## Title
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## Journal
Nursing and Health Sciences, 23(3)

## ISSN
1441-0745

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## Publication Date
2021-09-01

## DOI
10.1111/nhs.12859

Peer reviewed

Received: 25 January 2021 | Revised: 21 May 2021 | Accepted: 1 June 2021

DOI: 10.1111/nhs.12859

RESEARCH ARTICLE

Nursing & Health Sciences WILEY

# Resilience of frontline nurses during the COVID pandemic in China: A qualitative study

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**Funding information**
Fudan University Science Establishment, Grant/Award Number: IDF162005; National Institute of Mental Health, Grant/Award Numbers: P30MH058107, R25MH087217; Novel coronavirus "2019-NCOV" research project of Shanghai Public Health Clinical Center, Grant/Award Number: 2020YJKY01; UCLA CTSI/SON Intramural fund March 2020

## Abstract

The aim of this study was to describe the resilience of nurses who cared for patients with a confirmed COVID-19 diagnosis, as well as factors that potentially contributed to that resilience. A total of 23 frontline nurses who cared for patients with COVID-19 were recruited from a COVID-19–designated facility in Shanghai, China, using purposive sampling strategies. In-depth interviews were conducted from March to May 2020. Qualitative data were transcribed verbatim and content analysis was used. Nurses exhibited psychological resilience while caring for patients with COVID-19. They displayed an ability to bounce back from negative mental experiences and transform to a positive mindset to cope with the stress they faced. Factors that enhanced the nurses' resilience during the pandemic were their becoming familiar with infectious disease protocols, having a sense of professional achievement, receiving social support, having trust in the infection-control response team in the hospital, and using self-regulation strategies. This study could guide the design of future resilience-enhancing interventions that provide positive coping strategies for nurses caring for individuals with infectious diseases during a pandemic.

KEYWORDS
China, COVID-19, infectios disease, mental health, nurses, pandemic, resilience

## Key points

- This qualitative study provides several insights regarding the experience of mental resilience among nurses caring for patients with COVID in Shanghai and the potential factors that facilitate such resilience.
- We found that the nurses displayed an ability to bounce back from negative mental experiences and transform to a positive mindset to cope with the COVID-related stress.
- Future studies should explore how to cultivate, mobilize, and actively maintain nurses' positive strengths and provide resources to enhance mental resilience.

## 1 | INTRODUCTION

Coronavirus disease 2019 (COVID-19) is still a global pandemic (World Health Organization, 2020). Healthcare providers (HCPs) are vital resources in the control of the epidemic – especially nurses, who constitute the largest group of HCPs for patients with COVID-19. They spend the longest periods of time, often hours, providing and monitoring patients with COVID-19 and are often directly exposed to

  

the virus; as such, they can contract it through in-house transmission at hospitals (Fernandez et al., 2020; Mo et al., 2020; Zhang, 2021). Consequently, frontline nurses frequently experience fatigue, burnout, sleep disorders (Khalid et al., 2016), anxiety, depression, post-traumatic stress disorder (PTSD; Chew et al., 2020), loneliness, fear, discrimination, isolation from society, and frustration regarding the outcomes of the disease (Jun et al., 2020; Khalid et al., 2016), which may lead to poor morale at work, absenteeism, apathy, and poor work performance (An et al., 2020).

The specific work schedules of nurses assigned to COVID units in China differ based on the hospital's situation (e.g., availability of workforce). For example, in the facility where participants in this study worked, nurses who were assigned to the intensive-care COVID wards worked 10-day rotations. Nurses who were assigned to the mild to moderate COVID floors worked 14 days straight. Each day's shift lasted 8 h, with a 1-h break. All the nurses were asked to stay on the hospital campus, where dormitories were provided, during their work shifts. Before staff who had been in contact with suspected/confirmed COVID patients left the campus, they were given two polymerase chain reaction (PCR) tests on Day 7 and Day 13 within the 14-day rotation, and on Day 5 and Day 10 for the 10-day rotation. The nurses were then dismissed for a 14-day self-quarantine. After the rotation, nurses could go back to their original assignments if they wished, or they were reassigned to the intensive or mild-to-moderate COVID units. From June 2020 to December 2020, approximately 50% of the nurses returned to COVID floors. As of August 2020, more than 400 nurses rotated through COVID units. Half of the 400 nurses were floated from nearby hospitals to care for COVID-19 patients, as the local government highly recommended.

