

The Psychological Effect of 2019 Coronavirus Disease Outbreak on Nurses Living in Islamic Culture Dominant Region, China

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Abstract

Background: The outbreak of Coronavirus Disease (COVID-19) in Wuhan, owing to the uncertain nature of COVID-19, can cause concerns about the potential health risks and may engender fear, anxiety, depression and so on. China is a multi-ethnic society, and Linxia Hui Autonomous Prefecture is a multi-ethnic residential city and is influenced profoundly by Islamic culture. Culture can influence perceptions, but it is unknown how much it affects frontline nurses' perceptions of the emerging infectious disease outbreak. The aim of this study was to investigate the psychological characteristics of nurses with minority ethnic backgrounds in response to the public health crisis and to explore its related factors.

Methods: We undertook a cross-sectional online survey in the Linxia Hui Autonomous Prefecture, Gansu province, China. There were eight secondary-level hospitals and one tertiary-level hospital, six of which were COVID-19-designated hospitals. The structured questionnaire consisted of demographic questionnaire, COVID-19 related questionnaire, Self-Rating Anxiety Scale, and Self-rating Depression Scale.

Results: A total of 1569 nurses enrolled in our online survey. The majority of the nurses were women (98.8%), aged younger than 40-year-old (90.3%), holders of a junior college degree (59.5%), married (74.6%), needed to care for children (63.9%) or elders (84.6%), with working years of less than 10 years (61.9%), and worked at non-high exposure departments(75%) in secondary hospital (66.9%) or COVID-19-designated hospital (85.4%). The anxiety and depression level ($M \pm SD$) were 42.56 ± 8.95 and 46.52 ± 11.883 , respectively. The factors associated with psychological variables were social support, family role, fear of contagion, the desire to learn knowledge about COVID-19, and so on.

Conclusion: Nurses who are of the Islamic culture are affected slightly by the COVID-19 outbreak, but their concern and factors associated with psychological variables are in keeping with the common nursing groups.

Background

The outbreak of Coronavirus Disease (COVID-19) in Wuhan[1], which began at the end of 2019[2], has resulted in over three-thousand deaths and spread to more than one hundred countries up to March 10th, 2020[3]. The COVID-19, also called Novel Coronavirus Pneumonia, is the human-to-human transmitted lower respiratory tract infection disease, while its pathogenicity and transmissibility remain unknown[4]. The current COVID-19 is of primary global concern and has been categorized by the World Health Organization (WHO) as a Public Health Emergency of International Concern (PHEIC) and assessed as very high risk at the global level.

Facing uncertain infectious threats, we should pay attention to the mental health of nurses based on our experience with other respiratory coronavirus diseases, such as the Severe Acute Respiratory Syndrome (SARS)[5]. In the struggle against COVID-19, nurses are the vulnerable population who constitute the largest workforce within medical systems internationally[6].

According to Zangaro et al. research, racial and ethnic diversity has a sharp increase among the nursing workforce since the 21st century in the United States[7]. However, little is known about the responses of minority ethnicity to public emergency outbreak, especially the medical staff. China is a multi-ethnic society, and the ethnic regional autonomy system is one of China's basic political systems. Gansu province, situated in northwestern China, offers astonishing cultural and ethnic diversity. Linxia Hui Autonomous Prefecture, Gansu, is one of the two Chinese only Hui Autonomous Prefecture. Autonomous prefectures are equivalent to city-level administrative units. Linxia Hui Autonomous Prefecture is a multi-ethnic residential city and is influenced profoundly by Islamic culture. Culture can influence perceptions, but it is unknown how much it affects frontline nurses' perceptions of the emerging infectious disease outbreak.

The purpose of this study was to investigate the psychological characteristics of nurses with minority ethnic backgrounds in response to the public health crisis and to explore its related factors. The findings may offer new insight into nurses' response to an infectious disease outbreak and build cultural awareness for nursing professionals.

