Original Article

Hospital ethical climate associated with the professional quality of life among nurses during the early stage of COVID-19 pandemic in Wuhan, China: A cross-sectional study

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ABSTRACT

Objectives: To describe the professional quality of life and explore its associated factors among nurses coming from other areas of China to assist with the anti-epidemic fight in Wuhan and especially examine whether the hospital ethical climate was independently associated with nurses' professional quality of life.

Methods: A cross-sectional online survey was conducted from March 2020 to April 2020. The nurses working in Wuhan from the other parts of China were the target population. The Professional Quality of Life Scale version 5, the Hospital Ethical Climate Survey, and a basic information sheet were used to collect data. Descriptive statistics, *t*-test, ANOVA, Pearson correlation, and multiple linear regression analysis were used to analyze the data.

Results: In total, 236 nurses participated in this study, and 219 valid questionnaires were analyzed. The average age of the participants was 31.2 ± 5.0 years. Most nurses were female (176/219; 80.4%) and married (145/219; 66.2%). In term of professional quality of life, nurses reported moderate (129/219; 58.9%) to high (90/219; 41.1%) levels of compassion satisfaction, low (119/219; 54.3%) to moderate (100/219; 45.7%) levels of burnout, and low (67/219; 36.0%) to high (10/219; 4.6%) levels of secondary traumatic stress. Regarding hospital ethical climate, nurses reported moderately high hospital ethical climates with an average score of 4.46. After controlling for socio-demographic characteristics, the multiple linear regression models showed that the hospital ethical climate subscale of "relationship with physicians" was independently associated with the compassion satisfaction ($\beta = 0.533$, $P < 0.01$) and burnout ($\beta = -0.237$, $P < 0.05$); the hospital ethical climate subscale of "relationship with peers" ($\beta = -0.191$, $P < 0.01$) was independently associated with the secondary traumatic stress.

Conclusions: During the early stage of the pandemic, nurses demonstrated moderate to high level of compassion satisfaction, low to moderate level of burnout, and all nurses experienced secondary traumatic stress. Nurses perceived a high level of hospital ethical climate, and the perceived hospital ethical climate played an important role in promoting nurses' professional quality of life during a life-threatening infectious disease pandemic.

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Peer review under responsibility of Chinese Nursing Association.

What is known?

- The COVID-19 pandemic has become the most severe public health crisis in the present era.
- In the early stage of the outbreak, Chinese nurses faced high risk of infection and many ethical dilemmas in taking care of the COVID-19 patients in the designated hospitals, which might affect their professional quality of life.
- Theoretically, a positive hospital ethical climate might improve the nurses' professional quality of life, namely developing more professional compassion, less burnout and work-related stress.

What is new?

- Anti-pandemic nurses demonstrated higher level of compassion satisfaction, and lower level of burnout during the early stage of the pandemic. And all nurses reported experiencing secondary traumatic stress.
- Anti-pandemic nurses perceived higher level of hospital ethical climate during the early stage of the pandemic due to the sound ethical environment established in that context.
- The perceived sound hospital ethical climate established in hospitals was associated with the improvement of professional quality of life among nurses, which could potentially enhance the quality of care for patients.

1. Introduction

Coronavirus disease 2019 (COVID-19) has been characterized as a pandemic by the World Health Organization [1], and has become the most severe public health crisis in the present era [2]. In order to control the pandemic, more than 42,000 healthcare workers, including 28,600 nurses from other provinces of China, came to Hubei Province to assist with patient care [3]. These nurses were regarded as anti-pandemic nurses. During the early stage of the COVID-19 pandemic, the scarcity of personal protective supplies put these healthcare workers' lives at the most risk of infection. Up to February 24, 2020, a total of 3387 Chinese healthcare workers were infected with COVID-19; more than 90% were in Hubei province [4]. Facing a sudden and immediately life-threatening infectious disease could lead to a series of emotional symptoms in nurses. Many studies [5–7] showed that a considerable proportion of anti-pandemic nurses self-reported experiencing severe mental health symptoms, such as distress, anxiety, insomnia, and depression, and some even experienced secondary traumatic stress [8], all of which might affect their professional quality of life (ProQOL).