Under extraordinary circumstances such as these, the promotion of frontline nurses' well-being is more critical than ever; in particular, mental resilience training is essential (Babanataj et al., 2019). Mental resilience is defined as the ability to adapt to changes caused by stressful events in a flexible way and to recover from negative emotional experiences (Tugade & Fredrickson, 2004). A growing number of researchers have confirmed the role that resilience plays in the adjustment to adversity, finding that it is positively associated with meaning in life and with self-efficacy, whereas lack of resilience is associated with poor mental health and depression (Lenzo et al., 2020). A previous study has indicated that mental resilience is a protective factor that helps nurses who return to work after recovering from COVID-19 cope with job stress (Zheng et al., 2021), and another study found that health education can reduce nurses' fear of COVID-19 (Mubarak et al., 2021).

It is essential to understand the mental resilience experienced by frontline nurses and its contributing factors; however, no specific qualitative data on the mental resilience of such nurses have been reported. An understanding of the mental resilience displayed by frontline nurses is urgently needed so that healthcare administrators can design effective interventions to support or further strengthen that resilience (Pollock et al., 2020). Thus, in this paper, we aim to describe the experience of mental resilience among nurses caring for patients with COVID in Shanghai, China, and the potential factors that facilitate such resilience.

## 2 | METHODS

### 2.1 | Design

Qualitative, in-depth interviews were conducted by cell phone with nurses who were caring for patients with COVID-19 in Shanghai, China. We used the qualitative descriptive design to guide this study (Doyle et al., 2020). Also, the Standards for Reporting Qualitative Research guidelines were used in the reporting of this study (O'Brien et al., 2014). This research was approved by the relevant institutional review boards of UCLA (IRB#20-000832) and the Shanghai Public Health Clinical Center (YZ-2020-S037-01).

### 2.2 | Participants and settings

Twenty-seven eligible nurses were recruited using the purposive sampling method from the COVID-19–designated healthcare institution in Shanghai, China. More than 1000 patients with COVID-19 have been cared for in this institution. Among the 27 eligible nurses, 23 provided consent to participate in the study. These 23 nurses were willing to share their personal stories about caring for patients with COVID-19. None of them was infected with COVID-19 at the time of the in-depth interview. The sample size was determined by data saturation, that is, recruitment ended at the point where no new themes emerged from the participants' experiences (Blaikie, 2018).

### 2.3 | Qualitative data collection

Written informed consent was obtained from each of the participating nurses before they were interviewed. After securing the participant's consent, the research staff scheduled a time for a one-on-one, in-depth interview. One Chinese-speaking researcher who was not affiliated with the study site and had no prior relationship with the participants conducted the in-depth interviews by phone from April to May 2020. Each interview took about 40–60 min and was audio-recorded for transcription. All study participants received limited stipends for their participation.

Participants' demographic data – age, gender, marital status, ethnicity, educational level, professional title, years as a nurse, and length of time working in COVID-related wards – were obtained at the beginning of the interview. We pilot tested the interview with two participants to enhance the study's acceptability and credibility. The interview questions were: "What was your response when you received the notice that you were selected to work in the inpatient ward for patients with COVID-19?" "What was your understanding of COVID-19 before you worked in the ward?" "Any concerns about this duty before you worked in the ward?" "What were your feelings during work (including negative or positive aspects)?" "How did your feelings affect your work?" "When and what are the changes during work especially mentally?" "What do you think are the factors for these

changes?" and "Is there anything else you would like to share with me or tell me?"

Data analysis occurred concurrently with data collection. The audio recordings were transcribed verbatim by nursing graduate students. To ensure confidentiality, we assigned an ID code for each participant and removed potential identifiable information from the transcriptions.