Methods

Setting and procedures

We undertook a cross-sectional online survey in the Linxia Hui Autonomous Prefecture. There were eight secondary-level hospitals and one tertiary-level hospital, six of which were COVID-19-designated hospitals. A total of 1648 participants were voluntarily recruited and enrolled in our survey. The questionnaire was administered between February 6th to February 10th, 2020. Questionnaires with answer time less than 5 minutes, returning the same response regularly, and had invalid responses for age or years of working were excluded. In the end, 1569 returned questionnaires were included and analyzed (valid response rate of 95.2%).

Instruments

The structured questionnaire consisted of four parts:

1) Demographic questionnaire

The demographic questions included gender, age, educational level, marital status, work position, years of working, department, need to take care of children or elders, voluntary to be the reserve personnel to provide medical assistance to Wuhan, and so on.

2) COVID-19 related questionnaire

For the present study, a 19-item questionnaire tailored to nursing workers was developed by the researchers, which was chosen based on the available literature on the perceptions and opinions of experts regarding infectious disease outbreaks [8]. Items were grouped in four domains: (a) nurses'

concerns and worries about the “COVID-19”, (b) effects of “COVID-19” on nurses, (c) expected behavior, and (d) social support.

3) Self-Rating Anxiety Scale, SAS

The anxiety levels of nurses were measured using the 20-item Self-rating Anxiety Scale developed by Zung[9]. This 20-item scale has a wide range of applications, of which 15 are positive scores, and 5 are negative scores. A 4-point Likert scale is employed to evaluate each item (e.g. 1 = never or some of the time, 4 = most of the time), yielding a totally original score ranging from 20 to 80. The total standard score was recorded as the original score (the sum of 20 items) multiplied by 1.25. The higher the score, the higher the anxiety level. A total score of ≥ 50 points was considered as the cut off for experiencing anxiety symptoms in the Chinese population. A standard score of 50–59 points indicated mild anxiety, 60–69 points indicated moderate anxiety, and > 70 points signified severe anxiety[10]. In this study, the Cronbach’s α coefficient of the scale was 0.865.

4) Self-rating Depression Scale, SDS

The 20-item Self-rating Depression Scale developed by Zung [11] was used to assess depression symptoms. This scale is commonly used to measure depression symptoms in the population over the past week, including subjective feelings of emotional, psychological, and physical aspects[12]. Each item is rated on a 4-point Likert scale and ranges from 1 (never or some of the time) to 4 (most of the time). The total possible standard score, ranging from 25 to 100, was obtained by multiplying the total original score by 1.25. According to the results of Chinese norms, the boundary value of SDS was 53 points, a standard score of 53–62 points indicated mild depression, 63–72 points indicated moderate depression, and > 72 points signified severe depression[13]. The Cronbach’s α coefficient of this scale was 0.892.

Statistical analysis

Questionnaire scores were carefully checked, and each item was computed separately by two investigators with the Microsoft Excel program. The Statistical Package for the Social Sciences 22.0 (SPSS) for Windows was used for analysis. Descriptive analysis of socio-demographic data, work-related characteristic variables, and self-perceived physical health status were performed. The enumeration data was expressed as frequencies and percentages. Measurement data was expressed as mean \pm standard deviation ($M \pm SD$). The independent sample two-tailed t-test was used to evaluate differences in the mean in dichotomous variables, and One-way ANOVA was used to evaluate differences in the mean value of categorical variables. Stepwise multiple regression analysis was used to identify the anxiety and depression as the dependent variables. The independent variables were the factors with statistically significant differences in univariate analysis such as gender, COVID-19-designated hospital (yes, no), age (< 30 years old, 30–40, ≥ 40 years old), and so on. $P < 0.05$ was considered statistically significant.

