Impact of COVID-19 on psychology of nurses working in the emergency and fever outpatient:A cross-sectional survey

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Abstract

Background COVID-19 poses a great challenge to the global health system. The nurses of emergency and fever outpatient (EFO) act as gatekeepers to the health care system in the public health response to COVID-19 epidemic. This study examined the psychological impact of COVID-19 upon EFO nurses in Chinese hospitals.

Methods In midmonth of February, 2020, convenience sampling was used to recruit EFO nurses from hospitals in Jiangsu Province. Data were obtained by self-administered online questionnaires, which consisted of a general questionnaire, the Self-Rating Anxiety Scale, Perceived Stress Scale-14 and Simplified Coping Style Questionnaire. A total of 481 questionnaires were returned and 453 valid questionnaires were recovered. Multiple linear regression was used to explore the influence of socio-psychological and working condition factors on anxiety, stress and stress coping tendency. Pearson correlation coefficients were calculated to assess the associations among anxiety, stress and coping tendency.

Results Among the participants, 281(62.03%) had no anxiety symptoms, 154(34.00%) had mild anxiety, 16(3.53%) had moderate anxiety, and 2(0.44%) had severe anxiety. There were 146(32.23%) participants with scores greater than 25 in the PSS, indicating excessive stress. We found that 229(50.55%) participants were more likely to respond positively to stress, while 224(49.45%) were more likely to respond negatively. The models we used included gender, fear of infecting family members, regretting being a nurse, having children, confidence in fighting outbreak, rest time, professional attitudes, having attended infection prevention training, and number of night shifts; and they were all predictors of the mental health of EFO nurses. Pearson correlation showed a positive correlation of the anxiety with stress score (r=0.443, P<0.001), while the coping tendency score was found negatively correlated with anxiety (r=-0.268, P< 0.001) and stress (r=-0.503, P< 0.001).

Conclusion COVID-19 has a certain psychosocial impact upon EFO nurses. Effective measures, such as strengthening protection training, adequate nurses for emergency and fever clinics, reducing night shifts, and timely updates of latest epidemic situation, should be taken. Moreover, greater attention should be paid to female EFO nurses and nurses with children.

Background

H1N1, SARS, Ebola, Zika and other infectious diseases frequently occur in recent years, posing serious threats to human health and development [1–5]. In December 2019, Corona Virus Disease 2019 (COVID-19) epidemic broke out in Wuhan, Hubei Province, and quickly spread to the whole country [6]. COVID-19 soon gained global attention due to rapidly growing infected cases. WHO officially declared the outbreak of COVID-19 as a Public Health Emergency of International Concern (PHEIC) on 30 January, 2020. Till Feb 20, 2020, a total of 75 465 infected cases have been confirmed in China, and 2 236 of them have died [7]. Although the outbreak has been effectively under control, the numbers of confirmed and suspected

patients are still increasing. COVID-19 is highly infectious and human-to-human transmission is confirmed [8, 9]. Doctors, nurses and ambulance men are more likely to be infected than any other groups. By February 11, 2020, 1 716(3.8% of the country's confirmed cases) medical workers in China had been infected, and six of them have died, accounting for 0.4% of all deaths in the country [10].

Many hospitals in China have been flooded by the outbreak. Health care workers are at high risk of infection and are also fearful. Meanwhile, they have great burdens in clinical treatment and public prevention. High expectations, lack of time, skills and social support may cause occupational stress, and stresses and challenges can lead to anxiety, post-traumatic stress disorder [11, 12], great distress, and burnout or physical illness. As a result, they may not be able to provide high-quality medical services and may even quit the job as a nurse [13, 14].

Nurses serve as an important force in the fight against the epidemic, and they are under the highest pressure of all medical workers [12, 15].In order to reduce human-to-human transmission in hospitals, many Chinese hospitals have closed some outpatient clinics, only keeping emergency and fever clinic open to receive patients, and EFO nurses act as gatekeepers to the health care system, identifying suspected and confirmed patients by carefully evaluating their clinical manifestations, contact history, and travel history. They are critical to control transmission among patients, staff, visitors, and the community [16]. EFO nurses are most likely to come into contact with suspected patients, which leads to high risk of exposure. Compared with the frontline nursing staffs, EFO nurses receive relatively less attention, their protection training is not so intense, and some staffs may have fluke mentality, with inadequate protective measures. In addition to the higher risk of infection, EFO nurses also have a heavy workload and fear for the safety of their families, which can affect their mental health. During major outbreaks, most studies focused on the mental health of nurses caring for confirmed patients in isolation wards [12, 17–20].Understanding the anxiety, major stressors and coping styles of EFO nurses can help to design intervention and training programs, so as to better meet the psychological needs of EFO nurses, providing actionable guidance for all those involved.

