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## Geriatric Nursing

journal homepage: [www.gnjournal.com](http://www.gnjournal.com)

Special issue on Infectious Disease: From Prevention to Management

## Nursing home staff perceptions of challenges and coping strategies during COVID-19 pandemic in China

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## ARTICLE INFO

## Article history:

Received 2 February 2021

Received in revised form 25 April 2021

Accepted 27 April 2021

Available online 5 May 2021

## Keywords:

Stress

Nursing home

Nursing staff

COVID-19

Qualitative research

## ABSTRACT

**Background:** First-line nursing staff are responsible for protecting residents, the most vulnerable population, from COVID-19 infections. They are at a high risk of being infected with COVID-19 and experience high levels of psychological distress.

**Aims:** To explore the challenges and coping strategies perceived by nursing staff during the COVID-19 pandemic in China.

**Methods:** In April, 2020, we conducted a qualitative study using in-depth semi-structured interviews with nursing staff. Participants were selected from seven nursing homes in three cities in Hunan Province, China.

**Results:** A total of 21 nursing staff participated in the study, including seven nurse managers, seven registered nurses and seven nursing assistants. Three main themes were identified. Different groups encountered different sources of stress and adopted various coping strategies to fulfil their responsibilities.

**Conclusions:** Nursing home staff were underprepared for dealing with COVID-19-related challenges. Educational programs to improve the ability to deal with COVID-19 prevention and control are needed.

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## Introduction

Coronavirus disease 2019 (COVID-19) has continued to spread globally, with the number of infections and deaths rising daily. By July 1, 2020, COVID-19 had affected more than 200 countries, resulting in over 10 million identified cases and 508 000 confirmed deaths.<sup>1</sup> The epidemic has posed considerable challenges worldwide.<sup>2</sup> COVID-19 is transmitted mainly through droplets and close contact. Older adults with chronic diseases are particularly at high risk.<sup>3</sup> As a result, nursing homes have been significantly impacted by the COVID-19 pandemic.<sup>4</sup> The Office for National Statistics (ONS) reported that from the first recorded case in the United Kingdom to June 5, 2020, there were 17422 deaths of nursing home residents from COVID-19 across England and Wales, which was 47% of the total deaths.<sup>5</sup> There have been increasing reports by the media regarding work overload and lack of protection for nursing home staff.

## Nursing home characteristics in China

Nursing homes in China have increased rapidly due to the ageing population and demand for older adult care. However, nursing homes

in China are still at an early stage of development. Compared with other developing countries, China has a larger ageing population and relatively less developed long-term care systems, with different policies and standards.<sup>6</sup> In 2019, there were 204,000 nursing homes, with a total of 7.75 million beds.<sup>7</sup> Only 1.5–2.0% of people aged 65 and over living in nursing homes, which is a lower institutional care rate compared with 4–8% in Western countries.<sup>8</sup> There are three major types of nursing homes in China, which are operated by government-owned organizations, not-for-profit, or for-profit investors; although, most nursing homes are funded by public resources. In general, the monthly cost per person is low and the quality is reasonable, with one room being shared by three residents.<sup>8</sup>

The limited number of trained nursing assistants and registered nurses in nursing homes has been identified as a factor that threatens the safety and quality of nursing home care in China. Registered nurses are a minority among nursing home staff, where a large proportion of nursing home staff consisting of nursing assistants.<sup>9</sup> Nursing assistants are commonly workers who were laid-off in previously state-run factories or migrant workers from rural villages with low levels of education and have received little training in older adult or nursing home care.<sup>10</sup> Despite low salaries, the work is high-intensity.<sup>11</sup> Therefore, it is difficult to attract and retain skilled care workers, resulting in high staff turnover.<sup>10</sup> The poor work environment reflects those reported in western countries.<sup>12</sup> Nursing assistants are

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mainly recruited from rural areas with limited or no training. In addition, the staff-to-resident ratio in nursing homes is low, and thus the care needs of residents are not always met.<sup>9</sup>

