Factors associated with post-traumatic stress disorder of nurses exposed to corona virus disease 2019 in China

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Abstract
Quantitative studies using validated questionnaires on post-traumatic stress disorder (PTSD) of Nurses exposed to corona virus disease 2019 (COVID-19) in China are rare and the baseline PTSD must first be evaluated before prevention. This study aimed to investigate the factors potentially involved in the level of PTSD of Nurses exposed to COVID-19 in China.

In this cross-sectional study, male and female Nurses (n=202) exposed to COVID-19 from HuBei China were included in the final sample. The PTSD Checklist-Civilian (PCL-C) questionnaire and Simplified Coping Style Questionnaire (SCSQ) were used for evaluation. Multivariate stepwise linear regression analysis and spearman correlation test were performed to assess the association between various factors associated with PTSD.

The incidence of PTSD in Nurses exposed to COVID-19 was 16.83%, the PCL-C score was 27.00 (21.00–34.00), and the highest score in the three dimensions was avoidance dimension 9.50 (7.00–13.25); multivariable stepwise linear regression analysis showed that job satisfaction and gender were independently associated with lower PCL-C scores (both P<.001); PCL-C scores were correlated with positive coping (r = −0.151, P =.032), negative coping (r = 0.154, P =.029).

Nurses exposed to COVID-19 from HuBei China with job satisfaction, male and positive coping had low PCL-C scores which necessitate reducing the PTSD level by ways of improving job satisfaction, positive response, and strengthening the psychological counseling of female nurses in order to reduce the risk of psychological impairment.

Abbreviations: COVID-19 = Corona virus disease 2019, M(IQR) = Median (Inter Quartile Range), PCL-C = PTSD Checklist-Civilian, PTSD = Post-Traumatic Stress Disorder, RMB = RenMinBi (Chinese currency), SARS = Severe Acute Respiratory Syndrome, SCSQ = Simplified Coping Style Questionnaire.

Keywords: nurses exposed to COVID-19, PTSD, SCSQ

1. Introduction
Post-traumatic stress disorder (PTSD) is a mental disorder that may develop after exposure to exceptionally threatening or horrifying events. Its main features are re-experience, avoiding traumatic memory and the feeling of continuous threat to be vigilant or over vigilant.[1] A South African study that investigated the relationship between exposure to critical incidents and prevalence of mental health problems among emergency medical care personnel (including traffic police, fire services, ambulance staff, and sea and air rescue workers) found that symptoms of anxiety, depression, or PTSD intensified when exposure to critical incidents increased.[2] Research shows that paramedics are more prone to develop PTSD symptoms than general population, and positive coping style plays an important role in PTSD symptom relief.[3] Many people show remarkable resilience and capacity to recover following exposure to trauma.[4]

In December 2019, an outbreak of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection occurred in Wuhan, Hubei Province. On February 12, 2020, WHO officially named the disease caused by the novel coronavirus as Corona virus Disease 2019 (COVID-19), which has the characteristics of fast transmission, wide transmission, and strong infectious. Droplets, close contact, aerosols, as well as fecal and oral transmission are all routes of transmission of the virus.[5] Most of the patients infected with the virus have fever, dry cough, dyspnea, and other symptoms, and even acute respiratory distress syndrome, septic shock, metabolic acidosis, bleeding, and coagulation dysfunction.[6]

COVID-19 is a highly contagious disease, and nurses are at the front lines of care and are thus more susceptible to infection.[7] This makes the nurses’ physiological and psychological state highly stressed and even PTSD. In order to reduce the incidence of PTSD, reduce the clinical symptoms of PTSD and improve the prognosis, it is necessary to understand the influencing factors of...
PTSD and make early and effective intervention. The purpose of this study was to investigate PCL-C scores and the incidence of PTSD in Nurses exposed to COVID-19 in China; to analyze the influencing factors of PTSD; and to explore the correlation between the PCL-C scores, positive coping and negative coping.

2. Methods

2.1. Ethics

This study was approved by the Ethics Committee of the Affiliated Hospital of the Inner Mongolia Medical University (approval number: 2020010). All the participants provided an informed consent.

2.2. Study design

This cross-sectional and correlational study was conducted between February 2020 and March 2020, and 211 male and female nurses filled out the questionnaire.