Methods

Participants

The present study was conducted more than a month after the COVID-19 outbreak. In midmonth of February 2020, an online questionnaire was used to investigate the mental health status of EFO nurses in Jiangsu Province. All the participants agreed to participate in the cross-sectional study. The inclusion criteria were as follows:registered nurses; working in hospitals in Jiangsu Province; emergency or fever outpatient(EFO) nurses, who have been exposed to the epidemic for more than one month. Exclusion criteria were as follows: nursing students; other medical workers.

Measures

This was a cross-sectional study using data obtained by self-administered online questionnaires, which consisted of a general questionnaire and the Self-Rating Anxiety Scale, Perceived Stress Scale and Simplified Coping Style Questionnaire. The general information consisted of questions on the descriptive and professional characteristics of the nurses, including their gender, age, technical title, education level, marital status, reproductive history, hospital grade, rest time each week and number of night shifts in the past month, professional attitude, confidence and willingness in fighting transmission, whether the hospitals having confirmed patients, whether they have been in contact with confirmed patients, whether they have attended infection prevention training recently, whether their family supported them, and whether they worried about bringing the virus home?

Instruments

Self-rating anxiety scale (SAS)

SAS, compiled by ZUNG [21] in 1971, can better measure the anxiety feelings and severity of the subjects, and is widely used in various professions. In China SAS scale had been used for the nurses [22, 23]. SAS has 20 items and uses a 4-point scoring system to measure the frequency of symptoms (1=no or little time, 2=a small part of the time, 3=a considerable amount of time, 4=most or all of the time). Of these, 15 items use negative words, which are scored according to the above method from 1 to 4, while the other 5 items use positive words, which are scored in reverse. Adding the scores of all items produces the rough score, and multiplying the score by 1.25 produces the standard score. The higher the standard SAS score, the higher the anxiety level (Chinese norm: normal: <50points; 50 to 59 points for mild anxiety; 60 to 69 points for moderate anxiety; and above 69 points for severe anxiety) [24].

Perceived stress scale (PSS)

PSS is a representative tool for measuring stress. There are three versions of PSS: PSS-14, PSS-10 and PSS-4. The original PSS was compiled by professor Cohen, and consisted of 14 items and 2 dimensions [25]. The shorter forms of the items were selected from the original PSS-14. The PSS scale had been used to measure stress of patients, police, students, nurses, pregnant women and the elderly in many countries [26-36]. PSS-14 was first introduced for Chinese population by professor Yang et al in 2003 [34]. The Chinese version of PSS-14 scale adopted a 5-point scoring system (0=never, 1=almost never, 2=sometimes, 3=fairly often, 4=always). Of these, 7 items (1, 2, 3, 8, 11, 12, 14) belong to the negative dimension, and are scored from 0 to 4, while the other 7 items (items 4, 5, 6, 7, 9, 10, 13) belong to positive dimension, and are scored in reverse. PSS score is obtained by adding the 14 items together, the higher the score the greater the perceived stress. (Chinese norm: normal: ≤25points; stress: >25 points) [34].

Simplified Coping Style Questionnaire (SCSQ)

Professor XIE compiled the SCSQ scale based on the overseas pressure coping style scale and the characteristics of Chinese population [37]. SCSQ is an effective and sensitive instrument for measuring stress response，and it included two dimensions: positive coping (12 items) and negative coping (8 items). The SCSQ uses a 4-point scoring system (0=never, 1=seldom, 2=sometimes, 3=often). Chinese norm: the average score of positive coping dimension is 1.78, while the average score of negative coping dimension is 1.59. When individuals are under stress, they will take various coping measures, including both positive coping style and negative coping style. The following formula can be used to judge the individual's tendency of coping style [24]:

Coping tendency=positive coping standard score - negative coping standard score

Positive coping standard score =（Individual average score for positive coping dimension -Sample positive coping dimension mean）/Sample standard deviation

Negative coping standard score =（Individual average score for negative coping dimension -Sample negative coping dimension mean）/Sample standard deviation

When coping tendency score is greater than 0, it indicates that the positive coping style is mainly adopted; if less than 0, negative coping style is mainly adopted.

