leading to physical and psychological disorders.

Methods: A qualitative study was conducted from January to February 2020 at a COVID-19-designated hospital in Wuhan, China. Thirty nurses were selected for the study using a purposive sampling method. Data were collected by semi-structured interviews and analysed using content analysis.

Results: Two main categories were defined in the study from the perspective of nurses: negative experiences during clinical first-line work and positive impacts of clinical first-line work. Under the first category, two subcategories were included: psychological experiences of clinical first-line work and difficulties faced during clinical first-line work. The analysis further yielded two subcategories for the second category: the needs of clinical first-line work and the impact of clinical first-line work on professional attitudes.

Conclusions: The results demonstrate that success depends upon strengthening emergency training and knowledge of infectious diseases for nurses, providing adequate protective equipment and improving the emergency response plans of hospitals for public health emergencies.

Implications for Nursing Management: It is believed that our findings will guide hospital managers to make improvements in personal, administrative and institutional areas and that they will provide a reference and inspiration for nurses with regard to public health emergencies in the future.

KEYWORDS

COVID-19, first-line nurses, public health emergency, qualitative study, work experience

1 | INTRODUCTION

At the end of December 2019, a novel coronavirus emerged in Wuhan, China, and spread rapidly throughout the country (Lu et al., 2020; Li et al., 2020; Munster et al., 2020). The identification of this particular microorganism followed that of two similar viruses: the severe acute respiratory syndrome coronavirus (SARS-CoV-1) and the Middle East respiratory syndrome coronavirus (MERS-CoV) (Lippi & Plebani, 2020). The International Committee on Taxonomy of Viruses named it the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), and the respiratory illness caused by the virus was named coronavirus disease 2019 (COVID-19) by the World Health Organization (Gorbalenya et al., 2020). The novel coronavirus is highly contagious and can be transmitted from person to person, resulting in secondary cases among close-contact family members and health care workers (To et al., 2013). By April 2020, there were over 80,000 confirmed cases of COVID-19 in China and over 3,000 deaths attributed to the disease (National Health Commission of the People's Republic of China, 2020). Moreover, COVID-19 has spread across the world, with over a million confirmed cases and over 70,000 deaths (WHO, 2019). The number of cases continues to increase, posing an urgent threat to public health.

Due to the rapid initial growth in the number of infected patients in Wuhan, China, there were insufficient local medical staff to meet the demand (Feng et al., 2020). Consequently, the Chinese government acted quickly by adopting various measures to deal with the epidemic and prevent its spread: financial support for treatment (USD \$16.5 billion, as of 13 March 2020) (Chinese Economic Network, 2020), the construction of temporary hospitals (mobile cabin hospitals), a policy of admitting all COVID-19 patients to hospitals, dispatching army medical staff and several other measures. Numerous medical staff rushed to Wuhan to support first-line health care workers (Feng et al., 2020). Approximately 10,000 medical staff from various institutions were on the frontline providing patient care. According to the Wuhan Municipal Health Commission (2020), by 16 February 2020, the city had designated 46 hospitals and 18,816 isolated patient beds to deal with the crisis. Of these, 18,037 beds were used, a utilization rate of 96%.

Wuhan Union Hospital (Union Hospital, Tongji Medical College, Huazhong University of Science and Technology) was founded in 1866 and is a major general hospital under the National Health and Family Planning Commission. It consists of the Main Campus, the West Campus and the Cancer Center, along with the planned Jinyinhu Hospital. When it was designated for the prevention and treatment of infectious diseases, the hospital actively renovated its ordinary wards. Currently, 1,866 beds are available to treat critically ill patients with COVID-19. Of these, 1,660 beds are now being used for this purpose. To date, nearly 2,000 nurses in the hospital have been working in shifts. However, many more medical personnel are needed in the fight against COVID-19.

