



REVIEW

Mental Health Issues of the Medical Workforce during COVID-19: A Review

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ABSTRACT

The COVID-19 pandemic is a public health emergency. As we write, the world counts more than 10 million positive cases and more than 500 thousand deaths. The difficult conditions faced by healthcare workers helping with the COVID-19 pandemic are leading to severe adverse mental health consequences.

The aim of this review is to summarize and analyze the mental health issues that healthcare workers are experiencing during the COVID-19 outbreak. We conduct a systematic literature review to investigate the healthcare workforce's mental health disorders. About 145 articles were retrieved for the period between January 1, 2020 and April 30, 2020. After screening, 27 articles were selected for full-text examination, 13 were included in the review. Of the studies included, 69% (9/13) and 61% (8/13) investigated depression and anxiety, respectively, although other mental health disorders such as insomnia, distress, stress, and fear were also assessed. Most of the healthcare workers in the studies reported high levels of stress, anxiety, and severe symptoms of depressions.

Caregivers are working under high levels of pressure, in a high-risk environment, and are dealing with many physical and psychological challenges. Appropriate actions and well-timed psychological support to protect medical workers' mental health should be considered.

1. Introduction

In December 2019, the Chinese city of Wuhan reported the first case of a novel pneumonia caused by coronavirus disease 2019 (COVID-19)^[1]. Today, the virus is identified as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which differentiates from the previous coronaviruses that caused severe acute syndrome (SARS) and Middle East respiratory syndrome

(MERS) by having a much faster contagious rate. After only a few months, the novel coronavirus was spreading worldwide with an unprecedented rate and a high number of deaths, determining an alarming situation and forcing the WHO to announce the state of pandemic. As we write, the world counts more than 10 million infections and more than 500 thousand deaths^[2]. Only in the US more than 2.5 million individuals tested positive for COVID-19, with a mortality rate of 4.9%. Higher case fatality rates

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have been observed in European countries: UK, Italy, and Spain presented a mortality rate of 13.9%, 14.4%, and 9.5%, respectively [2]. Despite the achievements that have been made to battle COVID-19, including determining virus information, clinical characteristics, and fast diagnosis [3,4,5], effective treatment is not yet available, and COVID-19 still represents a global public health emergency.

In this critical situation, healthcare workers play a leading role in the diagnosis, treatment, and care of patients affected by COVID-19. Due to the enormous increasing number of confirmed positive cases among both civilians and the medical workforce, retired doctors have been recalled, and medical students were allowed to obtain an early degree to practice during the outbreak [6,7]. Despite the tentative to increase the number of health professionals, medical workers still face hard working conditions. Aspects such as a shortage of adequate personal protection equipment (PPE), high risk of being infected, as well as living isolated and being exposed to dramatic life events, put doctors and nurses under intense stress and pressure, and may lead to an onset of severe mental health issues [8,9,10]. Previous research has shown that psychological disorders such as stress, anxiety and depression occurred in healthcare personnel engaged in the treatment of patients with SARS and MERS [11,12,13,14,15,16,17]. A few studies performed in the past months showed that similar mental health issues have already been evident in doctors and nurses involved in treating patients with COVID-19. This narrative review aims to investigate and summarize the studies conducted about the mental health status among healthcare workers assisting in the COVID-19 pandemic. Understanding the most common mental health issues that medical staff is facing in this period is essential for developing precautionary measures, applying appropriate strategies to manage medical staff, and providing the well-timed psychological care that healthcare professionals may need during and after the pandemic.

2. Methods and Material

We conducted a systematic search of literature and critically selected the articles that contain material that would provide evidence on mental health status among the healthcare workers during the COVID-19 pandemic. A detailed process of the searching and the selection of the articles is reported in Figure 1.