Statistical data analysis

Statistical analysis was performed using IBM SPSS 23.0 Statistics. Descriptive statistics included frequency, proportions (%), mean, and standard deviations. Multiple linear regression analysis with a stepwise selection of predictor variables was used to identify the influencing factors of EFO nurses' anxiety, perceived stress and stress coping tendency. Pearson correlation coefficients were calculated to assess the associations among anxiety, stress and coping tendency. Linearity assumptions were checked by tolerance>0.1, variance inflation factor<10, condition index<30 and eigenvalue>0.01 [38]. Homogeneity of variances was checked by scatterplots. The multicollinearity test reported that minimum and maximum variable inflation factors were 1.001 and 1.160 respectively, indicating that there was no multicollinearity. In the final adjusted multiple regression, variables with $p<0.05$ were considered significantly correlated with the measured values. Standardized Beta and 95% confidence interval (CI) coefficients were calculated to evaluate the statistical significance of multivariate regression analysis.

Results

Descriptive statistics

A total of 481 participants were investigated, and 453(94.18%) valid questionnaires were finally included. Demographic statistics, work characteristics and socio-psychological variables of the participants were described in table 1(at the end of the document). Of the 453 nurses, 16(3.53%) were males and 437(96.47%) were females. Mean age was 33.15 years (SD=8.38).Mean working time was 11.33 years (SD=9.25).

Table 1 Characteristics and coding of socio-psychological and working condition variables.

Variables	Variable categories	Code	N (%)
Gender	Male	=1	16(3.53%)
	Female	=0	437(96.47%)
Technical title	Primary nurse	=1	93(20.53%)
	Nurse practitioner	=2	217(47.90%)
	Nurse-in-charge.	=3	118(26.05%)
	Co-chief superintendent nurse and above	=4	25(5.52%)
Education level	College degree	=1	116(25.61%)
	Bachelor degree	=2	333(73.51%)
	Master degree or above	=3	4(0.88%)
Rank of the hospital	Grade Ⅰ Class B hospital and below	=1	39(8.61%)
	Grade Ⅱ Class A hospital	=2	63(13.91%)
	Grade Ⅱ Class B hospital	=3	197(43.49%)
	Grade Ⅲ Class A hospital	=4	154(34.00%)
Marital status	Married	=1	312(68.87%)
	Unmarried	=0	141(31.13%)
Having children	Yes	=1	163(35.98%)
	No	=0	290(64.02%)
Rest time each week in the past month	Less than 1 day per week	=1	17(3.75%)
	One day per week	=2	111(24.50%)
	Two days per week	=3	257(56.73%)
	More than two days per week	=4	68(15.01%)
Number of night shifts in a week	Zero	=0	147(32.45%)
	One night shift a week	=1	87(19.21%)
	Two night shifts a week	=2	109(24.06%)
	Three or more night shifts a week	=3	110(24.28%)
Contact with a confirmed patient	Yes	=1	65(14.35%)
	No	=0	388(85.65%)

Regretting being a nurse	Yes	=1	20(4.42%)
	No	=0	433(95.58%)
Professional attitude	Negative	=0	3(0.66%)
	General	=1	19(4.19%)
	Positive	=2	97(21.41%)
	Strongly positive	=3	334(73.73%)
Confidence in fighting transmission	Lack of confidence	=1	1(0.22%)
	General confident	=2	26(5.74%)
	Quite confident	=3	426(94.04%)
Signed up to go to Hubei Province for support	Yes	=1	385(84.99%)
	No	=0	68(15.01%)
Having attended infection prevention training	Yes	=1	328(72.41%)
	No	=0	125(27.59%)
Family support	Yes	=1	435(96.03%)
	No	=0	18(3.97%)
Hospital for confirmed patient	Yes	=1	181(39.96%)
	No	=0	272(60.04%)
Fear of infecting family members	Yes	=1	361(79.69%)
	No	=0	92(20.31%)

Overall, the results of the scales were SAS (mean=49.01, SD=5.46), PSS-14(mean=21.09, SD=7.76) and SCSQ (positive coping mean=1.97, SD=0.57; negative coping mean=1.13 SD=0.48). Among the participants, 281(62.03%) had no anxiety symptoms, 154(34.00%) had mild anxiety, 16(3.53%) had moderate anxiety, and 2(0.44%) had severe anxiety. There were 146(32.23%) participants with scores greater than 25 in the PSS, indicating excessive stress. 229(50.55%) participants were more likely to respond positively to stress, while 224(49.45%) were more likely to respond negatively. Positive coping scores were higher than the Chinese norm, while negative coping scores were lower than the norm (table 2).

