The Anxiety Disorder Among the Healthcare Providers During The COVID-19 Infection Pandemic: A Systematic Review

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Abstract
Background: The outbreak of the new coronavirus disease (COVID-19) imposes a considerable psychological burden on the medical staff working in central hospitals for COVID-19. In this systematic review, we will discuss the Prevalence and the risk factors of anxiety disorder among the frontline medical staff dealing with COVID-19 patients.
Methods: PubMed, Scopus, Embase, Web of Science databases systematically searched from December 1, 2019, to April 30, 2020, for related published articles. In all electronic databases, the following search strategy implemented, and these keywords (in the title/abstract) used: "COVID-19" OR "novel Coronavirus" AND "anxiety" OR "psychology" OR "psychiatry" OR "psychological distress" AND "nurses" or "clinicians." We included only the cross-sectional studies.
Results: Through the search strategy, we could identify eight related cross-sectional articles about anxiety among the healthcare workers in central hospitals for COVID-19 infection. However, the authors scanned the reference lists of the included studies and identified multiple references. According to our findings, the frontline medical staff are at risk of developing an anxiety disorder, which is mainly mild. Additionally, female nurses are more susceptible to experience anxiety during the COVID-19 pandemic.
Conclusion: Regarding the outbreak of COVID-19 worldwide and the workload of the frontline medical staff dealing with COVID-19 patients, particular attention should be given on the mental health of the healthcare provides.
Keywords: COVID-19; Novel coronavirus; Anxiety; Psychological distress; Clinicians.

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Introduction

The outbreak of novel coronavirus (COVID-19) disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV2) first emerged in Wuhan, China, in December 2019, in a cluster of severe unknown pneumonia and rapidly spread to the rest of the world. It has been declared as a worldwide pandemic on March 11, 2020, by World Health Organization (WHO) with more than three million reported cases to date.[1,2] The first reproductive number, R0 of the virus, is estimated to be approximately 2.2, the fatality rate of the virus stands at roughly 4% according to the current data.[3] To date, no precise therapy or vaccination has found. More ever, the course of the pandemic is still poorly understood. Given this critical situation, parallel to the therapeutic aspects

of the disease, the psychological burden of the newly emerging pandemic is paramount of importance.[4-6]
Of note, the healthcare providers directly involved in the diagnosis, treatment, and care of the patients with COVID-19 are at risk of developing psychological distress.[7-10]

The leading causes of mental health problems among the healthcare providers seem to be insufficient knowledge about the disease, the shortage of medical protective equipment, the long-term workload and lack of adequate rest, the high risk of exposure to patients with COVID-19 and the probability to take the infection home to their family.[11-14]

With all considerations, the healthcare providers are at high risk of developing diverse psychological distress that

the anxiety has considered to be the first psychological response.[15]

As a result, particular attention should give to the mental health problems of medical staff during the pandemic of COVID-19. As the pandemic is continuing worldwide and the psychological distress becomes more pronounced, herein, we aim to review the existing literature addressing anxiety disorder associated with COVID-19 to provide a more comprehensive view of the importance of psychological support in the management of the pandemic.

Methods

We undertook a systematic review to explore two key questions relating to the psychological impact of the outbreak of COVID-19 infection. Our report has written according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Figure 1).

Our first question examined the frequency of anxiety disorder among the healthcare workers in the COVID-19 central hospitals. Our second question examined the risk factors to develop an anxiety disorder.

We undertook a single search to encompass all two review questions. The study was carried out in four databases, including PubMed, Scopus, Embase, and Web of Science, all from inception to April 30, 2010, for related published articles. The MESH keywords (in the title/abstract) used: "COVID-19" OR "Coronavirus" AND "psychology" OR "psychologic" OR "anxiety" OR "psychiatry" OR "Psychiatric" AND "nurses" OR "clinicians."

We assessed study inclusion based on the research questions. We included all cross-sectionals studies worldwide to review the anxiety disorder among the nurses and clinicians of central hospitals against COVID-19 during the pandemic. Articles written in English were all included.