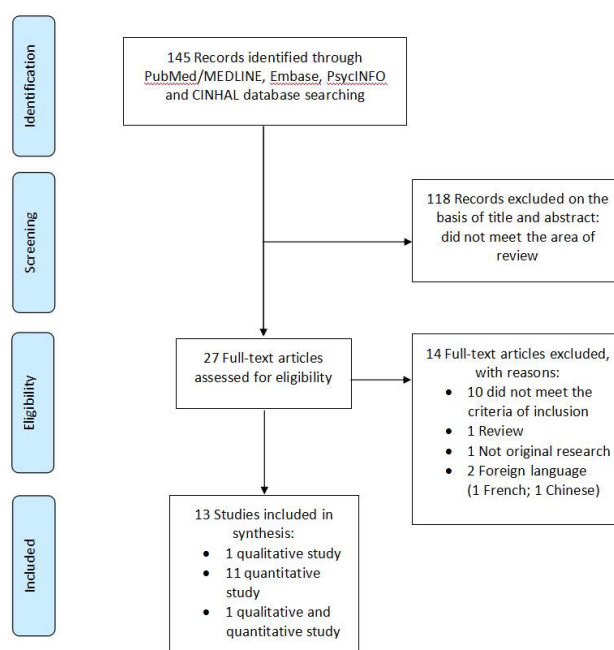


Figure 1. PRISMA Flowchart: progression of articles selection

Step 1: Literature Search

A PubMed/MEDLINE, PsycINFO, CINHAL, and Embase electronic search, conducted from January 2020 to April 2020, yielded 145 records referring to mental health disorders among medical staff dealing with COVID-19. PubMed/MEDLINE is a primary database containing articles in the biomedical and health science areas. PsycINFO is a database of abstracts for psychological literature. CINHAL is the most comprehensive database of information in nursing and health related fields. Lastly, Embase is an extensive biomedical database that contains records from academic journals as well as grey literature.

The literature search was conducted using a combination of the following key words:

(1) Mental health, mental disorders, mental illness, psychiatric symptom or disorder, well-being, psychiatric or psychological outcome, psychiatric morbidity or disability, psychological morbidity or disability, distress, stress, posttraumatic stress, PTSD, anxiety, depression, traumatic reaction.

(2) Medical staff or medical workers, hospital staff or hospital workers, healthcare staff or healthcare workers, caregivers, physician, provider, practitioner, nurse.

(3) Coronavirus or COVID-19 or severe acute respiratory syndrome.

We considered all types of publications from January 2020 to April 2020, including letters to editors, original research articles, commentary, and correspondence.

Reference lists of retrieved articles were also reviewed to search for other relevant studies. Studies were included in the present review if they reported original data (qualitative and quantitative) about mental health problems encountered by healthcare workforce involved in the SARS-CoV-2 pandemic.

From all the articles that were relevant to the topic of the review, only original research studies (including those published as letters to the editors/commentaries) that assessed mental health issues faced by healthcare workers were included in the narrative review.

Step 2: Article Selection

Of all the 145 articles that were retrieved, 118 were excluded on the base of title and abstract and 27 were selected for full text examination. After scrutinizing each paper, 14 were excluded from this review: 10 did not report a study, one commented on a study that was already included in the present review, one was a literature review, and two were written in a foreign language (one in French and one in Chinese). A total of 13 articles were included in this review.

3. Results

Among the 13 selected articles, 12 were from Chinese centers and one from Hong Kong. Eight were published as research articles and five as letters to the editor. The majority of the articles (10/13) were quantitative cross-sectional studies; one publication was a purely qualitative cross-sectional study; one article was featured research that was both qualitative and quantitative; and one article was a longitudinal study with two time points. Three studies were conducted between the end of January and the beginning of February; five studies were conducted in the month of February; one study was performed between the end of February and the beginning of March. One study compared data from the outbreak period (Jan 28-Feb 29) and the after-outbreak period (Mar 2-Mar 21). Meanwhile three studies did not report the period in which they were carried out. The sample size of the studies varied from 20 participants to 3343 participants. Depression and anxiety were evaluated in 69% (9/13) and 61% (8/13) of the studies, respectively. Other mental health disorders assessed in these studies included insomnia, distress, stress, fear, dream anxiety, and other. Studies characteristics are reported in Table 1.

Table 1. Studies characteristics

Author	Methodology	Period	Country/Region	Populations studied	Total sample size	Endpoints- Instruments
Lai et al.	Quantitative Survey	Jan 29-Feb 3	Wuhan Hubei Other region (China)	Physicians and nurses	1257	Depression- PHQ-9 Anxiety- GAD-7 Insomnia- ISI Distress- IES-R
Kang et al.	Quantitative Survey	Jan 29-Feb 4	Wuhan (China)	Physicians and nurses	994	Depression- PHQ-9 Anxiety- GAD-7 Insomnia- ISI Distress- IES-R
Sun et a.	Qualitative	Jan 20-Feb10	First Affiliated Hospital of Henan University of Science and Technology (China)	Nurses	20	Psychological Experience-Colaizzi's 7-step method
Wu et al.	Quantitative Survey	Feb 10-Feb 21	China	Medical staffs and college students	3343	Risk Awareness- Own questionnaire Physical and Mental Response- Own questionnaire Optimistic Hope- Own questionnaire
Mo et al.	Quantitative Survey	Feb 21	Hubei (China)	Nurses	180	Stress-SOS Anxiety-SAS
Li et al.	Quantitative Survey	Feb 17-Feb 21	China	General public, frontline nurses, non-frontline nurses	740	Vicarious traumatization- Vicarious traumatization questionnaire
Chung et al.	Quantitative	Feb 14-Feb24	Hong Kong East Cluster	Hospital Staff	69	Depression- PHQ-9
Lu et al.	Quantitative Survey	Feb 25-Feb 26	Fujian Provincial Hospital (China)	Medical staff and administrative staff	2299	Fear- NRS Anxiety- HAMA Depression- HAMD