## 2.4 | Qualitative data analysis

We used NVivo 12 software (QRS International) to code the data and then conducted inductive qualitative content analysis (Hsieh & Shannon, 2005) based on PsyCap's HOPE framework (Luthans et al., 2007). The data collection and analysis were conducted simultaneously. The study team then looked for concept categories and code trees related to mental resilience and its contributing factors among the nurses. The team next inspected the transcriptions individually and assigned codes from the code list based on themes that were gleaned from those transcriptions. Three transcriptions were then randomly selected to check for coding reliability. Also, the analytical memos were used between coding and writing this paper. Then, for uncertain quotes, the team met to discuss and resolve discrepancies to enhance the confirmability of the study.

Representative quotations related to mental resilience and its contributing factors were selected from the transcriptions. After the process of coding the 20 transcriptions, the quotes were retrieved and translated into English and back-translated by two researchers to ensure their accuracy for publication. The dependability of this study was upheld by external mental health experts, who performed audits throughout the process of data collection, thematizing, and analyzing. These audits were performed to confirm the accuracy of the findings and to ensure that they were supported by the study data. Last, the thematic categories were integrated into a theoretical framework (see Figure 1).

# 3 | RESULTS

Among the 27 eligible nurses, two nurses could not be reached and two nurses were unwilling to share their experiences due to physical discomforts, so our final sample consisted of 23 nurses. The mean age of the nurses was 29.78 years ($SD = 5.23$) and the average years of working as nurses was 9.10 ($SD = 6.35$). The average time of working in COVID-related units was 2 months ($SD = 0.85$). Table 1 presents the sociodemographic characteristics of the nurses.

Nurses displayed mental resilience as they cared for patients with COVID; in other words, they had the ability to bounce back from negative experiences, adopt a positive mental state, and cope with the stressful pandemic situation (see Figure 1).

## 3.1 | Nurses' negative feelings during their first few days of working with patients with COVID

During their first few working days in COVID-related units, most nurses experienced various degrees of negative feelings, such as emotional breakdowns, fear, anxiety, suffering, or nervousness. Fighting a new disease about which little was known, being unfamiliar with the nursing protocols of infectious disease wards, worrying about potential exposure to COVID, and being overwhelmed and exhausted by the workload and shortage of personal protective equipment (PPE) all induced substantial stresses.

Since COVID-19 is highly contagious through droplets and contact routes, nurses needed to become familiar with the environmental and infectious disease protocols, become proficient at putting on protective gear, and overcome the cumbersomeness caused by the necessary PPE. One 30-year-old, married, experienced nurse said:

> On the first day, I slowly got used to working with the PPE for 8 h under the hot, [high]-pressure environment. When I took care of COVID-19 patients, I felt lost due to the unfamiliarity of the isolated environment, materials, and nursing procedures.

In addition, a 32-year-old, unmarried, experienced nurse said:

> I needed to draw many blood samples from all the COVID patients. I…drew blood from 3:00 a.m. till 6:00 a.m. but still could not finish all of them. I needed to wear goggles and two layers of thick gloves. I could not see clearly and could not feel my hands, just like that. Well, it was very, very devastating. I was not familiar with the several layers of gloves; I could not find the needles, tubes, and supplies. The tasks were not completed [and] just could not be completed on