### Sources of stress for staff during the COVID-19 outbreak

Research has shown that the most important source of stress in the work environment is workload.<sup>13</sup> In the early stage of the COVID-19 pandemic in China, the government adopted a strict mass prevention and control mechanism, which resulted in a rapid reduction in the number of COVID-19 cases.<sup>3</sup> During this period, nursing homes in China implemented a series of measures issued by the Ministry of Civil Affairs: Guidelines on the Prevention and Control of the Pneumonia Epidemic caused by a Novel Coronavirus in Eldercare Institutions.<sup>14</sup> Between January and April, 2020, nursing homes in Hunan Province were locked down completely, with restrictions on visitors, cancellations of social activities, and confinement of residents to their rooms. During this period, nursing staff experienced a significantly high workload on a daily basis to comply with lockdown measures and meet training requirements, while providing additional support for residents to communicate with their families virtually.<sup>15,16</sup>

In addition to the work pressure that impacted staff health and well-being, occupational hazards during COVID-19 were also identified as sources of stress. Nursing staff had feared of being infected with COVID-19. To avoid cross-infection, they were required to isolate themselves from family and friends. Usual work-life patterns had been disrupted and rapid adaptation to the COVID-19 work environment was difficult.<sup>15,17</sup> COVID-19-related occupational stress was evident and has been widely recognized by health care providers across care settings globally.<sup>18</sup> The most commonly reported symptoms of stress included excitement, fear, anxiety, depression, sleep disorders, and headache.<sup>16</sup>

Studies have found that nursing staff had both a fear of being infected and a sense of responsibility by which they were at a risk of experiencing, mental exhaustion and burnout during the COVID-19 pandemic.<sup>19,20</sup> However, how staff cope with these challenges remains largely unknown, especially, nursing assistants who were particularly vulnerable because the nature of personal care activities which required them to have a close contact with residents.<sup>21</sup> Coping strategies are usually individualized and influenced by personal experiences, education levels and resources available for them in a social context.<sup>22,23</sup> Therefore, qualitative research is the most appropriate approach to exploring the challenges and coping strategies experienced by nursing managers, nurses and nursing assistants during the COVID-19 pandemic.

## Material and methods

### Design

The aims of the study were to identify challenges faced by nursing home staff and coping strategies they applied during the COVID-19 pandemic in China. A qualitative description was chosen to address the aims of the study.<sup>24,25</sup> This methodology shares the main philosophical foundation of qualitative research, but also integrates the following unique features: maintaining the study in a naturalistic setting, collecting data that reflects actual events or experiences of participants, and presenting findings that are in line with data provided by participants.<sup>24,25</sup> This study was approved by the Ethical Review Board at Central South University with approval number E202037.

### Setting and participants

Nursing staff was recruited from seven nursing homes in three cities in Hunan Province, China (Changsha, Zhuzhou, Yiyang). A

previous study identified 23 nursing homes from four geographic areas of Hunan Province, and nursing homes resident numbers ranged from 36 to as many as 380 residents.<sup>26</sup> The number of staff employed by these nursing homes ranged from eight to 110. In this study, we used the purposive sampling method to select nursing homes and staff. Inclusion criteria for nursing homes were: more than 150 beds and willing to participate in the study voluntarily. First, we searched the website of the Civil Affairs Department of Hunan Province and confirmed the potential nursing homes to be recruited to the study. Then, we contacted the managers of nursing homes that met the inclusion criteria and invited them to the study. Recruitment of participants commenced after we obtained their consent.

To represent the different groups of nursing home staff, we approached three groups of nursing staff in each nursing home: nurse managers, registered nurses, and nursing assistants. The inclusion criterion for participants was that nursing staff were on duty during the COVID-19 outbreak in China in the months of March and April, 2020. Participants were excluded if they had worked in a nursing home for less than one year. The participants were fully informed about the purpose of the study, the confidentiality of the data, and the voluntary nature of participation. We obtained written informed consent from all study participants.

### Data collection

An interview guide was developed based on a literature review of nursing staff responses to COVID-19 outbreaks. A pilot interview was conducted to test the interview questions, which were adjusted for the final interview guide.

In April, 2020, nursing homes were lifted from complete lockdown, but were still under partial closure. Our researchers were permitted to enter the nursing homes through a series of procedures: an ethical review for the study; an application for site visit to the nursing homes; and COVID-19 tests for researchers. For each entry to the nursing homes, researchers' temperatures were measured and their certifications regarding their COVID-19 test were checked. Two Masters students (PY and DZ) who had received qualitative interview training, had extensive interview experience, and were not known to the participants collected the data. They conducted in-depth semi-structured interviews with each participant that lasted 40–60 minutes. Demographic information of participants was collected at the beginning of each interview.