Results

Demographic characteristics

The majority of the nurses were women (98.8%), aged younger than 40-year-old (90.3%), holders of a junior college degree (59.5%), married (74.6%), needed to care for children (63.9%) or elders (84.6%), with working years of less than 10 years (61.9%), non-reserve personnel to assist Wuhan (73.6%) and worked at non-high exposure departments(75%) in secondary hospital (66.9%) or COVID-19-designated hospital (85.4%). As for the psychological variables, 16% of nurses had mild anxiety, 3.7% had moderate anxiety, and 0.6% had severe anxiety. With respect to depression, 24.7% of nurses had mild depression, 6.6% had moderate depression, and 5.5% had severe depression. Detailed data about recruited participants are presented in Table 1.

Concerns and worries about the “COVID-19”

Table 2 shows that 19.8% of the participants said they knew a lot about the “COVID-2019”, and the primary sources of information were from the media (99.4%) and hospital learning (61.6%). There were 65.5% of nurses who were very eager to acquire the knowledge of “COVID-19”. The knowledge that needed to be supplemented were, in descending order, treatment (78.6%), prognosis (77.4%), prevention (68.4%), transmission (56.2%), and symptoms (48.8%). The two most concerned pieces of information about the “COVID-19” were new preventive measures (90.6%) and the progress in scientific research (83.2%). There were 22.1% of nurses thinking they or those around them were more likely to be infected with “COVID-19”. During the “COVID-19”, the top three concerns were the fear that family and friends would be infected (78.8%), lack of protective gear (60.2%), and fear of contagion (45.9%). Besides, 12.6% of nurses thought they needed psychological assistance at present.

Effects of “COVID-19” on nurses and expected behavior

As shown in Table 3, the most significant influences of “COVID-19” on nurses were, in descending order, daily life (43.7%), work and study (28.1%), mood status (14.9%), and family reunion (13.3%). There were 72.1% of nurses with different degrees of sleep disorders, and 86.5% of them were easily upset. There were 75.8% who would take the initiative to limit their social activities because their work environment was considered “dangerous”, and 73.7% thought they would avoid contact with family and friends (interpersonal isolation) because they worked in a “high-risk” environment. Only 0.6% nurses would take leave to avoid going to work, and 1.6% would avoid their occupational duties in an emergency due to the “COVID-19”.

Factors associated with nurse’s anxiety and depression

As shown in Table 4, univariate analyses revealed several variables associated with anxiety and depression, and multiple regression analyses presented a positive or negative correlation. Nurses who

were older and needed to care for children, worked in COVID-19-designated hospital, desired knowledge related to COVID-19, and restricted social activities had high anxiety scores. It was found that the years of working, fear of contagion, and sense of duty were positive correlations with anxiety ($P < 0.05$). The need to care for elders, desire to learn about COVID-19, interpersonal isolation, and social support were negatively correlated with anxiety ($P < 0.001$).

Depression scores were higher for older nurses who were reserved personnel to assist Wuhan, needed to take care of elders, and worked in COVID-19-designated hospitals. The working department, the experience of caring for a confirmed or suspected case, knowledge level related to COVID-19, and social support were negatively correlated with depression ($P < 0.001$). The years of working, fear of contagion, and sense of duty had positive correlations with depression ($P < 0.001$).

Discussion

Our results indicate that nurses in the Linxia Hui Autonomous Prefecture are slightly affected by COVID-19. Compared with the data from the 2003 SARS, the psychological impact of the COVID-19 outbreak on nurses in the Linxia Hui Autonomous Prefecture is dramatically lower. The anxiety and depression level are much less than that of nurses caring for SARS patients in Taiwan using the same Zung's scale[14]. The desire to avoid the occupational duty in our study is lower than that of the intention to leave their job during the SARS outbreak[15].