Health care workers have been on the frontline of both the pandemic response and exposure to infection. Indeed, there is

an expectation that they can provide assistance in an emergency (Damery et al., 2010). However, the duty to tend to the sick is not absolute, insofar as health care workers also have obligations to their own family members (Selgelid, 2009). During the 2020 Spring Festival, the Wuhan government announced the closure of the entire city, suspending public transportation and delivery services (Chinese National Health Commission, 2020). This severely challenged the city's infrastructure, labour resources and health care sector (Butsashvili et al., 2007). During the epidemic, first-line nurses were at high risk of infection, they lacked experience, and they were inadequately prepared for COVID-19. As such, they were susceptible to physical and psychological disorders (Zhang et al., 2014; Xu & Zhang, 2020). In treating sudden and emerging infectious diseases, nurses are the guardians of health, yet they also need urgent attention. Miao et al. (2018) found that the work experiences of nurses treating patients with the H7N9 virus were helpful to nursing managers for understanding the needs of nurses during emergencies, and to provide some reference for the development of targeted measures. Consequently, it is important to have a comprehensive understanding—through qualitative research (Nasrin et al., 2019)—of the experiences of first-line clinical nurses during the COVID-19 outbreak. We believe that the recommendations provided by the results of this study will be relevant and practical for other countries that are currently facing the challenges of COVID-19.

1.1 | Study aim

This study was conducted to describe, interpret and understand the real feelings of first-line clinical nurses, their needs during clinical first-line work and the problems they face. We also aimed to develop recommendations for solutions to these problems.

2 | METHODS

2.1 | Study design

In this qualitative study, the phenomenological method was adopted, since it offers the opportunity to gain an understanding of the meaning of a phenomenon as it really is (Barnett, 2005). In the field of nursing, the phenomenological method is mainly used to explore subjective cognitive aspects or life experiences related to health and disease. Its central question pertains to reflections on the experienced world (Li & Liu, 2012; Refrande et al., 2019). The method was deemed most relevant for this study, because it allowed the participants to focus on their individual inner feelings and describe their needs and the problems they faced during their clinical first-line work. This enabled the researchers to capture the work experience of nurses treating patients with COVID-19. It sought to provide a better understanding and to present their subjective perceptions with clarity and meaning. Accordingly, Heidegger's hermeneutic phenomenological approach was adopted in this study.

Hermeneutic phenomenology enables researchers to become more aware of the interpretations of encountered phenomena (Li & Liu, 2012). The meaning embedded in experience can be understood and explained based on one's unique perspective and life experience (Heidegger, 2010). Hence, interviewers read the transcribed materials attentively in order to grasp the global meaning and interpret or identify the attributes contained in them. Then, all descriptions were identified and grouped to show the essentialities of the phenomena (Refrande et al., 2019).

2.2 | Research team

Five researchers with experience in qualitative research formed the research team. Researcher A (a first-line nurse) conducted face-to-face interviews, and researcher B (a non-first-line nurse) conducted interviews using WeChat (a messaging app) and via telephone. The WeChat interviews included voice calls and video conferences. Researchers A and B thus collected and analysed the data and extracted themes. Researchers C and D verified the interpretation and consistency of the themes found. Researcher E—a nursing manager with previous experience in qualitative research—was appointed to guide the whole process. All five researchers were registered nurses, and they were uniformly trained for the study. This approach ensured that the participants' experiences were described without bias.

2.3 | Setting and participants

The research setting was Wuhan Union Hospital, a large public tertiary health organisation. The comprehensive strength of this hospital ranks second in the local area. It is one of the main hospitals in the fight against COVID-19, and it was one of the first hospitals designated as such. As a result, at the time of the study, there were many frontline nurses from all over the country.

Our study participants were first-line clinical nurses at the forefront of the epidemic. Researcher A was working on the frontline with some interviewees. The first participant was recruited by Researcher A via WeChat, and such early informants referred other participants. Purposive sampling was applied to select the nurses who (a) were on the frontline for at least 3 weeks such that purposeful reflections and rich data could be collected for analysis, (b) were expressive and (c) were willing participants. All first-line nurses who met the inclusion criteria were invited to participate in the study. We aimed to identify and select participants who could provide rich data. This allowed us to conduct an in-depth investigation of their work experience. A letter of invitation and a participant information form were sent to those who were interested in our study via email or WeChat to inform them of the purposes and methods of the study. In order to maximize the perspectives of the participants and achieve breadth and depth of the data collected, the maximum variation sampling technique was used to recruit samples of heterogeneous nurses at

TABLE 1 Semi-structured interview guide

Questions

1. Could you tell me about your working experience on the frontline?
2. What impressed you most during your time on the frontline?
3. Could you tell me your most pressing needs during first-line work?
4. Could you talk about self-evaluation during your work on the frontline?

different levels (Holloway & Wheeler, 2010). The researchers contacted 40 qualified participants, 10 of whom refused to participate. The most common reasons were as follows: heavy workload, no time and lack of interest. In total, interview data were collected from 30 nurses, namely, ward nurses, specialist nurses and nurse managers.

