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The experiences of health-care providers during the COVID-19 crisis in China: a qualitative study

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Summary

Background In the early stages of the outbreak of coronavirus disease 2019 (COVID-19) in Hubei, China, the local health-care system was overwhelmed. Physicians and nurses who had no infectious disease expertise were recruited to provide care to patients with COVID-19. To our knowledge, no studies on their experiences of combating COVID-19 have been published. We aimed to describe the experiences of these health-care providers in the early stages of the outbreak.

Methods We did a qualitative study using an empirical phenomenological approach. Nurses and physicians were recruited from five COVID-19-designated hospitals in Hubei province using purposive and snowball sampling. They participated in semi-structured, in-depth interviews by telephone from Feb 10 to Feb 15, 2020. Interviews were transcribed verbatim and analysed using Haase's adaptation of Colaizzi's phenomenological method.

Findings We recruited nine nurses and four physicians. Three theme categories emerged from data analysis. The first was "being fully responsible for patients' wellbeing—'this is my duty'". Health-care providers volunteered and tried their best to provide care for patients. Nurses had a crucial role in providing intensive care and assisting with activities of daily living. The second category was "challenges of working on COVID-19 wards". Health-care providers were challenged by working in a totally new context, exhaustion due to heavy workloads and protective gear, the fear of becoming infected and infecting others, feeling powerless to handle patients' conditions, and managing relationships in this stressful situation. The third category was "resilience amid challenges". Health-care providers identified many sources of social support and used self-management strategies to cope with the situation. They also achieved transcendence from this unique experience.

Interpretation The intensive work drained health-care providers physically and emotionally. Health-care providers showed their resilience and the spirit of professional dedication to overcome difficulties. Comprehensive support should be provided to safeguard the wellbeing of health-care providers. Regular and intensive training for all health-care providers is necessary to promote preparedness and efficacy in crisis management.

Funding National Key R&D Program of China, Project of Humanities and Social Sciences of the Ministry of Education in China.

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Introduction

Coronavirus disease 2019 (COVID-19) is rapidly spreading worldwide. As of April 22, 2020, there have been 2471136 confirmed cases worldwide, with 169006 deaths;¹ 82798 confirmed cases and 4632 deaths have been reported in mainland China.² The rapidly evolving epidemic has stressed the entire Chinese health-care system, especially in Wuhan, Hubei province. When fever clinics and respiratory and infectious disease units in Wuhan were overwhelmed by the increasing number of suspected and confirmed cases in the early stages of the outbreak, general wards were quickly modified into isolation wards, and health-care providers who did not have infectious disease expertise stepped up to provide care for patients with COVID-19. As the epidemic progressed in Hubei province, more local health-care providers joined the epidemic control efforts, and 42000 health-care providers (including 28600 nurses) from across China came to Hubei to support them.³

Health-care providers are vital resources for every country. Their health and safety are crucial not only for continuous and safe patient care, but also for control of any outbreak.⁴ However, health-care providers caring for patients during the severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS) outbreaks were under extraordinary stress related to high risk of infection, stigmatisation, understaffing, and uncertainty, and comprehensive support was a high priority during the outbreaks and afterwards.^{5,6} Quantitative studies have shown that frontline health-care providers treating patients with COVID-19 have greater risks of mental health problems, such as anxiety, depression, insomnia, and stress.⁷ Frontline physicians and nurses who had no infectious disease expertise had additional challenges when they adjusted to an entirely new working environment in this stressful situation. To our knowledge, no qualitative studies of the experiences of these health-care providers have been published. To

Lancet Glob Health 2020; 8: e790–98

Published Online
April 29, 2020
[https://doi.org/10.1016/S2214-109X\(20\)30204-7](https://doi.org/10.1016/S2214-109X(20)30204-7)

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Research in context

Evidence before this study

We searched PubMed, ScienceDirect, and Google Scholar on Feb 8, 2020, for studies published in English describing the experiences of health-care providers treating patients with coronavirus disease 2019 (COVID-19), using the search terms “COVID-19” or “coronavirus disease” or “novel coronavirus” and “health-care providers” or “health-care professional” or “medical workers” or “medical staff”. We also searched Wanfang Data using the same terms in Chinese. We found several online comments calling for mental health care and infection prevention for health-care providers. There were no research articles on the health-care providers’ experiences early in the COVID-19 crisis, when little was known.

