

RESEARCH ARTICLE

Intention to response, emergency preparedness and intention to leave among nurses during COVID-19

Jiaying Li¹  | Pingdong Li²  | Jieya Chen¹  | Liang Ruan¹  | Qiuxuan Zeng¹  | Yucui Gong² 

¹Guangzhou Institute of Respiratory Health, The First Affiliated Hospital of Guangzhou Medical University, Guangzhou, China

²Nursing Department, The First Affiliated Hospital of Guangzhou Medical University, Guangzhou, China

Correspondence

Yucui Gong, Nursing Department, The First Affiliated Hospital of Guangzhou Medical University, No.151 Yanjiang West Road, Yuexiu District, Guangzhou, Guangdong, China.

Email: gongyucui_gz@163.com

Abstract

Aim: To comprehensively assess the current level and identify associated factors of intention to response and emergency preparedness of clinical nurses during COVID-19 outbreak.

Design: A cross-sectional study was designed.

Methods: Demographic and characteristic questionnaire, intention to response scale, emergency preparedness scale and a self-designed questionnaire related to effects of events and intention to leave were used in this study.

Results: The mean scores of intention to response and emergency preparedness were 82.00 ($SD = 18.17$) and 64.99 ($SD = 12.94$), respectively. Moral consideration, engaged in COVID-19 protection training, had working experience in SARS, and the other eight factors were explained 34.6% of the total model variance in intention to response model ($F = 80.05, p < .001$). While, the level of IR, whether the pace of work was affected and above three same factors were explained 21.5% of the total model variance ($F = 91.05, p < .001$). Pathway analysis revealed that moral consideration, intention to leave and impacts on work and life mediate the relationship between EP and IR.

KEYWORDS

COVID-19, emergency preparedness, intention to response, nurses

1 | INTRODUCTION

In the past century, human beings had suffered several epidemic outbreaks of avian influenza, SARS, MERS and COVID-19, which posed a huge threat to human health (Reperant & Osterhaus, 2017; Peiris et al., 2004; Zaki, Van Boheemen, Bestebroer, Osterhaus, & Fouchier, 2012; Chen et al., 2020). Beyond the threat of high rates of morbidity and mortality, infectious disease emergency events also

posed the greatest threat to the effective operation of the medical system, particularly in the healthcare sector and personnel of healthcare workers (Yonge, Rosychuk, Bailey, Lake, & Marrie, 2010).

Healthcare professionals are usually on the front line of care during an outbreak of avian flu (Cheong et al., 2007; Young, 2009), and nurses are the biggest group of healthcare professionals. According to the Number 517th Order of the State Council of the people's Republic of China of the nurse regulations, nurses are obligated to participate in

Jiaying Li and Pingdong Li made the equal contribution to the paper.

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public disease control. Otherwise, nurses' practising certificate would be revoked (State Council of the PRC, 2008). When there was a contradiction between the compulsory obligation and self-willingness, nurses were forced to work or were revoked their nurses' practice certificate. Working unwillingly will lead to decreasing the quality of care and increasing intention to leave, which will affect the workforce combating infectious disease in the short-term and aggravate the long-standing shortage of nurses (Kim, Yoo, Yoo, Kwon, & Hwang, 2006). To meet the inevitable demands for combating public health events, it is necessary for managers to have a better understanding of the level of nurses' intention to response (IR) and associated factors. That will benefit the lay down of promoting training, rules and regulations.