2.4 | Data collection

Under the guidance of a drafted outline for semi-structured interviews, we interviewed the participants. At first, two clinical first-line nurses were pre-interviewed, to familiarize the researchers with the research process and to improve the analysis of the research. According to the results of these preliminary interviews, the final interview outline was modified and formed (Table 1).

Interviews were conducted in January and February 2020, until the content reached a saturation level. Before the interviews, we conducted unified training for the research team members. We immediately conducted the interviews after the participants completed the first-line work. This way, their memories and emotions were fresh. Interviews were conducted face to face, by telephone and by WeChat over voice or video during the outbreak. Prior to the interview, we contacted the interviewees to discuss the appropriate interview time and choose a quiet and comfortable place for the interview. We recorded the conversations with the consent of the interviewees. The researchers encouraged the interviewees to be expressive and to follow up with responses. In addition, the interviewers were instructed to keep the language neutral and avoid induced orientation, such that the interviews would aptly reflect the opinions, attitudes and thoughts of the interviewees. The interviews lasted 30–50 min. Subsequent telephone interviews were conducted if additional enquiries and data collection were required.

2.5 | Data analysis

The data were analysed by content analysis (Li & Liu, 2012). In addition, to verify the rationality of the data analysis and interpretation, three researchers (A, B and E) performed the initial analysis of the data independently within 24 hr of the interview. They listened to the audio or video materials multiple times and transcribed them. Subsequently, these three researchers read and reread the interview materials several times to immerse themselves fully in

TABLE 2 Main categories and subcategories, main concepts extracted, and extracted concepts from qualitative data

Main categories	Subcategories	Main concepts	Extracted concepts	
1 Negative experiences during clinical first-line work	1.1 Psychological experiences of clinical first-line work	1.1.1 Heavy workload and pressure	(1) Tiredness and stress (2) Exhaustion	
		1.1.2 Fear and anxiety	(1) Fear (2) Anxiety	
		1.1.3 Helplessness and frustration	(1) Powerlessness (2) Helplessness (3) Ineffectiveness	
		1.1.4 Empathy and compassion	(1) Pity (2) Sympathy (3) Misery	
		1.1.5 Unfamiliarity with environment and disease	(1) Inexperience (2) Discomfort and unfamiliarity	
	1.2 Difficulties faced by clinical first-line work	1.2.1 Shortage of health care workers and protective equipment		(1) Material shortages (2) Insufficient staff (3) Lack of protective supplies
			1.2.2 Lack of knowledge and experience	(1) Insufficient teaching (2) Unfamiliarity
		2.1 Needs of clinical first-line work	2.1.1 Need for specialized knowledge and training	(1) Lack of training (2) Unfamiliarity
			2.1.2 Need for proper scheduling	(1) Overworking (2) Mismanaged human resources (3) Tiredness
			2.1.3 Need for psychological counselling	(1) Lack of care (2) Helplessness and depression (3) Flashbacks
2.2 Impact of clinical first-line work on professional attitudes	2.2.1 Improved professional responsibility		(1) Responsibility (2) Endurance	
		2.2.2 Promotion of professional identity	(1) Saving lives (2) Resolving difficulties	

the data. The data were classified and coded, and the related codes were combined around a certain meaning to generate the themes. To validate the research feasibility, the other two researchers (C and D) reviewed the initial analysis. These researchers were not involved in the interview process, but they were familiar with qualitative data analysis. They compared the results with their own experience and response process. Ultimately, all researchers assembled in the presence of the fifth researcher to check the coding consistency by comparing coding and making the results meaningful. In addition, two participants (from among the 30 who were interviewed) were asked to confirm the research results, to further clarify their responses and prevent any possible misunderstandings. In order to improve consistency and ensure neutrality, all five researchers made every attempt to suppress their own existing views and ideas. In other words, we attempted to ensure that the particular experiences of the researchers did not affect the analysis (Lee, et al., 2019).

