


# Anxiety and Depression of Nurses in a North West Province in China During the Period of Novel Coronavirus Pneumonia Outbreak

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## Abstract

**Purpose:** To investigate the anxiety and depression levels of frontline clinical nurses working in 14 hospitals in Gansu Province, China, during this period.

**Design:** A cross-sectional survey was conducted online between February 7 and 10, 2020, with a convenience sample of 22,034 nurses working in 14 prefecture and city hospitals in Gansu Province, located in northwest China.

**Methods:** A self-reported questionnaire with four parts (demographic characteristics, general questions related to novel coronavirus-infected pneumonia, self-rating anxiety scale, and self-rating depression scale) was administered. Descriptive statistics including frequencies, means, and *SDs* were computed. The associations between anxiety and depression with sociodemographic characteristics, work-related concerns, and impacts were analyzed, followed by multiple stepwise linear regression to identify factors that best predicted the nurses' anxiety and depression levels.

**Findings:** A total of 21,199 questionnaires were checked to be valid, with an effective recovery rate of 96.21%. The mean  $\pm$  *SD* age of the respondents was  $31.89 \pm 7.084$  years, and the mean  $\pm$  *SD* length of service was  $9.40 \pm 7.638$  years. The majority of the respondents were female (98.6%) and married (73.1%). Some demographic characteristics, related concerns, and impacts of COVID-19 were found to be significantly associated with both anxiety ( $p < .001$ ) and depression ( $p < .001$ ). Nurses who needed to take care of children or elderly relatives, took leave from work because they were worried about COVID-19, avoided contact with family and friends, and wanted to obtain more COVID-19-related knowledge had higher levels of both anxiety and depression.

**Conclusions:** Results show that nurses faced with the COVID-19 outbreak are at risk for experiencing anxiety and depression. Demographic background, psychosocial factors, and work-related factors predicted the psychological responses. The family responsibilities and burdens of women may explain the higher levels of anxiety and depression among nurses with these obligations as compared to those without. On the other hand,

nurses who chose not to take leave from work or who did not avoid going to work during this period were less anxious and depressed.

**Clinical Relevance:** Professional commitment might be a protective factor for adverse psychological responses. It is pertinent to provide emotional support for nurses and recognize their professional commitment in providing service to people in need.

The current outbreak of the novel coronavirus disease (COVID-19) emerged from Wuhan, the capital city of Hubei Province in central China, in late December 2019 (Huang et al., 2020). It was the third time that human populations had been infected by the respiratory coronavirus in the 21st century, after the 2003 severe acute respiratory syndrome (SARS) and the 2012 Middle East respiratory syndrome (MERS) crisis (Paules, Marston, & Fauci, 2020).

According to the report of the World Health Organization (WHO) on February 29, 2020, there were 85,403 confirmed cases globally, about 92.96% in China (WHO, 2020). The uncertain nature and consequence of the disease and concerns about the potential health risks of COVID-19 have impacts on patients as well as nurses, who account for the largest number of staff in hospitals and endure the longest potential exposure to infected patients. The struggle against COVID-19 not only tested the nurses' competence and skills but also has challenged their psychological well-being in battling this new virus where there are a lot of uncertainties (Johnstone & Turale, 2014).

Nurses experience a great deal of emotional stress in their day-to-day work in safeguarding human health and saving lives. The prevalence rate of anxiety among Chinese female nurses (41.1%) was found to be significantly higher than that of the general population (Gao et al., 2012; Zhou et al., 2018). Researchers have reiterated the need to consider the psychological well-being of nurses who are going through adverse experiences, especially those who have had to deal with situations of high risks and with limited choice. Chen, Wu, Yang, and Yen (2005) compared three groups of nurses working in a community hospital during the SARS outbreak. These groups included those who originally worked in units with a high risk for SARS exposure, those who were involuntarily conscripted into high-risk units due to demand of personnel, and those who worked in units with a low risk for SARS exposure. The analysis showed that both groups of nurses working in the high-risk groups experienced higher levels of anxiety, depression, hostility, and somatization when compared to the low-risk group, with the conscripted group experiencing the most severe distress on average (Chen et al., 2005).

The negative effect of the incident would not only affect the hospital personnel's overall health or life satisfaction, which may be related to their job value, responsibility, and purpose in helping patients, and thus satisfaction from saving life (Ben-Ezra & Soffer, 2010), but also XXXXXXXXXXXXXXXXXXXX.

