Lessons from the COVID-19 epidemic in Hubei, China: Perspectives on frontline nursing

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Abstract

Background: The emergence of COVID-19 has been an ordeal for nurses worldwide. It is crucial to understand their experiences at the frontline, attempt to allay their concerns, and help inform future pandemic response capabilities.

Aims: To explore nurses' lived experiences at the frontline in order to identify and address their concerns and help enhance future responses to infectious disease outbreaks.

Methods: A qualitative study was carried out. Semi-structured interviews were conducted with 60 registered nurses who came to Hubei from different parts of China to care for patients with COVID-19. Interviews were audio-recorded and transcribed verbatim for thematic analysis.

Results: Six major themes emerged: emotional turmoil due to personal and professional concerns, quality issues with personal protective equipment and associated physical discomfort, witnessing and managing patient distress, readiness of emergency response mechanisms in the health system, collective community awareness and preparedness, and heightened professional pride and confidence in future epidemic control.

Discussion: Nurses were placed in challenging and unfamiliar situations to deal with unexpected and unpredictable events which caused considerable psychological and physical distress. Support in the form of government edicts, hospital management policies, community generosity and collegiality was highly welcomed by the nurses. Policy makers and managers should ensure that nurses are provided with the support and resources necessary for dealing with large-scale infectious disease outbreaks. Priority should be given to risk assessment, infection prevention and control, and patient and staff health and safety.

Keywords

COVID-19, nursing, support, pandemics, qualitative research

Background

Emerging in late December 2019, the novel coronavirus disease (COVID-19) has posed an unprecedented public health challenge for countries worldwide. As the initial epicentre of national and global outbreaks, the Chinese province of Hubei and its healthcare services were placed under immense pressure to cope with a rapidly increasing number of infections amidst a critical shortage of healthcare workers. Consequently, over 40,000 healthcare workers were recruited from across the country and deployed to the province to provide additional support. Of these workers, over two-thirds were nurses whose efforts have proven to be vital in the successful control of COVID-19 in the country (Burki, 2020; Chung et al., 2021).

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Nurses play an essential role in the effective management of infectious diseases. While working on the frontlines of public health emergencies however, they are often exposed to several risks which threaten their physical and psychological health, including the possibility of infection and even death, overwhelming workloads, inadequate infection control measures, and a lack of a specific proven treatment or cure for the disease (Khalid et al., 2016). Data on the risk of acquiring COVID-19 also suggests that frontline healthcare workers are more likely to be infected than the general public (Shah et al., 2020). Although advances have been made in epidemic prevention and control measures in recent years (Bouey, 2020), nurses' ordeals continue to suggest that there is room for improvement in ensuring their health and safety when working under such demanding and life-threatening conditions (Mo et al., 2020).

Despite being one of the driving forces behind China's relative success in controlling the COVID-19 epidemic, the experiences of volunteer nurses who travelled from across the country to offer support in Hubei remain under-studied. As part of the first group of nurses to encounter a large-scale COVID-19 outbreak, exploring their lived experiences and perspectives may help inform nursing education and management efforts to better deal with future infectious disease outbreaks.

Methods

Design

A descriptive qualitative approach was employed to explore the lived experiences of nurses who have provided care for people diagnosed with or suspected of having COVID-19 in Hubei province, China.

Sample

Participants were recruited through purposive, convenience, and snowball sampling. Recruitment was aimed at volunteer registered nurses working at a hospital during the COVID-19 outbreak in Hubei province. Of 80 nurses approached, 60 gave their consent and were interviewed. The nurses worked at one of 22 public hospitals in Yunnan, Sichuan, Chongqing, Guangdong, Zhejiang, and Shandong provinces in China before deployment to Hubei province. Nurses worked in various cities across the province but most were stationed in Wuhan.

Data collection

A semi-structured interview guide was developed. Consenting participants were interviewed over the phone by a research assistant. Each interview lasted about 30 min and was conducted in Mandarin. All interviews were audio-recorded and duplicated to prevent accidental data loss. Participants were asked to share their experiences of caring

Table 1. Characteristics of interviewed nurses (N = 60).