On search completion, we used EndNote X9 software to identify and remove duplicate citations systematically. Two reviewers from the team independently reviewed titles and abstracts, and irrelevant articles have excluded. One independent reviewer focused on the anxiety and COVID-19. The second independent reviewer extracted the articles related to the anxiety among the nurses and clinicians. We subsequently screened the full-text papers to decide which articles meet the inclusion criteria. We extracted critical data from each study relevant to the specific research questions. The reports concerning the public health, other healthcare providers as the laboratory or radiology department staff, or the ones working in the non-dedicated hospitals for COVID -19 have excluded. Additionally, case reports, reviews, letters to the editor have excluded.

The following results were extracted from the study designs, study authors, and study the main results.

Results

Searches of databases and other sources identified 757 citations. Following the removal of duplicates and screening of titles/abstracts, we retrieved 24 full-text papers, of which eight were eligible for inclusion in the review (Figure 1). Of the 8 papers, we included all studies for question one and seven for question two. All papers
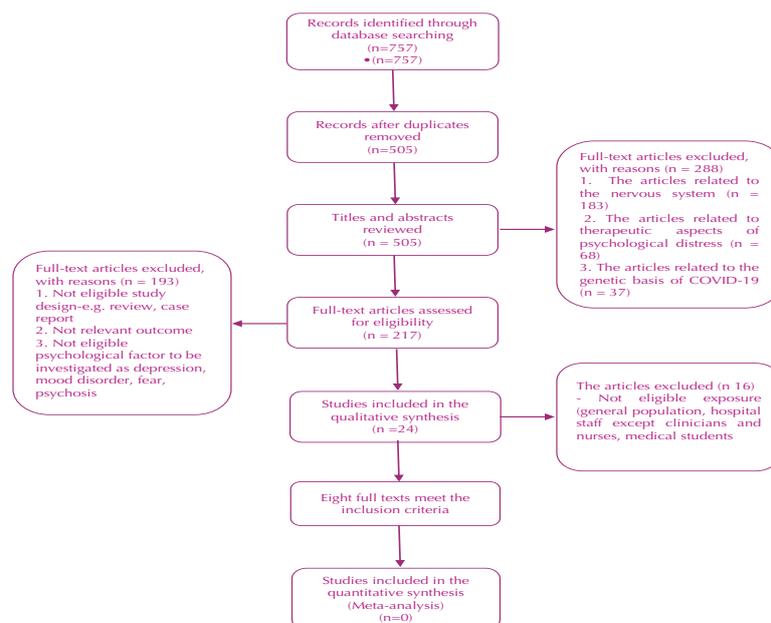

Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-analysis Flow Chart Depicting the selection process of Included Studies.

included in question two have also included in question one. We included all available cross-sectional studies, all conducted in China except for one in Singapore and India. Table 1 shows the summary of the studies on the anxiety disorder among the healthcare providers working in the central hospitals for COVID-19.

Question 1: Prevalence of Anxiety Disorder
According to our findings, the frontline medical staff caring for COVID-19 patients have exposed to psychological trauma such as anxiety, depressive disorders, and post-traumatic stress disorder, which could affect the quality of life and quality of patient service among the health care providers. Additionally, we revealed that the majority of the participants who experienced anxiety disorder declare a mild degree of anxiety.[8-21]

Questions 2: Contributing Factors to Develop an Anxiety Disorder
Seven studies have dedicated to evaluating the risk factors to develop anxiety disorder (Table 1).