Table 2 Descriptive statistics of the anxiety, stress and coping style

Variable	N (%)	Mean	SD
Anxiety[1]		49.01	5.46
None	281(62.03%)		
Mild anxiety	154(34.00%)		
Moderate anxiety	16(3.53%)		
Severe anxiety	2(0.44%)		
Perceived stress[2]		21.09	7.76
Normal	307(67.77%)		
Stress	146(32.23%)		
Coping style[3]			
coping tendency>0	229(50.55%)		
coping tendency<0	224(49.45%)		
positive coping		1.97	0.57
negative coping		1.13	0.48

Effects of socio-psychological and working condition variables on scores of anxiety, stress and stress coping tendency

The coding of socio-psychological and working condition variables are shown in table 1.The results showed that 19.2% total variation in the anxiety was explained by variables in the model (Adjusted R^2= 0.192, P=0.032). Fear of infecting family members (β=0.263, P=0.000), regretting being a nurse (β=0.216, P=0.000) and having children (β=0.096, P=0.028) were positively associated with anxiety. Confidence in fighting transmission (β=-0.147, P=0.001), gender (β= -0.106, P= 0.015) and rest time each week in the past month (β= -0.092, P=0.032) were inversely associated with anxiety. And female gender, less rest time, having children, lack of confidence in fighting transmission, regretting being a nurse and fear of infection in family were risk factors of anxiety (table 3 see Additional file 1).

In perceived stress domain, 13.7% total variance was explained by the variables in the model (Adjusted R^2=0.137, P=0.014). Fear of infecting family members (β=0.239, P=0.000), regretting being a nurse (β=0.199, P=0.000) and number of night shifts in a week (β=0.109, P=0.014) were positively associated with stress. Having attended infection prevention training (β= -0.122, P=0.006) was inversely associated with stress. The analysis showed that regretting being a nurse, not having an emergency protection training, fear of infection in family and the more night shifts were risk factors of perceived stress (table 4 see Additional file 2).

About 13.2% total variation in stress coping tendency was explained by variables in the model (Adjusted R^2=0.132, P=0.029).Professional attitude (β=0.125, P=0.008), having attended infection prevention training (β=0.108, P=0.015) and signing up to go to Hubei Province for rescue (β=0.099, P=0.029) were positively associated with stress coping tendency. Fear of infecting family members (β= -0.188, P=0.000) and regretting being a nurse (β= -0.155, P=0.001) were inversely associated with stress coping tendency. In other words, participants with a positive professional attitude, not regretting being a nurse, training in emergency preparedness, willingness to go to Hubei Province for rescue, and not fearing infecting family members responded more positively to stress(table 5 see Additional file 3).

The correlation among levels of SAS, PSS and SCSQ.

After controlling for socio-psychological and working condition variables, Pearson correlation coefficients were calculated to assess associations among anxiety, stress and coping tendency. The calculated correlation coefficients were shown in Table 6. Statistically significant positive correlations were found between stress with anxiety (r=0.443, P<0.001), while coping tendency score was negatively correlated with anxiety (r=-0.268, P< 0.001) and stress (r=-0.503, P< 0.001).

Table 6 Correlation among anxiety, stress and coping tendency

Variables	Anxiety	Stress	Coping tendency
Anxiety	1		
Stress	0.443*	1	
Coping tendency	-0.268*	-0.503*	1

[1] Chinese norm: normal: <50points, 50 to 59 points for mild anxiety, 60 to 69 points for moderate anxiety, and above 69 points for severe anxiety.

b Chinese norm: normal: ≤25points, stress: >25 points.

[3] Chinese norm: the average score of positive coping dimension is 1.78, while the average score of negative coping dimension is 1.59.

* P<0.001

Discussion

The purpose of this study was to investigate the psychological impact of COVID-19 on EFO nurses in Chinese hospitals. We explored the effects of socio-psychological variables and working conditions on anxiety, stress and stress coping tendency, as well as the correlation of anxiety, stress, and stress coping tendency in EFO nurses.