A number of articles related to COVID-19 have been published recently, but these studies have mainly focused on the pathology of the virus and the disease sequelae of patients (Hui et al., 2020; Li et al., 2020; Nishiura et al., 2020). Insufficient attention has been paid to the mental health of clinical nurses (Xiang et al., 2020). This survey captured the time period when the outbreak of COVID-19 had just commenced and investigated the anxiety and depression of frontline clinical nurses.

## Methods

### Study Design, Procedures, and Participants

A cross-sectional survey was conducted among 22,034 nurses working in 14 prefecture and city hospitals in Gansu Province, China, between February 7 and 10, 2020. Gansu Province was purposely selected since the first author (L.H.) has a working network with most of the hospitals in the province.

An online crowdsourcing platform in mainland China, which provided functions equivalent to those of Amazon Mechanical Turk, was used. The questionnaire was tested among 200 nurses, whose data were not included in the main study, to ensure that the wording was clear and that the instrument was valid and reliable.

In the main study, researchers and hospital coordinators distributed the questionnaires to participants. The research procedures were explained to the potential participants, and it was emphasized that the results would remain anonymous and that there were no right or wrong answers. Only registered nurses currently working in the hospitals were invited. Respondents who agreed to participate were asked to sign a consent form before completing the self-report questionnaire. This questionnaire would be regarded as invalid if all entries were not filled in ( $n = 63$ ), if respondents took less than the estimated reasonable time of 10 min to

complete it ( $n = 83$ ), and if the same rating responses were elicited for all questions ( $n = 689$ ). A total of 21,199 questionnaires out of 22,034 were found to be valid, with an effective recovery rate of 96.21%.

### Ethical Considerations

Approval from the Institutional Review Board of the Provincial Hospital (no. 2020-011) was granted. The purpose, benefits, and uses of the study were explained, confidentiality was assured to all participants, and informed consent was obtained.

### Questionnaires and Instruments

Questionnaires and instruments had four parts, as described in the ensuing subsections.

### Demographic Characteristics

Data on gender, age, marital status, education, work position, length of service, working in a COVID-19-designated hospital, working in an area with exposure to COVID-19, care for children/elderly, and whether the respondent or family member was a confirmed or suspected COVID-19 carrier were collected.

### Questionnaire Related to Novel Coronavirus-Infected Pneumonia.

19-item questionnaire, based on available literature and expert opinions, addressed perceptions on (a) COVID-19-related concerns and (b) the impact of COVID-19 on nurses (Gouliia, Mantas, Dimitroula, Mantis, & Hyphantis, 2010).

**Self-Rating Anxiety Scale (SAS).** The 20-item SAS, developed by Zung (1971), was used. Fifteen positive and five reverse negative items were scored on a 4-point Likert scale (1 = *never or some of the time* to 4 = *most of the time*). The total score was computed as an original score, and then multiplied by 1.25 to get the standard score. According to the extensive validation of SAS on the Chinese population by various studies, a total score of more than 50 is indicative of anxiety symptoms. The higher the score, the higher the anxiety level (Gong et al., 2014). The Cronbach's  $\alpha$  coefficient of the scale in this study was 0.865.

**Self-Rating Depression Scale (SDS).** Depression symptoms were assessed using the 20-item SDS developed by Zung (1965). Each item was rated on a 4-point Likert scale, ranging from 1 (*never or some of the time*) to 4 (*most of the time*), and measured subjective feelings of emotional,

psychological, and physical aspects in the preceding week. The total score was computed as an original score, and then multiplied by 1.25 to get the standard score. According to the extensive validation of SDS on the Chinese population by various studies, a total score of more than 50 is indicative of depression symptoms. A total rating of up to 53 is considered to be the standard score; a total score of 53 to 62 is indicative of mild depressive symptoms, 63 to 72 of moderate depressive symptoms, and greater than 72 of severe depressive symptoms (Gong et al., 2014; Liu et al., 2013). In this study, the Cronbach's  $\alpha$  coefficient of this scale was 0.892.

### Statistical Analysis

All statistical analyses were performed using the Statistical Package for Social Sciences version 25.0 for Windows (IBM Corp., Armonk, NY, USA). Descriptive analysis was carried out for sociodemographic data, work-related characteristic variables, and self-perceived physical health status. The dichotomous variables were expressed as frequencies and percentages. Continuous variables were expressed either as means  $\pm$  SDs or medians and IQRs, according to normal or skewed data distribution. The degree of anxiety and depressive symptoms were examined in groups with varied sociodemographic characteristics, COVID-19-related concerns, and perceived impacts.