In one study, the most prevalence of anxiety has observed among female nurses (26.88% vs. 14.29%) with a higher SAS score (44.84 ± 10.42 vs. 38.50 ± 10.72).[16] Similarly, in another study, it was revealed that the frontline medical staff in Wuhan, 36.9% had subthreshold mental health disturbances (mean PHQ-9: 2.4), 34.4%: mild disturbances (mean PHQ-9: 5.4), 22.4%: moderate disturbances (mean PHQ-9: 9.0), and 6.2%: severe disturbance (mean PHQ-9: 15.1) during the early phase of the COVID-19 epidemic in which the noted burden fell particularly slowly on young women.[22]

According to more comprehensive surveys, other main risk factors have obtained as the study of Cai et al which revealed that the main factors associated with stress were concerns for personal safety ($P < 0.001$), concerns for their families ($P < 0.001$), and concerns for patient mortality ($P = 0.001$). Additionally, they indicated that while the main concern for viral transmission to the families observed in the 31–40-year age-group, the older participants were mostly worried about their safety, observing the patient's death and exhaustion. More ever, the safety of the colleagues and the lack of treatment for COVID-19 has considered being an essential predisposing factor in all age groups.[9]

In another study investigating 1257 clinicians and nurses in hospitals equipped for patients with COVID-19, it has revealed that the nurses, women, frontline health care providers and those working in Wuhan (the main focus of the disease) or the secondary hospitals compared to tertiary hospitals were more susceptible to develop severe symptoms (nurses 47.1% VS physicians 40.6%, women 47.2% VS men 35.4%, frontline workers 51.3 % VS 39.4% second-line workers, participants in secondary hospitals 49.2% VS 42.7% tertiary hospitals, participants in Wuhan 42.4% VS Hubei province and 36% in outside

Hubei province).[17]

In another study, the potential risk factors for medical health workers to develop anxiety were considered to be having organic disease, living in rural areas, being at risk of contact with COVID-19 patients in hospitals, or being female. [18]

Similarly, direct contact with COVID-19 patients highlighted in another study. Among 2299 participants who answered the anxiety questionnaire, the main contributing factors to the expansion of psychological distress have considered being working in the isolation ward ($P < 0.001$), worrying about being infected ($P < 0.001$), shortage of the protective equipment ($P < 0.001$), the epidemic would never control ($P = 0.002$), frustrated with unsatisfactory results on work ($P < 0.001$), and feeling lonely with being isolated from loved ($P = 0.005$).[20]

It should note that, In the only study conducted outside of China, the main risk factors to develop anxiety disorder were the preexisting comorbidities, positive screen for anxiety and older age ($P < 0.001$) considered to be the main factors associated with the anxiety.[23]

Discussion
In this systematic review of eight studies, we identified that the medical health workers during the COVID-19 pandemic had high prevalence rates of psychological distress. Of note, the increasing pattern in confirmed cases and consequence mortality worldwide, bring tremendous stress and anxiety to frontline medical staff. Our results indicated that the frontline medical staff experience some degree of anxiety at work, which is considerably higher than the healthy population. However, the severity of the anxiety was mainly mild regarding our results.[8-21]

Since completing the review, we extracted the main risk factors to develop an anxiety disorder. The most important common contributing factors in all articles were gender and nursing.

The most logistical justification for women's susceptibility to developing anxiety disorder seems to be that women are more concerned about their inner experience and self-feeling according to their biological, psychological, and social status.[24,25]

On the other hand, the most probable reason for nurses' higher stress levels is their workload. In comparison to doctors, their working hours in the isolated wards are much longer, and consequently, they have closer contact with COVID-19 patients, which all could contribute to psychological distress.[17,21] The other risk factors considered to be concerned for personal safety, concerns for their families, patient mortality, concern for their colleagues' safety, inadequate knowledge about the disease as uncertainty about the global control of the disease, lack of appropriate treatment, and vaccination, and exhaustion.[9,18,20]

Additionally, the frontline medical staff who works in

Table 1. The Results of the Current Studies Considering Anxiety Among the Frontline Health Workers in the Central Hospitals for COVID-19