2 | BACKGROUND

Previous studies had demonstrated varying healthcare workers' willing response rates to public health emergencies, ranging between 25%–80% (Alexander & Wynia, 2003; Lenaghan, Smith, & Gangahar, 2006; Ko et al., 2004; Qureshi et al., 2005). Factors founded to be associated with nurses' intention to response were insufficient knowledge and skills, fear of being infected, overworking, a sense of responsibility, perceived self-efficacy, financial compensation, gender, age and academic degrees. (Cheong et al., 2007; Daugherty, Perl, Lewis, Andrew, & Rand, 2009; Ehrenstein, Hanses, & Salzberger, 2006; Martin, 2011; Qureshi et al., 2005; Wong, Wong, Kung, Cheung, & Griffiths, 2010; Yonge, Rosychuk, Bailey, Lake, & Marrie, 2007; Cone & Cummings, 2006; Ives et al., 2009; Martinese, Keijzers, Grant, & Lind, 2009). Response rate and ability are crucial factors to maintain the nursing workforce during emergency events (Martin, 2011). However, a handful of studies had described the current level and identified associated factors of IR of nurses by scales or instruments. Grimes and Mendias (2010) had assessed IR level and primarily pointed out several associated factors in their study with moderate sample size. By far, there was no research in developing countries or countries have the similar workforce-related laws in China. Research with larger sample size is also expected to be conducted to make the results more reliable.

Adapted DeJoy's behavioural-diagnostic model was used to explain individuals' behaviour of IR. It comprised two components, which were individual factors (demographic, job-related and health status variables; influenza vaccination history/intentions; respiratory protection practices/intentions; perception of risk/fear/concern; pandemic-related variables) and organizational factors (workplace safety climate; organizational trust and shared values; respiratory protection programme; employer pandemic planning) (Gershon et al., 2010). Some studies pointed out families factors (Smith, Morgans, Qureshi, Burkle, & Archer, 2009; Veenema et al., 2008), cultural perspective factors (Kim et al., 2006) and care taking commitment (Adams & Berry, 2012; Grimes & Mendias, 2010) were also potential factors beyond the model but affected nurses' willingness to respond, which indicated that more unknown associated factors need to be identified to refine this model.

Limited studies had assessed nurses' IR comprehensively used scales or other instruments with good reliability and validity.

Furthermore, more potential-associated factors should be identified to refine the current model. Therefore, we aimed to give hospital managers a better understanding of nurses' willingness to provide care, so as to have a better arrangement of the workforce during infectious disease emergency events. The specific objectives of this study were to: (a) assess the current level of nurses' intention to response and also identify more potential factors facilitate or hinder nurses' intention to response; (b) describe the current level of emergency preparedness among nurses and analysis factors affecting nurses' emergency preparedness; and (c) examine the moderation by key variables on the relationship between EP and IR.

Based on previous studies, Connor (2014a) pointed out that knowledge and perceptions of efficacy were crucial components that have an impact on nurses' IR. Since EP has been regarded as an indicator that reflects the nurses' perceived familiarity with emergency preparedness and disaster response core competencies (Georgino, Kress, Alexander, & Beach, 2015), it is expected that nurses with a higher EP indicate a higher level of intention to response. A range of ability-related factors has been confirmed associated with the willingness to a response, such as knowledgeable about the disease, able to recognize symptoms and treat appropriately (Connor, 2014a). Potential factors that functioned from the ability to willingness demand being revealed. Since overworking (Cheong et al., 2007) and moral obligations (Yonge et al., 2010; Rosychuk et al., 2008) were proved to have an association with an intention to response, thus, we aimed to confirm the positive association between EP and IR. Besides, the moderation effect of moral consideration, degree of work and life being affected and intention to leave were also explored. The specific hypotheses are as follows:

Hypothesis 1 *There will be a positive association between EP and IR.*

Hypothesis 2 *Intention to leave will mediate the relationship between EP and IR.*

Hypothesis 3 *Moral consideration will mediate the relationship between EP and IR.*

Hypothesis 4 *Degree of work and life being affected will mediate the relationship between EP and IR.*

3 | THE STUDY

3.1 | Design

A cross-sectional study was designed in our study.

3.2 | Methods

3.2.1 | Sample

Respondents were recruited according to the following inclusion and exclusion criteria. Inclusion criteria were as follows: (a) nurses

from hospitals in China; and (b) has the ability to read Chinese; Exclusion criteria were as follows: (a) according to the principle of voluntaries, the nurses who refused to participate in the survey were excluded; and (b) has no ability to read Chinese. For the calculation of sample size, it was recommended as 15 times per-variable in multiple linear regression according to Stevens (1992). Therefore, desired sample size in this study was determined at more than 420.