Author	Methodology	Period	Country/Region	Populations studied	Total sample size	Endpoints- Instruments
Zhang et al.	Quantitative Survey	Feb 19-Mar 6	China (China)	Medical healthcare workers and Nonmedical healthcare workers	2182	Insomnia- ISI Anxiety- GAD-2 Depression- PHQ-2 Somatic symptoms- SCL-90-R OCD- SCL-90-R Phobic anxiety- SCL-90-R
Cao et al.	Qualitative and Quantitative Survey	N/A	Union Medical College Hospital (Beijing, China)	Physicians, nurses, and clinical technician	37	Depression- PHQ-9 Emotional Exhaustion- MBI-EE Depersonalization- MBI-DP Personal Accomplishment- MBI-PA
Chen et al.	Quantitative Survey	N/A	Guiyang (China)	Pediatric medical staff	105	Depression- SDS Anxiety- SAS
Liang et al.	Quantitative Survey	N/A	Fifth affiliated hospital of Sun Yat-sen University (China)	Physicians and nurses	59	Depression- SDS Anxiety- SAS
Xu et al.	Observational Study	Jan 28-Feb 29 Mar 2-Mar 21	Shanghai Shuguan Hospital (China)	Surgical medical staff	120	Anxiety Depression Dream Anxiety SF-36

Four studies did not present demographic characteristics, two studies included only the average age and gender of the participants, and seven studies reported a broader set of demographic information. In the studies that reported demographic characteristics, the average age of the population ranged between 29 and 43 years, and most of the participants were female (from 64% to 90%). About 50-80% of the population was married, and around 75-100% of the individuals received a college education.

Consistent results were observed across the majority of the studies. Lai et al. [18] conducted a study to investigate the geographical differences and the potential factors that might affect mental health outcomes among healthcare workers in China. The survey was conducted in 34 different hospitals of which 20 were located in Wuhan, 7 in the province of Hubei, and 7 in other 7 different regions. Of the 1257 participants, who responded to the questionnaires, 493 were physicians and 764 were nurses. A high rate of participants reported depression (50.4%), anxiety (44.5%), insomnia (34.0%), and distress (71.5%). More severe mental health outcomes were observed in women, nurses, medical staff working in Wuhan, and frontline healthcare workers compared to other healthcare workers.

Similar results have been found in the studies performed by Liang et al. [19] and by Chung et al. [20]. Several of the 59 medical healthcare workers in Liang et al. [19] screened positive for depressive symptoms; although no difference in scores between healthcare professionals working in COVID-19 department and other departments was observed. Chung et al. and colleagues [20] reported that 34.8% (24/69) of the hospital

staff in Hong Kong East Cluster who completed the survey were experiencing depression. About 44.9% (31/69) of the participants expressed their concerns about the lack of personal protective equipment and the fear of contracting SARS-CoV-2.

Kang et al. [21] examined the depression symptoms, anxiety, insomnia, and distress level of 994 caregivers (183 doctors and 811 nurses) working in Wuhan. Of those, 36.9% had low symptoms of mental health disorders, 34.4% had mild symptoms, 22.4% had moderate symptoms, and 6.2% had severe symptoms. The study found that staff with limited access to psychological advice resources such as printed brochures and digital media guidance were more likely to reveal severe degrees of mental health symptoms.

Two studies were completely focused on nurses. Mo et al. [22] found that the sample of 180 nurses involved in COVID-19 assistance in Wuhan registered a level of anxiety higher than the standard national level. About 39.91% and 22.2% of the participants reported high stress load and severe stress load, respectively. Several factors such as being the only child, number of hours worked per week, as well as the level of anxiety, showed to be statistically significant in affecting the level of stress load of nurses engaged in taking actions against COVID-19.