2.3. Setting and participants

Three tertiary hospitals (West District of Wuhan Union Hospital, the First People’s Hospital of Jingmen City, the People’s Hospital of Zhongxiang City) were randomly selected from Hubei provinces in China for participation. Only tertiary hospitals were selected because they offer high-level specialized health care services.

The inclusion criteria were:
1. registered nurses with designations of Staff Nurse; and
2. Nurses exposed to COVID-19.

The exclusion criteria were:
1. Nurses unwilling to be surveyed; or
2. Assistant nurse.

2.4. Outcome measurements

2.4.1. PTSD checklist-civilian (PCL-C). The PTSD checklist-civilian version (PCL-C) was translated to Chinese language by Professor Shi Tieying and others. The questionnaire was used to assess the severity of PTSD symptoms. The Cronbach’s alpha coefficient for the total scale was 0.840. The item validity was 0.930. The PCL-C comprises of a total of three dimensions (re-experiencing dimension, avoidance dimension, hyperarousal dimension). The intensity and frequency of PTSD symptoms are rated as 5 levels. Total PTSD scores were calculated by summing the scores for all items, with higher scores indicating more severe PTSD symptoms. Study participants with total scores ranging from 38 to 49 were defined as having some degree of PTSD and ranging from 50 to 85 were definitively diagnosed with PTSD.

2.4.2. Simplified coping style questionnaire. The Simplified Coping Style Questionnaire (SCSQ) was designed by Yaning Xie to evaluate coping style in Chinese. It is a self-rating scale in which a total of 20 items are measured, including positive coping and negative coping. Multilevel scoring was used for each coping (range 0–3), and the results of the SCSQ are the overall positive and negative coping scores. Higher scores indicate higher frequencies of relevant coping. The Cronbach’s alpha of the total score is 0.900. It shows that the scale has good reliability. The results of validity analysis show that the coping style can indeed be divided into two factors: “negative coping” and “positive coping,” which is in line with the theoretical concept.

2.5. Data collection/procedure

Socio-demographic information such as age, gender, nationality, professional title (based on the National Unified Examination, with appropriate certificates), work experience, education (based on certificates), average monthly income (RMB), marital status, degree of family support, degree of job satisfaction, training or learning methods protection knowledge, and have you participated in Severe Acute Respiratory Syndrome (SARS) prevention and control were collected from all the participants.

This survey uses the form of a questionnaire. Before issuing the questionnaire, the participant were informed of the purpose of this research and were assured of their right to refuse to participate or to withdraw from the study at any stage. Researcher issued instructions about filling the questionnaire and a unified guidance language is used to explain the research purpose to the research subjects, thereby ensuring that there was no ambiguity for answering the questions. Participants answered the questionnaire anonymously and hence there was no infringement on patient privacy. The confidentiality of all participants was guaranteed. A questionnaire was considered invalid if more than 10% of the items were not answered.

2.6. Statistical analysis

Data were analyzed using SPSS 19.0 (SPSS Inc, USA). Categorical data were presented as frequencies. The Shapiro–Wilk test and a histogram normal curve were used to test the normal distribution of the PCL-C scores, scores in three dimensions of PCL-C and the two dimensions of SCSQ (positive coping and negative coping). The results of the Shapiro–Wilk test showed that \( P < .05 \) and that histogram normal curve does not meet the concentration and symmetry. This indicated that the data did not follow a normal distribution pattern. Therefore, Median (Inter Quartile Range) were used to describe the data in this study. Two independent samples were tested using the non-parametric Mann–Whitney \( U \) test, and multiple independent samples were tested using the non-parametric Kruskal–Wallis \( H \) test. Multivariate stepwise linear regression analysis was conducted using the PCL-C score as the dependent variable. The independent variables were those with \( P \)-values \(<.05 \) in univariate analyses. Spearman correlation test was used for the correlations between the PCL-C scores, positive coping and negative coping. Two-sided \( P \)-values \(<.05 \) were considered statistically significant.

3. Results

Out of the total of 211 participants contacted for the study, 9 questionnaires was deemed as being disqualified due to inadequate responses and hence were excluded. Finally 202 questionnaires were included in the final sample, and the effective response rate was 95.7%.