3.2.2 | Instruments

The questionnaire in this study contained a self-designed demographic and characteristic questionnaire based on literature review and key-person interview, Intention to Response instrument (IR), revised Emergency Preparedness Information Questionnaire (EPIQ) and a self-designed questionnaire related to effects of events and intention to leave. 10-items Intention to Response instrument (IR) is a self-reported questionnaire, which has good inter-item reliability with a Cronbach's α of 0.91 (Grimes & Mendias, 2010). Continuous scores range from 0 (extremely unlikely to response) to 10 (extremely likely to response) for each item, and a total score range from 0–100. Higher scores of IR predict a higher level of IR. Original EPIQ was developed and evaluated with 44-items (Garbutt, Peltier, & Fitzpatrick, 2008; Wisniewski, Dennik-Champion, & Peltier, 2004), which was currently the only reliable and valid tool in the literature used to evaluate nurses' perceived familiarity of emergency preparedness and disaster response core competencies. Georgino et al. (2015) revised EPIQ and reduced original 44-items to 18-items for a better application. A higher score of revised EPIQ means better preparedness. The self-designed questionnaire that related to effects of events and intention to leave contains five questions about the impact on work and life of COVID-19 (overwork, income, work pace, lifestyle and distress) and one question about their intention to leave.

3.2.3 | Data collection

So Jump software (web link: <https://www.wjx.cn>) was used for design and distribution of the e-questionnaire. Data were collected from February 2020–March 2020. The submission of the e-questionnaire was allowed only if all the questions were completed. Therefore, the response rate was 100% in this study.

3.3 | Analysis

SPSS 21.0 and AMOS 19.0 (IBM Corporation) were used for data analysis. For the description of participants' demographic and characteristic profiles and current level of IR and EP, descriptive statistics of all variables were explored and mean values (M) and standard deviations (SD) are reported. To identify the associated factors of

IR and EP, t test or ANOVA analysis was used to determine group differences between independent variables. Normality checks were performed for all variables and normality transformation was performed where needed. Multiple linear stepwise regression analysis was used for establishing a prediction equation. For revealing the mediation by key variables on the relationship between EP and IR, pathway analysis was conducted.

3.4 | Ethics

This study was carried out by the ethical principles of the Declaration of Helsinki. The research protocol has been approved by the ethics committee of the First Affiliated Hospital of Guangzhou Medical University and the approval number is 2020 No.73.

4 | RESULTS

4.1 | Demographic and characteristic profiles of participants

A total of 1,646 nurses have come from 27 provinces in China. Participants from Guangdong province accounted for the largest proportion, reaching 62.27%. The age of respondents was between 18–60 with an average age of 33.20 (8.43). Other demographic and characteristic details were given in Table 1.

4.2 | The current level and associated factors of IR among nurses

4.2.1 | The level of intention to response among nurses

Since Cronbach α values >0.9 indicating an excellent consistency (Zutshi et al., 2020), the reliability of IR was also good with a Cronbach α of 0.96 in our study. Scores of IR among nurses ranged from 10–100, with an average score of 82.00 (18.17).

4.2.2 | Uni-variate analyses of the factors associated with IR

Uni-variate analyses results demonstrated that education level ($F = 6.67, p < .001$), working seniority ($F = 8.73, p < .001$), had working experience in SARS ($t = 7.77, p < .001$), had protection training about COVID-19 ($t = 9.51, p < .001$), family members' job ($t = 3.31, p = .001$), moral consideration ($F = 182.51, p < .001$), whether the pace of work was affected ($t = -7.24, p < .001$), overwork ($t = -5.61, p < .001$), being treated differently by society ($t = -8.96, p < .001$), whether lifestyles were affected ($t = -6.17, p < .001$), whether income level was effect ($t = -6.17, p < .001$),