In accordance with the characteristics of qualitative description methodology, the interview guides were used as a starting point to elicit participants' experiences and events during the COVID-19 pandemic (Table 1). Probing questions, such as, "Please tell me more about that", were used to enhance participants' description of their experience. During the interviews, participants were encouraged to speak freely, raise issues that they considered important, and give

**Table 1**  
Interview guide for the nursing staff.

Interview guide
1. How do you think the COVID-19 pandemic has affected your work? Any differences compared with the past?
2. What prevention and control work did you undertake during the COVID-19 pandemic? What impact has it brought to you?
3. During the outbreak of COVID-19 in China, what were your feelings? did you feel pressured? where did the stress come from?
4. How did you cope with stress at work? What resources were available to support you to relieve stress?
5. During the COVID-19 pandemic, did you feel any positive or negative emotions? What were the causes? How did you deal with the negative emotions?
6. Faced with the risk of infection, what do you think are the contributing factors and barriers to your work during the COVID-19 outbreak?

**Table 2**  
Sociodemographic characteristics of the 21 participants.

Code	Age	Gender	Maritalstatus	Position	Length of work in nursing home	Education level	Work location
Nurse manager 1	30	Female	Married	Nurse manager	4	University	Changsha
Nurse manager 2	45	Female	Married	Nurse manager	22	College	Changsha
Nurse manager 3	49	Female	Married	Nurse manager	12	College	Changsha
Nurse manager 4	59	Female	Widowed	Nurse manager	6	High school	Zhuzhou
Nurse manager 5	36	Female	Married	Nurse manager	10	College	Zhuzhou
Nurse manager 6	46	Female	Married	Nurse manager	14	College	Yiyang
Nurse manager 7	57	Female	Married	Nurse manager	2	College	Yiyang
Registered nurse 1	26	Female	Married	Registered nurse	4	University	Changsha
Registered nurse 2	25	Female	Single	Registered nurse	2	College	Changsha
Registered nurse 3	25	Female	Single	Registered nurse	4	University	Changsha
Registered nurse 4	27	Female	Married	Registered nurse	4	College	Zhuzhou
Registered nurse 5	42	Female	Married	Registered nurse	10	High school	Zhuzhou
Registered nurse 6	29	Female	Married	Registered nurse	3	University	Yiyang
Registered nurse 7	27	Female	Married	Registered nurse	1	College	Yiyang
Nursing assistant 1	54	Female	Married	Nursing assistant	2	High school	Changsha
Nursing assistant 2	58	Female	Married	Nursing assistant	10	Middle school	Changsha
Nursing assistant 3	52	Female	Married	Nursing assistant	5	Middle school	Changsha
Nursing assistant 4	54	Female	Married	Nursing assistant	8	High school	Zhuzhou
Nursing assistant 5	58	Female	Widowed	Nursing assistant	2	High school	Zhuzhou
Nursing assistant 6	49	Female	Married	Nursing assistant	3	Middle school	Yiyang
Nursing assistant 7	49	Female	Married	Nursing assistant	5	Middle school	Yiyang

examples to support their views. Field notes were taken to document participants' non-verbal expressions and gestures to assist in the interpretation of the findings. With participant permission, the audio of all interviews was recorded. Data collection and analysis were conducted concurrently and data collection was ceased when data analysis showed no new themes emerged from interviews or data saturation was achieved.

#### Data analysis

The interview tapes were transcribed verbatim and a unique identifier was assigned to each participant. Transcripts were first compared with audiotapes for accuracy, and relevant information, such as emotional content and nonverbal behavior was noted from the field notes. The researchers used Nvivo11 to analysis the transcribed interviews. Braun and Clarke's phases of thematic analysis was applied to the data.<sup>27,28</sup> In accordance with qualitative description methodology, transcripts were thoroughly read line-by-line by two researchers to understand participants' perceptions of challenges they faced and coping strategies they applied during the COVID-19 outbreak. Each researcher independently coded meaningful words based on the aims of the study. Consensus of codes was reached through team meetings. The agreed codes were compared and reduced into group codes, based on similarities and differences. Team meetings were also held to elaborate on the relationships between the group codes and study aims in order to identify potential themes and sub-themes. The most relevant excerpts were selected as a team to support our findings. The researchers cross-checked the final results. The data collection and analysis methods were in line with credibility, dependability, confirmability, and transferability for qualitative research.<sup>27</sup> To enhance credibility, we returned all transcripts to the participants for verification. Further, the team as a whole had an intensive experience and international reputation in conducting and publishing qualitative studies in nursing home settings. The two researchers who collected data were Master's students. They were trained and supervised by experienced qualitative researchers in the team. They kept fieldnotes to reflect on their performance in data collection and data analysis and to discuss these in regular team meetings. All of these data collection and data analysis strategies ensured the transparency of this study and enabled the team to minimize their personal influence in interpreting findings.