Added value of this study

We used an adaptation of Colaizzi’s empirical phenomenological research approach to obtain an in-depth understanding of health-care providers’ experiences of caring for patients with COVID-19. Health-care providers showed a

tremendous sense of responsibility and concerted efforts in alleviating patients’ suffering, including working in a totally new context, physical exhaustion due to heavy workloads and protective gear, the fear of becoming infected and infecting others, and feeling powerless to handle patients’ conditions. To cope with stressful situations, they identified many sources of social support and used self-management strategies. They also described how they were able to transcend the difficulties inherent in their unique experience.

Implications of all the available evidence

Comprehensive support is needed for frontline health-care providers, including sufficient personal protective equipment, reasonable work schedules, effective communication, monitoring and supervision of infection control, and professional psychological support. Intensive training is necessary for health-care providers without infectious disease expertise.

support them effectively, it is necessary to gain insights into their lived experience.

While being quarantined at home and not able to provide frontline care at the height of the coronavirus outbreak, we wanted to make sure the experiences of these frontline health-care providers who had no infectious disease expertise were not lost. Therefore, we aimed to describe the experiences of these physicians and nurses caring for COVID-19 in the early stages of the outbreak.

Methods

Study design and participants

We did a qualitative study through telephone interviews. An empirical phenomenological approach was used to obtain detailed descriptions of the experiences of physicians and nurses who had no infectious disease expertise in providing patient care during the COVID-19 outbreak in Hubei, China. The focus of phenomenological research is to describe commonalities of experiences across a population.

Participants were recruited through purposive and snowball sampling. Physicians or nurses who were recruited from their original departments to provide direct care and treatment for patients with COVID-19 were eligible. The sample size was determined by data saturation—ie, at the point where no new themes from participants’ experiences emerged. Five participants were already known by one of the two interviewers and the rest were approached through snowball sampling. Variation in years of work experience, number of support days, and hospital of employment were considered to obtain diversity in the experiences of caring for patients with COVID-19.

Ethics approval for this research was received from the institutional review board at Renmin Hospital of Wuhan University (WDRY2020-K004). The study objectives and voluntary nature of the study were explained to participants, and oral informed consent was obtained before each telephone interview. Confidentiality was assured by using numbers instead of names (eg, physician P1, P2, etc and nurse N1, N2, etc) and removing identifying information from the transcripts. All audio recordings and transcripts were saved on a password-protected computer. Throughout this study, we followed the Standards for Reporting Qualitative Research guidelines.

Procedures

Semi-structured, in-depth telephone interviews were done at a time convenient for participants between Feb 10 and Feb 15, 2020. With participant permission, all interviews were audio-recorded. Participants’ age, marital status, years of work experience, original department, the date they started working on the COVID-19 ward, and number of days they worked on the COVID-19 ward before the interview was obtained at the start of the interview. A broad data-generating question was first used: “Please tell me about your experiences of taking care of patients with COVID-19.” Open-ended follow-up questions were used to obtain detailed descriptions, and examples were: “what is the difference between providing care due to the epidemic and working in your original department”; “how did you feel on the first day”; “how are you feeling now”; “what challenges did you encounter”; “how did you respond”; “what external support have you received”; and “what other support do you need?” Probing questions, such as “Please tell me more about that”, were used to enhance the depth of discussion.

Data collection occurred concurrently with data analysis. The audio recordings were transcribed verbatim by a transcription company within 24 h of the interviews and reviewed by the interviewers for accuracy. The interviews, original transcriptions, and data analysis were in Chinese. During the data analysis, all authors agreed with the results and chose the highlighted quotations. All quotations were translated into English by QL and back translated by DL to ensure that meaning was retained.

Data analysis

Haase's adaptation of Colaizzi's method was used to analyse transcripts.^{8,9} The analysis included reading the transcript several times to gain an understanding of meanings conveyed, identifying significant phrases and restating them in general terms, formulating meanings and validating meanings through research team discussions to reach consensus, identifying and organising themes into clusters and categories, and developing a full description of themes.