The reason why the psychological outcomes of nurses in Islam culture dominant region were better than that of other Chinese nurses during the SARS outbreak can be summarized as follow. Firstly, the Linxia Hui Autonomous Prefecture contains Dongxiang Autonomous County and Jishishan Baoan Dongxiang Salar Autonomous County. The Hui nationality, the Dongxiang nationality, the Baoan nationality, and the Salar nationality are ethnic minorities consisting of Muslim population, which are part of fifty-six Chinese ethnic groups. Moreover, the Hui nationality ranks second in the number of population of the Chinese ethnic minority. Islam is the dominant religion and has a considerable impact on the Linxia Hui Autonomous Prefecture citizens' daily life. Muslims tend to be conservative and believe the view that Allah controls everything according to his will. Muslims do not eat pork or drink alcohol, however, Cheung's research found that nurse stress is associated with drinking alcohol[16] that were related to substance abuse. Religious belief, which forbids nurses to relieve their stress by depending on alcohol, has remarkable social and psychological influences that help them to sustain a similar pattern in their daily lives during the COVID-19 outbreak. Secondly, it is also worthy to note that the number of confirmed cases in Gansu province is 91, while that of Hubei province (the virus originating province) up to now is nearly 67000. Besides, the geographic distance between Gansu province and Hubei province cannot be ignored. Thirdly, the SARS outbreak is an unprecedented public health crisis for China in the 21st century, but the experience we learned from SARS can help us to face the COVID-19 challenge. For example, the nursing procedures of caring for SARS patients have been compiled into professional textbooks. Besides,

the case-fatality rate of COVID-19 is lower than SARS. Fourthly, in the past few decades, rapid progress and innovation have been achieved in medical technology. For instance, the extracorporeal membrane oxygenation (ECMO) can provide life support for acute respiratory failure patients[17].

Besides, the factors associated with the psychological health status are consistent with the result of Brooks et al. review[18], including training or preparedness, role-related stressor, social support, interpersonal isolation, perceived risk. The valuable findings of this study add new information to our understanding of the nurses with minority ethnic backgrounds in the face of the public health crisis.

According to our result about the COVID-19 effects on nurses and their concerns, several improvement measures are required. First of all, it is of high urgency to conduct COVID-19 related training programs for nurses. The global tendency of emerging infectious diseases is of growing significance over time[19]. Our results showed that 97.9% of nurses have the desire to learn knowledge about COVID-19, and it points to where we need to improve. Facing the unknown nature of COVID-19, illness uncertainty easily causes fear, anxiety and depression, which has been reflected by a number of researchers[6]. Second, the media, as the nurses' dominant information source (99.4%), should take the responsibility of building a positive image of the nurse. The public's view on the medical staff is actually one of the nurses' social support. Media coverage can influence the social conception of nurses' roles[20]. Social support negatively correlated with anxiety and depression levels[21]. The positive media portrayal of nurses can increase morale[22]. Third, it is vital to guarantee occupational safety. Nurses have direct contact with patients and have potential exposure to coronavirus contagion[23]. The hospital should spend more effort to assure the supplies of personal protective equipment, such as gloves, face masks, gowns, which help nurses cope effectively and mitigate their fear of contagion[24]. Fourth, government and institutions should provide credible support to nurses' families. The need to care for children or elders is a nurse role-related stressor. Consistent with Nickell's research[25], more than two-thirds of nurses were concerned that their family members would be infected. Lastly, it is necessary to increase payment for nurses appropriately. In order to relieve Wuhan's medical burden, the hospital will select competent nurses to assist Wuhan, resulting in the local department having a shortage of nursing workforce. The parallel bonus should be distributed to coordinate limited nursing professionals effectively.

Several limitations need to be mentioned. First, our analysis based on the cross-sectional survey only reflects the condition at the time that the data was gathered and did not track the dynamic change. Besides, we only collected data from one Islam culture dominant region.

In light of our results, it is suggested that future research should expand the investigation to the other minority ethnic and monitor the dynamic trajectory with different stages of the public health emergency. Further exploration of the potential mechanism about how religious belief would affect how nurses encounter public health emergency is needed.

Conclusion

In conclusion, our result reveals how nurses from ethnic minorities cope with emerging infectious diseases. Nurses who are of the Islamic culture are affected slightly by the COVID-19 outbreak, but their concern and factors associated with psychological variables are in keeping with the common nursing groups.