2.6 | Ethical considerations

Ethics approval was obtained from the Institutional Ethics Review Board (approval number S171). We complied strictly with the standard ethical guidelines. The purpose and methods of the study, the voluntary nature of participation, the anonymity of the participants and their right to withdraw at any time were explained to the participants as part of the informed consent.

3 | RESULTS

We interviewed 30 nurses: 24 females and six males. The mean age of the nurses was 31.23 ± 6.27 years (ranging from 24 to 47 years old). Among the interviewed nurses, five held associate degrees, 22 held bachelor's degrees, and three held master's degrees. They each had between two and 25 years of nursing experience with a

mean of 9.10 ± 5.90 years of experience. There were four nurses working in the fever clinic, five nurses in the intensive care unit, six in the emergency department, seven in the infection wards and eight in the isolation wards. Three nurses were supervisors (head nurses), six were specialist nurses, and the rest were ward nurses. Only six nurses had intensive care experience and were trained to use a ventilator. In particular, one nurse volunteered to the frontline for a second time.

Through the extraction, induction and analysis of transcriptional manuscripts, two main categories were defined in our study: negative experiences during clinical first-line work and positive impacts of clinical first-line work. We also defined four subcategories, as listed in Table 2.

3.1 | Category 1: Negative experiences during clinical first-line work

This category included two subcategories: psychological experiences of clinical first-line work and difficulties faced during clinical first-line work.

3.1.1 | Subcategory 1: Psychological experiences of clinical first-line work

Heavy workload and pressure

During the interview, almost every nurse in the first-line ward mentioned exhaustion, a heavy workload and a lack of rest as the most common experiences.

I am very tired and stressed when I am working in the infection ward, but I can barely help the patients...and then we are overworked, which is physically tiring...

(N3)

...eight hours without eating, drinking, or going to the toilet. My throat burns. I feel like I am going to fall down, but I keep going until I get off work...

(N7)

Fear and anxiety

Due to the outbreak of the epidemic, there was continual high-intensity rescue work, close contact with patients and the loss of a normal and balanced life. Most first-line nurses were under great psychological pressure, and they were prone to fear and anxiety.

In fact, in addition to ambition, I am afraid at the same time... We don't seem to have a good way to stop the deterioration of the disease. It's very difficult to fight the virus, so I am quite scared.

(N15)

... And the other thing is fear, fear of everything, of being infected, of infecting the people around you, and of an outbreak of the virus...

(N21)

Helplessness and frustration

When facing the growing epidemic, with an increasing number of confirmed cases and deaths, first-line nurses were prone to frustration, helplessness and even self-blame.

What really hits me is the overwhelming sense of powerlessness. When you get to the frontline, you realize that both doctors and nurses are a little overwhelmed by this new disease...

(N6)

...There are some cases of family aggregation. The patients are elderly and without anyone to take care of them; their condition is very bad; it's so helpless.

(N11)

I tell the head nurse that I would like to go to the frontline and that I really want to help the patients. But when I go there...I have a sense of being ineffective...

(N9)

Empathy and compassion

Compassion resonated in others. During the outbreak, first-line nurses were mostly women who were extremely empathetic with patients and who were especially emotionally affected.

...The ventilator is uncomfortable for the patient; she doesn't even have the strength to drink water... looks very pitiful, and drinking water seems like an extravagant feeling.

(N1)

A lot of diagnosed patients don't have a sickbed, so they bring a foldout bed and sleep in the outpatient hall... The hall is super cold without heating. The patients and their family members are facing difficulties, and I sympathize with them...

(N25)

Seriously ill patients are really miserable; their families have also suffered a lot...

(N21)

Unfamiliarity with environment and disease

The scope of the work of first-line nurses was limited to the infection ward, which was mostly closed off, with poor air circulation and little communication with the outside world. In addition, when nurses arrived in these unfamiliar working environments, they had to take

care of critically ill patients immediately, before they could adapt. In facing death and other painful scenes, nurses felt depressed and anxious.

I don't have the experience of working in the Intensive Care Unit, and I don't know much about the use of the ventilator... Under pressure and on the verge of collapse, we all have to work in high concentrations.

(N10)

Some patients in the isolation ward were very heavy... all operations were a little uncomfortable with the gloves and isolation gowns...