3.1. Participants’ characteristics

Socio-demographic data, job characteristics and PCL-C scores of the participants are presented in Table 1 and in Figure 1. When data did not follow a normal distribution pattern, \( M(IQR) \)median (Inter Quartile Range) were used to describe the data and the Mann–Whitney \( U \) test and Kruskal–Wallis \( H \) test was applied. The mean age of the participants was...
32.00 (29.00–40.00) years (P < .001). The majority of the participants were females and male had lower PCL-C scores than female (P < .001). Work experience was 10.00 (6.00–19.00) years (P < .001). Nurses satisfied with their career had lower PCL-C scores than those who were unsatisfied (P < .001). Nationality, Professional title, Education, Average monthly income (RMB), Marital status, Degree of family support, Training or learning methods Protection knowledge, and have you participated in SARS prevention and control were not associated with PCL-C scores.

3.2. PCL-C scores and scores in the two dimensions of SCSQ

The specifics of these results are provided in Tables 2 and 3, Figures 1–3. The data for the PCL-C scores and scores in the two dimensions of SCSQ were not normally distributed and M(IQR) were used to describe the data. PCL-C scores were 27.00 (21.00–34.00) points. The minimum value was 17 points (16 cases in total) and the maximum value was 56 points (3 cases in total). PCL-C score between 38 to 85 points accounted for 16.83% (PTSD incidence rate). The highest score in three dimensions was avoidance dimension 9.50 (7.00–13.25). Three dimensions score from high to low, it was the avoidance dimension, re-experiencing dimension, and hyperarousal dimension. Positive coping and negative coping scores were 22.00 (15.00–25.25) and 9.00 (6.00–11.00).

3.3. Analysis of influencing factors of PTSD

Details are shown in Table 4. Multivariate stepwise linear regression analysis was conducted using the PCL-C score as the

Table 1

| Variable                                      | n (%)   | PCL-C scores M (IQR) | Z/H     | P      |
|------------------------------------------------|---------|----------------------|---------|--------|
| Age (years)                                   |         | 32.00 (29.00–40.00)  | 2.157   | .000***|
| Gender                                        |         |                      |         |        |
| Male                                          | 25 (12.4)| 19.00 (17.00–26.00)  | −3.874  | .000***|
| Female                                        | 177 (87.6)| 28.00 (22.50–34.50)  |         |        |
| Ethnic group                                  |         |                      |         |        |
| Han                                           | 167 (82.7)| 28.00 (21.00–34.00)  | 0.446   | .800   |
| Mongolian                                     | 23 (11.4)| 24.00 (19.00–31.00)  |         |        |
| Others                                        | 12 (5.9) | 29.00 (20.25–42.25)   |         |        |
| Professional title                            |         |                      |         |        |
| Staff nurse                                   | 10 (5.0) | 25.50 (22.00–32.50)   | 0.435   | .933   |
| Nurse practitioner                            | 104 (51.5)| 27.50 (21.00–34.00)  |         |        |
| Chief nurse                                   | 59 (29.2)| 28.00 (21.00–35.00)   |         |        |
| Deputy director                               | 29 (14.3)| 25.00 (20.00–30.00)   |         |        |
| Work experience (years)                       |         | 10.00 (6.00–19.00)    | 2.064   | .000***|
| Education                                     |         |                      |         |        |
| Junior college                                | 27 (13.4)| 22.00 (19.00–34.00)  | 3.422   | .181   |
| Undergraduate                                  | 166 (82.2)| 28.00 (21.00–34.00)  |         |        |
| Master                                        | 9 (4.4)  | 26.00 (23.50–34.00)   |         |        |
| Average monthly income (RMB)                  |         |                      |         |        |
| 1000–3000                                     | 5 (2.5)  | 30.00 (19.00–21.00)   | 0.595   | .898   |
| 3001–5000                                     | 63 (31.2)| 26.00 (21.00–31.00)  |         |        |
| 5001–7000                                     | 65 (32.2)| 26.00 (20.50–34.50)  |         |        |
| >7000                                         | 69 (34.1)| 28.00 (21.00–37.00)  |         |        |
| Marital status                                |         |                      |         |        |
| Married                                       | 148 (73.3)| 26.00 (20.25–34.00)  | 4.498   | .106   |
| Unmarried                                     | 46 (22.8)| 29.00 (21.00–35.50)  |         |        |
| Divorced                                      | 8 (3.9)  | 35.50 (28.00–47.75)   |         |        |
| Degree of family support                      |         |                      |         |        |
| Yes                                           | 199 (98.5)| 27.00 (21.00–34.00)  | 3.795   | .051   |
| No opinion                                    | 3 (1.5)  | 37.00 (34.00–44.00)   |         |        |
| Degree of job satisfaction                    |         |                      |         |        |
| Very satisfied                                | 95 (47.0)| 23.00 (19.00–30.00)  | 36.101  | .000***|
| Satisfied                                     | 79 (39.1)| 30.00 (26.00–39.00)  |         |        |
| Neutral                                       | 28 (13.9)| 30.00 (21.50–38.75)  |         |        |
| Training or learning methods                  |         |                      |         |        |
| Protection knowledge                          |         |                      |         |        |
| Live lecture                                  | 26 (12.9)| 26.00 (20.75–30.25)  | 2.952   | .707   |
| Online teaching                               | 33 (16.3)| 27.00 (21.00–34.00)  |         |        |
| Distribute ppt lecture notes, videos, and video materials | 48 (23.8)| 28.00 (23.00–37.00)  |         |        |
| Putting on and taking off protective equipment exercises | 39 (19.3)| 30.00 (21.00–37.00)  |         |        |
| Combat drill                                  | 48 (23.8)| 26.00 (20.00–33.50)  |         |        |
| Others                                        | 8 (3.9)  | 35.50 (17.50–40.25)   |         |        |
| Have you participated in SARS prevention and control | 47 (23.3)| 28.00 (21.00–37.00)  | −0.983  | .326   |
| Yes                                           | 155 (76.7)| 27.00 (21.00–34.00)  |         |        |
| No                                            |         |                      |         |        |