	No. of nurses	%
Age (years)		
25–30	30	50.0
31–39	30	50.0
Mean (SD)	30.9 (4.2)	
Gender		
Male	13	21.7
Female	47	78.3
Education		
College	5	8.3
Bachelor's degree	49	81.7
Master's degree	6	10.0
Years of nursing experience		
Median (IQR)	7 (7.75)	
Technical title		
Nurse practitioner	3	5.0
Senior nurse	32	53.3
Supervisor nurse	25	41.7
Marital status		
Married	35	58.3
Single	24	40.0
Did not state	1	1.7
Number of children		
None	28	46.7
One	27	45.0
Two	5	8.3
Age of children (years)		
Mean (SD)	5.55 (4.07)	
Previous infection control team experience?		
Yes	8	13.3
No	52	86.7
Received COVID-19–related training?		
Yes	60	100
Time spent caring for COVID-19 patients (hours/day)		
4–5	26	43.3
6–7	32	53.3
8	2	3.3
Time spent caring for COVID-19 patients (days/week)		
2–3	1	1.7
4–5	34	56.7
6–7	24	40
Uncertain	1	1.6
Total time spent caring for COVID-19 patients (days)		

Table 1. (continued)

	No. of nurses	%
Median (IQR)	44.5 (17)	
Quarantine experience due to suspected COVID-19 exposure?		
Yes	1	1.7
No	59	98.3
Sleep quality during care of COVID-19 patients		
Good	14	23.3
Neither good nor poor	18	30.0
Poor	28	46.7
Sleep quantity during care of COVID-19 patients		
Increased	4	6.7
Decreased	33	55.0
No change	23	38.3

N, Number; SD, Standard deviation; IQR, Inter-quartile range; PPE, Personal protective equipment.

for patients with confirmed or suspected COVID-19, the challenges encountered, strategies adopted to address them, and recommendations for improving future outbreak responses.

Data analysis

Interview data were transcribed verbatim from the audio recordings. All transcripts were analysed according to the six-phase method of thematic analysis by Braun and Clarke (2006), then coded and grouped under themes and sub-themes by two research assistants. To ensure credibility, themes were carefully considered with respect to the overall data set and finalised after discussion and consensus by all research team members.

Ethical consideration

This study was approved by the relevant university ethics committee. Prior to scheduling the interviews, participants were approached by a researcher over the phone and given an explanation of the study objectives and advised of their right to refuse to participate in or withdraw from the study. Verbal consent was obtained by subsequent interview participation. To ensure confidentiality, all data were collected anonymously for research purposes only and stored in a locked cabinet or encrypted. Only research team members were given access to the data.

Results

Participant ages ranged from 25–39 (mean, 30.9 ± 4.2) years. Most participants were female (78.3%) and married (58.3%). They had a median of 7 (IQR, 7.75) years

of nursing experience. Although most participants (86.7%) had no prior experience in infection control, all had recently received COVID-19–related training. More than half of the nurses spent 6–7 h daily (53.3%) caring for patients with suspected or confirmed COVID-19 for 4–5 days each week (56.7%). About half of the participants reported experiencing poorer sleep quality (46.7%) and reduced sleeping time (55.0%) during their service in Hubei province. The characteristics of the sample are shown in Table 1.

Six key themes and four sub-themes emerged from the interview data and are summarised in Table 2.

Theme one: Emotional turmoil due to personal and professional concerns

Fear and courage in the face of uncertainties regarding COVID-19 and irregular work demands. Due to the novelty of COVID-19, nurses mentioned that the initial absence of trustworthy and reliable information regarding transmission, diagnosis, and treatment was a significant source of anxiety when they decided to join health teams headed to Hubei province.

> 'There were many unknown factors about COVID-19, so we were quite worried that we would get infected ourselves'. (Participant 10)

> 'We were scared when we showed up to work because we've never experienced anything like this before'. (Participant 56)

Further uncertainties included the delivery of interventions outside of nurses' usual duties and the operation of unfamiliar equipment, such as extracorporeal membrane oxygenation machines and ventilators. Longer shifts, heavier workloads, and additional responsibilities further compounded their sense of distress.