Anxiety, stress and stress coping style of EFO nurses

Stress and anxiety are common mental health problems among nurses. The results of this study showed an anxiety score of 49.01± 5.46, which was slightly higher than those reported by Yu [22] and Yang [23]. We found that 32.23% of EFO nurses had perceived stress in the present study, and previous studies also revealed that being a nurse was highly stressful [12, 15], especially for nurses working in emergency departments [39]. During the outbreak of COVID-19 in China, EFO nurses served as gatekeepers of the medical system. Unlike nurses in other departments, EFO nurses have a higher risk of exposure to COVID-19. In addition, factors such as excessive workload, fear of family member infection, and the death of medical staff can also lead to stress and anxiety [12, 40, 41]. Coping is the cognitive and behavioral measure taken by individuals to life events and their own unbalanced state. In this study, the score of positive coping of EFO nurses was 1.97±0.57, which was higher than the Chinese norm (1.78±0.52).While the score of negative coping was 1.13±0.48, which was lower than Chinese norm (1.59±0.66) [24]. Among the participants, 229(50.55%) were more likely to respond positively to stress, while 224(49.45%) were more likely to respond negatively，which was similar to the previous study in China [42]. Nearly half of EFO nurses responded to stress mainly in a negative way, suggesting that appropriate interventions should be given to improve their coping style.

Predictors of stress, anxiety, and stress coping tendency

The models we used included gender, fear of infecting family members, regretting being a nurse, having children, confidence in fighting outbreak, rest time, professional attitudes, having attended infection prevention training, and number of night shifts; and they were all predictors of the mental health of EFO nurses.

Socio-psychological variables and working conditions as predictors, accounted for 19.2% of the variance in anxiety, 13.7% in stress domain, and 13.2% in stress coping tendency. Among variables, fear of infecting family members was the most influential and predictive of all three criterions. During infectious disease epidemic it was difficult for hospital workers to return home from the hospital because they worried about family infection [12, 40, 41]. Nurses are vulnerable to infection during outbreaks of infectious disease [40, 43-45], especially when there are emerging infectious diseases with infectious nature not entirely clear. During the COVID-19 outbreak, emergency and fever clinics in Chinese hospitals

are the high-risk workplaces, where nurses are more likely to be exposed. COVID-19 is highly infectious, which make nurses even more worried about their family members, subsequently making them more anxious, stressed and more inclined to adopt negative coping methods.

Those who regretted becoming a nurse reported higher levels of anxiety, stress and mainly adopted negative coping style. Nurses who reported serving voluntarily were less stressed than those who were appointed [46]. Some studies also suggested that the potential turnover rate for nurses may be high during an outbreak and that they may face more psychological problems [47, 48]. Wong et al found that 76.9% community nurses were unwilling to work because of psychological stress and fear of being infected by H1N1 influenza, and those who reported unwillingness were more depressed and were more stressful [41]. It is unclear why respondents regretted becoming a nurse during the COVID-19 pandemic. We can only assume to the following reasons: protective working conditions or facilities may be unavailable [49], fears of infection, excessive workload, childcare responsibilities and prioritization of family members [50].

We also noted that 72.41% (328) respondents had attended infection prevention training, which resulted in lower levels of stress and adoption of positive coping style. Inadequate training in infection control, lack of knowledge and unclear specific tasks increased perceived personal risk and reduced willingness to work [41]. Not only nurses, but also all those involved need to be trained for the skills necessary to protect them from infection [51]. Institutional preparedness is a positive predictor of individual perceptions of preventive measures [52]. Protection training can help to understand the nature of infectious diseases, standardize protection measures, enhance confidence, and improve nurses' compliance with infection control measures, thus reducing the risk of disease transmission. Protection training is necessary, especially for the highly infectious COVID-19. Medical institutions should attach great importance to improving the protection training system, and online and offline comprehensive training should be used to improve the occupational protection ability of EFO nurses.

Those who took fewer breaks and more night shifts each week had higher levels of anxiety and stress. The length of rest time and the number of night shifts can reflect whether the nursing resources are sufficient or not and the workload. Previous studies have suggested that long hours and high workloads are predictors of stress [12, 13, 40, 51]. Nurses' duties may change in response to the outbreak, which can also lead to stress and anxiety. Overworking can make the EFO nurse lose the sense of control to the life, produce the feeling of powerless, and even cause insomnia, headache, loss of appetite and other physical problems [53].Therefore, hospitals should ensure that the emergency and the fever clinics are adequately staffed with nurses, and the head nurse should arrange the shift of nurses in a coordinated way to ensure that they can get sufficient rest.

There were 35.98% (163) of the respondents had children and had higher levels of anxiety, similar to the results of Maunder [12]and Leslie [15], but unlike Chen's study [46]who found that nurses with more than two children reported the lowest levels of job stress, while nurses without children reported the highest levels of job stress and were more likely than other nurses to have destructive stress coping strategies.