ProQOL is a multi-dimensional concept including two components, namely compassion satisfaction and compassion fatigue, and the latter consists of two components of burnout and secondary traumatic stress [9]. Compassion satisfaction is the satisfaction achieved within one's work by helping others and fulfilling one's professional responsibility well [9]. Burnout is a condition often associated with feelings of inability and hopelessness to perform job duties effectively [9]. Secondary traumatic stress is the psychological stress or emotional pain resulting from the desire to relieve others' suffering [9,10]. Recent studies indicated that healthcare workers might suffer high level of compassion fatigue, and their ProQoL might be impaired in the present health crisis [11,12].

Many factors could influence ProQOL for nurses, including demographic and work-related characteristics [9,13]. In addition, based on Stamm's [9] conceptual framework, which elaborated the relationships between compassion satisfaction, burnout, and secondary traumatic stress among anti-pandemic nurses, the work environment, clients' (patients) environment, and the person's (healthcare workers) environment all have influences on nurses' ProQOL. These environmental factors are similar to Olson's concept of hospital ethical climate, which focuses on the individual's perception on their organizations. Specifically, hospital ethical climate refers to the "individual perception on the organization that influences attitude and behavior, and serves as a reference for employee's behavior" [14]. This concept includes five dimensions: nurses' perceived relationships with peers, patients, managers, physicians, and hospital [14]. Based on the above conceptual framework and concepts, theoretically, a positive hospital ethical climate might help nurses develop more professional compassion, less burnout and work-related stress, and improve adherence to ethical principles and organizational commitment [15–18]. On the contrary, if nurses were not supported by their hospital ethical climate when performing their duties, they might be reluctant to fulfill their responsibility and get tired of their work [19]. This hypothesis has been confirmed in a previous study conducted in diversified wards of a Iran teaching hospital, in which nurses' perception of hospital ethical climate was associated with their ProQOL [15].

During the early stage of the COVID-19 pandemic, many unprecedented strategies were used to assist healthcare workers to quickly adapt to their new work environments and effectively participate in the fight against the pandemic, such as calling for donations and supplies to meet the needs of healthcare workers, creating a humanistic administrative system with fewer hours on one shift; close supervision on donning and doffing personal protective equipment; necessary training; psychological counseling; and guaranteeing adequate food, transportation and accommodations for healthcare workers [20–24]. Would sound hospital ethical climates be established for the new medical teams/designated hospitals with the implementation of such strategies ? How would a sound hospital ethical climate affect nurses' ProQOL? To date, little is known about the anti-pandemic nurses' ProQOL and perception of the hospital ethical climate, nor whether the hospital ethical climate influenced nurses' ProQOL.

Therefore, the purpose of the present study was to (a) describe the level of ProQOL and the perceived hospital ethical climate among Chinese nurses who supported Wuhan in fighting against COVID-19, (b) explore the relevant influencing factors of ProQOL, and especially examine whether the perceived hospital ethical climate had an impact on ProQOL for anti-pandemic nurses during the early stage of COVID-19 outbreak.

2. Methods

2.1. Study design

A cross-sectional study was conducted through an online survey.

2.2. Participants and settings

The target population was the nurses who came from other areas of China to take care of COVID-19 patients in Wuhan from January to April 2020. Seven medical teams (Sichuan medical team, Hunan medical team, Liaoning medical team, Guangdong medical team, Guangxi medical team, Jilin medical team, and Guizhou medical team) were selected to recruit potential nurses. The nurses were eligible for this study if they were: (a) registered nurses; (b) working in designated hospitals for COVID-19 patients for at least one week; (c) providing direct patient care; (d) from other areas of

the country other than Wuhan; and (e) volunteering to participate in this study. Participants who withdrew from frontline clinical work due to exposure, suspected/confirmed COVID-19 infection, and other events during the survey period were excluded.