#### Results

We approached all nursing home staff who met the selection criteria and 47 of them agreed to participate in the interview. We ceased interviews when we achieved data saturation. In total, 21 nursing staff from seven nursing homes participated in the study. These participants were employed by seven nursing homes and three of the nursing homes were in Changsha, the capital city of Hunan Province and two each in Zhuzhou and Yiyang, which are regional cities in Hunan Province. Five of the seven nursing homes were public and two were private. The number of beds for the residents in those nursing homes was ranged from 160 to 577, and the number of nursing staff was ranged from 69 to 243. Participants included seven nurse managers, seven registered nurses, and seven nursing assistants. All participants were women aged 25 to 59 years, with a mean age of 42.7 years. Their length of working in a nursing home ranged from 1 to 22 years. The demographic information of participants is summarized in Table 2.

#### Challenges experienced by managers and the coping strategies used

Managers were in a position of leadership to direct staff to meet COVID-19 prevention and control measures, in addition to their usual role in managing everyday care activities to meet safety and quality standards. Their stress arose from worries regarding COVID-19 infection in residents and staff.

##### Managing unfamiliar situations

Managers faced enormous challenges to lead staff in the prevention and control of COVID-19 in a context of limited resources and support from their organization and the government. Five participants reported that they were worried about COVID-19 infections in residents in the ward that they managed, with two stating that they had insomnia and felt negative emotions and anxiety:

"During Chinese New Year, I was under a lot of pressure and felt very anxious because I hadn't experienced such a strongly contagious disease before. I could not sleep well at night..." (Nurse manager 3)

This example revealed that the lack of knowledge and experience in managing such unexpected situations was the source of stress. Moreover, the additional work required due to COVID-19-related measures and requirements resulted in more stress:

“I had to undertake additional work. I felt mentally and physically exhausted. I had to take Estazolam [sedative-hypnotic medication] for more than one week. As soon as I heard the phone ringing [after hours], I was nervous and afraid of something terrible happening.” (Nurse manager 6)

#### *Monitoring staff*

Four nursing managers mentioned that they were worried that staff might have been infected with the virus when they visited relatives and friends during Chinese New Year.

“During Chinese New Year, I was worried that staff would visit relatives and friends. So, I issued an emergency notice in the WeChat work group asking them to please not visit relatives and friends during this time and to try to decrease social activities.” (Nurse manager 4)

The managers were also concerned about staff health and wellbeing:

“I feared that working here for a long time would put psychological pressure on staff. . . The knowledge level of the nursing assistants was not as high as our professional staff. They were psychologically stressed and sometimes felt panic and fear.” (Nurse manager 1)

It seemed that managers identified that nursing assistants were at a high risk of coping poorly because of their low education levels.

#### *Managers' coping strategies*

Most managers expressed that although they felt stressed during work, they were able to control their stress through positive thoughts about COVID-19:

“I read the up-to-date news about the epidemic every day. I saw more and more people had recovered, I felt much more relaxed and confident, although there were also deaths.” (Nurse manager 2)

This example indicated that positive thoughts were built on experience and information-seeking to predict the recovery of the crisis. All managers stated that when experiencing stressful work situations, they were able to seek help from family, friends, and their organization. Family provided the strongest support for them:

“All my family members were very supportive of my work, so that I could work wholeheartedly. My husband often chatted with me on WeChat about pleasant things, such as stories about our son. . .” (Nurse manager 5)

This example indicated that virtual support from family was a vital tool for managers to overcome social isolation due to being unable to see their family members. Friends were also sources of support for managers:

“Chatting with friends was a way for me to release pressure. . . I also had contact with my friends in Wuhan. They worked on the front-line and told me that I didn't have to be so scared. Getting

the most authentic information from them made me much more reassured.” (Nurse manager 1)

This example revealed that lack information was a source of stress. Chatting with friends from the same discipline provided mentoring support for managers. In addition, support at the organizational level was a source of stress relief for managers:

“Our director said in a meeting that there were psychological counselling services for staff. If there were staff who were experiencing psychological stress, they could seek free counselling support. But at present, no one has had problems in our ward.” (Nurse manager 7)

The manager's views that staff had no psychological problems might not reflect the real situation. It seemed that managers' involvement in encouraging staff to use counselling services was minimal.