M (IQR) = median (inter quartile range), PCL-C = PTSD checklist-civilian, RMB = renminbi (Chinese currency).
*** P < .001.

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dependent variable. The independent variables were those with $P$-values $<.05$ (age, gender, work experience, degree of job satisfaction) in univariate analyses. The variables that remain in the equation were degree of job satisfaction and gender. The coefficient of determination $R^2$ was 0.180, indicating that these two factors can explain 18% of all PCL-C variation.

### 3.4. Correlation between the PCL-C scores, positive coping and negative coping

The specifics of these results are provided in Table 5, Figures 1–3. The two dimensions of SCSQ were positive coping and negative coping. The data for the PCL-C scores, positive coping and negative coping were not normally distributed and adopted spearman correlation analysis. The results showed that PCL-C was negatively correlated with positive coping ($r = -0.151$, $P < .05$), and PCL-C was positively correlated with negative coping ($r = 0.154$, $P < .05$).

#### Table 2

| PCL-C score distribution (N=202). | Composition ratio (%) |
|-----------------------------------|-----------------------|
| PCL-C (17–37)                      | 168                   | 83.17 |
| some degree of PTSD (38–49)        | 15                    | 7.42  |
| definitively diagnosed PTSD (50–85)| 19                    | 9.41  |

#### Table 3

| PCL-C Scores and scores in the 2 dimensions of SCSQ among nurses (n=202) exposed to COVID-19 in Tertiary Hospitals in China. | Score M (IQR) | Maximum | Minimum |
|---------------------------------------------------------------------------------------------------------------------|---------------|---------|---------|
| PCL-C                                                                                                                 | 27.00 (21.00–34.00) | 56.00   | 17.00   |
| Re-experiencing dimension                                            | 9.00 (6.00–11.00) | 18.00   | 5.00    |
| Avoidance dimension                                                  | 9.50 (7.00–13.25) | 22.00   | 7.00    |
| Hyperarousal dimension                                                | 8.00 (6.00–12.00) | 20.00   | 5.00    |
| Positive coping                                                      | 22.00 (15.00–25.25) | 36.00   | 4.00    |
| Negative coping                                                      | 9.00 (6.00–11.00) | 18.00   | 2.00    |