In a qualitative study, Sun et al. [23] explored the psychological feelings of 20 nurses who were assisting in treating patients with COVID-19. All the nurses expressed negative feelings: (1) fatigue and discomfort due to increased workload and the number of infected patients; (2) concern about the conditions of their patients and the lack of caregivers; and (3) fear of the pandemic's effect

on their families. About 50% of the participants declared to feel anxious due to the challenges of working in an unusual environment with lack of personal protective equipment.

Chen et al. [24] observed that of 105 pediatric medical staff sampled in Guiyang, 18.1% and 29.5% reported anxiety and depression, with scores significantly higher than the general national level.

Further evidence was obtained by comparing the medical healthcare workforce to the general population or to the administrative staff. The study carried out by Zhang et al. [25] compared the mental health status between medical healthcare workers (927, of which 680 doctors and 247 nurses), and nonmedical healthcare workers (1255). More medical health workers screened positively for insomnia, anxiety, depression, somatization, and obsessive-compulsive symptoms compared to nonmedical healthcare workers. The study found that factors such as living in rural areas, being at risk of contact with patients affected by COVID-19, being female, having an organic disease increased the risk of developing mental health disorders in healthcare workers. With an exception for having an organic disease, all the factors were statistically non-significant in the nonhealthcare worker population.

In the comparison between medical staff and administrative staff carried out by Lu et al. [26], medical health workers reported higher rates of moderate and severe fear, as well as higher rates of mild to moderate anxiety than administrative staff. Healthcare personnel working in departments with high-risk contact with COVID-19 patients, such as ICU, department of respiratory, and department of emergency, presented significantly more severe symptoms of fear, anxiety and depression than administrative staff, and severe symptoms of anxiety compared to medical staff working in a low-risk department.

Similarly, Cao et al. [27] selected 16 doctors, 19 nurses, and 2 clinical technicians. About 21.6% of participants had low appetite, and 29.7% had sleeping problems. A total of 18.9% of participants (6.3% of doctors, 31.6% of nurses, and 0% of technicians) reported depression symptoms. A total of 25% (26.7% of doctors, 20.0% of nurses, 50% of clinical technicians) of the medical staff screened positively for professional burnout. Consistent with the report of Sun et al. [23], nurses (52.6%) expressed negative emotions such as worrying about their family members, worrying about being infected, and feeling stressed about heavy workload.

The custom-developed questionnaire by Wu et al. [28] aimed to investigate the emotional state and psychological stress of medical healthcare workers and college students.

Medical staffs reported significantly higher psychological stress than college students. Moreover, medical staffs working in Wuhan presented more negative emotions such as concern for their family members, fear of being infected, need of psychological support, and low confidence in the end of the epidemic than medical staffs outside of Wuhan and college students.

On the other hand, Li et al. [29] found that no differences were observed between non-frontline nurses and general public in terms of vicarious traumatization. However, frontline nurses showed to suffer less from vicarious traumatization compared to the other two groups.

Lastly, Xu et al. [30] observed 60 subjects during the outbreak period and 60 subjects during the non-outbreak period. All the 120 individuals in the study were selected from the surgical staff of Shanghai Hospital. Surgical staff during the outbreak period scored a significantly higher anxiety score, depression score, dream anxiety score and SF-36 than the group during the non-outbreak period.

4. Discussion

The present review found that the psychological status of healthcare workers is strongly related to the experiences that they live through as workers fighting against the Covid-19. Healthcare workers involved in the COVID-19 pandemic were likely to encounter higher level of anxiety, stress, depression, and insomnia than non-medical workers [25].

Most common reasons for the mental health problems which medical staff are undergoing might be affected by the high likelihood of being in contact with infected patients and contracting the disease, the concern of transmitting the disease to family members, the shortage of medical protective equipment, the heavy workload, the lack of rest, and the exposure to traumatic life events, such as death. Studies have shown that being a frontline worker, a nurse, a woman, having organic disease, working in a high-risk department were also risk factors for more severe mental health outcomes [18,25,26]. Liang et al. [19] reported that medical workers under the age of 30 had worse levels of depression and of anxiety than older medical workers, although the differences were not statistically significant (p -value=0.11 and p -value=0.76, respectively).

Holding an intermediate technical title appeared to be another factor that influenced the severity of mental health outcomes [18]. The distress might be caused by the lack of experience and training that young and less educated staff members might have.

The fear of being infected was especially experienced by medical healthcare workers in rural area [25]. Rural

areas might present different medical conditions than urban areas: hospitals might lack modern equipment and sufficient personnel, and staff might not be experienced in dealing with a virus of this kind. These differences might cause difficulties in the rural areas when facing a pandemic. Conversely, Lai et al. [18] reported that working in Wuhan was associated with a higher level of distressed than working outside of Hubei province.