### **Challenges experienced by registered nurses and coping strategies used**

Registered nurses in nursing homes were a minority. They provided direct care to residents and supervised nursing assistants. They were a key group that implemented COVID-19 prevention and control measures. The main challenges they faced included lack of relevant work experience in dealing with COVID-19 epidemic prevention and control and COVID-19-related workload.

#### *Challenges arising from lack of work experience*

Registered nurses with work experience during an epidemic showed relatively calm responses to challenging situations:

“I was not particularly scared compared with the others. Because I had experienced severe acute respiratory syndrome (SARS) and swine flu before so that I had some experience in dealing with similar situations.” (Registered nurse 5)

Those who had not experienced similar epidemics perceived difficulties in working with residents and their families:

“Because I had only worked in a nursing home for one year, my experience was not sufficient to handle things appropriately.” (Registered nurse 7)

These examples indicated knowledge deficits for coping with the COVID-19 pandemic and under-preparation for their role.

“At the beginning of the COVID-19 pandemic, I felt panic. First, I didn't know much about the COVID-19 virus. Then, I lacked some knowledge about epidemic prevention and control.” (Registered nurse 4)

#### *Challenges to cope with a heavy workload*

During the pandemic, nursing homes did not recruit any new staff to reflect the increased workload. Registered nurses were required to undertake additional work in relation to COVID-19 prevention and control. The increased workload had a negative impact on their emotions.

“We worked alternating shifts and were on duty here for 24, 48, or even 72 h. The workload increased a lot. We needed to disinfect

the ward area, measure the body temperature of the residents three times per day, and observe whether residents had respiratory symptoms. But the number of nurses didn't increase." (Registered nurse 1)

When there were suspected cases in the nursing homes, some staff were quarantined and the outstanding workload was taken on by other staff:

"We had a resident with high suspicion of coronavirus pneumonia in our ward. During that time, I carried out my usual duties and the duties left by those who were in quarantine. My usual work pattern was disrupted." (Registered nurse 6)

#### *Registered nurses' coping strategies*

Education and training on prevention and control were perceived as the most important strategies to help cope with challenges:

"We had training courses that were specific to nursing homes to deal with the COVID-19 pandemic. Activities included hand hygiene and the correct wearing of masks and protective clothing. Mastering these aspects could at least provide effective self-protection." (Registered nurse 6)

Most importantly, they received support from the management group, which enhanced their ability to cope with challenges:

"If I couldn't handle the problem, there were so many people in our department that we could approach for help. Our management group often taught us some useful management methods and skills." (Registered nurse 2)

Peer support was mentioned by registered nurses as a coping strategy for the increased workload:

"Usually, the nurses in the day shift would assist the nurses in the night shift instead of going home after work. In addition, there was one thing that touched me: I once stayed here for two or three days and didn't go home because there was no bus or taxi. My colleague said she would take me home on her motorcycle." (Registered nurse 4)

In situations where staff were unable to go home because of mandatory isolation, they supported each other via leisure activities:

"Several of us lived here. We made jokes, watched TV, and chatted after work. Sometimes we could buy some snacks and participated in other activities for entertainment, which alleviated this tense situation." (Registered nurse 3)

It seemed that they developed stronger bonds and work relationships during the COVID-19 pandemic.

#### **Challenges experienced by nursing assistants and the coping strategies used**

Nursing assistants are mainly responsible for assisting residents with activities of daily living. The main challenge they perceived came from interactions with residents and their families. At the same time, they were also concerned about inadequate prevention and control measures that exposed residents and themselves to potential infection of COVID-19.