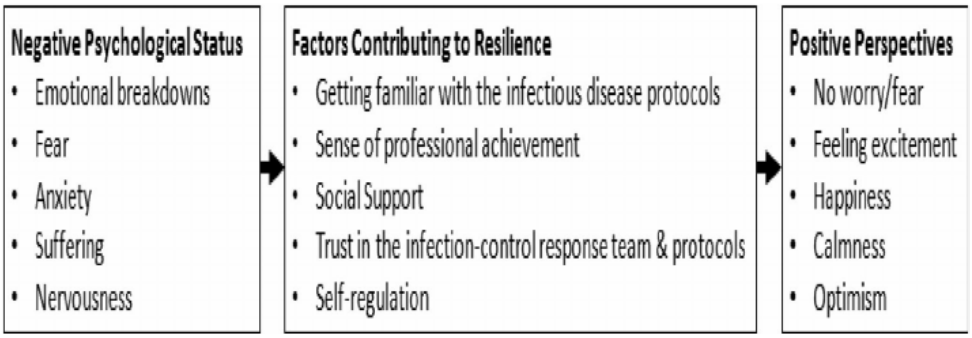


**FIGURE 1** The resilience experienced by nurses

**TABLE 1** Sociodemographic characteristics of the nurses ($N = 23$)

| Variables | *N* (%) |
|---|---|
| Marital status | |
| Single | 7 (30.40%) |
| Married | 15 (65.20%) |
| Cohabitating | 1 (4.40%) |
| Education level (nursing degree) | |
| Certificate or associate's degree | 11 (47.80%) |
| Bachelor's degree | 11 (47.80%) |
| Master's degree | 1 (4.40%) |
| Professional title | |
| Novice nurses (working less than 5 years) | 6 (26.10%) |
| Experienced nurses (working 5–10 years) | 10 (43.50%) |
| Expert nurses (working more than 10 years) | 7 (30.40%) |
| Workplace | |
| Mild/moderate COVID cases | 13 (56.50%) |
| Severe COVID cases | 10 (43.50%) |

> time. To be honest, I was devastated and broke down after that day.

Nurses were under extreme pressure; they were afraid of making mistakes and were overwhelmed and exhausted by the workload. For example, one 34-year-old, unmarried, experienced nurse shared the following.

> The first day I worked on the night shift. Because of the unfamiliarity, I rushed myself to complete my assignments but still left many things undone. Most importantly, I was afraid of making mistakes, such as a medication error or giving the wrong injections to patients. I kept thinking about whether I missed giving something to a patient, or whether I missed doing some procedures. Even after work, I still wondered, did I miss something? I was so afraid that I would make mistakes.

Some nurses said that they were influenced by patients' negative emotions, that is, when patients were depressed, they also felt uneasy.

## 3.2 | Nurses' positive mental status after 1 to 2 weeks

After working in COVID-related wards for 1 to 2 weeks, nurses stated that they experienced a more positive mental state, including having no worries or fears but instead feeling excitement, happiness, calmness, optimism, and a sense that they were adapting to the situation.

> The first time I went into the emergency room during [this] pandemic, I was a nursing student. I was so nervous at that time. I remember that I could not wear protective clothing proficiently, but now I can put them on quickly and correctly. I became familiar with the [new] protocols and was not afraid again. (23-year-old, unmarried, novice nurse)

## 3.3 | Factors that contributed to nurses' mental resilience

Nurses shared the possible reasons for why they bounced back from negative experiences and changed to a positive mental state.

### 3.3.1 | Getting familiar with infectious disease protocols

After 1 to 2 weeks of clinical practice, especially with the increased working hours in the COVID-related units, nurses became accustomed to the nursing care of COVID-19 patients, and thus their initial negative emotions (e.g., worry, anxiety, or fear) were replaced by a calm and positive response.

> Due to [the] experience [with COVID-19 patients], I now am skilled in [self-]protection and nursing care (e.g., the use of ventilators) [during my] second assignment to work in the COVID units. I did not feel as worried as before and [I was] not afraid of potential infection. (34-year-old, married, experienced nurse).

### 3.3.2 | Sense of professional achievement

Nurses felt happy and pleased when they saw patients who had recovered and were discharged from the hospital. As one 34-year-old, unmarried, experienced nurse expressed:

> I [have] felt happy and honored to participate in the fight against COVID-19 and contribute my nursing career to the pandemic – especially when I saw patients who recovered and are now healthy again; I felt very contented.

### 3.3.3 | Social support

Nurses mentioned many sources of social support that helped them cope with the negative emotions that arose when they first began working with COVID-19 patients and to regain a positive emotional state, including support from family members, colleagues, managers, and hospital administrators. Nurses received encouragement and support from parents, spouses, and children via WeChat. This encouragement from the institution and community was helpful in their coping

with the mental stresses, worries, and anxiety brought on by their work. For example, one 25-year-old, married, novice nurse said:

> I missed my children; they are so young. I worried about [their] diet, sleep, [and] socializing with other children. My husband sent me photos and videos about my kids every day and told me that they were well, so I do not need to worry about them.