2.3. Data collection

Data were collected from March 2020 to April 2020 through an online survey (http://www.sojump.com). Initially, a flyer was sent out to the targeted anti-pandemic nurses through Wechat (an instant online chatting platform) groups. Those who were interested in this study could click the QR code to fill out the survey. Once they read the electronic informed consent explaining the purpose, risks, and benefits of the study on the smartphone or the computer interface and clicked the "Agree" button could they continue to start filling out the survey. They were provided with an opportunity for a random lottery valued 10 CNY (1.527 US$), which was set up in advance by the researcher and automatically performed by the *Sojump* online platform. Participants could easily accept the lottery by depositing it into their Wechat account. The login IDs were recorded automatically, and thus each smartphone or computer could only submit the survey once. To fill out the survey typically took about 10 min, and if the questionnaire was submitted within 3 min, it was deemed invalid. Only all the items required to be filled out, could they submit the questionnaire. Participants could withdraw at any time. No personal identifiers were collected, and all the data were exported from the *Sojump* Platform and stored safely in an offline password-protected computer, and only research staff could access the data.

2.4. Instruments

2.4.1. Basic information sheet
Age, gender, ethnicity, marital status, educational background, being the only child in the family, have a child, religious background, ethical training experience, professional qualification, years worked as a nurse, monthly income, employment type, working setting, days worked in isolation wards, and whether reducing the number of face-to-face contact with COVID-19 patients due to the occupational prevention requirements were collected.

2.4.2. Professional quality of Life Scale version 5
ProQOL was measured using the Professional Quality of Life Scale version 5 (ProQOL version 5) developed by Stamm [9] in the United States in 2010. The Chinese version of the ProQOL scale used in this study was translated and localized by Zheng et al. [25] in 2013, and consists of 30 items representing two components (three subscales): the positive component (compassion satisfaction) and the negative component (Burnout and secondary traumatic stress). Each subscale has 10 items and uses a 5-point Likert scale, scoring from 1 = "never" to 5 = "very often". For each subscale, a raw score of 22 or less indicates a low level of compassion satisfaction, burnout, or secondary traumatic stress; raw score of 23–41 indicate moderate levels, and raw score of 42 and above indicate a high level. The compassion satisfaction, burnout, and secondary traumatic scales had Cronbach's α coefficients of 0.88, 0.75, and 0.81, respectively [9]. The ProQOL manifested acceptable reliability in the current study with Cronbach's α coefficients of 0.91, 0.79, and 0.87 for the three subscales, respectively.

2.4.3. Hospital Ethical Climate Survey
Hospital ethical climate was measured using the Hospital Ethical Climate Survey (HECS) developed by Olson [14] in the United States in 1998 and adapted in China by Wang et al. [26] in

2018. The 25 items on the HECS are organized into five subscales: relationship with peers (4 items), patients (4 items), managers (6 items), physicians (5 items), and hospital/Organization (6 items). The responses use a 5-point Likert scale ranging from 1 = "almost never true" to 5 = "almost always true". A total score can be calculated, and higher score indicate more positive perception of hospital ethical climate. The subscales had Cronbach's α coefficients of 0.73, 0.68, 0.92, 0.77, and 0.81, respectively [14]. The HECS for the current study had acceptable reliability with Cronbach's α coefficients of 0.83, 0.84, 0.89, 0.83, and 0.88 for the subscales, respectively, and 0.97 for the total scale.

2.5. Ethical consideration

This study was approved by the Institutional Review Board (IRB) of Xiangya Nursing School of Central South University before data collection (Approval No. E202023). An electronic informed consent was sent to the participants to ensure they fully understood the study purpose and procedure, and the risks and benefits of participating in this study. Participation was voluntary and anonymous. All participants were assured confidentiality and informed about the right to withdraw at any time.

2.6. Statistical analysis

Frequencies and percentages were used to describe categorical variables, and means and standard deviations were used to describe the distributions of continuous variables. Student's *t*-test, one-way analysis of variance (one-way ANOVA), and Pearson's correlations were used to examine the associations between sociodemographic characteristics, hospital ethical climate subscales, and the level of compassion satisfaction, burnout, and secondary traumatic stress. Multiple linear regression models were conducted to determine whether the perceived hospital ethical climate was an independent predictor of professional quality of life among anti-pandemic nurses. All the significant variables during the bivariate analysis were entered into the regression model using the stepwise approach. Data were analyzed using SPSS 24.0. The significance level was set at $\alpha = 0.05$, and all tests were 2-tailed.

Sample size was estimated according to the textbook of Medical Statistics for Chinese graduate Students, which recommended that an estimated sample size could be 5–10 times more than the independent variables by using multiple linear regression model. In this study there were 20 independent variables and thus an estimated number of 100–200 participants were required.