Abbreviations

COVID-19; 2019 Coronavirus Disease; SARS; Severe Acute Respiratory Syndrome; SAS; Self-Rating Anxiety Scale; SDS; Self-rating Depression Scale; PHEIC: Public Health Emergency of International Concern; WHO; World Health Organization;

Declarations

Ethics approval and consent to participate

The study was approved by the Ethical Committee of Gansu Provincial hospital (No.2020-011). All participants signed the informed consent before answered the questionnaire.

Consent for publication

All authors have agreed with the content and approved the submission of the manuscript.

Availability of data and materials

The main data have been listed in the results. Additional materials with details may be obtained from the corresponding author.

Competing interests

None declared.

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Authors' contribution

JMY and LSY drafted the manuscript, SDL and YFH conduct data collection, CY revised the manuscript, HL conducted the study design. All authors have given their final approval of the submitted manuscript.

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Tables

Table 1 Demographic and Psychological Characteristics of nurses (N = 1569)

	N (%)
COVID-19-designated hospital	
Yes	1340(85.4)
No	229(14.6)
Hospital level	
Secondary	1049(66.9)
Tertiary	520(33.1)
Gender	
Male	19(1.2)
Female	1550(98.8)
Age, y (M ± SD: 30.93 ±6.484)	
≤30	740(47.2)
30-40	677(43.1)
≥40	152(9.7)
Education level	
Secondary school and below	156(9.9)
Junior college	934(59.5)
College or above	479(30.5)
Marital status	
Single	399(25.4)
Married	1170(74.6)
Need to care for children	
Yes	1002(63.9)
No	567(36.1)
Need to care for elders	
Yes	1328(84.6)
No	241(15.4)
Department	
High exposure department	393(25.0)
Non-high exposure department	1176(75.0)
Years of working, y (M ± SD: 31.02 ±6.324)	
≤10	971(61.9)
≥10	598(38.1)
Work Position	
Frontline nursing worker	1520(96.9)
Nursing administrators	49(3.1)
Experience of caring for a confirmed or suspected case with "COVID-19"	
Yes	59(3.8)
No	1510(96.2)
Reserve personnel to assist Wuhan	
Yes	414(26.4)
No	1155(73.6)
Anxiety level (M ± SD: 42.56 ±8.957)	
Normal	1250(79.7)
Mild	251(16.0)

Moderate	58(3.7)
Severe	10(0.6)
Depression level (M ± SD: 46.52 ±11.883)	
Normal	1055(67.2)
Mild	387(24.7)
Moderate	104(6.6)
Severe	23(1.5)

Table 2 Concerns and worries about the “COVID-19”

	N (%)
Knowledge of the “COVID-19” $\bar{M} \pm SD: 3.12 \pm 0.515$	
Little understanding	5(0.3)
Unconversant	109(6.9)
Understand better	1145(73.0)
Know a lot about	310(19.8)
The desire to learn about “COVID-19” $\bar{M} \pm SD: 3.63 \pm 0.542$	
Without	7(0.4)
Little	26(1.7)
Relatively large	508(32.4)
Very large	1028(65.5)
The most need to update knowledge about the “COVID-19”	
Symptoms	766(48.8)
Prognosis	1215(77.4)
Transmission	882(56.2)
Prevention	1073(68.4)
Treatment	1233(78.6)
Concerned information	
Outbreaks	1213(77.3)
New preventive measures	1421(90.6)
Progress in scientific research	1306(83.2)
Social stability	1186(75.6)
Information source about the “COVID-19”	
Media	1559(99.4)
Family and friends	510(32.5)
Hospital learning	966(61.6)
People talk about	215(13.7)
During the “COVID-19”, top three concerns	
Fear of family and friends will be infected	1237(78.8)
Lack of protective gear	944(60.2)
Fear of contagion	720(45.9)
Possibility of infection by yourself or others around you $\bar{M} \pm SD: 2.68 \pm 0.914$	
No possibility	137(8.7)
Little possibility	579(36.9)
Some possibility	507 (32.3)
More likely	346(22.1)
Whether need psychological assistance at present $\bar{M} \pm SD: 1.98 \pm 0.629$	
Never considered	283(18.0)
Do not need	1088(69.3)
Need	151(9.6)
In great request	47(3.0)