Multiple stepwise linear regression analysis included variables that had significant association results ( $p < .05$ ) in the equations, in order to derive a model that best predicted nurses' anxiety and depression during the COVID-19 period.

Missing data of independent variables were treated by mean substitution. For all comparisons, differences were tested using two-tailed  $t$  tests, and  $p < .05$  was considered statistically significant.

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## Results

### Descriptive Analysis of Respondents' Demographics and Characteristics (Table 1)

The mean  $\pm$  SD age of the respondents was 31.89  $\pm$  7.084 years, and the mean  $\pm$  SD length of service was

**Table 1.** Demographic Characteristics of the Respondents (N = 21,199)

Demographic characteristics	n	%
Gender		
Male	290	1.4
Female	20,909	98.6
Age, years (mean ± SD, 31.89 ± 7.084)		
<30	9,352	44.1
30–40	9,032	42.6
≥40	2,815	13.3
Marital status		
Single	5,700	26.9
Married	15,499	73.1
Education		
Secondary school and below	907	4.3
Vocational school	10,999	51.9
College/university or above	9,293	43.8
Work position		
Front-line nursing worker	20,756	97.9
Nursing administrators	443	2.1
Length of service, years (mean ± SD, 9.40 ± 7.638)		
≤5	7,718	36.4
5–10	7,455	35.2
10–15	2,617	12.3
>15	3,409	16.1
Working in a COVID-19-designated hospital		
Yes	14,384	67.9
No	6,815	32.1
Working in an area with exposure to COVID-19		
High exposure	5,029	23.7
Low exposure	16,170	76.3
Care for children		
Yes	13,100	61.8
No	8,099	38.2
Care for elders		
Yes	17,414	82.1
No	3,785	17.9
Are you or your family member a confirmed or suspected COVID-19 carrier?		
Yes	55	0.3
No	21,144	99.7

9.40 ± 7.638 years. The majority of the respondents were female (98.6%), were married (73.1%), and had pursued their nursing education at a vocational school (51.9%). The proportion of respondents working in a COVID-19-designated hospital was 67.9%, but most respondents (76.3%) reported that they worked in areas of low exposure to COVID-19. A majority of respondents had to care for children (61.8%) and elderly relatives (82.1%). The respondents' anxiety levels were found to be normal (79.4%), mild (15.9%), moderate (3.9%), or severe (0.8%), and their depression levels were found to be normal (71.3%), mild (20.4%), moderate (6.9%), or severe (1.3%).

### Bivariate Analyses of Demographic Characteristics, COVID-19-Related Concerns, and Impact of COVID-19 on Nurses With Anxiety and Depression (Table 2)

**Associations of demographic characteristics with anxiety and depression.** Gender, age, marital status, need to take care of children, need to take care of elderly relatives, working in a designated hospital, working in an area with exposure to COVID-19, and caring for a confirmed or suspected COVID-19 carrier were found to be significantly associated with both anxiety ( $p < .001$ ) and depression ( $p < .001$ ).

**Associations of COVID-19-related concerns with anxiety and depression.** One fourth of respondents (24.5%) felt that they had excellent knowledge regarding COVID-19, and 68.6% of respondents desired to learn more about the disease. Among all the respondents, 19.4% believed it was quite possible that they or those around them would contract the disease. The top three worries expressed were transmitting the disease to family and friends, not having enough protective gear, and contracting the disease oneself. Knowledge of the disease, the desire for related knowledge, and the possibility of self or others contracting the disease were found to be significantly associated with anxiety ( $p < .001$ ) and depression ( $p < .001$ ).

**Associations of the impact of COVID-19 on nurses with anxiety and depression.** Actively limiting [JC20] one's social interactions, avoiding interaction with family and friends, taking leave from work because of worries about COVID-19, and evading one's duties during the COVID-19 outbreak were found to be significantly associated with anxiety ( $p < .001$ ) and depression ( $p < .001$ ).

### Multiple Stepwise Linear Regression Analysis for Anxiety (Table 3)

Nurses who were younger, needed to take care of children, needed to take care of elderly relatives, would take leave from work because of worries about COVID-19, avoided contact with family and friends, desired to obtain information, and worked in designated hospitals tended to have higher anxiety scores.