> 'I've never worked in an ICU before so I was quite nervous when working there'. (Participant 48)

> 'As resources were stretched out, there weren't enough nurses to take care of the large number of patients. We felt helpless'. (Participant 49)

However, believing it to be a part of their professional and moral duty, nurses adopted a brave and resilient attitude in facing such risks and challenges. Self-motivation and psychological management in particular were highlighted as key factors in persisting to work in such a challenging environment.

> 'I felt that since I signed up for this profession, I should do my best to take care of the sick, no matter what dangers lie ahead'. (Participant 14)

> 'We shouldn't be alarmed. The more scared you are, the more easily you might get infected'. (Participant 58)

Table 2. Themes and sub-themes arising from interview data.

Themes	Sub-themes
Theme one: Emotional turmoil due to personal and professional concerns	Fear and courage in the face of uncertainties regarding COVID-19 and irregular work demands
	Concerns about family subsistence under lockdown
Theme two: Quality issues with PPE and associated physical discomfort	—
Theme three: Witnessing and managing patient distress	—
Theme four: Readiness of emergency response mechanisms in the health system	Enhancements in nurses' practical and theoretical competencies in infection control
	Effective mobilisation of well-prepared resources
Theme five: Collective community awareness and preparedness	—
Theme six: Heightened professional pride and confidence in future epidemic control	—

ICU, Intensive care unit; PPE, Personal protective equipment.

'I like to listen to music so I used to listen to inspirational songs to encourage myself'. (Participant 13)

Moreover, nurses stressed the importance of maintaining their physical fitness and health in order to be well-prepared for labour-intensive tasks, and to avoid falling ill and further burdening fellow healthcare workers.

'We tried to have proper meals because if we didn't, we might not have enough energy to handle tasks needing physical strength and faint, and that would become an issue, so whether the food was according to my taste or not, I would still eat it'. (Participant 54)

'We also placed emphasis on protecting our own health because if any one of us fell sick then it would create more stress for the team'. (Participant 11)

Additionally, nurses noted that concrete support was provided to equip them with relevant knowledge and to increase self-confidence in their abilities through the provision of COVID-19 training prior to deployment, frequently updated government-issued guidebooks about COVID-19 diagnosis and treatment, and miscellaneous hospital guidelines supplied throughout the outbreak.

'Before the lockdown in Wuhan (city in Hubei), our hospital had already sent us a file about how to handle COVID-19 and arranged for infectious disease specialists to train us on how to don and doff PPE'. (Participant 15)

'We were trained before we entered the COVID-19 wards and made familiar with the layout of the hospital and the distribution and separation of patients'. (Participant 13)

'We received the sixth or seventh edition of the COVID-19 handbook [in Wuhan] and we would try to apply that knowledge as it had a lot of information about the level of protection and types of protective measures'. (Participant 53)

Collegial support was also emphasised as a useful knowledge exchange strategy as nurses discussed experiences and shared best practices with others.

'Every night we had discussions with nurses and doctors from different teams on WeChat, and we'd talk about things like how to take care of intubated patients… this helped our work get smoother over time'. (Participant 34)

Concerns about family subsistence under lockdown. Since nurses lived away from home, they expressed concern about their families, specifically regarding the risk of infection and disruptions to daily life. These concerns were addressed by multi-sectoral support from relevant authorities and community members who coordinated the supply and donation of essential provisions, such as food and masks, and endeavoured to fulfil each family's unique needs.

'While we were in Hubei, we were really worried about our families because they couldn't obtain masks so our hospital mailed some to them…I was touched as it allowed us to be worry-free [while working]'. (Participant 15)

'Even for my children's educational needs, the [hospital] department helped arrange for a teacher to tutor them'. (Participant 51)

'The local government and hospital would send vegetables, pork, mutton, or beef every week. Some companies would

ask for our family address and send us some staples like oil and rice'. (Participant 39)

Theme two: Quality issues with PPE and associated physical discomfort

Most participants expressed satisfaction with the provision of PPE. They believed that despite initial shortages, stocks became ample over the course of the outbreak due to concentrated efforts and donations made by the government and community. However, quality concerns persisted as PPE made of poor materials would cause complications and inconvenience.