TABLE 1 Demographic and characteristic information of the respondents and differences in mean of IR and EP by characteristics of the nurses ($n = 1,646$)

Variable	Category	n	%	IR		EP	
				Mean (SD)	t/F/p	Mean(SD)	t/F/p
Education level	Associate degree	658	40.00	80.32 (18.02)	6.67/0.000	64.67 (13.05)	1.27/0.279
	Bachelor degree	932	56.60	82.75 (18.24)		65.11 (12.93)	
	Master degree	50	3.00	91.86 (14.01)		67.64 (11.33)	
	doctor degree	5	0.30	70.00 (20.20)		63.00 (12.04)	
	Post-doctor	1	0.10	55.00.		45.00.	
Marriage and bearing	Unmarried and childless	485	29.50	81.13 (17.89)	1.87/0.154	64.58 (12.34)	2.48/0.084
	Married without child	95	5.80	79.74 (19.62)		62.54 (13.86)	
	Married and have child	1,066	64.80	82.60 (18.15)		65.40 (13.10)	
Only-one-child	Yes	247	15.0	80.79 (20.33)	-1.04/0.301	64.23 (14.36)	-0.91/0.362
	No	1,399	85.0	82.22 (17.76)		65.13 (12.67)	
Title	Primary technical job title	1,056	64.2	81.99 (17.74)	1.69/0.185	65.07 (12.90)	0.56/0.572
	Intermediate technical title	444	27.0	81.24 (19.17)		64.54 (12.93)	
	Senior technical title	146	8.9	84.42 (18.05)		65.78 (13.31)	
Working seniority	Less than 3 years	225	13.7	77.73 (18.67)	8.73/0.000	62.64 (11.93)	3.13/0.014
	From 3 to 5 years	265	16.1	78.45 (19.32)		64.00 (12.54)	
	From 5 to 10 years	382	23.2	84.42 (17.34)		65.91 (13.16)	
	From 10 to 15 years	306	18.6	82.38 (16.99)		65.69 (13.25)	
	More than 15 years	468	28.4	83.85 (18.09)		65.47 (13.12)	
Had working experience in SARS	Yes	362	22.0	87.92 (15.78)	7.77/0.000	68.76 (13.52)	6.09/0.000
	No	1,284	78.0	80.33 (18.46)		63.93 (12.57)	
Had COVID-19 protection training	Yes	1,540	93.6	83.09 (17.60)	9.51/0.000	65.58 (12.75)	7.19/0.000
	No	106	6.4	66.20 (19.12)		56.39 (12.66)	
Gender	Male	58	3.5	80.67 (22.21)	-0.47/0.642	66.41 (13.44)	0.85/0.394
	Female	1,588	96.5	82.05 (18.01)		64.94 (12.92)	
Family members job	Nobody is health workers	529	32.1	84.08 (17.04)	3.31/0.001	66.43 (12.96)	3.11/0.002
	Some are health workers	1,117	67.9	81.02 (18.61)		64.31 (12.88)	
Moral consideration on response	Totally moral consideration	922	56.0	88.83 (14.54)	182.51/0.000	69.23 (12.68)	98.60/0.000
	Many moral consideration	657	39.9	75.56 (17.17)		60.25 (10.68)	
	A little moral consideration	56	3.4	53.89 (17.19)		55.27 (11.76)	
	No moral consideration	11	0.7	37.91 (17.20)		42.73 (16.60)	
Being treated differently by the society	Yes	447	27.2	77.79 (19.85)	-8.96/0.000	64.13 (13.38)	-3.19/0.001
	No	1,199	72.8	83.66 (17.19)		65.33 (12.75)	
Work pace was affected	Yes	1,048	63.7	84.08 (17.04)	-7.24/0.000	66.43 (12.96)	-8.13/0.000
	No	598	36.3	81.02 (18.61)		64.31 (12.88)	
Overwork	Yes	465	28.3	79.69 (18.85)	-5.61/0.000	63.07 (12.94)	-1.69/0.091
	No	1,181	71.7	86.06 (16.15)		68.36 (12.24)	