### Multiple Stepwise Linear Regression Analysis for Depression (Table 4)

Nurses who had lower education levels, needed to take care of children, needed to take care of elderly

**Table 2.** Association of Demographic Characteristics, COVID-19-Related Concerns, and Impact of COVID-19 on Nurses With Anxiety and Depression

Variables	n (%)	Anxiety			Depression		
		Mean ± SD	F/t	p	Mean ± SD	F/t	p
Demographic characteristics							
Gender							
Male	290 (1.4)	40.72 ± 8.389			44.22 ± 11.829		
Female	20,909 (98.6)	42.80 ± 9.099	3.877	<.001	45.60 ± 12.010	1.971	<.001
Age							
<30	9,352 (44.1)	42.07 ± 8.792			44.96 ± 11.812		
30-40	9,032 (42.6)	43.54 ± 9.190			46.32 ± 12.093		
≥40	2,815 (13.3)	42.65 ± 9.559	60.696	<.001	45.28 ± 12.251	30.496	<.001
Education							
Secondary school and below	907 (4.3)	42.98 ± 8.232			46.55 ± 12.027		
Vocational school	10,999 (51.9)	42.51 ± 8.846			45.39 ± 11.877		
College/university or above	9,293 (43.8)	43.07 ± 9.446	9.963	<.001	45.72 ± 12.154	4.947	.007
Marital status							
Single	5,700 (26.9)	41.76 ± 8.658			45.05 ± 11.842		
Married	15,499 (73.1)	43.15 ± 9.220	10.154	<.001	45.78 ± 12.063	3.966	<.001
Need to take care of children							
Yes	13,100 (61.8)	43.36 ± 9.248			46.04 ± 12.085		
No	8,099 (38.2)	41.83 ± 8.754	12.105	<.001	44.85 ± 11.846	7.073	<.001
Need to take care of elderly relatives							
Yes	17,414 (82.1)	43.21 ± 9.180			45.97 ± 12.078		
No	3,785 (17.9)	40.79 ± 8.403	15.755	<.001	43.83 ± 11.519	10.269	<.001
Working in a designated hospital							
Yes	14,384 (67.9)	43.03 ± 9.185			45.81 ± 12.026		
No	6,815 (32.1)	42.25 ± 8.873	5.896	<.001	45.11 ± 11.958	3.933	<.001
Working in an area with exposure to COVID-19							
High exposure	5,029 (23.7)	43.69 ± 9.535			46.82 ± 12.339		
Low exposure	16,170 (76.3)	42.49 ± 8.932	7.906	<.001	45.20 ± 11.877	8.217	<.001
Care for a confirmed or suspected COVID-19 carrier							
Yes	596 (2.8)	46.16 ± 10.240			49.52 ± 12.612		
No	20,603 (97.2)	42.68 ± 9.039	8.216	<.001	45.47 ± 11.971	8.129	<.001
COVID-19 related concerns							
Knowledge of disease							
Barely understand	26 (0.1)	44.38 ± 8.553			52.60 ± 10.647		
Little understand	1,026 (4.8)	44.47 ± 9.811			48.39 ± 12.213		
Good understanding	14,943 (70.5)	42.78 ± 9.006			45.71 ± 11.882		
Excellent understanding	5,204 (24.5)	42.41 ± 9.159	15.092	<.001	44.62 ± 12.218	33.565	<.001
Desirability for related knowledge							
None	41 (0.2)	43.75 ± 6.960			49.85 ± 10.941		
Little	273 (1.3)	45.52 ± 10.179			51.22 ± 12.115		
Much	6,351 (30.0)	43.67 ± 9.179			47.30 ± 11.883		
Very much	14,534 (68.6)	42.33 ± 9.001	40.704	<.001	44.72 ± 11.952	91.611	<.001
Possibility of self or others contracting the disease							
Not possible	2,010 (9.5)	40.64 ± 8.238			43.79 ± 12.092		
Not quite possible	8,122 (38.3)	40.79 ± 8.289			43.61 ± 11.473		
Quite possible	6,945 (32.8)	43.46 ± 8.761			46.21 ± 11.677		
Very possible	4,122 (19.4)	46.57 ± 10.115	444.890	<.001	49.30 ± 12.553	233.067	<.001
Impact of COVID-19 on nurses							
Actively limit your social interactions							
Yes	16,471 (77.7)	43.19 ± 9.290			45.84 ± 12.070		
No	4,728 (22.3)	41.33 ± 8.209	13.364	<.001	44.70 ± 11.749	5.732	<.001
Avoid interaction with family and friends							
Yes	16,359 (77.2)	43.27 ± 9.260			46.01 ± 12.067		
No	4,840 (22.8)	41.09 ± 8.288	15.636	<.001	44.13 ± 11.690	9.776	<.001

