

ORIGINAL ARTICLE

Factors associated with nurses' willingness to participate in care of patients with COVID-19: A survey in China

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Abstract

Aim: The research aims to assess nurses' willingness to participate in care of patients with coronavirus disease 2019 (COVID-19) in China and to identify its associated factors.

Background: Along with the increasing number of infections, the world has paid widespread attention to COVID-19.

Methods: This cross-sectional study used a convenience sampling method that included a demographics questionnaire and the Nurses' Perceived Professional Benefits Questionnaire. The survey was distributed to 1,787 nurses from 36 hospitals in China.

Results: In total, 1,176 questionnaires were usable for this research. 92.79% of nurses were willing to participate in care of patients with COVID-19. Intensive care unit (ICU) nurses were less willing to participate, while surgical nurses were more willing to participate. In addition, nurses with high positive professional perception scores were more willing to participate than those with low scores.

Conclusion: The vast majority of nurses were willing to participate in care of patients with COVID-19 in China. Surgical nurses and nurses with positive professional perceptions are more likely to be willing to participate in treatment.

Implications for nursing management: To increase nurses' willingness to participate in care of patients with COVID-19, improving the sense of perceived professional benefits, offering salary and offering paid sick leave for nursing staff are effective ways. In addition, raising the awareness of infectious diseases and increased pre-disaster training during infectious diseases is critical.

KEYWORDS

coronavirus disease 2019, epidemic, nursing staff, willingness to work

1 | INTRODUCTION

Since December 2019, a large number of patients in Wuhan, Hubei Province, have been reported with coronavirus disease

2019 (COVID-19) (Huang et al., 2020; Wang, Horby, Hayden, & Gao, 2020). COVID-19 is an acute respiratory tract infectious disease, typically featuring rapid onset, strong infective ability and rapid change of course, attracting universal attention in the world.

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At present, there is no special effective treatment for this disease (Huang et al., 2020). Along with the increasing number of infections, supplying nurse aid to the hardest-hit areas is a task which brooks no delay. Unfortunately, infection between patients and health care workers has been confirmed. As of on 5 March, more than 3,000 medical workers have been infected with COVID-19 in China, and 34 of them have died (Department of human resources., 2020), which aggravated the panic among health care workers.

Outbreaks of infectious diseases placed a heavy burden on health care workers and caused adverse health consequences in lacking of disaster preparedness (Patel et al., 2017). Although nurses had trained in trauma, wound care, infection control and perioperative care before, in the face of a public health event with a high risk of infection, most of them had inadequate recognition of its risk and preparedness for its prevention and control (Tzeng et al., 2016). Several studies (Jong et al., 2014; Kilmarx et al., 2014) pointed out that medical staffs were infected due to insufficient infection precautions or omission of personal protective equipment in the treatment of patients with Ebola. In addition, a survey of the SARS epidemic in Singapore in 2003 (Koh et al., 2005) showed that health care workers were neither aware nor ready to respond to the epidemic, resulting in the rapid spread of the epidemic and high mortality rates.

In face of acute infectious disaster, not all health care workers were willing to work in disasters, which further limited the disaster preparedness (Connor, 2014). One study (Irvin, Cindrich, Patterson, & Southall, 2008) showed that only 50% of health care workers were willing to participate in bird flu pandemic work in the United States. In other word, the lack of willingness of medical staff to work in disasters could lead to severe shortages of nursing manpower.

The cognitive in infectious diseases and pre-disaster training would obviously affect the nurses' willingness to support epidemic-stricken areas (Patel et al., 2017). During the SARS, Australian medical staff apparently lacked knowledge about the transmission of infection owing to the insufficient education or training on the source of infection. Data showed that 89% of them suffer anxiety, and 85% thought medical work was accompanied with high risk, which some researches took to be associated with the pressure surge of medical staff who involved in SARS treatment (Kerriane et al., 2010; Maunder et al., 2004). It is reported that medical staff developed mental problems during SARS (Chua et al., 2004; Robertson, Hershenfield, Grace, & Stewart, 2004). Adaptive responses to stress and effective preventative training may offer protective effects for health care worker in similar epidemic outbreaks. An Australian survey (Arbon, Cusack, et al., 2013; Arbon, Ranse, et al., 2013) revealed that the nurses' willingness to participate in disease increased as the medical skills or knowledge in disasters increased. During the epidemic, effective preventative training for nursing staff in advance is a vital measure to reduce the psychological pressure of nursing staff in treating patients with infectious diseases.