(N18)

3.1.2 | Subcategory 2: Difficulties faced during clinical first-line work

Shortage of health care workers and protective equipment

The sudden large-scale outbreak of COVID-19 generated a large number of patients with different levels of severity. This was challenging for clinical first-line nurses. All nurses stated that they experienced periodic or long-term material deficiencies.

What most lack and need is strong support, including material support. I keep running back and forth when I go to work...

(N29)

First, there is insufficient staff, because a lot of patients are very heavy, and they need us to care for them. The second is not enough protective equipment.

(N14)

...extreme lack of protective supplies. Each person wears only a single isolation gown and mask at work until the end of the day...

(N22)

Lack of knowledge and experience

COVID-19 is a new infectious disease. Nurses did not have experience with it, and even the specialized knowledge was not enough. This tested the ability of nurses to respond to the emergency, as well as the first-aid technology that was available.

Well, regarding the use of isolation gown, there is still a relative lack of training... and in terms of specialized training, we are incapable of nursing critical patients and using critical equipment such as ventilators,

because we do not work in the Intensive Care Unit or the Respiratory Department; we usually don't use ventilators, and now we have to learn how.

(N22)

There are a lot of patients on ventilators in the infection ward, but not all first-line nurses know how to use ventilators. So, we have to arrange for a teacher who can teach us the basics first and give us guidance when we have problems using the ventilators...

(N30)

3.2 | Category 2: Positive impacts of clinical first-line work

This category included two subcategories: the needs of clinical first-line work and the impact of clinical first-line work on professional attitudes.

3.2.1 | Subcategory 1: Needs of clinical first-line work

Need for specialized knowledge and training

Most of the nurses who were interviewed in this study had no intensive care experience and did not know how to use ventilators. Although they had been trained in emergency medicine, their experience with critical instruments was mostly theoretical. Under the conditions of the emergency, they acted with confusion.

...I do not even know how to protect myself; there is no related training. It's so dangerous and I feel scared when I think about this...

(N8)

...For the use of a non-invasive ventilator, if it's only temporary learning, there's really no time to become familiar with the process of using it... You need to know how to deal with the ventilator's alarm, which I think must still be learned...

(N27)

Need for proper scheduling

The daily increase in patients amplified the nursing workload, and the demand for nurses and human resources increased significantly. The original scheduling and working mode could not meet the dramatic increase in treatment tasks. Scheduling and human resources needed to be adjusted in time to preserve combat effectiveness.

The work of first-line personnel is too intense... There is a need to reduce the number of hours each shift,

and there is the possibility of a protracted battle against infection...

(N19)

...What we need most is an effective management team that can arrange personnel and distribute staff appropriately...

(N4)

...I can only arrange for my nurses to rest when there are sufficient human resources. They are so tired every day. Sometimes when I see them like that, I just want to cry...

(N12)

Need for psychological counselling

All first-line nurses were highly exposed and risked infection. Consequently, they suffered from varying degrees of psychological distress. Their mental health deteriorated. According to the interviews, psychological interventions for first-line nurses were not followed up in time.

...Psychological counseling is needed. We treat patients every day... I have severe insomnia recently... I hope management cares about the needs of nurses while paying attention to patients.

(N16)

Now I feel helpless and depressed. I know I have the courage, so I always remind myself... I will recover.

(N21)

Up to now, my head has been full of those pictures. They linger... In fact, we don't want to admit this to others, but I am afraid others also feel depressed...

(N17)

3.2.2 | Subcategory 2: Impact of clinical first-line work on professional attitudes

Improved professional responsibility

Correct and positive professional values, to a certain extent, can enhance the sense of professional responsibility and identity. In our study, most nurses did not complain about working on the frontline. Rather, they exhibited strong professional responsibility as treatment initially progressed.

For my own evaluation, I think I am responsible... As medical staff, it is your duty to treat patients, and it is worth the effort...

(N5)

I really tried my best, although I am very tired... But I still endeavor to do my job and treat patients.

(N20)

Promotion of professional identity

All the interviewed nurses believed that patient satisfaction with nursing work gave them a sense of accomplishment and a high sense of professional identity.

...We, the medical staff, always have a protective heart. We try our best to alleviate the pain of patients and to save their lives...

(N21)

First-line work involves facing many difficulties, addressing urgent tasks in an orderly manner, and playing a strong organizational and coordination role...