Nurses received logistical and mental support from their institution (e.g., counseling and monetary assistance) and peer support from nurses who worked in the same unit. In addition, encouragement was received from managers, who helped bedside nurses maintain a sense of safety and a positive perspective. As one 32-year-old, unmarried, experienced nurse stated:

> My parents provided me encouragement by text messages and videos. I also talked to my boyfriend when I was stressed. Besides, I communicated with my colleagues, so they helped me to cope [with] the negative moods.

A nursing supervisor (34-year-old, married) shared the following.

> The nurses who came from another hospital cried often during the first few days because they were not familiar with this institution and just floated to our hospital during the COVID-related nursing shortage. I comforted them… and reassured them that things would get better. They would calm down and felt better a couple of days later.

### 3.3.4 | Initial and continuing training at the hospital

Most nurses stated that the hospital conducted various forms of systematic training for medical staff, such as orientation training and infection-control training (e.g., the classification and disposal of medical waste), which helped them adjust to the work and enhanced their confidence in coping with it. One 25-year-old, single, novice nurse said:

> Just before entering the emergency ward, the hospital provided us the orientation training on how to wear and take off protective clothing, disinfecting, and isolation. Furthermore, during work, we studied COVID-relevant information online.

### 3.3.5 | Trust in the infection-control response team in the hospital

Because the facility the nurses worked in was the COVID-designated hospital in Shanghai, nurses expressed confidence in the institutional infection control capability. Therefore, they felt they did not need to worry, as long as they maintained self-protection, disinfection, and isolation according to the protocol. One 26-year-old, single, novice nurse said:

> This hospital is the epidemic control and public health center so it has sufficient PPE reserves. The… clearly defined function in each area was clearly expressed in the care protocol. So I [was] less scared than I [was], and now, I have no worries.

### 3.3.6 | Self-regulation

Nurses described how they also used self-regulation strategies to reduce negative feelings and maintain a positive perspective. For example, some nurses mentally gave themselves a psychological hint or construct (e.g., "Actually, I kept telling myself that PPE inside this facility is adequate, and I do not need to worry of running out of any of the protections," related a 43-year-old, married, experienced nurse). In addition, some nurses engaged in relaxation activities during the period of quarantine, such as listening to soft music, talking with family members and friends, writing on social media, sleeping, or watching TikTok. As one 25-year-old, unmarried, novice nurse, said: "During quarantine, I went for a walk inside the quarantine unit and did some exercises, such as skipping rope or kickboxing, so I could relax a little bit during this time."

## 4 | DISCUSSION

Globally, nurses are one of the main forces in the fight against COVID-19 (S. C. Chen et al., 2020). Nurses' resilience not only affects their mental health but also the quality and safety of the patient care they provide to COVID-19 patients (C. H. Chen et al., 2016; Johnson et al., 2017). This qualitative study provides insights on how personal mental resilience can provide the strength for nurses to stay in the fight against the COVID pandemic. Specifically, nurses with mental resilience can continue to care for patients in need. This paper can also guide the design of future interventions to enhance the mental resilience of nurses during a pandemic.

We found that many nurses presented mental resilience during their work with COVID-confirmed individuals. In other words, negative emotions that arose before they started taking care of COVID patients had shifted to positive strengths after working in COVID units, a finding that echoes previous studies (Sun et al., 2020; Zhang et al., 2020). In their first few days in COVID units, nurses were under high pressure due to the demands of the infectious disease protocols, which were new to them. They had to adapt to an unfamiliar working environment and master the new nursing protocols for caring for COVID patients. The overwhelming conditions of the work, unceasing inflow of patients, and their initial lack of proficiency in wearing PPE caused nurses extreme stress.

Compared to pre-COVID times, nurses rarely dealt with such a highly infectious disease, for which there was no sure treatment, in their careers. Even in this COVID-designated facility, which only

provided care to infectious disease patients, there was panic after the breakout of COVID in China, even though some experienced nurses had limited knowledge and experience with Ebola through caring for patients with Ebola in Africa and in the management of the SARS 2 outbreak nearly 2 decades ago in China. After working 1–2 weeks in the COVID units, nurses stated that their negative perspectives changed to positive strengths, and they were less worried and/or afraid. Instead, they felt rather excited, happy, and calm as they adapted to the situation.