Well-prepared and trained health care workers who are willing to participate in care of patients with COVID-19 are the key to overcome COVID-19. Therefore, knowing and mastering the factors that

influence nurses' willingness to participate in care of patients with COVID-19 will be beneficial for making more effective planning to overcome the next inevitable outbreak. Accordingly, this investigation aims to assess nurses' willingness to participate in care of patients with COVID-19 and to identify its associated factors, which can give evidence for nursing administrators to prompt nurses to take part in the public health emergencies.

2 | METHODS

2.1 | Study design and sample

This is a cross-sectional study conducted from 36 hospitals in three provinces, including Jiangsu, Zhejiang and Anhui provinces, People's Republic of China. Nurses were sampled online through convenience sampling. In February 2020, a total of 1787 nurses were invited to complete the survey voluntarily. Finally, there were 1776 that were usable for this research, resulting in over a 99% respond rate. The nurses were included if they were over 18 years old; obtained the nurse practitioner certificate; and engaged in nursing work. The nurses were excluded if they were retired nurses; unwilling to participate in this research; and participating in care of patients with COVID-19.

2.2 | Survey questionnaire

The questionnaire included a general situation questionnaire and the Nurses' Perceived Professional Benefits Questionnaire.

The general situation questionnaire assessed demographic information, such as age, gender, education, fertility, only child or not, the nature of the hospital, hospital level, department, professional title, working years and individual annual income. In addition, the willingness to participate in epidemic work was also assessed. Nurses' willingness to participating in care of patients with COVID-19 was measured using a single self-report question: 'Are you willing to participating in care of patients with COVID-19?'. Scale options were 'willing' or 'unwilling'. Nurses who chose 'unwilling' were asked to provide reasons for their answer. In addition, a pilot study with 25 nurses has been completed within Jiangsu Cancer Hospital prior to the survey. The pilot study suggested that some nurses did not have clear opinion on willing or unwilling to participate in care of patients with COVID-19, which have resulted in the questionnaire being adjusted accordingly. Nurses who chose 'willing' were asked to answer a question: 'Is there any factors that influence your decision that prevent you from participating in care of patients with COVID-19?'. Scale options were 'Yes, those factors are _____' or 'No'. To create a dichotomous variable, responses were recorded into binary outcomes: 'Unwilling' if participants' response was 'Yes', and 'Willing' if participants' response was 'No'.

Compiled by Hu Jing (Hu & Liu, 2013), the Nurses' Perceived Professional Benefits Questionnaire is a widely used evaluation tool

for perceived professional benefits research in China. It consists of 33 items belonging to five dimensions: self-growth, good nurse–patient relations, recognition of relatives and friends, positive professional perception and sense of team belonging. The tool adopts a 5-point Likert scale, where 5 point means 'extremely agree', 4 point means 'somewhat agree', 3 point means 'not sure', 2 point means 'somewhat disagree', and 1 point means 'extremely disagree'. Its reliability has been well established with Cronbach's α of 0.958, split-half reliability coefficient of 0.938 and content validity S-CVI/Ave of 0.97. The Cronbach alpha result is 0.821 for positive professional perception, 0.854 for good nurse–patient relations, 0.852 for recognition of relatives and friends, 0.850 for sense of team belonging and 0.893 for self-growth, respectively (Hu & Liu, 2013).

2.3 | Data collection procedure

We distributed a questionnaire by using the Questionnaire Star platform relying on Wechat and asked the corresponding author, the chairman of the Oncology Committee of Jiangsu Nursing Association, to circulate said survey and questionnaires among nursing directors from the Oncology Committee of Jiangsu Nursing Association. An invitation to respond in an online survey questionnaire was sent to the nursing directors from different hospitals in a Wechat group of the Oncology Committee of Jiangsu Nursing Association. A public URL was used so that the person receiving the invitation could forward it to the most appropriate person to complete the survey. Finally, a total of 36 nursing directors from different hospitals agreed to participate in this study. With the support of the personnel administration from the 36 selected hospitals, information about the study was distributed to nurses who met the inclusion criteria through link of questionnaire. The respondents just needed to click the link to complete the questionnaire. The questionnaires could only be completed on mobile phones or computers. Surveys were anonymous and consent was implied when participants completed and submit their survey. To avoid the same participant completing multiple questionnaires, the same account, device and IP address could only be submitted once.