'[Some of the PPE] would tear even if we pulled on it just a little bit … it would break and if we scraped against a bed, we'd have no choice but to leave the ward and change into a new set [of PPE]'. (Participant 43)

Moreover, the usage of protective gear such as gloves, masks and goggles caused frustration as standard interventions were often disrupted due to hindrances in vision, speech and dexterity. Also, as PPE was often constricting and stifling, nurses complained of extreme physical discomfort which led to embarrassing and compromising situations.

'In the beginning, we had to wear two layers of gloves and that made giving injections quite difficult. One time, I had a breakdown because it's such a basic process, but it suddenly felt so challenging'. (Participant 22)

'Once, I had a runny nose and it made the N95 mask wet, but I couldn't change it as it would've been wasted. I had to wait a long time before changing and when I took it off in front of my colleagues, I felt really embarrassed'. (Participant 44)

Theme three: Witnessing and managing patient distress

In addition to personal concerns, nurses also had to cope with the psychological strain of observing an unusually high number of deaths and patients in severe distress, leading to feelings of despair and helplessness. Nurses also reported uncooperative patient behaviour as a source of worry as patients would sometimes refuse to accept treatment due to their own psychological distress.

'Some [patients] wouldn't let us collect their blood specimen and whenever we visited them, they'd say things like, "Are you here to draw blood? If you are, then leave"'. (Participant 55)

Therefore, great emphasis was placed on nursing patients' mental health in order to boost compliance with interventions and consequently, promote positive outcomes.

'Although medical treatment is necessary, I think providing emotional support was more important… we would have conversations with patients to increase their confidence in facing the illness and avoid potential deterioration in their condition'. (Participant 44)

Various communication techniques were used to develop comfortable and amiable relationships with patients, leading to a reduction in psychological distress and an increase in intervention acceptance.

'As our knowledge [of COVID-19] increased, we were able to communicate with the patients better and able to decrease their anxiety by telling them, for example, that the fatality rate was not as high as we originally thought. This would decrease their anxiety and boost their confidence in facing the disease'. (Participant 55)

'Since we wanted to reduce the distance between ourselves and the patients, we wrote our name and drew some local [culinary] specialties on our PPE. When the patients saw the drawings, they felt excited and this eased communication as it opened up topics for conversation'. (Participant 53)

'We thought we should do something to improve patients' mood and support their recovery so we decided to sing to provide encouragement and praise them on their progress…' (Participant 18)

Theme four: Readiness of emergency response mechanisms in the health system

Enhancements in nurses' practical and theoretical competencies in infection control. Participants stressed the importance of improving nurses' fundamental knowledge of infectious diseases and infection control, including strict personal protective measures, proper PPE use, crisis management skills, and psychological patient care. They suggested more regular hands-on training by hospitals, such as annual examinations on donning and doffing full PPE, focused drills, and sharing by experienced nurses to reinforce awareness of the severity of infectious diseases. Additionally, most participants became more self-motivated to perform self-learning both inside and outside the hospital, particularly via government-issued COVID-19 control and management guidebooks.

'Every day, other medical workers and I would get together to study to increase our knowledge…based on the guidebook…and reading the updated information [in the guidebooks]'. (Participant 54)

Effective mobilisation of well-prepared resources. Most participants appreciated the timely and well-coordinated responses displayed by the regional and centralised governments in effectively arranging PPE stocks, free

medical treatment, specialised hospitals for COVID-19 treatment, and screening and temporary hospitals.

'We promptly implemented measures such as building temporary hospitals. If we delayed this, I don't know if the situation in Wuhan would have been as controlled as it is now'. (Participant 31)

'What we did best was the provision of free medical treatment. If it wasn't free, many infected people perhaps would not want to come to the hospital for treatment'. (Participant 26)

They also valued the access to updated information provided via government guidebooks, prompt testing, isolation and quarantine arrangements, and travel entry restrictions.