We found that the main facilitators of resilience included social support, becoming familiar with infectious disease protocols, the continuing training provided by the hospital, trusting the institutional infectious disease protocols, succeeding in their professional responsibilities, and self-regulation during quarantine. Taking social support as an example, during the COVID-19 epidemic, in-person communication between nurses and the outside world was greatly restricted. Therefore, electronic social support from colleagues, family, and friends became an efficient buffer against the stressful life events they faced (Cheng & Xu, 2012).

This study supports the cultivating and maintaining of nurses' mental resilience during the COVID pandemic; healthcare settings and administrators should provide resources to enhance such resilience. Several lessons were learned in this study. First, strong infection-control measures within an institution can provide a "psychological safety net" for nurses; those measures should include any necessary infection-control protective gear (e.g., masks, gloves, PPE) and infection-control training that covers, among other topics, the classification and disposal of medical waste (Li et al., 2020). Second, the continuing education and sustainability training for nurses working in COVID units should be strengthened in, for example, the correct use of equipment, for example, PPE and ventilators (Tan et al., 2020). Experienced nurses should mentor novice nurses in infectious-disease protocols as soon as possible. Third, administrators should not only pay attention to maintaining and enhancing a spirit of unity and professional dedication but also of enhancing nurses' optimism, such as encouraging the sharing of experiences by veteran nurses and empowering novice nurses for potential future opportunities (Dimino et al., 2020). Fourth, during quarantine, administrators should encourage nurses to engage in recreational activities for self-management, such as jumping rope, playing games, watching movies or other shows, and listening to music. Finally, family members, friends, and peer support groups should be encouraged to regularly communicate with nurses to provide psychological support.

### 4.1 | Limitations

There are several limitations to this study. First, all participants were interviewed by cell phone, which was an appropriate and convenient way for both the nurses and interviewers during the pandemic. However, it was difficult to build rapport with participants and nonverbal cues were not discernible. Second, we recruited study participants from one COVID-19–designated hospital in Shanghai – which is one of the premier healthcare institutions in China; therefore, the experiences of these nurses may not be generalizable to all nurses providing care in COVID units in China. Third, our study used qualitative in-depth interviews to obtain data; however, future studies should examine the mental resilience and influencing factors on nurses through quantitative studies. With such studies, data triangulation can be conducted.

## 5 | CONCLUSIONS

This qualitative study presented information on how nurses obtained mental resilience during their care of COVID patients and how they moved from negative mental states to positive strengths. We also provided several insights into how to enhance mental resilience in nurses in COVID units. Future studies should explore how to cultivate, mobilize, and actively maintain nurses' positive strengths and provide supporting resources to enhance their mental resilience. This paper can serve as an initial guide for the design of future mental resilience-enhancing interventions for nurses providing care in COVID units.

### ACKNOWLEDGMENTS

We gratefully acknowledge all the study participants, as without them, it would not be possible to complete these projects. This publication is a result, in part, from research supported by Fudan University Science Establishment (IDF162005), Novel coronavirus "2019-NCOV" research project of Shanghai Public Health Clinical center (No. 2020YJKY01), UCLA CTSI/SON Intramural fund March 2020, FIC (R21TW011277), and NIMH (No. P30MH058107; R25MH087217).

### CONFLICTS OF INTEREST

The authors have no conflicts of interest to report.

### AUTHOR CONTRIBUTIONS

Study design: Wei-Ti Chen, Lin Zhang, and Hongzhou Lu.
Data collection: Feifei Huang, and Meilian Lin.
Data analysis: Wenxiu Sun.
Manuscript writing: Feifei Huang, and Wei-Ti Chen.
Final approval for submission: Lin Zhang, Hongzhou Lu, and Wenxiu Sun.

### DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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**How to cite this article:** Huang, F., Lin, M., Sun, W., Zhang, L., Lu, H., & Chen, W.-T. (2021). Resilience of frontline nurses during the COVID pandemic in China: A qualitative study. *Nursing & Health Sciences*, 1–7. https://doi.org/10.1111/nhs.12859