Several strategies were used to ensure trustworthiness and credibility. Credibility was achieved by in-depth interviews followed by peer debriefing. Two coauthors analysed the transcripts independently by bracketing data on preconceived ideas and strictly following the adapted Colaizzi's method described above. Findings were then compared and discussed by the team until consensus on themes, theme clusters, and categories was achieved. Transferability was established by considering variations of participant characteristics and sufficient quotations collected through in-depth interviews. The audit trail was maintained to ensure all analysis steps could be traced back to original interviews.

Role of the funding source

The funder of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report. The corresponding authors had full access to all the data in the study and had final responsibility for the decision to submit for publication.

Results

Our sample consisted of nine nurses and four physicians recruited from five COVID-19-designated hospitals in Hubei province in February, 2020. Three physicians and one nurse declined to participate in the study due to their high level of fatigue. All participants took care of patients with COVID-19 in the hospitals in which they were employed. They joined COVID-19 wards at different times, from mid-January to early February, and their time working on these wards before the interviews ranged from 4 to 33 days; 12 of the 13 participants were still working at the time their interviews were done (table). Thematic redundancy was achieved with the 11th interview, and two participants were then interviewed to confirm thematic redundancy.

Interviews lasted about 20–60 min (mean 38·62 min, SD 13·16).

Three theme categories emerged from analysis of the interviews (panel): being fully responsible for patients' wellbeing—"this is my duty", challenges of working on COVID-19 wards, and resilience amid challenges.

We named the first theme cluster within the first category "a call to duty: joining the fight". Nine of the 13 participants volunteered and four were asked and agreed to care for patients with COVID-19. From mid-January to early February, 2020, their frontline colleagues had been stretched thin as the virus rapidly progressed. Health-care providers from other departments felt that when they were most needed by their country and people, they were duty-bound to align with and work with health-care providers on the frontline to save lives.

"We must try our best to win this battle. As health-care providers, we are at the forefront. I fight for my family, and I fight more for this society." (N2)

"This is my duty because I am a medical worker. No matter what will happen..." (N3)

The second theme cluster identified was "treating and caring for patients—managing both mundane and extraordinarily difficult situations". Physicians and nurses were determined to provide the best care to patients in their respective roles. Physicians assessed patients during rounds, chose different respiratory treatment methods, evaluated and adjusted therapeutic regimens, and documented their care. Because COVID-19 was an unknown illness, they followed the diagnosis and treatment guidelines released by the National Health Commission, while also drawing on previous clinical experiences and learning through exploration.

	Age, years	Gender	Marital status	Work experience, years	Original department	COVID-19 ward start date	Days worked on COVID-19 ward before interview
Nurse 1	34	Female	Married	13	Stomatology	Jan 20	12
Nurse 2	36	Female	Married	13	Oncology	Jan 25	16
Nurse 3	27	Female	Single	3·5	Oncology	Jan 28	16
Nurse 4	30	Female	Single	7	Neurosurgery	Feb 2	11
Nurse 5	32	Female	Married	9	Oncology	Feb 4	9
Nurse 6	23	Male	Single	2	Neurosurgery	Jan 31	14
Nurse 7	23	Female	Single	3	Neurosurgery	Feb 11	4
Nurse 8	32	Female	Married	10	Neurosurgery	Jan 13	33
Nurse 9	22	Male	Single	2	Neurosurgery	Feb 9	7
Physician 1	39	Male	Divorced	13	Anaesthesia	Feb 8	5
Physician 2	36	Male	Married	6	Oncology	Feb 1	12
Physician 3	42	Male	Married	17	Neurology	Jan 24	22
Physician 4	37	Female	Married	10	Neurology	Feb 5	10

COVID-19=coronavirus disease 2019.