### 4. Discussion

#### 4.1. PCL-C scores and scores in the three dimensions

This study showed that PCL-C scores were 27.00 (21.00–34.00) points. The minimum value was 17 points (16 cases in total) and the maximum value was 56 points (3 cases in total). PCL-C score between 38 and 85 points accounted for 16.83% (PTSD incidence rate). Since the COVID-19 outbreak was a bio-disaster with profound psychological effects on health workers. Many previous studies had shown that emergency rescuers were likely to suffer from PTSD after participating in emergency. The prevalence of PTSD among medical staff after...
The Wenchuan earthquake was 19%.[14] The prevalence of PTSD among search and rescue workers in 2 months after the binge was 25%.[15] During the SARS epidemic in 2003, the detection rate of PTSD among medical staff at the first line was high at 25.8%.[16] The findings of Pompili et al have reported that almost half of the psychologists reported post-traumatic stress symptoms that did not subside until at least 6 months had elapsed.[17] Therefore, social should focus on the supportive and therapeutic resources available for nurses. There is a need for urgent intervention after crisis to identify and treat those with PTSD as such approach can reduce the risk of psychological impairment.[18]

The study showed that the highest score in three dimensions was avoidance dimension. [13] However, other existing studies have found the opposite.[29] This phenomenon might be attributable to the fact that the injuries sustained by the men after experiencing physical violence were more severe than those of the women.[30] This discrepancy also may be explained by the fact that males display a higher basal cortisol level (during fertility years) associated with lower prevalence of stress-related psychopathology.[31]

### 4.3. Correlation between the PCL-C scores, positive coping and negative coping

The results showed that PCL-C was negatively correlated with positive coping, and PCL-C was positively correlated with negative coping. Active coping is "process of taking active steps to try to remove or circumvent the stressor or to ameliorate its effects."[32] Negative coping is marked by avoidance (e.g., ignoring the problem) or other maladaptive efforts (e.g., self-blame, venting) that worsen rather than resolve the challenge.[33,34] The results is consistent with previous research results. When medical staff encounter traumatic events, negative coping styles are more likely to increase their tendency to develop PTSD symptoms, and active coping can help prevent or alleviate PTSD symptoms.[30,35–39]

### 5. Conclusion

The innovations of this study can be summarized as the factors potentially involved in the level of PTSD of Nurses exposed to COVID-19 in China. Nurses exposed to COVID-19 from HuBei China with job satisfaction, male and positive coping had low PCL-C scores. Which necessitates empowering the nurses by way of education and training programs, reach their goals at the individual and team level, getting career progression thereby ensuring their job satisfaction. Effective and sustainable psychological counseling should be directed particularly to the female nurses in order to reduce the risk of psychological impairment. Active coping includes initiating direct action, increasing one's self-esteem, and active coping. Active coping is "process of taking active steps to try to remove or circumvent the stressor or to ameliorate its effects."[32] Negative coping is marked by avoidance (e.g., ignoring the problem) or other maladaptive efforts (e.g., self-blame, venting) that worsen rather than resolve the challenge.[33,34] The results is consistent with previous research results. When medical staff encounter traumatic events, negative coping styles are more likely to increase their tendency to develop PTSD symptoms, and active coping can help prevent or alleviate PTSD symptoms.[30,35–39]

### 6. Research limitations and future research ideas

This study has several limitations. First, the self-assessment method may be relatively subjective. A third-party evaluation should be used in future studies and to validate the self-assessments. Second, the study covered only tertiary hospitals in HuBei provinces of China, thus limiting the generality of the conclusions. Future research should be conducted nation-wide. Third, confounding factors such as stress, work conflict, time management, and team work had not assessed. Fourth, due to flaws in the study design,

### Table 4

| Influential factor | B   | SE  | β   | t   | P     |
|-------------------|-----|-----|-----|-----|-------|
| Constant          | 7.340 | 4.064 | -   | 1.806 | .042  |
| Degree of job satisfaction | 5.110 | 0.326 | 0.354 | 5.520 | <.001** |
| Gender            | 7.080 | 1.865 | 0.229 | 3.666 | <.001** |

F=21.894, P<.001, R²=0.180.
β=standard regression coefficient, β̂=partial regression coefficient, SE=standard error.
P<.05.
**P<.001.

### Table 5

| Variables         | Positive coping | Negative coping |
|-------------------|-----------------|-----------------|
| f                 | -0.151          | 0.154           |
| p                 | .032*           | .029*           |

M (QR) = median (Inter Quartile Range), PCL-C=PTSD Checklist-Civilian.
P<.05.
we failed to calculate the sample size by power analysis before the study. Alternatively, we calculated the sample size according to the number of variables (10 times of the variables), and taking a 10% attrition rate into consideration, the total sample size was determined to be 132. In the present study, there are a total of 202 valid questionnaires, we believe the participant’s number is sufficient. Despite these limitations, the present research is meaningful.