#### *Challenges arising from interactions with residents and their families*

Nursing assistants stated that during the closure of the nursing homes, some residents had negative emotions, such as restlessness and panic because of the restrictions on outdoor activities and lack of family visitations. The residents wished to go outside, their family members wanted to visit them and they did not comply with prevention and control measures. Such situations were a source of stress for nursing assistants and they blamed themselves for not being assertive:

"They didn't cooperate with me as I believe I could not explain the prevention and control measures to them (residents and their families) clearly. When I faced such situations, I had no idea how to do my job." (Nursing assistant 3)

Disputes arose between nursing assistants and residents/families when nursing assistants were unable to meet their demands to see each other face-to-face:

"We had implemented a complete lockdown for nearly three months. Some residents had bad emotions, family members demanded to visit residents and we refused as we had to comply with the prevention and control measures. Residents and families had disputes with us because of those reasons. I felt helpless and sad that we could not understand each other, even though we worked so hard to protect residents from infection." (Nursing assistant 7)

#### *Challenges to control COVID-19 infection*

Five nursing assistants reported that they were worried about the inadequate prevention and control measures, which increased the risk of infections for residents and themselves. Specifically, their main concerns included the uncertainty of whether family members of the residents had carried in the virus before the closures of the facilities:

"Many family members of the residents had a Chinese New Year reunion dinner here prior to lockdown of the nursing home. . . I worried that these family members had come here from all over the country or even from Wuhan, which would cause cross infection." (Nursing assistant 4)

They also faced a lack of protective equipment and felt uncertainty about the effectiveness of infection control measures:

"I was scared of getting infected because of inadequate self-protection. We were short of protective equipment and wore the same mask for a few days at a time. I didn't know if the disinfection that we usually do would be effective." (Nursing assistant 6)

#### *Coping strategies*

Support from the management group and registered nurses was mentioned by all nursing assistants as a strategy to help them cope with challenges and stress:

"Our head and registered nurses were approachable here. We could always discuss with them how to solve a problem. When faced with difficult problems, I told the head nurse and gained help from her." (Nursing assistant 1)

This revealed strong team building and teamwork across different levels of staff. Furthermore, nursing assistants indicated that they learned to adopt to the stressful working environment:

"I knew how to deal with it (stress). I paid more attention to COVID-19 prevention every day during the lockdown. . . I worked

more carefully than I usually do, such as washing hands frequently and disinfecting strictly. I followed all instructions from management and registered nurses and I did my job well.” (Nursing assistant 2)

Nursing assistants were able to contribute to COVID-19 prevention and control measures if they were given clear guidance from management and registered nurses.

## Discussion

Findings from our study support previous studies showed that health care workers, especially nursing home staff, are at a high risk of infection and mental health problems.<sup>29,30</sup> Our study demonstrated that all staff, including nurse managers, registered nurses, and nursing assistants, experienced COVID-19-related stress and unexpectedly high workloads. However, different groups faced different sources of stress and thus adopted different coping strategies to carry out their role and responsibilities during the COVID-19 pandemic.

In our study, nurse managers experienced a higher level of stress due to their overall responsibilities for residents and staff, compared with registered nurses and nursing assistants. They were highly vulnerable to experiencing sleep problems and mental health problems. Studies identified that nurse managers were overwhelmed by their dual role as a manager and a clinical leader, which suggested that the role may currently be misunderstood and unrealistically configured.<sup>31</sup> For them, positive attitudes and effective self-control played an important role in alleviating stress. Studies that have investigated job stress in nurses have shown that self-control is one of the strategies that are often used by nurses to cope with job stress.<sup>32,33</sup> Other studies have found that self-control is positively associated with work skills, hope, and optimism.<sup>34,35</sup> Understanding a nurse's self-control ability can proactively help nurses identify or prevent potential problems, thus fostering positively associated factors and ultimately, achieving personal and professional growth. In regard to the improvement of work skills and increasing hope, nurse managers are required to help nurses to set appropriate, specific, and challenging job goals, and hold training programs to help achieve them. Nurse leaders may instill optimism via internet-delivered cognitive behavioral therapy (CBT), which uses standard cognitive behavioral frameworks to develop new models of thinking and behavior.

Our study revealed that nursing managers often relied on social support, including family, peers, and their organization in managing stress and physical symptoms. Social support can mitigate stressful emotions, according to the stress and coping theory.<sup>36</sup> Research has shown that social support is the main strategy utilized to deal with stress, and access to social support at work affects job stress and satisfaction.<sup>22</sup> Social support has both direct and buffering effects.<sup>37</sup> In times of stress, nurses who make more use of social support, in particular family support, cope better than nurses who do not have such support.<sup>38</sup> During the COVID-19 pandemic, strong family support enabled staff to fully dedicate themselves to their work, especially when they were unable to return to their home.