Table: Characteristics of participants

Panel: Theme categories and clusters**1. Being fully responsible for patients' wellbeing—"this is my duty"**

- A. A call to duty: joining the fight
- B. Treating and caring for patients—managing both mundane and extraordinarily difficult situations
- C. Supporting patients emotionally—"treating the patient, not just the disease"

2. Challenges of working on coronavirus disease 2019 wards

- A. Working in a completely new context
- B. Overwhelmed and exhausted by the workload and protective gear
- C. The uncertainty and fear of being infected and infecting others
- D. Witnessing patients' experiences
- E. Relationship between patients and health-care providers—trying to engage amid chaos

3. Resilience amid challenges

- A. Many sources of social support to cope with the situation
- B. Transcendence

"We try to deeply understand the guidelines released by the country, discuss with other colleagues to know their experiences in treating patients with COVID-19, then transform the knowledge and experience to use for our patients. We keep exploring." (P1)

Nurses had the closest contact with patients and spent much of their time providing intensive care. They made efforts to minimise complications by frequent assessment, management of airways, tubes, medications, chest physical therapy, and positioning. Additionally, when patients were unable to take care of themselves, nurses assisted with patients' activities of daily living, including offering nutrition and fluids, meeting elimination needs, and providing oral hygiene and skin care.

"Severe patients need help from various respiratory therapies, such as high flow oxygen therapy and ventilators. We are busy all day. We try to assess patients frequently, ask patients whether they feel uncomfortable and adjust various parameters of the ventilator in time." (N6)

"Every patient has to stay in their room, so their activities of daily living are all facilitated by nurses, such as getting food and water. When severely ill patients cannot get out of bed without oxygen, we need to assist them to use bedpans." (N3)

Physicians and nurses collaborated, and they respected their team members' hard work and contribution.

"We enter isolation wards during rounds; if patients' conditions are stable, we leave and give orders and do not enter isolation wards again. All the orders are implemented by nurses through the most direct contact with patients... Wearing such thick protective suits and staying in the wards for a six-hour-shift will cause severe dyspnoea. So, nurses are very tough. I always

respect nurses, now I feel we are more closely connected." (P2)

The third cluster identified was "supporting patients emotionally—"treating the patient, not just the disease". Quarantined patients were not accompanied by their family and only saw medical staff in protective suits for a long time. Health-care providers recognised that isolation could cause psychological problems that, if not addressed in time, could lead to severe consequences. Therefore, health-care providers emphasised the need for emotional support and conscientiously integrated it into their care. No matter how busy they were, they made efforts to comfort and relieve patients' emotional burdens.

"Patients are struggling to breathe, and some can only lie in bed. They are very helpless and want care from their families." (N9)

"We are not treating the disease, we are treating the patient. Many patients have severe anxiety and we need to deal with this." (P1)

"I comforted the patient while I gave the injection, [I told him] 'Patients who were more serious finally recovered.' I wanted to give him some hope and kept encouraging him, 'We will not give up on you. You cannot give up on yourself either'... Then he felt better." (N4)

The second category of themes, "challenges of working on COVID-19 wards", consisted of five clusters relating to the workload and stresses of treating patients with COVID-19 and adapting to a new working environment. Although health-care providers carried on with their duties, they also experienced their own physical and emotional stresses, common to other people. None of the participants had previous experience with an infectious disease and entering the isolation ward was viewed as oppressive and stressful. The restricted zoning, disinfection efforts, and isolation measures were reminders that they were caring for patients with an infectious disease.

"I felt very depressed on the first day in the infectious disease hospital because there was only one entrance and passage for medical staff, and it is a real isolation unit with negative pressure. I felt it was difficult to breathe... This new environment brought a sense of oppression." (N9)

Due to the surge of patients, many regular wards that were not initially designed for infectious diseases were modified into isolation wards within a short time. Some did not meet the criteria of infectious disease units or lacked equipment when they were set up.

"This infectious department is modified from a clinical drug trial centre, and the layout is quite different from regular wards. The layout of the clean, contaminated, and semi-contaminated zones did not fully meet the standards. Also, in the first week, we lacked many supplies and equipment and needed to borrow from other units." (N6)

Initially, health-care providers were nervous and lacked confidence in caring for patients with this new disease.

The risk, transmissibility, pathogenicity, and treatment of the disease were not well understood. Some health-care providers had no experience working in an intensive care unit or dealing with critically ill patients requiring mechanical ventilation, so they needed to learn and master new technical procedures in a short time.