(Continues)

**Table 2.** (Continued)

Variables	n (%)	Anxiety			Depression		
		Mean ± SD	F/t	p	Mean ± SD	F/t	p
Take leave from work because of worries about COVID-19							
Yes	153 (.7)	50.83 ± 10.747			56.08 ± 11.976		
No	21,046 (99.3)	42.72 ± 9.054	9.308	<.001	45.51 ± 11.975	10.880	<.001
Evade your duties during COVID-19 outbreak							
No	12,995 (61.3)	41.74 ± 8.838			44.06 ± 11.859		
Occasionally	7,810 (36.8)	44.12 ± 9.050			47.63 ± 11.691		
Often	334 (1.6)	50.19 ± 10.887			55.00 ± 12.820		
Always	60 (.3)	51.52 ± 11.387	212.091	<.001	57.56 ± 10.143	241.791	<.001

Note. Two-tailed t-tests, "t" value was the parameter of similarity between two groups of data. The larger the "t" value, the more reasonable to believe that there were differences between two groups of data. One-way ANOVA, "F" was the ratio of mean square between groups and mean square within a group. The higher the "F" value, the more reasonable to assume that the population mean of each group was not completely equal.

relatives, would take leave from work because of worries about COVID-19, avoided contact with family and friends, and desired to obtain information tended to have higher depression scores.

## Discussion

The results show that nurses faced with the COVID-19 outbreak are at risk for having anxiety and depression, and there are common predictors associated with these two psychological responses. These predictors can be grouped into three major categories. The first category concerns nurses' demographic backgrounds. Nurses who were female, were married, and had family burdens of taking care of the old and young were more anxious and depressed.

The anxiety levels of younger nurses were found to be higher than those of older nurses, which is

supported by a study that examined the weighted prevalence and associated risk factors of depression, anxiety, and stress among Hong Kong nurses. As age increased, depressive and anxiety symptoms decreased (Cheung & Yip, 2015). Younger nurses may have less clinical experience and worry about how to deal with new emerging infectious diseases. The depression level of nurses with less education was higher than that of others. Similar to this finding, a higher educational degree, such as a master's of science in nursing, inversely affected the level of depression among Iranian nurses compared to those with a bachelor of science in nursing (Khodadadi, Hosseinzadeh, Azimzadeh, & Fooladi, 2015). Knowledge usually empowers people, and COVID-19 knowledge in particular may give confidence to nurses who care for patients with coronavirus. It is assumed that nurses with less education may lack the confidence to deal with the unknown virus and become depressed.

**Table 3.** Result of Multiple Stepwise Linear Regression Analysis for Anxiety

	Nonstandardized coefficient		Standardized coefficient		
	B	SE	$\beta$	t	p
Constant	56.616	1.135		49.899	.000
Gender	2.238	0.504	0.029	4.441	.000
Age <sup>a</sup>	-.289	.098	-.022	-2.944	.003
Marital status	.462	.193	.023	2.398	.016
Need to take care of children <sup>a</sup>	-0.712	0.179	-0.038	-3.972	.000
Need to take care of elderly relatives <sup>a</sup>	-1.472	0.162	-0.062	-9.093	.000
Possibility of self or others contracting the disease	1.836	0.067	0.182	27.341	.000
Avoid contact with family and friends <sup>a</sup>	-1.287	0.142	-0.059	-9.095	.000
Desire for obtaining information <sup>a</sup>	-0.735	0.118	-0.041	-6.212	.000
Take leave from work because of worries about COVID-19 <sup>a</sup>	-5.066	0.695	-0.047	-7.286	.000
Evade duties during COVID-19 outbreak	1.773	0.112	0.105	15.773	.000
Designated hospital <sup>a</sup>	-.256	.126	-.013	-2.037	.042

Note.  $R^2 = 0.130$ ,  $F = 99.746$ ,  $p < .05$ .