(Continues)

TABLE 1 (Continued)

Variable	Category	n	%	IR		EP	
				Mean (SD)	t/F/p	Mean(SD)	t/F/p
Lifestyles were affected	Yes	1,126	68.4	75.25 (19.22)	-6.17/0.000	63.33 (12.83)	-6.21/0.000
	No	520	31.6	84.52 (17.11)		65.61 (12.93)	
Income was affected	Yes	1,023	62.2	80.23 (18.70)	-6.17//0.000	63.66 (12.83)	-4.70/0.000
	No	623	37.8	85.83 (16.33)		67.87 (12.71)	
Felt anxious and depressed	Yes	828	50.3	77.98 (19.01)	-9.27/0.000	62.64 (12.53)	-7.54/0.000
	No	818	49.7	86.07 (16.31)		67.37 (12.92)	
Intention to leave	Intention to leave due to COVID-19	22	1.3	58.59 (19.72)	-6.15/0.000	56.73 (13.10)	-3.02/0.003
	Intention to leave irrelevant to COVID-19 and no intention to leave	1623	98.7	82.32 (17.95)		65.10 (12.90)	
Departments	Emergency treatment	120	7.3	78.26 (18.37)	10.00/0.000	66.11 (11.93)	3.63/0.013
	Department of respiration	485	29.5	85.64 (16.94)		66.41 (13.05)	
	ICU	65	3.9	81.02 (16.71)		64.89 (14.02)	
	Other	976	59.3	80.72 (18.58)		64.15 (12.87)	

TABLE 2 Regression analyses for demographics and characteristics and IR and EP

Items	IR					EP				
	B	SE	β	t	p	B	SE	β	t	p
Constant term	66.24	7.74		8.55	.000	68.38	2.98		22.98	.000
Moral consideration	-10.98	0.68	-0.36	-16.26	.000	-5.40	0.55	-0.25	-9.83	.000
EP	0.22	0.03	0.16	7.14	.000	-	-	-	-	-
Treated differently by the society	5.08	0.88	0.12	5.76	.000	-	-	-	-	-
Had COVID-19 protection training	-10.33	1.51	-0.14	-6.85	.000	-5.11	1.18	-0.10	-4.33	.000
Had working experience in SARS	-4.07	0.90	-0.09	-4.53	.000	-2.75	0.70	-0.09	-3.95	.000
Overwork	2.63	0.88	0.07	3.01	.003	-	-	-	-	-
Education level	2.14	0.65	0.07	3.30	.001	-	-	-	-	-
Intention to leave	8.99	3.20	0.06	2.81	.005	-	-	-	-	-
Support to set public nurse	-2.79	0.96	-0.06	-2.92	.004	-	-	-	-	-
Felt anxious and depressed	2.00	0.80	0.06	2.50	.013	-	-	-	-	-
Department	0.99	0.46	0.04	2.12	.034	-	-	-	-	-
IR	-	-	-	-	-	0.13	0.02	0.19	7.12	.000
The pace of work was affected	-	-	-	-	-	3.09	0.60	0.12	5.12	.000

Note: IR model: $R = .592$, $R^2 = .350$ Adjust $R^2 = .346$, $F = 80.05$, $p < .001$, EP model: $R = .466$, $R^2 = .217$ Adjust $R^2 = .215$, $F = 91.05$, $p < .001$.