(N30)

4 | DISCUSSION

This research was a qualitative study with the aim of describing, interpreting and understanding the work experiences of first-line clinical nurses treating patients with COVID-19. We believe that the recommendations offered by the results of this study will be relevant and practical in other countries that are currently facing the epidemic. Two main categories were determined for the research: negative experiences during clinical first-line work and positive impacts of clinical first-line work. Under the first category, it was determined that nurses highlighted their psychological experiences with clinical first-line work and the material difficulties they faced. These difficulties mainly related to labour shortages and a lack of protective equipment and experience.

One of the most critical findings of this study was the negative psychological experiences of clinical first-line nurses—that is, the heavy workload and pressure, fear and anxiety, helplessness, and unfamiliarity with the environment and the disease. Such experiences affect the care that can be offered to patients, as well as the physical and mental well-being of nurses (Martins & Robazzi, 2009). All COVID-19 patients admitted in our hospital were critically ill, with rapidly worsening symptoms. Xu and Zhang (2020) conducted a psychological questionnaire survey of 41 first-line clinical nurses with pneumonia who participated in the fight against COVID-19 and found that 92.68% of nurses developed psychological problems within 2 weeks, mainly manifested as terror and anxiety. Their findings are similar to ours. Indeed, psychological nursing and appropriate psychological interventions are crucial during public health emergencies (Xiang et al., 2020). First-line nurses must adapt to the abnormal treatment and nursing work, and they must maintain the necessary working ability. Thus, nursing managers should appropriately assess the

situation, recognize the practical difficulties faced by clinical first-line nurses, supplement human resources, optimize scheduling and correctly distribute labour. Particularly, it might be necessary to develop a mechanism that protects first-line nurses from psychological distress to relieve the pressure they face. Indeed, Liu et al. (2020) recommended setting up a psychological counselling line and providing online and offline psychological clinics that can offer psychological counselling to medical staff.

Importantly, almost all interviewees noted that the first-line nurses lacked personal protective equipment and experienced a shortage of human resources. This situation is doubtless similar to that in other countries facing COVID-19 (Tan et al., 2020; Nagesh & Chakraborty, 2020; Chersich et al., 2020). Overloaded work can lead to burnout, inefficiency and physical and mental exhaustion, directly affecting nursing quality (Miao et al., 2018). Insufficient nursing staff and an excessive number of patients result in the inability to provide timely care and degraded care quality (Soltani Molayaghobi et al., 2019). Therefore, nursing managers should allocate sufficient nursing resources in proportion to the number of patients in a way that ensures that nurses can sufficiently rest after each shift. Liu & Liehr (2009) endorsed a two-person work system whereby each nurse assists another with complex nursing operations and monitors the implementation of isolation and protection measures. In order to achieve this, the formation of an emergency echelon should be based on senior nurses with intensive care experience, supplemented by general ward nurses.

Personal protective equipment is the most important aspect of protection from professional risk (Samur & Intepeler, 2019). When personal protective equipment is unavailable, first-line nurses must strive to save materials, and this poses both physical and psychological challenges. When general hospitals encounter public health emergencies, the supply of personnel and materials is often one of the key reasons for their success. Hospital management should focus on coordinating and distributing resources to ensure the adequate supply and appropriate use of these materials (Zhang et al., 2003). The results of our research emphasize the need for general hospitals to strengthen their logistical procedures for protecting the supply of resources, to ensure that adequate protective equipment can be provided to first-line nurses. In addition, health administrators should take the initiative to contact hospital managers, simplify application procedures for materials and ensure the supply of materials in the shortest time. Doing so can make clinical treatment work smoother and win precious time for treating patients.

Under the second category, it was determined that the needs of clinical first-line nurses included specialized training, proper scheduling and psychological counselling. Some interviewed nurses considered the treatment of COVID-19 patients as a special work experience. They said they felt the professional ethics of nursing included saving lives. Our results were in line with those of Ye et al. (2020), who suggested that nursing managers should seek to boost the morale of nurses during epidemics by actively commending the advanced model of first-line personnel, granting

temporary work allowances, providing appropriate holiday rewards and establishing communication channels between first-line staff and their families.