In contrast from nursing managers, registered nurses in our study were mainly stressed about the heavy workload and lack of experience. The heavy workload was due to severe shortage of registered nurses and the lack of staff recruitment to replace those in quarantine. In addition, registered nurses were not only required to care for the residents as usual, but also implement COVID-19 prevention and control measures, which they were not familiar with. Our findings support a previous study that showed that nurses who had prior experience were more likely to have confidence in their abilities to respond to major disaster events.<sup>39</sup> This indicates that nurses need to engage in training in order to increase competence, confidence, and

familiarity with pandemic preparedness. Our study identified that the most commonly mentioned effective coping strategy by registered nurses was support from management and peers. This finding supports a previous study that showed that this kind of support provides sympathy, information, and advice about the best actions to take, which reduces emotional stress.<sup>35</sup> Reflecting on this finding, nursing homes need to provide opportunities for registered nurses to interact with management and peers and foster a team approach reducing stress.

In our study almost all nursing assistants had worries about the safety of residents and themselves. The finding supports previous studies on the Middle East Respiratory Syndrome Coronavirus and SARS outbreaks that showed that safety was the main concern for staff.<sup>40,41</sup> The main strategy that helped ease the nursing assistants' stress of being infected was education and training. To reduce the risk of infection and ensure their own and residents' safety, the nursing assistants in our study proactively implemented preventive measures, which included disinfection and personal hygiene. Similar findings have been reported in other studies.<sup>42,43</sup> Problem-focused coping strategies are widely used coping strategies because they give a sense of control via careful step-by-step planning.<sup>44</sup> They are most effective for individuals whose stress factors are within their control and can therefore manage stress factors effectively.<sup>45</sup> This kind of strategy needs to be implemented during the education and training of nursing assistants.

Our study has some limitations. First, this study was done during the stable period of the COVID-19 pandemic in China, which may have resulted in recall (i.e. under- or overestimation of response severity) and selection bias. The study also omitted responses of staff who resigned during the outbreak. Moreover, because of the timely measures implemented by the nursing homes, there were no cases of infection; the situation is likely to be different in nursing homes with infections. Despite these limitations, our study of three locations in Hunan province represents the situation of nursing homes across Hunan province.

## Conclusions

The findings of the study showed that the main stressors were associated with staff roles and responsibilities worries about resident and staff safety, and the heavy workloads. Staff perceived that effective coping strategies included approachability of management, peer support, and teamwork. Nursing assistants required more practical guidance regarding COVID-19 prevention and control measures and relationship building with residents and their families. Our findings have important implications. First, nursing homes need to develop educational programs to improve the ability of nursing staff to implement prevention and control measures especially for the nursing assistants. Nurses need opportunities to engage in planning, mock drills, and education and training that simulate pandemic situations to develop competencies in dealing with future pandemic. Moreover, strategies such as cognitive behavioral therapy may also be helpful in improving self-regulation to reduce stress. Using Massive Open Online Courses (MOOCs) as a platform for nursing home staff to learn challenges and coping strategies in pandemic situations might be an effective education strategy considering the increased numbers of the workforce employed in nursing homes in China and other countries with an ageing population. Focusing on these aspects may enhance the experience of nursing staff during future pandemics. Second, policy makers need to reflect on the severe shortage of registered nurses and develop policies and resources to address this issue. Third, although health counselling services for staff were made available, utilization was not mentioned, despite nursing staff perceiving a high level of stress. Further studies on the factors affecting staff to seek timely counselling services are needed.

## Authors' contributions

SZ and PY contributed to the work equally and should be regarded as co-first authors. SZ, YP, SW, LLL, MQL, XFY, DZ had roles in research design, recruitment, data collection. SZ and SW analyzed the results. SZ, WS, and YP drafted the manuscript. LDX made significant contributions to the methodology, methods and manuscript revision. All authors reviewed and revised the manuscript and approved the final version. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

## Funding sources

This work was supported by the Special Funding for the Construction of Innovative Provinces in Hunan (Grant no. 2019SK2141). The research was designed, conducted, analyzed, and interpreted by the authors entirely independently of the funding sources.

## Declaration of Competing Interest

The authors declare no conflicts of interest

## Acknowledgements

The authors would like to thank the nursing staff participants and participating nursing homes.

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