Note Computed by multiple stepwise linear regression analysis. Moral consideration (Totally moral consideration = 1, Many moral consideration = 2, A little moral consideration = 3, No moral consideration = 4), treated differently by the society (yes = 1, no = 2), had COVID-19 protection training (yes = 1, no = 2), had working experience in SARS (yes = 1, no = 2), overwork (yes = 1, no = 2), education level (associate degree = 1, bachelor degree = 2, master degree = 3, doctor degree = 4, post-doctor = 5), intention to leave (intention to leave due to COVID-19 = 1, intention to leave irrelevant to COVID-19 or no intention to leave = 2), support to set public nurse (yes = 1, no = 2), felt anxious and depressed (yes = 1, no = 2), department (other = 1, department of respiration = 2, emergency treatment = 3, ICU = 4), the pace of work was affected (yes = 1, no = 2).

felt anxious and depressed ($t = -9.27, p < .001$), intention to leave ($F = -6.15, p < .001$), departments ($F = 10.00, p < .001$) had a significant different in the level of IR. More details were presented in Table 1.

4.2.3 | Multiple linear stepwise regression analyses on demographics and characteristics having an impact on IR

For IR as the dependent variable, the regression model was generated by multiple linear stepwise regression and was shown in Table 2. We identified thirteen factors and five factors associated with IR and EP, respectively. Moral consideration, the level of EP, being treated differently by the society, had participated in COVID-19 protection training, had working experience in SARS, overwork, education level, intention to leave, support to set public nurse, felt anxious and depressed and department were explained 34.6% of the total variance in IR model ($F = 80.05, p < .001$).

4.3 | The current level and associated factors of EP among nurses

4.3.1 | The level of EP among nurses

Cronbach α of revised EPIQ was 0.900 in this research, which means an excellent consistency according to Zutshi et al. (2020). EP scores were between 18–90, with an average score of 64.99 (12.94).

4.3.2 | Uni-variate analyses of the factors associated with EP

As shown in Table 1, working seniority ($F = 3.13, p = .014$), had working experience in SARS ($t = 6.09, p < .001$), had protection training about COVID-19 ($t = 7.19, p < .001$), family members' job ($t = 3.11, p = .002$), moral consideration ($F = 98.60, p < .001$), whether the pace of work was affected ($t = -8.13, p < .001$), being treated differently by society ($t = -3.19, p = .001$), whether lifestyles were affected ($t = -6.21, p < .001$), felt anxious and depressed ($t = -7.54, p < .001$), intention to leave ($F = -3.02, p = .003$) and departments ($F = 3.63, p = .013$) had a significant impact on the level of EP among clinical nurses.

4.3.3 | Multiple linear stepwise regression analyses on demographics and characteristics having an impact on EP

In EP model, demographics and characteristics information of participants were used as independent variables and EP as dependent variables. Table 2 shows moral consideration, had participated in COVID-19 protection training, had working experience in SARS,

the level of IR, whether the pace of work was affected the level of nurses' emergency preparedness, which explained 21.5% of the total variance ($F = 91.05, p < .001$).

4.4 | Mediation by key variables on the relationship between EP and IR

The regression weight between EP and IR was 0.365 ($p < .001$), which confirmed the positive association by hypothesis 1. Three mediation diagrams for standardized estimates were contained in Figure 1. In Figure 1a, EP significantly predicted IR ($\beta = 0.20, p = .001$). The direct effect of EP to moral consideration was -0.39 ($p = .001$), and the direct effect of moral consideration to IR was -0.41 ($p = .001$). Mediation by moral consideration on the relationship between EP and IR was 0.16 ($p = .001$), which supports our hypothesis 3. In Figure 1b and 1c, impacts on work and life of COVID-19 and intention to leave also have slight effects on mediate the relationship between EP and IR with an indirect effect of 0.04 ($p = .001$) and