The opposite finding may be due to the timing of the survey. During infectious disease outbreaks, nurses have a duty to protect their own children from being infected and the burden of caring for children grows as schools are closed. The double burden of family and work makes them more anxious.

Women made up the majority (96.47%) of our respondents and had higher levels of anxiety. Previous studies have shown that gender had different effects on mental health. During Ebola outbreak, male health workers experienced more mental distress [54]. This is different from the results of this study, which may be due to the fact that the emergency and fever outpatient have undertaken most diagnosis and treatment in this COVID-19 epidemic, and the workload is large. Compared with women, men can better cope with the high workload. However, only 16 nurses in this study were male, so the findings should be applied only in the appropriate context and further research is needed.

Confidence in fighting the outbreak was negatively correlated with anxiety levels among EFO nurses. Confidence is a display of perseverance and optimism, which can reduce the degree of individual stress response and avoid psychological disorder. Confident nurses tend to have more abundant clinical professional knowledge and abilities, and can effectively manage their time and tasks [55]. Confidence can help to stimulate professional potential, overcome pressure and difficulties, and maintain a good physical and mental state. In addition, Professional attitude is a positive predictor of stress coping tendency. The more positive the professional attitude, the more likely EFO nurses were to adopt positive coping tendency. Lam et al. found that during the influenza outbreak, nurses endured a considerable amount of hardship. They overcame their own risk of infection and provided nursing service largely because of professional loyalty, mission and obligation to perform professional duties [40] A strong professional attitude contributes to the quality of care [56]. Therefore, it is recommended that medical institutions should summarize the epidemic prevention and control work on a daily basis, and encourage nurses to share their clinical experience and feelings, affirm their professional value, and improve their professional identity and confidence in fighting the epidemic.

Correlation among stress, anxiety, and stress coping tendency

While controlling for socio-psychological and working condition variables, we found that stress was positively correlated with anxiety score, which is consistent with previous findings [57, 58]. It has been shown that constant high work stress may have negative physical and psychological effects on health (anxiety, depression, and burnout) [59].Coping tendency score was negatively correlated with anxiety and stress score, which is also consistent to those of previous studies [58, 60]. However, mental health is the result of multiple factors, so the relationship between variables and whether there is mediating effect is worthy of further discussion.

Limitations

Our study also had some limitations. First, the convenience sampling method to recruit respondents from hospitals may reduce the generalizability of the results. Second, the cross-sectional nature of the data constrains us from drawing any conclusions about causality among anxiety, stress, and coping tendency. Finally, the present survey relied only on the self-reported questionnaire, which may lead to lack of objective source in data collection.

Conclusions

The sudden onset and strong infectivity of COVID-19 pose a great challenge in clinical prevention and control of the outbreak. Our results indicate that the COVID-19 outbreak in China has a certain psychosocial impact on EFO nurses. Psychological intervention is necessary and effective measures should be taken, and they may include strengthening protection training to improve self-protection ability, ensuring adequate nurses for emergency and fever clinics, reducing the number of night shifts and ensuring adequate rest time, timely updates of the latest information to keep nurses informed, and encouraging EFO nurses to share clinical experience and feelings. Moreover, greater attention should be paid to female EFO nurses and nurses with children, providing more support for their families.

Our research was carried out at the peak of the COVID-19 outbreak in China, when knowledge of the epidemic was limited and information was rapidly changing. In the following investigation, it is necessary to combine qualitative and quantitative methods, so as to better understand the psychosocial impact on EFO nurses.

Abbreviations

COVID-19: Corona Virus Disease 2019; EFO: nurses of emergency and fever outpatient; PHEIC: Public Health Emergency of International Concern; SAS: Self-Rating Anxiety Scale; PPS-14: Perceived Stress Scale-14; SCSQ: Simplified Coping Style Questionnaire

Declarations

Ethics approval and consent to participate

This study received ethical approval from the Committee on Ethics of Medical Research, Navy Medical University (Formerly known as the Second Military Medical University), HJEC number 2020-LW-001. All participants gave written consent, in keeping with Ethics Committee requirements. Individual data is not reported in this study.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

Study design: SC, JC; Scale selection: MQ, YJ, QS; Data collection: SC, MQ, QS; Data analysis: SC, YJ, JC; Manuscript writing: SC, YJ, LZ, DK. All authors read and approved final manuscript.

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Authors' information (optional)

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