2.4 | Data analysis

Data analysis was performed using Social Sciences (SPSS) version 22.0. The statistical description of count data is expressed by frequency and composition ratio. The measurement data did not coincide with normal distribution; thereafter, the statistical description is expressed by interquartile range. In single factor analysis, the chi-square test was used to compare the scores of different dimensions, including gender, whether or not the only child, the nature of the hospital, age, education, professional title, fertility status, working years, hospital level and the department. Wilcoxon rank-sum test was used to compare each dimension scores of nurses' perceived professional benefits and the total score. For multiple factor analysis,

binary logistic regression model was adopted to analyse the influencing factors of nurses' willingness to participate in the epidemic work. The difference embodied statistical significance when $p < .05$.

2.5 | Ethical consideration

Ethical approval was obtained from the Institutional Review Board of Jiangsu Cancer Hospital in China (no. 2019/007). As this study was conducted for a relatively short time, permission to conduct the study was not obtained from each of the 36 hospitals from which nurses were recruited. But this study was conducted with the support of the nursing directors from the rest of the selected hospitals.

A participant information sheet providing detailed explanation on the research study was attached to the questionnaire for their reference. All participants were informed about the study's purpose and procedures by the researchers. To maintain anonymity, participants were assured that participation was wholly voluntary, and were reminded not to write any form of identifiers on the questionnaire. They were assured that all information would be treated in strict confidence.

3 | RESULT

3.1 | Nurses' willingness to participate in care of patients with COVID-19

A total of 1787 nurses were invited to complete the survey voluntarily. Finally, there were 1776 that were usable for this research. A total of 1648 (92.79%) were willing to participate in care of patients with COVID-19, and 128 (7.21%) were unwilling. The reasons for unwillingness were as follows: 26 (20.31%) reported fear of insufficient local protective measures and fear of infection, 21 (16.41%) reported frail and weakened immune systems, 20 (15.63%) reported an unsupportive family, 17 (13.28%) reported limited work skills, 17 (13.28%) were pregnant, 15 (11.72%) were worried about child care, 8 (6.25%) were aged and had poor physical health, and 4 (3.13%) had other reasons.

3.2 | Single factor associated with nurses' willingness to participate in care of patients with COVID-19

Single factor associated with nurses' willingness to participate in care of patients with COVID-19 is listed in Table 1. The results of single factor revealed that age, working years, professional titles and department significantly affected nurses' willingness ($p < .05$), while education, number of children, fertility, nature and level of hospitals had inconspicuous effect ($p > .05$). For those who were willing to participate in care of patients with COVID-19, each dimension's scores and total score of nurses' perceived professional benefits

TABLE 1 Single factor associated with Nurses' Willingness to Participate in Care of Patients with COVID-19 [numbers (percentage, %)]

Items	Numbers (n = 1776)	Willing (n = 1648)	Unwilling (n = 128)	χ^2	p-value
Age				10.129	.017
18–25	305 (17.17)	284 (17.23)	21 (16.41)		
26–35	851 (47.92)	774 (46.97)	77 (60.16)		
36–45	429 (24.16)	406 (24.64)	23 (17.97)		
>45	191 (10.75)	184 (11.16)	7 (5.47)		
Gender				0.02	.88
Male	38 (2.14)	36 (2.18)	2 (1.56)		
Female	1738 (97.86)	1612 (97.82)	126 (98.44)		
Only child				0.53	.47
Yes	723 (40.71)	667 (40.47)	56 (43.75)		
No	1,053 (59.29)	981 (59.53)	72 (56.25)		
Education				2.415	.491
Technical secondary school	20 (1.13)	18 (1.09)	2 (1.56)		
Junior college	295 (16.61)	272 (16.50)	23 (17.97)		
Undergraduate	1,411 (79.45)	1,309 (79.43)	102 (79.69)		
Graduate or above	50 (2.82)	49 (2.97)	1 (0.78)		
Professional title				10.776	.029
Nurse	310 (17.45)	289 (17.54)	21 (16.41)		
Nurse practitioner	706 (39.75)	643 (39.02)	63 (49.22)		
Charge nurse	532 (29.95)	494 (29.98)	38 (29.69)		
Assistant director nurse	189 (10.64)	185 (11.23)	4 (3.13)		
Director nurse	39 (2.20)	37 (2.25)	2 (1.56)		
Annual income (10,000 RMB)				5.443	.142
<5	200 (11.26)	184 (11.17)	16 (12.50)		
5–10	727 (40.93)	671 (40.72)	56 (43.75)		
10–15	620 (34.91)	572 (34.71)	48 (37.50)		
>15	229 (12.89)	221 (13.41)	8 (6.25)		
Number of children				7.133	.068
0	633 (35.64)	581 (35.25)	52 (40.63)		
1	903 (50.84)	844 (51.21)	59 (46.09)		
2	238 (13.40)	222 (13.47)	16 (12.50)		
≥3	2 (0.11)	1 (0.06)	1 (0.78)		
Working years				13.495	.009
<3	296 (16.67)	272 (16.50)	24 (18.75)		
3–5	224 (12.61)	203 (12.32)	21 (16.41)		
5–10	407 (22.92)	366 (22.21)	41 (32.03)		
10–20	505 (28.43)	479 (29.09)	26 (20.31)		
20	344 (19.37)	328 (19.90)	16 (12.50)		
Hospital type				0.07 ¹⁾	.80
Specialized hospital	699 (39.36)	650 (39.44)	49 (38.28)		
Comprehensive hospital	1,077 (60.64)	998 (60.56)	79 (61.72)		
Hospital level				4.353	.36
3 Grade Class A Hospital	1,303 (73.37)	1,200 (72.82)	103 (80.47)		
3 Grade Class B Hospital	259 (14.58)	247 (14.99)	12 (9.38)		