3. Results

3.1. Sociodemographic characteristics

A total of 236 nurses participated in the study (with a response rate of 33.7%, 236/700), and 219 questionnaires with completed information were used for analysis. The nurses' average age was 31.17 ± 4.99 years (range: 20–52 years). The majority were female (176/219; 80.4%), Han ethnicity (203/219; 92.6%), married (145/219; 66.2%), having no religion (187/219; 85.4%), having baccalaureate degrees in nursing (169/219; 77.2%), contract-employed (141/219; 64.4%), and had received ethical training before (155/219; 70.8%) (Table 1).

3.2. Nurses' professional quality of life

The average scores for the subscales of compassion satisfaction, burnout, and secondary traumatic stress were 39.58 ± 6.91 (range 24–50), 21.71 ± 6.13 (range 10–37), and 26.12 ± 8.09 (range

Table 1
Characteristics of nurses in the study ($n = 219$).

Characteristics	n	%
Gender		
Male	43	19.6
Female	176	80.4
Ethnicity		
Han	203	92.6
Minority	16	7.4
Marital status		
Single	57	26.0
Married	145	66.2
Divorced/widowed	17	7.8
Educational background		
Certificate (vocation school)	6	2.7
Associate degree	29	13.2
Bachelor's degree	169	77.2
Master's degree	15	6.9
Being the only child in the family		
Yes	97	44.2
No	122	55.8
Have a child		
Yes	136	62.1
No	83	37.9
Religious background		
Yes	32	14.6
No	187	85.4
Ethical training experience		
Yes	155	70.8
No	64	29.2
Professional qualification		
Level 1	18	8.2
Level 2	124	56.6
Level 3	63	28.8
Level 4	10	4.6
Level 5	4	1.8
Years worked as a nurse		
≤5	25	11.4
6—10	106	48.5
11—15	52	23.7
16—20	20	9.1
≥21	16	7.3
Monthly income (CNY)		
≤3999	11	5.0
4000—5999	71	32.4
6000—7999	71	32.4
8000—9999	43	19.7
≥10000	23	10.5
Employment type		
State-employed	78	25.6
Contract-employed	141	64.4
Working setting		
Intensive care unit (ICU)	73	33.4
COVID-19 isolation ward	112	51.1
Fangcang shelter hospitals	34	15.5
Days worked in isolation wards		
≤10	3	1.4
11—20	68	31.1
21—30	52	23.7
31—40	24	11.0
≥41	72	32.8
Whether reducing the frequency of face-to-face contact with COVID-19 patients due to the occupational prevention requirements		
Yes	29	13.2
Uncertain	66	30.1
No	124	56.7

Note: Level 1 are new nurses who have passed the National Nurse Practitioner Registration Examination; Level 2 are nurses who have had 1—5 years of experience after level 1 and passing primary title examination; Level 3 are nurses who have had 1—7 years of experience after level 2 and passing intermediate title examination; Level 4 are nurses who have had 2—7 years of experience after level 3 and passing senior title examination; Level 5 are nurses who have had 5 years of experience after level 4 and have specified academic performance. 100 CNY = 15.27 US$.

10—50), respectively. None of the nurses had reported low level of compassion or high level of burnout. All the nurses reported experiencing secondary traumatic stress, and most of them (130/219; 59.4%) reported a moderate level (Table 2).

3.3. Nurses' perceived hospital ethical climate

The average hospital ethical climate scores were 4.45 ± 0.60, which indicated a moderately high hospital ethical climate. The average scores for the domains of hospital ethical climate including nurses' relationships with peers, patients, managers, physicians, and hospital were 4.49 ± 0.65, 4.48 ± 0.62, 4.50 ± 0.65, 4.33 ± 0.65, and 4.44 ± 0.61, respectively.

3.4. The association between socio-demographic/working characteristics and professional quality of life

The bivariate analysis showed that age, ethnicity, educational background, religious background, ethical training experience, professional qualification, years worked as a nurse, days worked in isolation wards, and self-reported whether reducing the number of face-to-face contact with COVID-19 patients due to the occupational prevention requirements were significantly associated with compassion satisfaction. Age, gender, ethnicity, educational background, religion, ethical training experience, professional qualification, years worked as a nurse, and self-reported whether reducing the number of face-to-face contact with COVID-19 patients due to the occupational prevention requirements were significantly associated with burnout. Gender, educational background, religious background, and employment type were significantly associated with secondary traumatic stress (Table 3).