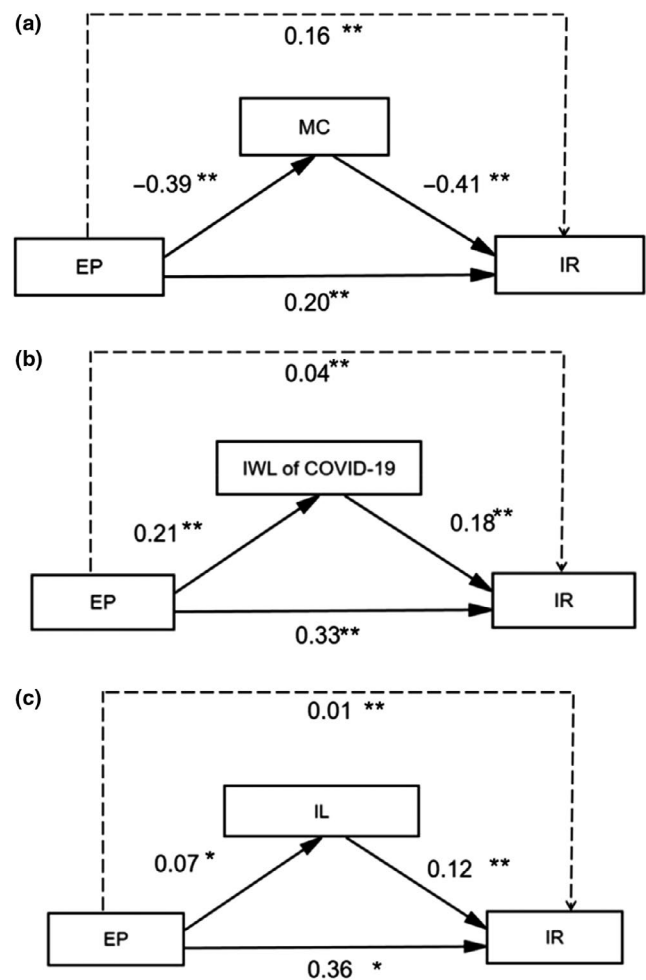


FIGURE 1 Mediation by key variables on the relationship between EP and IR. IR, intention to response; EP, emergency preparedness; MC, moral consideration; IWL of COVID-19: impacts on work and life of COVID-19. ** $p < .01$. * $p < .05$

0.01($p = .006$), respectively. Therefore, hypothesis 2 and hypothesis 4 were also been supported.

5 | DISCUSSION

Comparing to the previous study of Grimes and Mendias (2010), the IR level of Chinese nurses with 82.00 (18.17) was much higher than that of nurses in the United States with 69.6 (21.1), which probably account for the different national system and the cultural difference. Chinese nurses had no right to refuse in any emergency event. Besides, the Chinese believe in the core values of "country first, then home" and "give up a family for everyone." However, the average EP score among nurses was 64.99(12.94) and not high. The considerate level of IR among Chinese nurses predicted a relatively adequate nursing workforce to be arranged in future infectious disease emergency events. Moreover, related studies highlighted a culture of self-sacrifice in the nursing profession may lead to job dissatisfaction, presenteeism, burnout and retention problems (Ciezar-Andersen & King-Shier, 2020). As a result, there is no need to force a small number nurse who was reluctant to respond at the legal level.

Eight of 11 confirmed associated factors in this study were consistent with the previous study. Having protection training and working experience in SARS had a positive effect on nurses' intention to response, which can be explained as respiratory protection practices by previously adapted DeJoy's behavioural-diagnostic model (Gershon et al., 2010). In this model, overwork can be explained as a job-related variable, while department, felt anxious and fear also can be explained as the perceived risk. Besides, nurses who had a higher level of EP were likely to response because of the higher perceived behavioural control (Connor, 2014b; Grimes & Mendias, 2010; Ko et al., 2004). The factor of education level we identified was also in line with previous studies (Basta, Edwards, & Schulte, 2009; Martinese et al., 2009; Seale, Leask, Po, & MacIntyre, 2009). The nurse who did report a higher level of confidence was more likely involved in a disaster relief effort in the past (Baack & Alfred, 2013), whereas who had an intention to leave was unlikely to respond due to the lack of professional obligation and duties (Giarratano, Orlando, & Savage, 2008; Qureshi, Gershon, & Conde, 2008).