'Although we had to make huge sacrifices, the policies of lockdown and isolation were very effective in controlling the outbreak'. (Participant 17)

'It was easier to track suspected cases because neighbourhoods were locked down, temperature checks were implemented and when leaving/entering, people had to register their information'. (Participant 44)

Nevertheless, participants stressed the need to improve hospital management systems, particularly the availability of medical equipment, evidence-based resource management, hospital protocols to minimise environmental contamination, and safety and self-protection in workflows. They highlighted the value of expanding a qualified nursing workforce and enhancing the quantity and quality of isolation facilities.

'Most medical workers do not receive formal training on infectious diseases and their epidemic prevention knowledge is quite weak, so this area needs to be addressed'.

'We really needed more negative pressure wards and life-support equipment because it simply was not enough'. (Participant 19)

Theme five: Collective community awareness and preparedness

Participants felt highly supported by donations of money and daily necessities, encouragement and acknowledgement and volunteer contributions by the community. Additionally, they also praised the collective sense of solidarity and compliance with vital personal protective measures, including large-scale lockdowns, the health code system for contact tracing, hand hygiene, mask wearing and social distancing.

'Our collective response was excellent. People took warnings seriously and followed basic protective measures. The

societal consensus needed to tackle the epidemic was there'. (Participant 37)

'Collaborative effort among people is very important…can't just depend on healthcare workers to handle everything'. (Participant 22)

Most participants also stressed the responsibility of healthcare workers in promoting public health education. They suggested that multiple media formats, such as the Internet, mass text messages and posters, should be used for the dissemination of evidence-based information to ensure people of different age groups are targeted. Regular public education campaigns were encouraged, regardless of the occurrence of disease outbreaks.

'We need more public health campaigns as everyone has different levels of education and awareness…Everyone needs to be properly informed of infection prevention and control practices'. (Participant 19)

Theme six: Heightened professional pride and confidence in future epidemic control

Participants indicated that their experience of delivering care during the outbreak had significantly increased their sense of professional pride, confidence and satisfaction.

'Before [the epidemic], people used to give me the impression that no one needed nurses, but now, I have a sense of enthusiasm and I feel like my professional calling has been strengthened'. (Participant 19)

'When you take care of patients, see them recover and get discharged, it really makes your work feel meaningful'. (Participant 52)

Participants also felt that their technical skills and specialised knowledge regarding infection control and management had been enhanced. While working with nurses from around the country, participants broadened their horizons and skilfulness in nursing and medical interventions, including the use of ventilators for critically ill intensive care unit patients, intubation procedures, collection of throat swabs, proper PPE use and patient rescue in emergency situations.

'I didn't have much experience working with critically ill patients before this…didn't work in the ICU…We gained more specialised knowledge on coming to Wuhan…learnt how to operate ventilators'. (Participant 43)

Some participants further noted improvements in their working attitude, such as greater patience and reliability, and psychological maturity. Most participants also learnt to be more attentive to patient needs beyond physical health, and enhanced their decision-making skills. Overall, they felt

better prepared to combat future outbreaks with a renewed sense of infection control knowledge, skills, and hands-on experience.

> 'After this experience, all healthcare workers will have a deeper understanding of how to handle infectious diseases. If we encounter such a situation again, we can work more smoothly'. (Participant 28)

Discussion

Our findings highlight frontline nurses' unyielding courage, commitment and determination in providing effective nursing care during the COVID-19 pandemic. As Hubei became one of the initial epicentres of the pandemic, large numbers of nurses were deployed from other provinces around the country to provide healthcare assistance in coping with the rapidly growing number of COVID-19 infections (Chung et al., 2021).