“I have to treat many patients who are not in my specialty. Although the country has released six editions of diagnosis and treatment guidelines [for COVID-19], there is still no effective antiviral medicine. It is an unknown disease, and everyone feels powerless.” (P2)

“Many patients with dyspnoea need high-flow oxygen therapy, ventilators, and prone position ventilation. Some of these are beyond my expertise, which makes me a little stressful.” (N2)

Most team members were from different specialties, and some teams included health-care providers from other provinces. While working together, communication and collaboration with a new multidisciplinary team were challenging because different sites had different protocols, and they had to rapidly find ways to work together efficiently.

“I work with the medical team from [name of different province] and nurses from different departments in our hospital. It is stressful. We had to find ways to make the whole process as smooth as possible and ensure the quality of care.” (N2)

“Physicians and nurses come from different departments. We did not collaborate well in the first week. Prescribing and processing orders was a little messy.” (N6)

In the early stages of the outbreak, before health-care providers from across China had arrived, health-care providers in Hubei province were exhausted owing to the intensive care they provided during long shifts in protective suits without toilet breaks. Their workloads increased substantially when caring for critically ill patients. When providers' shifts were over, they often went straight to their living quarters, collapsed, and did not want to move.

“I was very tired. I had to lie in bed for a whole day to recover from the fatigue after work.” (N3)

“I am very tired and fall asleep quickly when I get back home.” (P3)

Providers repeatedly expressed that working with personal protective equipment (PPE) for long hours was a major physical and professional challenge. Because of the airtight protective gear, they sweated and their clothes became wet. The hospital central heating system was turned off to minimise the circulation of contaminated air, and wet clothes became cold at night because the epidemic occurred in winter. Providers also experienced anoxia and chest pain while in their PPE.

“Wearing the whole set of PPEs is very uncomfortable. I have difficulty breathing and feel very hot and my heart rate speeds up. We keep on sweating and the clothes are soaked.” (N5)

“I sweat after wearing the protective gear for a while or when I move, such as turning patients. Then I feel clammy.” (N8)

Because caregivers were weighed down by the PPE, their movement was clumsy and their protective goggles became blurred quickly, which made the work much more difficult.

“It feels clumsy to walk and do procedures. Although I am good at venepuncture, I cannot feel blood vessels to draw blood with three layers of gloves even when I palpate carefully. My glasses and protective goggles are blurry because I am hot, and it is very difficult to do things, such as writing nursing notes and medication administration. I must hold the medicine close to the face shield to read the words on it. I am very anxious and irritable, because I have so much work to do but I can't see well.” (N5)

Participants thought that their heavy workloads were related to the shortage of medical protective supplies. To ensure all health-care providers were fully protected in isolation wards, hospital managers had to limit the number of health-care providers. To save time and protective supplies, health-care providers did not eat or drink to avoid going to the restroom during working hours.

“Sufficient protective supplies are the most important. We have limited frontline medical staff because of insufficient protective supplies. If you cannot protect yourself, how can you treat patients? You will become a source of infection.” (P1)

“To extend the use of protective suits, we do not eat or drink during the 6-hour shift to avoid using the restroom. Every hospital does not have enough supplies, and we are trying our best to save them.” (N9)

Providers' heavy workloads also related to the insufficient number of health-care providers, so they wanted more health-care providers to relieve the physical challenges and ensure the quality of care.

“We do not know when we will be so fatigued that we cannot work at all... Our head nurse tries to coordinate the personnel to replace us; however, many medics are drafted to support the newly erected [name of infectious disease hospital], so the workforce of the whole hospital is very limited.” (N6)

“A larger workforce is needed. One's energy is limited, but each patient wants attention.” (P1)

Due to the highly contagious nature of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and lack of understanding of its transmission, health-care providers were constantly in fear of becoming infected. When participants heard that health-care providers from general wards were infected due to insufficient protection and awareness about the virus at the beginning of the outbreak, they had to consider whether they also had contact with any patients or colleagues in their original department who were diagnosed with COVID-19.

“I recently contacted a colleague without any protection, who was later diagnosed with COVID-19. Although my CT results did not show any abnormality, I am anxious and waiting to do the throat swab.” (N7)

Although well protected in the isolation wards, health-care providers were afraid of unintentional occupational exposure and of transmitting the virus to their colleagues; they consistently monitored their own health to avoid infecting others. Providers who lived with families also had great concern about taking the virus to their family members, especially their children and parents.