Author/ Year/ Country	Design and Setting	The Population	Number of Participants	The Evaluating Score	Prevalence of the Anxiety	Risk factors of Anxiety Development	Limitations
Cai et al[9]/2020/ China	A cross-sectional observational study	Doctors, nurses, and other hospital staff	534 (Nurses n=248, Doctors n=233, Medical Technician n=48, Hospital Staff n=5)	A qualitative questionnaire focusing on all emotional aspects	81.6% (41% slight, 33.9% moderate, 6.7% severe)	Concerns for personal safety (P<0.001), concerns for their families (P<0.001), and concerns for patient mortality (P=0.001).	Short duration, not analyzing the differences between participants in different departments, analysis based on subjective responses, a limitation for longitudinal follow up as it was a cross-sectional study.
Huang et al[16] 2020/China	A cross-sectional observational study	First-line medical staff	230 (Nurses n=160, Doctors n=70)	SAS and PTSD-SS	23.04% with a score of 42.91 ± 10.89 (2.1% severe, 4.78% moderate, 16.09% mild)	Female gender, nurses VS doctors, intermediate medical staff VS junior and senior medical staff	The short duration during the early phase of the outbreak, inability for longitudinal follow up
Kang et al[10]/2020/ China	A cross-sectional	Doctors and nurses	994 (Nurses n=811, Doctors n=183)	GAD-7	29.4% (Sub threshold 1.5%, mild 4.6%, Moderate 8.2%, Severe 15.1%)	Not assessed	Self-reporting VS face to face interview, limitations to tracking the efficacy of psychological services due to a cross-sectional study, small sample size
Lai et al[17]/2020/ China	A cross-sectional, survey-based, region-stratified study	Nurses and physicians	1257 (Nurses n=764, physicians n=493)	GAD-7	44.6% with a median total score of 4.0. (32.3% mild, 7% moderate, 5.3% severe)	Nurses, women, and those in Wuhan frontline workers, reported experiencing more severe symptom levels of anxiety, participants working in secondary hospitals VS tertiary hospitals (5.5% VS 5.1%)	It was limited in scope (most participants (81.2%) were from Hubei province), it was carried out during six days and lacks longitudinal follow-up, inability to distinguish the association of symptoms with being a clinician in this region vs. merely living in this region and inability to distinguish preexisting mental health symptoms vs. new symptoms. However, the response rate of this study was 68.7%, response bias may still exist.
Zhang et al[18]/2020/ China	A cross-sectional study	Non-medical workers and medical health workers	2182 Non-medical health workers (n=1255), medical health workers (n=927)	PHQ-4 via a 2-item anxiety scale	13% with a total score of 1.51±1.28	Underlying organic disease (p < 0.05 or 0.01), living in rural areas, being female, and being at risk of contact with COVID-19 patients (p < 0.01 or 0.05).	A limitation of the longitudinal approach is that the psychological assessment does base on an online survey, and on self-report tools versus clinical interviews, it is not possible to assess the participation rate since it is unclear how many subjects received the link for the survey.

Author/ Year/ Country	Design and Setting	The Population	Number of Participants	The Evaluating Score	Prevalence of the Anxiety	Risk factors of Anxiety Development	Limitations
Chew et al [19]/2020/ Singapore and India	A cross-sectional study	Doctors, nurses, allied healthcare workers, clerical administrators, clerical staff and maintenance workers	906 (physician n=268, nurses n=355, allied healthcare workers n=96, technicians n=40, clerical staff n=56, administrator n =39, maintenance workers n=52)	DASS-21	15.7% among all the participants (P=0.254) (44.36% mild, 42.9 % moderate, 6.33% severe, 6.33% extremely severe) with a mean score of 3.21	Preexisting comorbidities, positive screen for anxiety and older age (p < 0.001)	The cross-sectional nature of the study does not allow interpretation for causality as they have revealed an association between the presence of physical symptoms and the Prevalence of psychological distress. However, they were still unable to conclude that psychological distress had resulted in the manifestation of the physical symptoms. It is not clear if participants had taken a medical leave of absence or sought the testing for COVID-19 during the manifestation of physical symptoms. The questionnaire was self-administered, and a medical professional did not verify information provided on symptoms; the socioeconomic status and education level have not assessed.
Wen Lu [20] 2020 China	A single-center, cross-sectional survey	Medical staff (doctors and nurses) and administrative staff	2299 (2042 medical staff and 257 administrative staff)	HAMA	25.5% (22.6% mild to moderate, 2.9% severe to the extreme) (P=0.049) with a median score of 4.73 ± 6.291	Working in the isolation ward (p < 0.001), worrying about being infected (p < 0.001), shortage of the protective equipment (p < 0.001), the epidemic would never be controlled (p=0.002), frustrated with unsatisfactory results on work (p < 0.001), and feeling lonely with being isolated from loved (p=0.005).	The medical workers were from one general hospital, and the design limits the cause analysis of psychological strains.
Yuanyuan Mo et al [21] 2020 China	A cross-sectional survey	Nurses	180	The Chinese version of the SOS and the SAS	The total stress load score: 39.91±12.92 and total SAS score: 32.19±7.56	The nurse who is the only child in their families (p<0.05), long working time per week,	The results cannot be generalized to all Chinese nurse, inability for longitudinal observation of the subjects, it did not carry out an intervention, in addition to the factors concerned in this study, and there may be other factors that affect the work stress of nurses.