(Continues)

TABLE 1 (Continued)

Items	Numbers (n = 1776)	Willing (n = 1648)	Unwilling (n = 128)	χ^2	p-value
2 Grade Class A Hospital	185 (10.42)	173 (10.50)	12 (9.38)	24.206	.012
2 Grade Class B Hospital	25 (1.41)	24 (1.46)	1 (0.78)		
Community	4 (0.23)	4 (0.24)	0 (0.00)		
Department					
Internal medicine	803 (45.21)	740 (44.90)	63 (49.22)		
Surgery	345 (19.43)	333 (20.21)	12 (9.38)		
Emergency department	61 (3.43)	54 (3.28)	7 (5.47)		
ICU	93 (5.24)	78 (4.73)	15 (11.72)		
Obstetrics and gynaecology	38 (2.14)	37 (2.25)	1 (0.78)		
Paediatrics	24 (1.35)	22 (1.33)	2 (1.56)		
Radiotherapy department	138 (7.77)	127 (7.71)	11 (8.59)		
Operating room	69 (3.89)	64 (3.88)	5 (3.91)		
Nursing department	40 (2.25)	39 (2.37)	1 (0.78)		
Others	165 (9.29)	154 (9.34)	11 (8.59)		

Notes: Bolded significance < .05.

χ^2 based on chi-square test.

Items	(n = 1648) Willing	(n = 1648) Unwilling	Z-value	p-value
Positive professional perception	29 (26,32)	26.5 (24, 28)	-6.87	<.001
Good nurse-patient relations	28 (25,30)	25 (24, 29)	-6.17	<.001
Recognition of relatives and friends	24 (22,27)	23 (21, 25)	-4.59	<.001
Sense of team belonging	26 (24,29)	24 (22, 26)	-6.02	<.001
Self-growth	36 (32,39)	32 (31, 36)	-6.27	<.001
Total score	143 (131,155)	131 (122, 141)	-6.76	<.001

Notes: Bolded significance < .05.

Z-value based on Wilcoxon rank-sum test.

scale were higher than those who were unwilling to participate, as shown in Table 2.

3.3 | Binary logistic regression of nurses' willingness to participate in care of patients with COVID-19

To conduct the binary logistic regression, nurses' willingness was used as its dependent variable. Each dimension's scores and the total score of the statistically significant factors according to the single factor analysis, including age, working years, professional titles, department and nurses' perceived professional benefits, were used as independent variables. As shown in Table 3, surgical nurses were 2.477 times more willing than medical nurses to participate in epidemic work (OR = 2.48, $p < .05$, 95% CI = 1.296-4.734). ICU nurses were 0.443 times less willing than internal medicine nurses to participate in epidemic work (OR = 0.44, $p < .05$, 95% CI = 0.233-0.844).