“To protect other medics, we are fearful of being infected. Anyone who coughs in the office causes panic. If one is infected, all medics in the unit are in danger, then the unit will be paralysed.” (P1)

“Every morning I swallow hard to feel if I have a sore throat. I take my temperature repeatedly... When taking off the PPE, I always review the steps in my mind. I fear doing it wrong and having occupational exposure.” (P4)

“I lived at home. I was anxious, wondering if I brought the virus home and spread it to my family. My child is so young, what if she is infected?” (N1)

Health-care providers' moods fluctuated with their patients' conditions. They were happy and felt great relief when the patients' conditions improved. However, when they tried their best but patients' conditions showed no improvement or deteriorated, they felt depressed and had a deep sense of powerlessness.

“When I talk with patients who are recovering, I am more relaxed because treatments are effective. But when patients have a persistent fever without obvious improvement, or their condition deteriorates, I am very depressed when I enter their room.” (P1)

“The condition of elderly patients changes rapidly, and they may have respiratory failure suddenly. You will feel that, oh my god, there are few opportunities to save lives! The sense of powerlessness is the biggest distress. It makes me very depressed.” (P4)

When patients died, their health-care provider experienced emotional distress and grief for the patient and their family. Additionally, when providers had to prioritise care needs, they often felt that they had failed their patients.

“When a patient with an infectious disease dies, the body is wrapped in several layers of cloth, packed into two bags, which are sprayed with disinfectant... It is a little hard to accept this form of death.” (N2)

“There was a man whose parents died on the same day. He cried beside his mother's bed and said his parents were healthy previously, but he lost both of them due to this sudden disease. The scene was really painful, I cried. For a few days, the critical and intensive care unit had patients die every day, two even died on the same day. I feel very depressed. When is the end?” (N5)

“We have many patients but limited protective suits, and we cannot tolerate wearing protective suits for long hours. So, I can only focus on important problems and

am less concerned with other issues. I feel sorry about that.” (P4)

Some health-care providers felt challenged to have good relationships with patients, because it was more difficult to communicate when they were in such a stressful situation. Other health-care providers felt their relationships with patients were enhanced when patients expressed appreciation for their willingness to put themselves at risk to provide care to them, even when providing the care was difficult.

“If you are not good at communicating and do not know how to comfort patients, the doctor–patient relationship will be very bad. I think we need professional training in psychological communication skills.” (P1)

“I needed to establish an intravenous line for a patient with poor perfusion; it was cold that day and wearing the PPE made the work harder. I failed to get a line six times and I apologised to him, but he said, ‘I know you did your best’. He was grateful to us for taking great risks to take care of them [patients with COVID-19]. Nurses and patients understand each other, and the relationship is much better than usual.” (N4)

The third theme category consisted of two clusters: “many sources of social support to cope with the situation” and “transcendence”. Health-care providers identified multiple support systems, including their hospitals, colleagues, families, friends, and society. With logistical support from their hospital and peer support and encouragement among colleagues, they had a sense of safety and felt they were not alone. Talking to their significant others about their work experiences was also helpful as another form of support. Providers also appreciated the various forms of social support.

“I am not overstrained because I trust our hospital. Our hospital gives us strong logistical support, including providing medical protective supplies, accommodations, transportation, food, medicines, and subsidies.” (N3)

“The head nurse knows we come from different departments and infectious disease is not our specialty, so she sent us some educational videos and materials, and we can learn after work.” (N1)

“When I feel stressful, I complain to my boyfriend. He is also a nurse, and we are in the same department. We communicate with and understand each other.” (N7)

“Many people donate food and fruits to us. I appreciate it.” (N8)

Health-care providers also used self-management strategies to maintain a good mood, because they knew they were badly needed. Some of them preferred to focus on their work and pay less attention to information about COVID-19 to avoid being upset by the negative situations around them. Some chose to do relaxing activities and find a moment of peace, such as watching films, taking a shower, and reading. Owing to the heavy workloads, they also recognised the need for good nutrition and rest.