3.5. The association between professional quality of life and hospital ethical climate

Pearson correlation tests showed that the subscale of compassion satisfaction was positively associated with the HECS subscales ($r = 0.497$ to 0.563, all $P < 0.01$), and the subscales of burnout and secondary traumatic stress negatively associated with the HECS subscales ($r = -0.475$ to -0.439, all $P < 0.01$; $r = -0.240$ to -0.148, all $P < 0.05$) (Table 4).

After controlling for the socio-demographic/working characteristics, the multiple linear regression models showed that relationship with physicians ($\beta = 0.533, P < 0.001$; $\beta = -0.237, P < 0.05$) was independently associated with the subscales of compassion satisfaction and burnout. A positive relationship with physicians could help nurses increase compassion satisfaction and lessen burnout. Also, relationship with peers ($\beta = -0.192, P < 0.01$) was independently associated with the subscale of secondary traumatic stress. The better the perceived relationship with peers, the lower level of secondary traumatic stress nurses experienced (Table 5).

4. Discussion

To the best of our knowledge, this might be the first study to explore the status of ProQOL and hospital ethical climates among anti-pandemic nurses coping with COVID-19. Our study showed that anti-pandemic nurses reported a moderate level of ProQOL and a positive perception of hospital ethical climate, and highlighted that a sound hospital ethical climate established in hospitals could benefit the improvement of ProQOL among nurses.

What is surprising is that the anti-pandemic nurses in our study demonstrated greater professional compassion satisfaction than those Chinese nurses showed prior to the pandemic [27—29]. Although this result might seem counter-intuitive, it was consistent

Table 2
The status of nurses' professional quality of life ($n = 219$).

Subscale	n	%
Compassion satisfaction		
Low	0	0
Moderate	129	58.9
High	90	41.1
Burnout		
Low	119	54.3
Moderate	100	45.7
High	0	0
Secondary traumatic stress		
Low	67	36.0
Moderate	130	59.4
High	10	4.6

with the study results from Spain and Italy during the pandemic [11,12]. First of all, fighting the COVID- 19 pandemic allowed nurses to connect strongly with their intrinsic motivation to make great efforts to take good care of their patients [30,31]. Our findings revealed that those nurses who self-reported reducing the number of face-to-face contact with COVID-19 patients due to the occupational prevention requirements experienced lower compassion satisfaction. Avoiding direct contact with COVID-19 patients implied a mind-set of patient avoidance, which was the most complex dilemma concern [32]. Indeed, it violated nurses' professional value and work motivation to care for patients, and let nurses fall into the ethical dilemma of self-blame and guilt [33—35]. Second, an ethical social support environment, such as widespread media support and recognition for health-risk taking endeavors, could reinforce their choice of participating in this care activity and the value of their efforts [36]. Therefore, improving the hospital ethical climate could have nurses perceive their professional values deeply and create stronger compassion to take care of patients.

Our study indicated that nurses who had a more positive relationship with physicians were more likely to have higher compassion satisfaction and lower burnout. Long-standing affiliation in seniority hierarchies among nurses and physicians could result in an unstable practice environment, and the unequal social status could further affect nurses' professional independence, professional identity, and professional value [12,37]. The items assessing relationship with physicians mainly include mutual trust, mutual respect, and nurses' autonomy in clinical decision-making in term of the hospital ethical climate scale. When nurses were satisfied with their relationships with physicians, they would feel their work gained professional acknowledgment. Physicians and nurses played different roles in the treatment of COVID-19 patients. Nurses should execute all medical orders quickly, efficiently and prudently, while physicians should respect and give full play to the professional independence of nurses. Nurse leaders must be aware of the significance of nurse-physician relationships in improving the nurses' ProQOL and provide appropriate facilitation to improve their relationships in Chinese clinical settings.