TABLE 2 Nurses' Perceived Professional Benefits [points, MD (25%,75%)]

Nurses with score between 31 and 35 on the positive professional perception dimension of the nurse's professional benefit were 3.804 times more willing to participate in epidemic work than nurses with score less than 20 (OR = 3.80, $p < .05$, 95% CI = 1.063-13.606).

4 | DISCUSSION

4.1 | Nurses' willingness to participate in care of patients with COVID-19 was generally high except for 'older, frail, young and pregnant nurses'

In the 1776 respondents, 92.79% of nurses expressed their willingness to participate owing to the sufficient human resources and good policies in China. Loke, Fung, and Liu (2013) conducted a survey of Chinese nurses' willingness to work during the epidemic in 2013 and found that 83.6% of nurses were willing to work during

TABLE 3 Factors influencing nurses' willingness to participate in care of patients with COVID-19

Items	Regression coefficient	SEM	p-value	OR value	95% CI
Department					
Surgery	0.91	0.33	.01	2.48	1.296–4.734
Emergency department	−0.56	0.46	.22	0.57	0.232–1.405
ICU	−0.81	0.33	.01	0.44	0.233–0.844
Obstetrics and gynaecology	0.95	1.03	.36	2.59	0.341–19.636
Paediatrics	−0.23	0.77	.77	0.80	0.177–3.581
Radiotherapy department	−0.09	0.34	.81	0.92	0.458–1.839
Operating room	0.58	1.08	.59	1.78	0.214–14.833
Nursing department	0.33	0.51	.52	1.39	0.511–3.801
Others	−0.08	0.38	.83	0.92	0.441–1.931
Positive professional perception					
21–25	−0.01	0.44	.98	0.99	0.417–2.343
26–30	0.31	0.50	.53	1.37	0.509–3.679
31–35	1.34	0.65	.04	3.80	1.063–13.606

Notes: Bolded significance <.05.

Binary logistic regression model was adopted.

the epidemic, and 69.9% of nurses were willing to work during the outbreak of life-threatening infectious diseases. Charney, Rebmann, and Flood (2015) also investigated employees in Missouri Hospital and showed that 84.8% of medical workers were willing to work during the epidemic outbreak. Al-Hunaishi, Hoe, and Chinna (2019) surveyed medical workers in Sana'a, Yemen, and found that 66% of health care workers were willing to participate in the treatment of infectious diseases. The willingness of Chinese nurses to participate in care of patients with COVID-19 was much higher than before. Of the 128 nurses who were unwilling to participate, only 26 (20.31%) nurses were afraid of infection due to insufficient local protective measures, the vast majority—92 (79.69%)—were attributed to poor physical fitness, unsupportive family, pregnancy and maternity, insufficient working skills, age and others.

Areas for mitigation may include care and provision for dependent family members, protection for workers and improving working skills. Emphasizing the sense of importance and responsibility to nursing staffs may also be helpful in improving staff willingness during infectious diseases.

4.2 | Nurses' willingness to participate in care of patients with COVID-19 was not significantly related to demographic factors such as age, gender, professional title and working years

The survey showed that there was no significant correlation between nurses' willingness to participate in epidemic control and demographic factors such as age, gender, professional title and working years, which was consistent with the findings of Arbon, Cusack, et al.

(2013); Arbon, Ranse, et al. (2013). In addition, some studies showed that male respondents were more willing to work during the epidemic. A survey conducted by Al-Hunaishi et al. (2019) found that young, male and well-educated medical workers were related to the willingness to work during the epidemic. Charney et al. (2015) reported that women were less likely than men to work and participate in epidemic work, especially women with children. The difference between those studied and our survey was that the respondents in these studies were all medical workers, while the survey respondents in this study were mainly nurses. In fact, male nurses are a minority in China, and the sample of Chinese male nurses in this study was small, which may result in the insignificant correlation.

Surveys conducted by Tzeng et al. (2016) and by Loke et al. (2013) showed that nurses with more clinical experience were more willing to engage in disaster relief work than those with less clinical experience. According to previous single factor analysis, ages and working years had different impact on nurses' willingness to participate in care of patients with COVID-19. However, the binary logistic regression did not show essential differences. This difference may have been caused by cultural differences of various respondents. Therefore, it is better for nursing managers to make prudent decisions to deploy nurses based on realistic situations while referring to this research.