“I must adjust myself because I cannot be immersed in sadness, I must focus on combating the epidemic, and

take efforts to save more lives, win the battle, and help everyone to return to a normal life.” (N9)

“I like reading, watching movies, and writing. After work, many physicians returned to their own room in the hotel, and they were alone. I told them to do something they like after work, rather than keep thinking about the work.” (P2)

“To keep up with the workload, the most important thing after work is to eat and sleep to replenish strength.” (P4)

Although hospitals and the government provided a series of measures to maintain the psychological wellbeing of health-care providers amid COVID-19, they did not think their emotional pressure was serious enough for psychological counselling or hotline assistance.

“The hospital has set up an online psychological counselling group. The psychiatric department sent some videos to the group to help us cope with bad emotions. There is also a psychological assistance hotline. I have watched the videos, but I have not called the hotline.” (N1)

Health-care providers found meaning in their experiences. They were proud of themselves for the courage and potential to overcome difficulties. They also began to think about what was important to them and wanted to cherish the present.

“This is a special experience, I am lucky to have joined this team and to be combating the virus... I feel that I still have potential, I have become qualified for this challenging job within a short time.” (N1)

“I am proud that I do not hesitate in the face of risks and danger. My awareness of self-protection and communication skills have also improved.” (P1)

“I cherish life, because I don't know when an accident will happen.” (N3)

Discussion

Pervasive throughout health-care providers' descriptions of their lived experiences of battling COVID-19 was a sense of responsibility to alleviate patients' suffering and a need to make concerted efforts to safeguard the whole country from the virus. In China, there is an old saying, “Everyone is responsible for his country's rise or fall.” In the face of this unknown disease and unpredictable risks, health-care providers feared infection and worried about their families, but they still applied to join the fight, took up their responsibilities, concentrated on their duties, and showed a spirit of unity and professional dedication.

Young health-care providers were the backbone of the COVID-19 crisis in China. Of the 28600 nurses recruited from across China to provide care to patients with COVID-19 in Hubei, 90% were younger than 40 years, and 40% were younger than 30 years.¹⁰ These ages were consistent with the age range of our participants.

Health-care providers had crucial roles in treating patients with COVID-19, and they tried to provide the

best care to patients in a difficult situation. The condition of the critically ill patients with COVID-19 changed rapidly, and they often had many complications combined with multiple organ failure. Similar to many new infectious diseases of global health concern, such as Ebola, no effective medicines exist, and patient care is primarily supportive nursing care.¹¹ Therefore, nurses have heavy workloads that include comprehensive assessment and monitoring, rapid recognition and response to clinical deterioration, close communication and collaboration with physicians, symptomatic care, psychological support, and prevention of multiple potential complications.

In general, Chinese family members or family-paid caregivers have a role in bedside care and assisting with activities of daily living for hospitalised patients that are not in intensive care units, and patients view this family care as important psychological support while they are ill.^{12,13} Owing to the isolation policy in place during the COVID-19 outbreak, family members or family-paid caregivers could not accompany patients, and only nurses took responsibility for basic care. Although a majority (68%) of frontline health-care providers were nurses, they still had heavy workloads.³

In addition to providing care to patients, wearing PPE for long hours also led to physical distress, especially for nurses who had to stay in the isolation wards for entire shifts. Intensive work for long hours made health-care providers at risk of decreased immunity. When health-care workers became sick, there was concern regarding their ability to curb the outbreak and treat patients. When a health-care crisis as large as SARS-CoV-2 occurs, it is important for authorities to emphasise the importance of self-care, set maximal working hours and arrange shifts reasonably to protect health-care providers from overwork.¹⁴

Patients with COVID-19 need both comprehensive and specific management, and the outbreak brings great challenges to health-care systems, especially critical care medicine. Many health-care providers from other departments had few clinical experiences in infectious intensive care. When health-care systems are not ready to handle the outbreak of an infectious disease, training, education, and improved communication are needed.¹⁵ Temporary efforts to provide intensive training increased caregiver knowledge and skills. Continuous medical education and training is needed to assure medical teams are adequately prepared to deal with public health emergencies.¹⁶

When personnel from different specialties and hospitals work together, differences might exist in corporate cultures, procedures, and communication. The promotion of interprofessional and interorganisational collaboration should be a priority to ensure efficient and high-quality care. Nurses have a leading role in facilitating communication and collaboration among health-care team members; mutual trust and respectful environments should be developed, efficient communication

maintained, the role of individuals and teams clarified, standardised procedures established, and a sense of belonging fostered.¹⁷