Another unexpected result demonstrated by our study was that anti-pandemic nurses reported a lower level of burnout compared with nurses who worked in the non-pandemic period [27—29,38]. High levels of burnout indicated that nurses possessed insufficient resources to respond to their jobs' demands. According to several studies and reviews, nurses working in a supportive work environment were less likely to report a high level of burnout [39—41]. Thus, we believe that the positive hospital ethical climate established in the temperate isolated wards, such as the reasonable shift schedule of limiting anti-pandemic nurses' work hours to 4—6 h instead of the regular 8 h, might play a significant role in reducing burnout [20,22]. The data were collected from March to April 2020,

when the epidemic in Wuhan was almost contained, thus the perceived achievement might buffer the burnout.

Another significant finding of this study was that Chinese anti-pandemic nurses had higher secondary traumatic stress than nurses coping with the COVID-19 pandemic in Spain and Italy [11,12], and nurses working in other healthcare settings in the world [27—29,38]. Secondary traumatic stress was an occupational hazard for nurses who provided direct patient care, which stemmed from helping or wanting to help a traumatized or suffering person [10]. During the early stage of the COVID-19 pandemic, Chinese nurses faced great uncertainty trying to stop the pandemic in life-threatening situations. Furthermore, the frontline healthcare workers were witnessing the rising number of healthcare workers getting infected with, and some dying from, COVID-19. Although psychological counseling services were provided for all medical personnel, 4.6% of participants reported experiencing a high level of secondary traumatic stress.

Our results indicated that a positive relationship with peers might reduce nurses' secondary traumatic stress. The high level of cooperation with peers required by the nursing profession led to a strong alliance based on professional values and responsibilities. Previous studies reported that social support, especially from peers, could keep nurses focused and intent on collectively overcoming the challenges they faced and alleviate secondary traumatic stress [42,43]. A peer support program of the United Kingdom's National Institution for Health and Care Excellence (NICE) guidelines has been recommended as self-care strategies for frontline healthcare workers' trauma situations [44]. A recent study [45] also indicated that COVID-19 related trauma might cause or aggravate distress and burnout symptoms and decrease the work efficiency among healthcare workers who were lacking peer support. Thus, timely psychological counseling and emotional support are called for healthcare workers in a health crisis.

5. Limitations

Our study has several limitations. First, the non-random sample due to the urgent situation and massive clinical task for anti-pandemic nurses might result in a selective bias. Second, the online survey data collection method has its own limitation on data reliability. To address this, we set detailed instructions for completing the survey, and we also restricted the IP address to avoid repeatedly filling out the questionnaire. Third, this is a cross-sectional study, and we have only found a statistical association between hospital ethical climate and ProQOL at this one time point. Thus, to clarify the nature of the relationship between hospital ethical climate and ProQOL, more studies are needed in the future.

6. Conclusions

This study indicated a moderate level of ProQOL and a positive perception of hospital ethical climate among nurses coming from other areas of China to Wuhan during the early stage of the COVID-19 pandemic. Furthermore, the perception of hospital ethical climate played a vital role in developing nurses' ProQOL in the clinical healthcare settings. Accordingly, this study provides implications that establishing positive physician-nurse relationships, proving peer support, and creating an ethical environment in clinical settings could improve the ProQOL for nurses and care quality.

Table 3
Association between sociodemographic variables and professional quality of life among nurses ($n = 219$).