A major barrier to nursing care delivery identified in our study includes heightened feelings of anxiety and fear among nurses and patients due to uncertainties associated with COVID-19 transmission and management. Due to the novelty of the disease, nurses expressed concern about the effectiveness of their infection control abilities. Temperamental and volatile responses from patients were also prevalent, posing significant challenges to nurses in delivering care and managing unpredictable patient behaviour. A study on the experiences of healthcare workers in South Korea similarly identified the risk of infection, strict protective measures, and violent behaviour as major causes of psychological distress (N Lee and HJ Lee, 2020). Other key sources of emotional distress for nurses were worries about family well-being, long working times and heavy workloads, which manifested in reduced sleep quality and quantity. Moreover, our findings particularly emphasised issues with PPE use, namely, physical discomfort and inadequacies in PPE quality. Similar PPE-related adverse events have also been reported in other studies, for instance, the development of PPE-associated headaches found in a cross-sectional study of 158 healthcare workers in Singapore (Ong et al., 2020). Interestingly however, while studies, including a large-one of 2014 frontline nurses from two hospitals in Wuhan, China (Hu et al., 2020), widely reported burnout in nurses, nurses in our study largely displayed a more positive outlook, suggesting that their professional commitment and resolve has been renewed and strengthened.

Nurses' own support and coping strategies were vital to persevering through this crisis and fulfilling their responsibilities. They emphasised the importance of maintaining physical health, self-belief in their professional and moral duties and the need for tolerance and patience in adapting to suboptimal situations amidst the disorder of a pandemic. These findings are similar to a qualitative study of nurses and physicians in Hubei province (Liu et al., 2020), and a survey of 657 New York healthcare workers which found physical activity/exercise to be the most common coping behaviour (Shecter et al., 2020). Additionally, our findings identified psychological care and communication strategies as vital elements of effective patient care during the COVID-19 pandemic. With regards to PPE use, it is interesting to note that while studies have highlighted the reuse of single-use PPE among frontline nurses (Ahmed et al., 2020), our findings emphasised the maximisation of PPE use by working longer shifts and enduring self-soilage.

External multi-sectoral sources of support facilitated nurses' adaptability during the COVID-19 pandemic. Our findings highlight the importance of teamwork and cooperation among nurses and other healthcare workers, training support from hospitals and governments, as well as community aid and compliance. A study of 325 nurses from the Philippines also noted the role of perceived higher organisational and social support in reducing nurses' COVID-19–related anxiety levels (Labrague and de los Santos, 2020).

While nurses largely acknowledged the effectiveness of the pandemic response, the need for a sufficient and well-qualified nursing workforce for future infectious disease outbreaks was emphasised. Our findings identified self-motivation and self-learning as important aspects in nurses' ongoing infection control training. Regarding hospital responses, improvements were suggested for resource management, infection control practices and staff workflows to prevent intra-hospital infection and COVID-19 transmission (Gan et al., 2020). More widespread public health education campaigns about infection prevention and control (IPC) were also seen as paramount.

Surprisingly, after caring for COVID-19 patients, nurses in our study generally expressed positive experiences and views. Enhanced professional pride, nursing skills and knowledge on infectious disease outbreak management, and self-confidence in tackling future epidemics were commonly asserted. Despite the many challenges and hardships faced, nurses viewed the COVID-19 pandemic as an unprecedented learning opportunity to self-improve and deepen their professional commitment and ability to serve the community. These can be bolstered by the provision of support and resources necessary for dealing with large-scale infectious disease outbreaks. Priority should be given to risk assessment, IPC, and patient and staff health and safety.

Limitations

The study has some limitations. As interviews were conducted over the phone, the absence of non-verbal communication may have affected data interpretation. Also, our findings may not account for changes in nurses' perceptions and attitudes over the duration of their service. Lastly, as participants were frontline nurses in one province in China, the findings may not be representative of nurses in other

epicentres where public health infrastructure, government policies, and cultural outlooks may differ.

Conclusion

Nurses working at the frontline of the COVID-19 outbreak in Hubei, China, encountered several obstacles in the discharge of their duties which threatened their mental and physical health. This burden was alleviated by personal resilience, targeted government, institutional and community support, and collegiality. Study insights may help guide nursing education, government and hospital management, and health policy decisions to protect nurses' health and well-being and ensure they are well prepared to care for patients during future pandemics.

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