Among three new associated factors, moral consideration as well as whether being treated differently by society was cultural and social perspective factors. Since the cultural perspective was pointed previously (Couig, 2012; Kim et al., 2006), the intention to response of nurses was influenced by the perceived image of the nurse from society. Only 56 (3.4%) nurses have little moral consideration and fear of being blamed if not respond and 11 (0.7%) nurses had no moral consideration and were reluctant to respond regardless of others' condemnation. The expectations and condemnations from society considerably affect nurses' decision about willingness to response. Additionally, being treated differently by society due to bring the risk of transmission to healthy people has a negative

effect on their willingness, which indicates that the expectations and attitudes from society were also crucial factors associated with nurses' IR. Public health nurses (PHNs) as a crucial component in the preparedness effort were set up already in Ireland, UK, America and Canada (Mondy, Cardenas, & Avila, 2003; Philibin et al., 2010). Nurses who support to set up PHNs have a higher level of awareness of its importance as well as emergency events.

The EP among nurses in China was at a not high level that is in line with the results of Labrague, et al. (2018). A highly qualified response not only depends on the willingness and ability, but also depended on readiness (McCabe, Barnett, Taylor, & Links, 2010), although nurses' willingness to response was considerable in China. Unsatisfactory level of EP indicated that training need be taken for preparedness promotion and a better-qualified response. In our study, nurses who had protection training and working experience in SARS were likely to have a higher level of EP, which was consistent with the findings of previous studies (Baack & Alfred, 2013; Nilsson et al., 2016; Ning et al., 2014). Besides, we found that moral consideration, IR and whether their pace of work was affected were also associated factors of EP. Therefore, we here suggested hospital managers pay more attention to the preparedness promotion among nurses who had less moral consideration, lower IR and less experience. What's more, the training we recommended was on the principle of not to affect the working pace.

Since moral consideration greatly mediates the relationship between EP and IR, a reserve of plenty of nurses with well-trained and well-educated cannot completely address the shortage of nursing workforce in a future infectious disease outbreak. More potential variables associated with moral consideration should be noticed, such as social environment, professional commitment. Moreover, it is suggested that professional moral consideration should be emphasized in future nursing education and training, to ensure more able nurses have the willingness to respond in the future.

5.1 | Limitations

Although our study has confirmed the current considerable level of intention to response among clinical nurses and thirteen factors associated with IR, several limitations are accounted for when interpreting the findings. First, respondents were mostly from Guangdong province in China that can hardly completely represent all the clinical nurses in other provinces or other countries. We encouraged future research carried out at several sites in multiple countries. Second, IR and EP scales were self-reported scales, which may rely on the accuracy of participant responses. Third, we used a self-designed demographic and characteristic questionnaire for linear regression, which may bring limitations to identification of potential factors that affect IR or EP. We expected future researches could identify more associated factors based on the conceptual framework of IR and EP, so as to give managers a better understanding of what promotes or hinders the level of IR and EP among nurses.

6 | CONCLUSION

Notwithstanding the above limitations, this study proved a considerable level of intention to response among nurses accompanied by a moderate level of emergency preparedness. Our findings highlight the effects of social and moral factors on intention to response beyond the previous model. For nursing management, we recommended politic makers and managers to set up education courses or training projects related to emergency preparedness for a more qualified response to currently COVID-19 or future infectious disease outbreak emergency events.

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CONFLICT OF INTEREST

No conflict of interest has been declared by the authors.

AUTHORS CONTRIBUTION

We declared that all authors listed meet the authorship criteria according to the latest guidelines of the International Committee of Medical Journal Editors and all authors are in agreement with the manuscript.

ORCID

Jiaying Li  <https://orcid.org/0000-0002-5473-4320>

Pingdong Li  <https://orcid.org/0000-0002-3685-5268>

Jieya Chen  <https://orcid.org/0000-0002-3280-1027>

Liang Ruan  <https://orcid.org/0000-0002-9739-1735>

Qiuxuan Zeng  <https://orcid.org/0000-0001-9769-7112>

Yucui Gong  <https://orcid.org/0000-0003-2448-6503>

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