In the early stages of the COVID-19 epidemic, because of insufficient understanding of the virus and prevention and control measures, more than 3000 medical staff were infected in Hubei, 40% of whom were infected in hospitals.¹⁸ Health-care providers experienced persistent fear of infection due to the contagious nature of the virus, unknown transmission modes, close contact with patients, and infection happening to their colleagues. Infection among health-care workers has been a problem during other outbreaks. During the SARS epidemic, nurses' higher levels of trust in equipment or infection control initiatives were related to lower levels of emotional exhaustion and state anger.¹⁹ Workforce safety is a high priority. To help health-care providers reduce uncertainty and fear, in addition to improving knowledge of infection prevention and control and personal protection skills, hospitals need to provide a safe working environment and sufficient protective supplies and have personnel responsible for continuous training, monitoring, and supervision of infection prevention and control. Sound infection prevention practices are also needed in the living quarters of medical teams from other provinces. For frontline health-care providers who lived at home, the concerns about transmitting the virus to family members need to be addressed. Supportive conversations and recommendations, such as separation of living spaces, changing clothing, and immediately showering after duty, might help to reduce anxiety.¹⁴

In the face of various challenges, health-care providers showed great strength and resilience. They used multiple support systems and self-adjustment skills to relieve stress, because they knew they needed to be strong and focus on their duty in order to save more lives. However, health-care providers in this study also expressed grief and a strong sense of powerlessness about patients' suffering and the sudden loss of lives. During the SARS and MERS epidemics, frontline health-care providers were fearful, anxious, and frustrated and were at higher risk of mental health problems after the epidemic (eg, post-traumatic stress disorder).^{5,6,19} Although participants in this study thought they were able to deal with their emotional stress without professional support, their mental health should be continuously monitored, support systems strengthened, and professional psychological counselling and crisis interventions provided.

Owing to strict infection prevention measures, non-essential personnel, such as psychiatrists and psychotherapists, are discouraged from entering isolation wards.²⁰ Psychological care was mainly provided by frontline health-care providers, who had heavy workloads and did not have professional training in mental health care. Health-care providers in this study tried their best to provide psychological support to patients. Considering

the importance of psychological care to quarantined patients, professional training on psychological care and communication for health-care providers will be helpful to deal with patients' emotional problems.²¹

A limitation of this study was that all participants were interviewed by telephone, because Wuhan was in lockdown and the authors could not go to hospitals. It was more difficult to build rapport with participants over the phone, and non-verbal cues could not be obtained. The semi-structured interview guide was not piloted, but the interviewers were trained in interview skills before this study, and each interview was followed by peer debriefing. The sample composition was uneven, with nine nurses and four physicians. However, the authors did not aim to compare experiences between nurses and physicians, and among those health-care providers working in COVID-19 wards, 68% were nurses, so the sample composition seemed reasonable.

In treating patients with COVID-19, Chinese health-care providers showed a great deal of professional dedication and acceptance of the need to place themselves at risk and to overwork. Nurses took on difficult tasks and had an important role in promoting patients' recovery. The intensive work drained health-care providers physically and emotionally; therefore comprehensive support should be provided to safeguard the wellbeing of health-care providers and preparedness and efficacy promoted to manage crises.

Contributors

All authors had full access to all the data in this study and take responsibility for the integrity of the data and the accuracy of the data analysis. JY and BXY contributed equally and share the corresponding authorship. QL and DL contributed equally and share the first authorship. BXY conceived of and designed the study. ZL and BXY acquired funding. JY and BXY supervised data collection and analysis. QL and DL collected the data. QL, DL, JEH, QG, XQW, SL, LX, and BXY analysed and interpreted the data. QL, DL, and JEH wrote the original draft of the manuscript. All authors contributed to reviewing and editing the manuscript.

Declaration of interests

We declare no competing interests.

Acknowledgments

This work was supported by the National Key R&D Program of China (2018YFC1314600 to ZL) and Project of Humanities and Social Sciences of the Ministry of Education in China (20YJCZH204 to BXY).

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