Author contributions

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References

[1] Maercker A, Brewin CR, Bryant RA, et al. Diagnosis and classification of disorders specifically associated with stress: proposals for ICD-11. World Psychiatry 2013;12:198–206.
[2] Fjeldheim CB, Nöthling J, Pretorius K, et al. Trauma exposure, posttraumatic stress disorder and the effect of explanatory variables in paramedic trainees. BMC Emerg Med 2014;14:11.
[3] Kucmin T, Kucmin A, Turska D, et al. Coping styles and dispositional optimism as predictors of post-traumatic stress disorder (PTSD) symptoms intensity in paramedics. Sve strade zdobne so ze stresem i dyspozycyjny optymizm jako predyktry nasilenia objawów PTSD w grupie ratowników medycznych. Psychiatr Pol 2018;52:557–71.
[4] Bisson JI, Cosgrove S, Lewis J, et al. Post-traumatic stress disorder. BMJ 2013;351:h6161.
[5] Li JY, You Z, Wang Y, et al. The epidemic of 2019-novel-coronavirus (2019-nCoV) pneumonia and insights for emerging infectious diseases in the future. Microbes Infect 2020;22:80–103.
[6] Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet 2020;395:497–506.
[7] Huang L, Liu G, Yang L, et al. Special attention to nurses’ protection during the COVID-19 epidemic. Crit Care 2020;24:120.
[8] Shi TY, Jiang C, Jia J, et al. Evaluation scale of post-traumatic stress disorder in severe acute respiratory syndrome. [J]. Chin J Tissue Eng Res 2003;9:44–7.
[9] Zhau C, Shi L, Gao L, et al. Determine factors of mental health status in Chinese medical staff: a cross-sectional study. Medicine (Baltimore) 2018;97:e0113.
[10] Xie YN. A preliminary study on the reliability and validity of the Simplified Coping Style Questionnaire [J]. Chin J Clin Psychol 1998; 6:5–8.
[11] Lai J, Ma S, Wang Y, et al. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. JAMA Netw Open 2020;3:e203976.
[12] Carmassi C, Gru C, Somoncini M, et al. DSM-5 PTSD and posttraumatic stress spectrum in Italian emergency personnel: correlations with work and social adjustment. Neuropsychiatr Dis Treat 2016;12:375–81.
[13] Li C, Mi Y, Chu J, et al. Investigation and analysis of novel coronavirus front-line nurses’ post-traumatic emergency disorder. [JOL]. J Nurses Training 2020;5:1–5.
[14] Wang L, Zhang J, Zhou M, et al. Symptoms of posttraumatic stress disorder among health care workers in earthquake-affected areas in southwest China. Psychol Rep 2010;106:535–61.
[15] Ozen S, Sir A. Frequency of PTSD in a group of search and rescue workers two months after 2003 Bingöl (Turkey) earthquake. J Nerv Ment Dis 2004;192:573–5.
[16] Xu Y, Zhang KR, Xue YZ, et al. Study on the post-traumatic stress response of medical staff in the first line of SARS[J]. Chin Nursing Res 2004;18:179–81.
[17] Pompili M, Shrivastava A, Serafini G, et al. Bereavement after the suicide of a significant other. Indian J Psychiatry 2013;55:256–63.
[18] Nwoga CN, Audu MD, Obembe A. Prevalence and correlates of posttraumatic stress disorder among medical students in the University of Jos, Nigeria. Niger J Clin Pract 2016;19:595–9.
[19] Tang L, Pan L, Yuan L, et al. Prevalence and related factors of post-traumatic stress disorder among medical staff members exposed to H7N9 patients. Int J Nurs Sci 2016;4:63–7.
[20] Jiang Y, Investigation and Study of the Mental Health Status of the Disaster Relief Medical Staff and the Related factors. [D]. Jinzhou Medical University; 2012.
[21] Khanna N, Oldenburg B, Peltzer K, et al. Work related stress, burnout, job satisfaction and general health of nurses. Int J Environ Res Public Health 2015;12:652–66.
[22] Maharaj S, Lees T, Lal S. Prevalence and risk factors of depression, anxiety, and stress in a cohort of Australian nurses. Int J Environ Res Public Health 2018;16:61.
[23] Portero de la Cruz S, Vaquero Abellán M. Professional burnout, stress and job satisfaction of nursing staff at a university hospital. Rev Lat Am Enfermagem 2015;23:543–52.