the main focus of the disease as the main city, the central hospitals, and the critical departments as isolated wars were more susceptible to develop anxiety.[17]

Other potential factors were preexisting comorbidities, living in rural areas and older age.[18,23]

Although various reports have published on the psychological impact of the COVID-19, no systematic study has not performed so far. This review highlights the urgent need for research to identify and quantify more attention to the mental health of the frontline health workers, which can undertake using psychological counseling in all the COVID-19 hospitals. It should note that, On January 27, 2020, the National Health Committee of China released the guidance on national psychological crisis intervention and on March 18, 2020, the National Health Commission of China announced the psychological counseling for the COVID-19 to handle the psychological injury of the pandemic.[26] Such program is also essential to be performed in the hospitals for the medical staff to provide the chance to share their concerns.

It is noteworthy to emphasize that emotional and behavioral responses are part of an adaptive response to extraordinary stress in which anxiety is the most common response.[27] Given that despite all the global restrictions to control the pandemic as home quarantine, telecommunicating and social distancing, the disease is still progressing which impose much pressure on the society and healthcare provider. On the other hand, our results revealed that the medical staff's anxiety is not only attributed to the infection itself. The factors as a feeling of helplessness in the face of critical patients or patients' death play a significant role in creating anxiety.

As a result, COVID-19 crisis management should include both the medical and mental aspects of the disease. The psychological consultation team to provide free psychological consultation service to alleviate the psychological pressure seems to be the practical approach to achieving this goal.[28–30]

Our review has some fundamental limitations. Firstly, in order to provide an urgent review of evidence to meet the needs of psychological counseling, we were unable to access all the countries. Currently, most of the reports investigating the psychological aspects of medical health workers have confined to China, which does not reflect the state of the whole world. Secondly, according to our findings, the screening method for psychological status assessment of the medical staff was based on a self-reported questionnaire that did not include the participants' previous psychological state. Thirdly, the reports we reviewed conducted early at the beginning of the pandemic. However, as it is dynamic and growing, the chronicity of the disease and the hospital's workload might lead to more apparent psychological distress, which has not considered in the current reports. Continued acknowledgment of the medical staff by hospital management and the government, provision of infection control guidelines, specialized facilities for psychological counseling have recognized as factors that might help medical staff to work during the pandemic.

Conclusion
COVID-19 pandemic has become one of the central health crises worldwide. The rapid spread of the disease and the probable severe symptoms impose much pressure on both the general population and healthcare providers. In this systematic review, we identified that the medical staff has a higher incidence of anxiety disorders, and the female nurses are the most susceptible group to develop anxiety. As a result, medical institutions and hospitals should strengthen the psychological skills training of their medical staff.

Conflicts of interest
We have no conflicts of interest to declare.

Authors' Contributions
SP developed the idea for the position paper, wrote the initial draft of the manuscript, which was thoroughly reviewed and revised by other authors. The complete manuscript was commented on, revised, and approved by all authors.