Variables	Compassion satisfaction		Burnout		Secondary traumatic stress	
	Mean ± SD	t/F	Mean ± SD	t/F	Mean ± SD	t/F
Age		2.497*		2.549*		0.973
≤25	36.70 ± 8.05		22.78 ± 7.10		26.87 ± 7.67	
26−30	40.30 ± 6.54		20.63 ± 5.52		25.18 ± 8.71	
31−35	40.41 ± 6.89		22.03 ± 6.38		26.82 ± 7.83	
36−40	38.22 ± 6.68		23.00 ± 5.96		27.16 ± 7.68	
41−45	34.40 ± 4.04		27.20 ± 5.12		27.40 ± 5.51	
≥46	45.33 ± 5.03		15.33 ± 4.62		19.00 ± 1.73	
Gender		−1.236		4.088***		3.228**
Male	38.42 ± 7.70		25.02 ± 5.91		30.30 ± 9.94	
Female	39.87 ± 6.64		20.90 ± 5.93		25.10 ± 7.25	
Ethnicity		3.644***		−2.732**		−0.996
Han	40.05 ± 6.58		21.40 ± 6.05		25.97 ± 8.13	
Minority	33.69 ± 8.40		25.69 ± 5.93		28.06 ± 7.52	
Marital status		1.153		0.758		0.405
Single	39.98 ± 7.15		21.61 ± 5.93		26.00 ± 9.24	
Married	39.71 ± 6.58		21.54 ± 6.02		25.97 ± 7.71	
Divorced/widowed	37.18 ± 8.68		23.47 ± 7.77		27.82 ± 7.42	
Educational background		4.025**		3.335*		3.534*
Certificate (technical school)	31.50 ± 9.61		26.00 ± 7.67		30.00 ± 7.10	
Associate degree	39.10 ± 6.87		21.41 ± 6.51		25.59 ± 6.70	
Bachelor's degree	40.18 ± 6.65		21.27 ± 5.97		25.56 ± 8.22	
Master's degree	37.07 ± 6.77		25.53 ± 5.14		32.00 ± 7.27	
Being the only child in the family		−0.153		0.263		0.001
Yes	39.51 ± 7.30		21.84 ± 6.18		26.12 ± 8.46	
No	39.65 ± 6.61		21.61 ± 6.12		26.12 ± 7.82	
Have a child		0.998		0.093		0.244
Yes	39.95 ± 6.47		21.74 ± 6.30		26.23 ± 7.49	
No	38.99 ± 7.44		21.66 ± 5.89		25.95 ± 9.04	
Religious background		−3.038**		2.370*		2.317*
Yes	36.22 ± 6.65		24.06 ± 5.57		29.16 ± 7.12	
No	40.16 ± 6.81		21.31 ± 6.15		25.60 ± 8.15	
Ethical training experience		2.023*		−2.010*		−0.405
Yes	40.19 ± 7.03		21.18 ± 6.32		25.98 ± 8.50	
No	38.13 ± 6.44		23.00 ± 5.49		26.47 ± 7.07	
Professional qualification		4.594**		3.175*		2.042
Level 1	38.56 ± 7.01		21.17 ± 7.60		23.61 ± 5.56	
Level 2	40.59 ± 6.71		20.88 ± 5.88		25.45 ± 8.71	
Level 3	39.05 ± 6.47		22.70 ± 5.65		27.75 ± 7.37	
Level 4	37.30 ± 7.93		23.50 ± 7.62		26.00 ± 7.45	
Level 5	27.25 ± 3.86		30.00 ± 2.00		33.00 ± 3.16	
Years worked as a nurse		3.469**		3.739**		1.703
≤5	41.24 ± 4.86		20.08 ± 5.53		25.96 ± 6.68	
6−10	40.25 ± 6.79		20.57 ± 5.89		25.07 ± 8.23	
11−15	40.02 ± 6.12		23.10 ± 5.78		27.56 ± 7.90	
16−20	36.00 ± (8.38		24.50 ± 5.54		29.20 (±6.95	
≥21	35.63 ± 8.66		23.88 ± 8.21		24.88 ± 6.68	
Monthly income (CNY)		0.899		1.126		1.641
≤3999	39.36 ± 8.33		22.91 ± 4.72		29.55 ± 6.06	
4000−5999	39.89 ± 6.88		21.52 ± 6.60		25.38 ± 8.69	
6000−7999	40.35 ± 6.51		20.70 ± 5.95		24.97 ± 6.28	
8000−9999	39.05 ± 6.27		22.79 ± 5.83		28.00 ± 8.85	
≥10000	37.39 ± 8.56		22.83 ± 6.22		26.83 ± 9.88	
Employment type		−0.236		0.861		2.080*
State-employed	39.44 ± 6.99		22.19 ± 6.23		27.64 ± 8.16	
Contract-employed	39.67 ± 6.88		21.45 ± 6.08		25.28 ± 7.96	
Working setting		1.009		0.180		1.490
Intensive care unit (ICU)	40.49 ± 6.79		21.60 ± 6.58		27.33 ± 9.68	
COVID-19 isolation ward	39.24 ± 6.47		21.61 ± 5.75		25.25 ± 6.29	
Fangcang shelter hospital	38.76 ± 8.44		22.29 ± 6.53		26.41 ± 9.45	
Days worked in isolation wards		4.372**		1.253		1.358
≤10	44.67 ± 7.51		24.00 ± 9.17		31.67 ± 14.36	
11−20	39.97 ± 6.75		21.88 ± 6.35		27.07 ± 7.72	
21−30	40.08 ± 7.76		20.60 ± 6.13		24.63 ± 8.58	
31−40	34.42 ± 6.85		23.79 ± 6.19		24.46 ± 7.25	
≥41	40.38 ± 5.70		21.57 ± 5.76		26.63 ± 8.00	
Whether reducing the frequency of face-to-face contact with COVID-19 patients due to the occupational prevention requirements		7.273**		7.692**		0.379
Yes	36.28 ± 6.86		25.24 ± 6.41		27.28 ± 8.41	
Uncertain	38.39 ± 6.83		22.30 ± 6.28		26.18 ± 7.44	
No	40.99 ± 6.62		20.57 ± 5.66		25.82 ± 8.39	