Table 3 The effects of “COVID-19” on nurses

What pneumonia affects you most is

Work and study

Daily life

Mood status

Family reunion

Recent sleep situation compared to the past [M ± SD: 3.04±0.749]

Sleepless night

Hard to fall asleep

Slightly difficult

Same as before

Are you easily upset recently [M ± SD: 2.66±0.938]

No

Occasionally

Sometimes

Frequently

Avoidance to work

Yes

No

Possible to avoid the occupational duty (M ± SD: 1.39±0.522)

Not at all possible

Not possible

Possible

In all probability

Restriction of Social activities

Yes

No

Interpersonal isolation

Yes

No

Table 4 Factors associated with nurse's anxiety and depression (N=1569)

Independent Variables	Anxiety			Depression		
	Univariate Analyses	Multiple Regression Analysis		Univariate Analyses	Multiple Regression Analysis	
	P-values	Beta ²	P-values ¹	P-values	Beta ²	P-values ¹
Demographics						
Gender (0=Male, 1=Female)	0.131 ³	-	-	0.058 ³	-	-
Age	0.030 ⁴	-	-	0.001 ⁴	-	-
Education level	0.848 ⁴	-	-	0.805 ⁴	-	-
Marital status	0.083 ³	-	-	0.374 ³	-	-
Need to care for children	0.011 ³	-	-	0.111 ³	-	-
Need to care for elders (0=Yes,1=No)	<0.001 ³	-1.307	0.030	0.020 ³	-	-
Years of working	0.005 ⁴	1.135	0.011	0.023 ⁴	1.576	0.008
Work Position	0.488 ³	-	-	0.148 ³	-	-
Hospital level	0.385 ³	-	-	0.359 ³	-	-
Stressor					-	-
COVID-19-designated hospital	0.012 ³	-	-	0.049 ³	-	-
Working Department	0.076 ³	-	-	0.023 ³	-1.494	0.025
Experience of caring for a confirmed or suspected case	0.187 ³	-	-	0.039 ³	-3.727	0.014
The reserve personnel to assist Wuhan	0.066 ³	-	-	0.017 ³	-	-
Fear of contagion	<0.001 ⁴	1.616	<0.001	0.004 ⁴	1.028	0.001
Knowledge level related to "COVID-19"	0.038 ⁴	-	-	<0.001 ⁴	-1.309	0.025
Desire to learn about "COVID-19"	0.002 ⁴	-0.884	0.030	<0.001 ⁴	-1.867	0.001
Coping strategies						
Avoidance to work	0.088 ³	-	-	0.925 ³	-	-
Avoid the occupational duty	<0.001 ⁴	1.760	<0.001	<0.001 ⁴	2.329	<0.001

Restriction of Social activities	0.030 ³	-	-	0.337 ³	-	-
Interpersonal isolation	0.010 ³	-0.986	0.046	0.332 ³	-	-
Social support						
Outside views on medical staff	<0.001 ⁴	-1.250	<0.001	<0.001 ⁴	-1.453	0.001
Satisfaction with outside material assistance	<0.001 ⁴	-1.084	<0.001	<0.001 ⁴	-1.190	0.003
Acceptance of epidemics management	<0.001 ⁴	-1.731	<0.001	<0.001 ⁴	-2.824	<0.001

1: Stepwise multiple regression analysis with dependent variable the anxiety about the "COVID-19" and independent variables the major demographic variables and the statistically significant variables of the univariate comparisons; Cumulative R² Adjusted= 0.110; F = 22.615, p <0.05 2: Standardized beta coefficients; 3: two-tailed t-test; 4: One-way ANOVA.