In three studies [22,23,22], healthcare workers expressed their concern about the safety of their family members. Medical staffs, especially those who lived with elderly and children, were worried about infecting their families and reported that they felt helpless and guilty. Severe degrees of stress were observed in nurses who were the only children in their families. They worried not only for the health of their family members, but also about the fact that if they died of COVID-19, their parents would lose their only child and nobody will be there to take care of their parents. Many medical workers decided to live isolated during the pandemic in order to avoid contact with their family members to protect them, although this increased their feelings of loneliness and of isolation [26].

Mo et al. [22] highlighted that the overwhelming circumstances, combined with long shifts, heavy workload, and the state of tension and fatigue, that medical workers experienced might lead to burnout. About 25% of medical staff in the study conducted reported “personal accomplishment” burnout, probably due to the lack of effective treatment against Sars-CoV-2.

These findings were consistent with the studies regarding healthcare workers during SARS and MERS [17,16,11,12]. Research on the previous two outbreaks reported negative psychological reactions to these experiences, which caused long-lasting consequences even after the pandemic was over [13,14,15].

Other studies about COVID-19, instead, have observed that emotions such as fear and anxiety in caregivers tend to decrease after the peak of the outbreak or after work adjustments have taken place [23,30]. Providing psychological guidelines and counseling might also play an important role in experiencing less severe mental health reactions [21]. Curiously, the vicarious traumatization score, which measures the trauma that helpers might experience as a result of empathic engagement with traumatized people, was significantly lower in frontline nurses compared to non-frontline nurses and the general population, which reported similar scores [29]. Wu et al. [28] speculated that the decreasing of negative emotions over time might be a consequence of what is known in psychology as “exposure effect”. “Exposure effect” is defined as a predilection for

stimulus as a result of being repeatedly exposed to that stimulus. The preference for that stimulus increases as the time of exposure to stimulus increases.

Conclusions from the studies in this review should be considered carefully. The results are affected from many sources of bias and thus should not be generalized: (1) mental health measurements were mostly self-reported; (2) samples were from specific areas/hospitals; (3) many of the studies involved only nurses and/or doctors, excluding other healthcare workers; (4) the samples size varied from 20 to 3343, with 7 out of the 13 studies featuring a sample size lower than 200; (5) the studies were mostly descriptive cross-sectional studies, therefore causal relationships between factors cannot be drawn at the moment and additional longitudinal studies should be carry out, and lastly (6), all of the studies presented missing responses, making unclear whether individuals did not respond because they were too concerned to participate or not concern at all and hence not interested in the survey.

5. Conclusions

Since the beginning of the pandemic, healthcare workers are overwhelmed, emotionally exhausted, and constantly under pressure. Rarely, the working condition are appropriate to meet the high medical treatment demands. Thousands of healthcare personnel have been tested positive for COVID-19 and many others have already died. On May 6, the International Council of Nurses (ICN) estimated that at least 90,000 healthcare workers have contracted Sars-CoV-2, and more than 260 nurses have died worldwide [31]. The ICN highlighted that these numbers may be underestimations of the real numbers since the information they are based on is gathered from only 30 countries [32]. As consequences of negative cognitions and emotions, and the difficult conditions under which they are forced to work, many healthcare professional demanded resignation [33,34,35], others have started protesting [36,37], and someone committed suicide [38,39,40]. Although some studies claimed that fear and anxiety might decrease after the outbreak, other psychological disorders like PTSD are likely to arise after a longer period rather than in the immediate present as well as other mental health conditions/effects such as depression may last longer. Moreover, given the data from the previous studies about SARS and MERS, it is most likely that similar reactions to those observed during the previous outbreaks will be seen in the current crisis as well.

Mental health care for medical workers demands urgent attention. Caregivers are working under high

levels of pressure, in a high-risk environment, and are facing many physical and psychological challenges^[40,41]. Promoting psychological protection, providing adequate working conditions, and guaranteeing mental health support programs appear to be necessary to maintain good psychological conditions among hospitals staff and to prevent negative mental health deterioration when facing a global health crisis such as COVID19.

Conflict of Interest

Dr. Domenicano is also a Biostatistician at the West Haven, CT Cooperative Studies Program Coordinating Center, VA Office of Research and Development. The views expressed in this article are those of the authors and do not necessarily reflect the position or policy of the Department of Veterans Affairs or the United States government.

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