[24] Hall LW, Moore SM, Barnsteiner JH. Quality and nursing: moving from a concept to a core competency. Urol Nurs 2008;28:417–25.
[25] Pompili M, Gibinno S, Innamorati M, et al. Prolactin and thyroid hormone levels are associated with suicide attempts in psychiatric patients. Psychiatry Res 2012;200:389–94.
[26] Kessler RC, Berglund P, Demler O, et al. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the national comorbidity survey replication. Arch Gen Psychiatry 2005;62:593–602.
[27] Tolm DF, Foa EB. Sex differences in trauma and posttraumatic stress disorder: a quantitative review of 25 years of research. Psychol Bull 2006;132:959–92.
[28] Zhang LF, Zhao Q, Luo ZC, et al. Prevalence and risk factors of posttraumatic stress disorder among survivors five years after the “Wenchuan” earthquake in China. Health Qual Life Outcomes 2015;13:75.
[29] Shi L, Wang L, Ju K, et al. Prevalence and correlates of symptoms of post-traumatic stress disorder among Chinese healthcare workers exposed to physical violence: a cross-sectional study. BMJ Open 2017;7:e016810.
[30] Freedman SA, Gluck N, Tuval-Mashiach R, et al. Gender differences in responses to traumatic events: a prospective study. J Trauma Stress 2002;15:407–13.
[31] Cohen H, Yehuda R. Gender differences in animal models of posttraumatic stress disorder. Dis Markers 2011;30:141–50.
[32] Stanislawski K. The Coping Circumplex Model: an integrative model of the structure of coping with stress. Front Psychol 2019;10:694.
[33] Read JP, Griffin MJ, Wardell JD, et al. Coping, PTSD symptoms, and alcohol involvement in trauma-exposed college students in the first three years of college. Psychol Addict Behav 2014;28:1052–6.
[34] Folkman S, Lazarus RS, Gruen RJ, et al. Appraisal, coping, health status, and psychological symptoms. J Pers Soc Psychol 1986;50:371–9.
[35] Zheng Y, Fan F, Liu X, et al. Life events, coping, and posttraumatic stress symptoms among Chinese adolescents exposed to 2008 Wenchuan Earthquake, China. PLoS One 2012;7:e29404.
[36] Kishore V, Theall KP, Robinson W, et al. Resource loss, coping, and job satisfaction of nursing staff at a university hospital. Rev Lat Am Enfermagem 2015;23:543–52.
[37] Khamisa N, Oldenburg B, Peltzer K, et al. Work related stress, burnout, job satisfaction and general health of nurses. Int J Environ Res Public Health 2015;12:652–66.
[38] Maharaj S, Lees T, Lal S. Prevalence and risk factors of depression, anxiety, and stress in a cohort of Australian nurses. Int J Environ Res Public Health 2018;16:61.
[39] Portero de la Cruz S, Vaquero Abellán M. Professional burnout, stress and job satisfaction of nursing staff at a university hospital. Rev Lat Am Enfermagem 2015;23:543–52.
[40] Hall LW, Moore SM, Barnsteiner JH. Quality and nursing: moving from a concept to a core competency. Urol Nurs 2008;28:417–25.
[41] Pompili M, Gibinno S, Innamorati M, et al. Prolactin and thyroid hormone levels are associated with suicide attempts in psychiatric patients. Psychiatry Res 2012;200:389–94.
[42] Kessler RC, Berglund P, Demler O, et al. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the national comorbidity survey replication. Arch Gen Psychiatry 2005;62:593–602.
[43] Tolm DF, Foa EB. Sex differences in trauma and posttraumatic stress disorder: a quantitative review of 25 years of research. Psychol Bull 2006;132:959–92.
[44] Zhang LF, Zhao Q, Luo ZC, et al. Prevalence and risk factors of posttraumatic stress disorder among survivors five years after the “Wenchuan” earthquake in China. Health Qual Life Outcomes 2015;13:75.
[45] Shi L, Wang L, Ju K, et al. Prevalence and correlates of symptoms of post-traumatic stress disorder among Chinese healthcare workers exposed to physical violence: a cross-sectional study. BMJ Open 2017;7:e016810.