4.3 | Surgical nurses were more willing than ICU nurses to participate in care of patients with COVID-19

According to this study, surgical nurses had a higher willingness to participate in care of patients with COVID-19 than internal

medicine nurses, and ICU nurses had a lower willingness to participate than internal medicine nurses. A previous study (Danaci & Koc, 2020) showed that surgical nurses reported higher job satisfaction, lower job burnout and higher personalized nursing perception than nurses in other departments, which may result in surgical nurses being more willing to participate. When nurses experience emotional burnout, they often avoid stressful situations (Chen et al., 2020). Due to long working hours, frequent night shifts and difficult-to-manage patients, 80% of ICU nurses experience stress and burnout, and 38% of them plan to leave the ICU within the next year (Saravanabavan, Sivakumar, & Hisham, 2019). Tzeng et al. (2016) showed that nurses with emergency or intensive care experience performed better in emergencies, indicating that those nurses were more likely to be prepared an epidemic. However, this did not mean that they were more willing to participate in epidemic control. Another study (Arbon, Cusack, et al., 2013; Arbon, Ranse, et al., 2013) revealed that in different disasters, the willingness of emergency nurses to participate in epidemic control was determined by their own considerations, surrounding people and pressure in controlling the epidemic. ICU caregivers knew that they would face the most critical patients, a high risk of intubation and a high risk of infection. Moreover, it is important but stressful to discuss the risk of death with a patient's family members and notify family members about deaths.

Another reason for the low willingness of ICU nurses may be that most of them who have gone to the disaster area could not participate in this survey. For those with low willingness to participate, targeted measures should be enacted to reduce stress and burnout, encourage participation and increase income (e.g. higher bonuses and more paid sick leave).

4.4 | Higher positive professional perception scores were associated with higher willingness to participate in care of patients with COVID-19

Nurses' perceived professional benefits refer to the nurses' perception of the benefits of their work and the recognition that being a nurse can lead to growth (Fang, 2019). The higher the score is, the more positive the work experience and the stronger the intrinsic motivation are. Therefore, this study examined perceived professional benefits as one of the influencing factors. The findings indicated a higher positive professional perception in the perceived professional benefits scale was associated with a higher willingness to participate in epidemic control. Positive professional perception refers to the individual's capability to recognize his/her occupation and deal with it (Guo, 2019). A number of studies (Shi, Song, Xie, & Wang, 2016; Zhan, Li, & Ding, 2019) have shown that perceived professional benefits could assist in regulating nurses' negative emotions, reducing job burnout and turnover, increasing subjective happiness, stimulating innovative behaviours and improving work quality. This study also found a positive relation between nurses' perceived professional benefits and their willingness to participate

in care of patients with COVID-19. Therefore, for nursing managers, improving nurses' perceived professional benefits is an important strategy to improve their willingness to participate in care of patients with COVID-19.

5 | CONCLUSION

Nurses' willingness to participate in care of patients with COVID-19 plays a considerable role in ensuring the stability of the nursing team and in controlling the epidemic. Respondents in this survey were generally more willing to participate. Demographic factors such as age, gender, professional title and working years have no statistical significance to willingness; surgical nurses and nurses with higher positive professional perception scores were considerably more willing to participate in epidemic control. In future studies, we should explore the key issues in maintaining nurses' ability to respond to the epidemic. Therefore, we suggest that further research could examine nurses who are highly willing to participate in care of patients with COVID-19 based on qualitative research.

6 | LIMITATIONS

The research used convenience sampling rather than random sampling. Moreover, the chosen samples were concentrated in Jiangsu, Zhejiang and Anhui provinces, resulting in a lack of representation. At the beginning of this investigation, nurses participated in care of patients with COVID-19 were not surveyed, which affected the accuracy of the results.

7 | IMPLICATIONS FOR NURSING MANAGEMENT

Surgical nurses with higher job satisfaction and lower job burnout had a higher willingness to participate in care of patients with COVID-19 than other nurses. In addition, ICU nurses showed a lower willingness owing to high-risk infection and a high-pressure job. To increase nurses' willingness to participate in care of patients with COVID-19, improving the sense of perceived professional benefits, offering salary and offering paid sick leave for nursing staff are effective ways.

In the face of a public health event with a high risk of infection, most health care workers had inadequate recognition of its risk and preparedness for its prevention and control. Therefore, raising the awareness of infectious diseases and increased pre-disaster training during infectious disease outbreaks is equally critical. This result suggests integrating disaster management to nurses' in the early stages of their educational curriculum. This could be achieved by adding early exposure of health care workers to relevant disaster experiences, which would further boost their willingness to participate in infectious diseases response.