<sup>a</sup>Reverse item; that is, the lower the score of the variable, the higher the level of anxiety.

The second category is related to psychosocial factors. Nurses who worried about themselves or others contracting the disease and restricted their social interactions and contacts with family and friends had higher levels of anxiety and depression. The third category is work related. Nurses who were less likely to take leave from work or avoid their duties because of COVID-19 tended to be less anxious and depressed. Nurses who worked in hospitals designated to admit suspected cases tended to have increased levels of anxiety.

Women in this study (vs. men) had higher scores on anxiety and depression, which is consistent with the findings in the COVID-19 study of Lai et al. (2020) conducted from January 29 to February 3, 2020, and the study of Wu et al. (2009) conducted after the SARS outbreak of 2003.

Lai et al. (2020) investigated factors associated with mental health outcomes among 1,257 healthcare workers. Among them, 60.8% were nurses and 39.2% were physicians; 60.5% worked in hospitals in Wuhan; 41.5% were frontline healthcare workers; and 50.4% reported symptoms of depression, 44.6% of anxiety, 34.0% of insomnia, and 71.5% of distress. Nurses, women, frontline healthcare workers, and those working in Wuhan, China, reported more severe degrees of all measurements of mental health (Lai et al., 2020). As of February 12, the Chinese Center for Disease and Control Prevention had reported that over 3,000 healthcare workers were suspected to be infected with COVID-19. Among them, 1,716 cases had been confirmed and 5 healthcare workers had died. Timely mental health care is urgently needed during this period of

COVID-19 outbreak to maintain staff mental health, which may relate to better control of the infectious disease (Chen et al., 2020; Kang et al., 2020; Xiang et al., 2020).

Consistent with our findings, Wu et al. (2009) reported that married female employees had a greater fear of contagion than those who were unmarried. Women traditionally take up the caretaker role in families. The family responsibilities and burdens of women may explain the higher anxiety and depression level of nurses with these obligations as compared to those without.

Levels of anxiety and depression are often related to one's thinking and appraisal of COVID-19. Nurses who were more worried that they may contract the virus had escalated psychological responses, as documented in a Middle East respiratory syndrome coronavirus (MERS-CoV) study (AlNajjar, Attar, Faraha, & AlThaqafi, 2016; Kim & Choi, 2016; Oh et al., 2017), an influenza A(H1N1) study (Cowling et al., 2010), and SARS studies (Chen et al., 2006; Maunder et al., 2003). The current study found that over 50% of nurses felt that it was quite possible for them or others to contract COVID-19. This concern led to restriction of social contact (Goulia et al., 2010). Over 70% of the respondents chose to isolate themselves and avoid attending social events. This is a vicious cycle, since nurses require support from family and peers, and the adoption of avoidance is a form of negative coping. Kim and Choi (2016) conducted a study among emergency department nurses who worked in the hospitals designated for treating MERS-CoV-infected patients in Korea and found that poor support from

**Table 4.** Result of Multiple Stepwise Linear Regression Analysis for Depression

	Nonstandardized coefficient		Standardized coefficient	t	p
	B	SE	$\beta$		
Constant	67.573	1.538		43.922	.000
Gender	1.730	0.675	0.017	2.562	.010
Education level <sup>a</sup>	-0.401	0.141	-0.019	-2.847	.004
Need to take care of children <sup>a</sup>	-0.732	0.174	-0.030	-4.197	.000
Need to take care of elderly relatives <sup>a</sup>	-1.301	0.217	-0.041	-5.995	.000
Possibility of self or others contracting the disease	1.732	0.090	0.130	19.165	.000
Actively limit social interactions	0.535	0.218	0.019	2.459	.014
Avoid contact with family and friends <sup>a</sup>	-1.332	0.214	-0.047	-6.210	.000
Desire for obtaining information <sup>a</sup>	-1.696	0.159	-0.072	-10.678	.000
Take leave from work because of worries about COVID-19 <sup>a</sup>	-6.470	0.933	-0.046	-6.935	.000
Evade duties during COVID-19 outbreak	2.742	0.151	0.123	18.196	.000

Note.  $R^2 = 0.102$ ,  $F = 161.540$ ,  $p < .05$ .

<sup>a</sup> Reverse item; that is, the lower the score of the variable, the higher the level of depression.

family and friends significantly contributed to nurses' burnout. Wu et al. (2009) similarly revealed in their study that respondents who worked in high-risk areas were two to three times more likely to have high post-trauma symptom levels than those without such exposure.