Note: *P < 0.05, **P < 0.01, ***P < 0.001.100 CNY = 15.27 US$.

Table 4
Correlations between professional quality of life and ethical climate among nurses ($n = 219$).

Scale and subscales	1	2	3	4	5	6	7	8
1.Compassion satisfaction	—							
2.Burnout	−0.612**	—						
3.Secondary traumatic stress	−0.047	0.678**	—					
4.HECS total	0.555**	−0.481**	−0.223**	—				
5.Relationship with peers	0.503**	−0.442**	−0.240**	0.930**	—			
6.Relationship with patients	0.505**	−0.439**	−0.212**	0.955**	0.864**	—		
7.Relationship with managers	0.541**	−0.475**	−0.240**	0.960**	0.902**	0.888**	—	
8.Relationship with physicians	0.563**	−0.458**	−0.148*	0.922**	0.794**	0.853**	0.844**	—
9.Relationship with hospital	0.497**	−0.451**	−0.213**	0.941**	0.814**	0.892**	0.885**	0.847**

Note: Data are r values. *$P < 0.05$, **$P < 0.01$. HECS = Hospital Ethical Climate Survey.

Table 5
Multiple linear regression analysis of professional quality of life among nurses ($n = 219$).

Dependent variables	Independent variables	B	SE	β	t	Adjusted R^2	F
Compassion satisfaction	Relationship with physicians	5.647	0.603	0.533	9.358***	0.327	53.971***
	Whether reducing the frequency of face-to-face contact with COVID-19 patients due to the occupational prevention requirements[a]	1.275	0.550	0.132	2.319*		
Burnout	Relationship with managers	−1.792	1.058	−0.189	−1.694	0.277	21.906***
	Gender (Female as reference)	2.991	0.923	0.194	3.241**		
	Whether reducing the frequency of face-to-face contact with COVID-19 patients due to the occupational prevention requirements[a]	−1.356	0.512	−0.158	−2.651**		
	Relationship with physicians	−2.232	1.016	−0.237	−2.197*		
Secondary traumatic stress	Gender (Female as reference)	4.299	1.349	0.212	3.187**	0.091	11.976***
	Relationship with peers	−2.365	0.824	−0.192	−2.871**		

Note: *$P < 0.05$, **$P < 0.01$, ***$P < 0.001$. [a] Assignment to the variable: 1 = Yes, 2 = Uncertain, 3 = No.

CRediT authorship contribution statement

Wenjing Jiang: Conceptualization, Methodology, Investigation, Formal analysis, Data curation, Writing − original draft. **Xing'e Zhao:** Methodology, Investigation, Resources. **Jia Jiang:** Investigation, Resources. **Qidi Zhou:** Investigation, Resources. **Jiahui Yang:** Formal analysis, Validation. **Yuqing Chen:** Formal analysis, Validation. **Lloyd Goldsamt:** Writing − review & editing. **Ann Bartley Williams:** Writing − review & editing. **Xianhong Li:** Conceptualization, Methodology, Supervision, Resources, Writing − review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgments

Data availability

The data that support the findings of this study will be available from the corresponding author on reasonable request.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ijnss.2021.05.002.

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