Ethical statement
We testify that all the authors have been actively involved in substantive work leading to the manuscript and will hold themselves jointly and individually responsible for its content.

References
1. Pang J, Wang MX, Ang IYH, Tan SHX, Lewis RF, Chen JI, et al. Potential rapid diagnostics, vaccine and therapeutics for 2019 novel coronavirus (2019-nCoV): a systematic review. J Clin Med. 2020;9(3). doi: 10.3390/jcm9030623.
2. Lu R, Zhao X, Li J, Niu P, Yang B, Wu H, et al. Genomic characterisation and epidemiology of 2019 novel coronavirus: implications for virus origins and receptor binding. Lancet. 2020;395(10224):565-74. doi: 10.1016/s0140-6736(20)30251-8.
3. Turkish Ministry of Health. COVID-19 Turkish Ministry of Health: Covid-19 Guide for Medical Personnel-Turkish. Turkish Ministry of Health; 2020. [cited 2020 Mar 25]. Available from: https://data2.unhcr.org/en/documents/details/74802.
4. Liu N, Zhang F, Wei C, Jia Y, Shang Z, Sun L, et al. Prevalence and predictors of PTSS during COVID-19 outbreak in China hardest-hit areas: gender differences matter. Psychiatry Res. 2020;287:112921. doi: 10.1016/j.psychres.2020.112921.
5. Zandifar A, Badrfam R. Iranian mental health during the COVID-19 epidemic. Asian J Psychiatr. 2020;51:101990. doi: 10.1016/j.ajp.2020.101990.
6. Ahmed MZ, Ahmed O, Aibao Z, Hanbin S, Siyu L, Ahmad A. Epidemic of COVID-19 in China and associated psychological problems. Asian J Psychiatr. 2020;51:102092. doi: 10.1016/j.ajp.2020.102092.
7. Wu W, Zhang Y, Wang P, Zhang L, Wang G, Lei G, et al. Psychological stress of medical staffs during outbreak of COVID-19 and adjustment strategy. J Med Virol. 2020. doi:

10.1002/jmv.25914.

8. Chevance A, Gourion D, Hoertel N, Llorca PM, Thomas P, Bocher R, et al. [Ensuring mental health care during the SARS-CoV-2 epidemic in France: a narrative review]. Encephale. 2020. doi: 10.1016/j.encep.2020.03.001.

9. Cai H, Tu B, Ma J, Chen L, Fu L, Jiang Y, et al. Psychological impact and coping strategies of frontline medical staff in hunan between January and March 2020 during the outbreak of coronavirus disease 2019 (COVID-19) in Hubei, China. Med Sci Monit. 2020;26:e924171. doi: 10.12659/msm.924171.

10. Kang L, Li Y, Hu S, Chen M, Yang C, Yang BX, et al. The mental health of medical workers in Wuhan, China dealing with the 2019 novel coronavirus. Lancet Psychiatry. 2020;7(3):e14. doi: 10.1016/s2215-0366(20)30047-x.

11. Shanafelt T, Ripp J, Trockel M. Understanding and addressing sources of anxiety among health care professionals during the COVID-19 pandemic. JAMA. 2020. doi: 10.1001/jama.2020.5893.

12. Chen Y, Zhou H, Zhou Y, Zhou F. Prevalence of self-reported depression and anxiety among pediatric medical staff members during the COVID-19 outbreak in Guiyang, China. Psychiatry Res. 2020;288:113005. doi: 10.1016/j.psychres.2020.113005.

13. Asmundson GJG, Taylor S. How health anxiety influences responses to viral outbreaks like COVID-19: what all decision-makers, health authorities, and health care professionals need to know. J Anxiety Disord. 2020;71:102211. doi: 10.1016/j.janxdis.2020.102211.

14. Neto MLR, Almeida HG, Esmeraldo JD, Nobre CB, Pinheiro WR, de Oliveira CRT, et al. When health professionals look death in the eye: the mental health of professionals who deal daily with the 2019 coronavirus outbreak. Psychiatry Res. 2020;288:112972. doi: 10.1016/j.psychres.2020.112972.