Chen et al. (2006) found that a SARS prevention program with inservice training on the use of protective equipment, well-informed manpower allocation, and availability of mental health team support were instrumental in reducing the anxiety and depression levels of nurses during the SARS crisis in Taiwan. Maunder et al. (2003) conducted a study using interviews and observations during the SARS crisis in Toronto and similarly found that the fear of uncertainty and the unknown among staff could be relieved with clear, succinct information and reassurance of provision of appropriate equipment and supplies. Providing emotional support is no easy task during the period of a highly infectious disease outbreak. Staff were discouraged from interacting both in the hospital and outside. While face-to-face communication was difficult, the use of technology such as emails helped (Maunder et al., 2003).

Despite heightened anxiety and depression in facing the COVID-19 outbreak, this study revealed that less than 2% of the respondents indicated that they wanted to take leave from work or would choose to avoid duties. This proportion is less than that reported in a study of nurses who would take a leave to avoid infection (4.3%) (AlNajjar et al., 2016). It seems that professional commitment overrides their fear of contagion. Cowling et al. (2010) reported that altruistic acceptance of work-related risks was negatively related to post-traumatic stress levels, and may help protect nurses against negative impacts. Another study reported a positive association between nursing intention to stay and professionalism in nursing. The investigators recommended developing mechanisms to nurture professionalism in nursing to sustain continued provision of service during the challenging period of an outbreak. In the current study, working in designated hospitals was significantly associated with a higher level of anxiety. However, nurses' altruistic acceptance of job-related risk seems to be a protective factor against negative psychological outcomes (Wu et al., 2009).

Straus et al. (2004) interviewed 14 physicians about their experiences during the SARS outbreak. The discussion focused on professionalism and altruism. They shared their perceptions about the difficult balance between acceptable personal risk and attention to patients' welfare that is based on professional altruism

and dedication. All participants expressed concern about risk of contagion and instituted precautions to optimize safety, including sending their families away and eliminating social interactions. Despite concerns about personal safety, all participants stated that they felt a professional obligation to care for patients with SARS. However, six participants described episodes of health-care professionals refusing to assess or care for patients with SARS.

Carter (2014) interviewed 12 community nurses to understand the vocational and altruistic motivations of nurses as well as the social and cultural influences on nursing careers. The nurse respondents had highly individual and at times contradictory views on their motivations to nurse, including their views on vocation and altruism in nursing careers. By applying Bourdieu (2001)'s ideas of Habitus, Capital and Field to analyze nurses' stories, Carter (2014) found that social and cultural influences (i.e., gender, class, and educational experience) are important dimensions to understanding altruism in nursing.

The strength of this study is that the survey involves a rather large sample size in a province in China at a time when the COVID-19 outbreak had just begun. No study so far has reported investigating the anxiety and depression of nurses at the height of the new COVID-19 epidemic. This was a cross-sectional survey that had limitations in investigating causal pathways to establish relationships of factors, which contributed directly or indirectly to nurse anxiety and depression during the outbreak period. Another limitation of the study is the weakly explained effect of the models. Future studies may include a wider sampling frame to include nurses from both high- and low-risk areas to differentiate the impact of COVID-19 on their psychological responses.

## Conclusions

Nurses constitute the largest number of healthcare workers in hospitals, and they are intensively involved with patient care. It is important to address their needs to contain anxiety and depression at an acceptable level for an effective workforce in combating this unknown new virus. Nurses are tending to isolate themselves during this outbreak, which is an appropriate public health protective measure, but at the same time they need support from family and friends. Different measures can be implemented to combat this dilemma. For example, organized rotation and shifts would allow breaks from working in high-risk areas to facilitate the arrangement of family and social time. And organizations' expressed appreciation and support would help



to prevent burnout and build a resilient team to sustain strength for working in a stressful environment during the outbreak of an emerging infectious disease. Educational programs for nurses to fulfill their desire for related knowledge as well as mental health programs to improve their mental well-being are essential, and may relate to better control of the infectious disease.

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### Clinical Resources

- American Nurses Association. Combating stress. <https://www.nursingworld.org/practice-policy/work-environment/health-safety/combating-stress/>
- American Nurses Association. Coronavirus disease (COVID-19). <https://www.nursingworld.org/practice-policy/work-environment/health-safety/disease-preparedness/coronavirus/>

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