The competence of nurses directly affects the quality of patient care and the success rate during emergencies (Miao et al., 2018). As COVID-19 is a novel acute respiratory infectious disease, the training and skills of nurses cannot match the requirements of the job. In our study, nurses with low seniority and no intensive care or flu care experience indicated that training and specialized skills must be improved. Similarly, a related study (Tang et al., 2018) emphasized the requirement for training in emergency medicine. Therefore, in the case of COVID-19, managers should make every effort to ensure that first-line nurses understand how to use ventilators and that they can help patients adapt to the ventilators as quickly as possible. In non-emergency situations, managers should strengthen training in public incident rescue and emergency medicine for nurses in the hospital. They should be provided with systematic theoretical knowledge and professional technical training, as combining theory with practice is more effective. The formulation of emergency plans is particularly important, to ensure that medical staff can coordinate and regulate effectively when responding to public emergencies (Zhang, 2015). In addition, in the aftermath of emergencies, nursing managers should evaluate and revise emergency response plans according to the actual situation. Thus, the process can be constantly improved to provide a stable system for various emergencies in the future.

4.1 | Limitations

There are limitations to consider in this study. Some interviews were conducted by telephone. Telephone interviews offer limited non-verbal communication, and it is possible that face-to-face interviews in such cases would have yielded different results. In addition, as the study participants were exclusively from Wuhan Union Hospital, we did not account for potential jurisdictional or regional variations in the response capacity or risk perceptions towards COVID-19. Future research should involve a larger study with multiple sites and geographical locations for a more comprehensive understanding of the topic.

5 | CONCLUSIONS

As also shown in this study, in response to major public health emergencies, there is a need to make improvements in personal, administrative and institutional areas. That is, training for nurses should be strengthened in terms of their ability to deal with emergencies and protect against infectious disease. Hospital managers should pay attention to the potential for psychological distress among clinical first-line nurses during public health emergencies, and they should ensure the rapid and sufficient supply of resources and materials, while improving emergency response plans for public health

emergencies. It is believed that the findings of this study can guide hospital managers and facilitate a richer understanding of the experiences of first-line nurses and that they can serve as a reference and inspiration for nurses in subsequent public health emergencies.

6 | IMPLICATIONS FOR NURSING MANAGEMENT

This study has implications for nursing managers to address the adverse effects of emergency public health events on health care workers. The first implication is the need to strengthen psychological interventions for first-line nurses, by promptly providing them with simple and easy methods to deal with negative emotions when treating COVID-19 patients and to improve their ability to self-adjust. The second implication is the importance of training nurses to respond to emergencies. A systematic and targeted training plan should be formulated by nursing managers and ward nurses to improve emergency response capabilities and various emergency operations. The final implication pertains to regularly organising emergency response training, including rapid response procedures, professional staff coordination, and the preparation of treatment technology and protective equipment. Thus, in an emergency, the supply of materials can be guaranteed, personnel can be sufficiently mobilized, and departments can be appropriately coordinated.

Our findings also have specific implications for the continuing education of nurses. Given the importance of disaster preparedness in public health emergencies, focus on emergency education and training is warranted. In addition, a systematic evidence-based curriculum should be established to cultivate the specialized skills of nurses.

ACKNOWLEDGEMENTS

The authors would like to thank the participants for their contribution and their support for the study. We gratefully acknowledge all medical staff who support the first line in Wuhan hospitals.

AUTHOR CONTRIBUTIONS

All authors made substantial contributions to the study conception and study design. RT and TY, main interviewer, reviewed the literature, obtained ethics approval, collected the data and transcribed audio materials. KYL and FT reviewed the initial analysis. RT, TY, KYL, FT and DYH acquired and analysed the data. RT, TY and DYH drafted the manuscript. YLL, JL and DYH revised the manuscript critically for important intellectual content.

ETHICAL APPROVAL

The study was reviewed and approved by the Medical Ethics Committee of Union Hospital Affiliated with Tongji Medical College of Huazhong University of Science and Technology (approval number: S171).

ORCID

Rong Tan  <https://orcid.org/0000-0002-5124-1600>

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How to cite this article: Tan R, Yu T, Luo K, et al. Experiences of clinical first-line nurses treating patients with COVID-19: A qualitative study. *J Nurs Manag*. 2020;28:1381–1390. <https://doi.org/10.1111/jonm.13095>