Beyond that, owing to tremendous differences in historical background, social system and cultural tradition among countries, health care workers have different reactions to infectious diseases and nursing administrators need to make prudent decisions according to nurses' actual conditions when deploying nursing staff.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ETHICAL APPROVAL

This study received approval from ethics committee of Jiangsu Cancer Hospital (number: 2019/007).

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REFERENCES

- Al-Hunaishi, W., Hoe, V. C. W., & Chinna, K. (2019). Factors associated with healthcare workers willingness to participate in disasters: A cross-sectional study in Sana'a, Yemen. *British Medical Journal Open*, 9(10), 1–9. <https://doi.org/10.1136/bmjopen-2019-030547>
- Arbon, P., Cusack, L., Ranse, J., Shaban, R. Z., Considine, J., Kako, M., ... Hanmad, K. (2013). Exploring staff willingness to attend work during a disaster: A study of nurses employed in four Australian emergency departments. *Australasian Emergency Nursing Journal*, 16(3), 103–109. <https://doi.org/10.1016/j.aenj.2013.05.004>
- Arbon, P., Ranse, J., Cusack, L., Considine, J., Shaban, R. Z., Woodman, R. J., ... Mitchell, B. (2013). Australasian emergency nurses' willingness to attend work in a disaster: A survey. *Australasian Emergency Nursing Journal*, 16(2), 52–57. <https://doi.org/10.1016/j.aenj.2013.05.003>
- Charney, R. L., Rebmann, T., & Flood, R. G. (2015). Hospital employee willingness to work during earthquakes versus pandemics. *Journal of Emergency Medicine*, 49(5), 665–674. <https://doi.org/10.1016/j.jemermed.2015.07.030>
- Chen, J., Li, J., Cao, B., Wang, F., Luo, L., & Xu, J. (2020). Mediating effects of self-efficacy, coping, burnout, and social support between job stress and mental health among young Chinese nurses. *Journal of Advanced Nursing*, 76(1), 163–173. <https://doi.org/10.1111/jan.14208>
- Chua, S. E., Cheung, V., Cheung, C., McAlonan, G. M., Wong, J. W. S., Cheung, E. P. T., ... Tsang, K. W. T. (2004). Psychological EFFECTS of the SARS outbreak in Hong Kong on high-risk health care workers. *The Canadian Journal of Psychiatry*, 49(6), 391–393. <https://doi.org/10.1177/070674370404900609>
- Connor, S. B. (2014). When and why health care personnel respond to a disaster: The state of the science. *Prehospital and Disaster Medicine*, 29(3), 270–274. <https://doi.org/10.1017/S1049023X14000387>
- Danaci, E., & Koc, Z. (2020). The association of job satisfaction and burnout with individualized care perceptions in nurses. *Nursing Ethics*, 27(1), 301–315. <https://doi.org/10.1177/0969733019836151>
- Department of human resources. (2020). Decision to commend the advanced collectives and individuals in the prevention and control of new pneumonia epidemic in the national health system [N] national health commission, PRC. <http://www.nhc.gov.cn/renshi/s7771/202003/28cc60d7e33b4dc7bd77af485fab1a58.shtml>
- Fang, H. (2019). *Research on Perceived Professional Benefits of clinical nurses in oncology department of tertiary hospitals, Nanjing university of Chinese medicine.* (article in Chinese).
- Guo, Y. L. (2019). *Study on the influence of learning motivation and psychological capital on the Perceived Professional Benefits of nursing staff in third-class first-class hospitals, Southern medical university.* (article in Chinese).
- Hu, J., & Liu, X. H. (2013). Establishment of a questionnaire of nurses perceived professional benefits: Reliability and validity assessment. *Nursing Journal of Chinese People's Liberation Army*, 30(22), 1–5. (article in Chinese).
- Huang, C. L., Wang, Y. M., Li, X. W., Ren, L. L., Zhao, J. P., Hu, Y., ... Cao, B. (2020). Clinical features of patients infected with 2019 novel coronavirus in Wuhan. *China, Lancet*, 395(10223), 497–506. [https://doi.org/10.1016/S0140-6736\(20\)30183-5](https://doi.org/10.1016/S0140-6736(20)30183-5)