15. Xiang YT, Yang Y, Li W, Zhang L, Zhang Q, Cheung T, et al. Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. Lancet Psychiatry. 2020;7(3):228-9. doi: 10.1016/s2215-0366(20)30046-8.

16. Huang JZ, Han MF, Luo TD, Ren AK, Zhou XP. [Mental health survey of medical staff in a tertiary infectious disease hospital for COVID-19]. Zhonghua Lao Dong Wei Sheng Zhi Ye Bing Za Zhi. 2020;38(3):192-5. doi: 10.3760/cma.j.cn121094-20200219-00063.

17. Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, et al. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. JAMA Netw Open. 2020;3(3):e203976. doi: 10.1001/jamanetworkopen.2020.3976.

18. Zhang WR, Wang K, Yin L, Zhao WF, Xue Q, Peng M, et al. Mental health and psychosocial problems of medical health workers during the COVID-19 epidemic in China. Psychother Psychosom. 2020:1-9. doi: 10.1159/000507639.

19. Tan BYQ, Chew NWS, Lee GKH, Jing M, Goh Y, Yeo LLL, et al. Psychological impact of the COVID-19 pandemic on health care workers in Singapore. Ann Intern Med. 2020. doi: 10.7326/m20-1083.

20. Lu W, Wang H, Lin Y, Li L. Psychological status of medical workforce during the COVID-19 pandemic: a cross-sectional study. Psychiatry Res. 2020;288:112936. doi: 10.1016/j.psychres.2020.112936.

21. Mo Y, Deng L, Zhang L, Lang Q, Liao C, Wang N, et al. Work stress among Chinese nurses to support Wuhan in fighting against COVID-19 epidemic. J Nurs Manag. 2020. doi: 10.1111/jonm.13014.

22. Kang L, Ma S, Chen M, Yang J, Wang Y, Li R, et al. Impact on mental health and perceptions of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: a cross-sectional study. Brain Behav Immun. 2020. doi: 10.1016/j.bbi.2020.03.028.

23. Chew NWS, Lee GKH, Tan BYQ, Jing M, Goh Y, Ngiam NJH, et al. A multinational, multicentre study on the psychological outcomes and associated physical symptoms amongst healthcare workers during COVID-19 outbreak. Brain Behav Immun. 2020. doi: 10.1016/j.bbi.2020.04.049.

24. Neitzke AB. An illness of power: gender and the social causes of depression. Cult Med Psychiatry. 2016;40(1):59-73. doi: 10.1007/s11013-015-9466-3.

25. Adams JG, Walls RM. Supporting the health care workforce during the COVID-19 global epidemic. JAMA. 2020;323(15):1439-40. doi: 10.1001/jama.2020.3972.

26. Dan Z. China adopts non-contact free consultation to help the public cope with the psychological pressure caused by new coronavirus pneumonia. Asian J Psychiatr. 2020;52:102093. doi: 10.1016/j.ajp.2020.102093.

27. Folkman S, Greer S. Promoting psychological well-being in the face of serious illness: when theory, research and practice inform each other. Psychooncology. 2000;9(1):11-9. doi: 10.1002/(sici)1099-1611(200001/02)9:1<11::aid-pon424>3.0.co;2-z.

28. Yao H, Chen JH, Xu YF. Rethinking online mental health services in China during the COVID-19 epidemic. Asian J Psychiatr. 2020;50:102015. doi: 10.1016/j.ajp.2020.102015.

29. Ripp J, Peccoralo L, Charney D. Attending to the emotional well-being of the health care workforce in a New York City health system during the COVID-19 pandemic. Acad Med. 2020. doi: 10.1097/acm.0000000000003414.

30. Tsamakis K, Rizos E, A JM, Chaidou S, Kympouropoulos S, Spartalis E, et al. COVID-19 pandemic and its impact on mental health of healthcare professionals. Exp Ther Med. 2020;19(6):3451-3. doi: 10.3892/etm.2020.8646.