- Irvin, C. B., Cindrich, L., Patterson, W., & Southall, A. (2008). Survey of hospital healthcare personnel response during a potential avian influenza pandemic: Will they come to work? *Prehospital and Disaster Medicine*, 23(04), 328–335. <https://doi.org/10.1017/S1049023X0005963>
- Jong, M. D., Reusken, C., Horby, P., Koopmans, M., Bonten, M., Chiche, J. D., ... Goossens, H. (2014). Preparedness for admission of patients with suspected Ebola virus disease in European hospitals: A survey, August–September 2014. *Euro Surveillance*, 19(48), 20980. <https://doi.org/10.2807/1560-7917.ES2014.19.48.20980>
- Kerriane, W., Vivienne, C. T., Steven, G., Raven, B., Konrad, J., Michael, C., ... Heath, A. K. (2010). Attitudes to living and working in pandemic conditions among emergency prehospital medical care personnel. *Prehospital and Disaster Medicine*, 25(1), 13–19. <https://doi.org/10.1017/S1049023X00007597>
- Kilmarx, P. H., Clarke, K. R., Dietz, P. M., Hamel, M. J., Husain, F., McFadden, J. D., ... Jambai, A. (2014). Ebola virus disease in health care workers - Sierra Leone, 2014. *Morbidity and Mortality Weekly Report*, 63(49), 1168–1171.
- Koh, D., Lim, M. K., Chia, S. E., Ko, S. M., Qian, F., Ng, V., ... Fones, C. (2005). Risk perception and impact of severe acute respiratory syndrome (SARS) on work and personal lives of healthcare workers in Singapore what can we learn? *Medical Care*, 43(7), 676–682. <https://doi.org/10.1097/01.mlr.0000167181.36730.cc>
- Loke, A. Y., Fung, W. M. O., & Liu, X. (2013). Mainland China nurses' willingness to report to work in a disaster. *American Journal of Disaster Medicine*, 8(4), 273–282. <https://doi.org/10.5055/ajdm.2013.0134>
- Mauder, R., Lancee, W., Rourke, S., Hunter, J., Goldbloom, D., Balderson, K., ... Fones, C. (2004). Factors associated with the psychological impact of severe acute respiratory syndrome on nurses and other hospital workers in Toronto. *Psychosomatic Medicine*, 66(6), 938–942. <https://doi.org/10.1097/01.psy.0000145673.84698.18>
- Patel, R., Wattamwar, K., Kanduri, J., Nahass, M., Yoon, J., Oh, J., ... Lacy, C. (2017). Health care student knowledge and willingness to work in infectious disease outbreaks. *Disaster Medicine and Public Health Preparedness*, 11(06), 694–700. <https://doi.org/10.1017/dmp.2017.18>
- Robertson, E., Hershenfield, K., Grace, S., & Stewart, D. (2004). The psychosocial effects of being quarantined following exposure to SARS: A qualitative study of Toronto health care workers. *Canadian Journal of Psychiatry Revue Canadienne De Psychiatrie*, 49(6), 403–407. <https://doi.org/10.1177/070674370404900612>
- Saravanabavan, L., Sivakumar, M. N., & Hisham, M. (2019). Stress and burnout among intensive care unit healthcare professionals in an Indian Tertiary Care Hospital. *Indian Journal of Critical Care Medicine*, 23(10), 462–466. <https://doi.org/10.5005/jp-journals-10071-23265>
- Shi, J., Song, G. Q., Xie, L. F., & Wang, W. L. (2016). Relationship between perceived professional benefits and subjective well-being among nurses. *Chinese Nursing Management*, 16(3), 315–318.
- Tzeng, W.-C., Feng, H.-P., Cheng, W.-T., Lin, C.-H., Chiang, L.-C., Pai, L. U., & Lee, C.-L. (2016). Readiness of hospital nurses for disaster responses in Taiwan: A cross-sectional study. *Nurse Education Today*, 47, 37–42. <https://doi.org/10.1016/j.nedt.2016.02.025>

- Wang, C., Horby, P. W., Hayden, F. G., & Gao, G. F. (2020). A novel coronavirus outbreak of global health concern. *Lancet*, *S0140-6736(20)*, 30185-30189.
- Zhan, T., Li, H., & Ding, X. (2019). Can social support enhance sense of coherence and perceived professional benefits among Chinese registered nurses? A mediation model. *Journal of Nursing Management*, *28(3)*, 488-494. <https://doi.org/10.1111/jonm.12931>

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