

The impact of Covid-19 healthcare emergency on the psychological well-being of health professionals: a review of literature

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Key words: Psychological stress, healthcare workers, resilience, well-being, Covid 19, pandemic, emergency management, psychological assistance

Parole chiave: Stress psicologico, operatori sanitari, resilienza, benessere, Covid 19, pandemia, gestione delle emergenze, assistenza psicologica

Abstract

Introduction. The Coronavirus pandemic (Covid-19) was first identified in December 2019 in the city of Wuhan, China, and later caused a severe health crisis, causing massive disruptions to most healthcare systems worldwide. The Covid-19 health emergency has seen healthcare workers in the front line facing all the difficulties related to the care burden. One of the most significant and probably underinvestigated aspects is the psychological stress of the healthcare staff managing the emergency. The aim of the paper is to analyze the literature on the impact of the Covid-19 crisis on the psychological well-being of health professionals.

Methodology. We conducted a systematic review of articles published on this topic during the months from January 2020 to December 2020, searching on Pub Med, Scopus and Web of Science databases.

Results. Most of the issues can be summarized into five conceptual categories: Stress, Depression and Infection Anxiety, Anguish, Insomnia, Post Traumatic Stress Disorder, and Suicide. The literature identifies many factors contributing to the onset of anxiety, depression, and stress, like the fear of contracting the disease and transmitting it to family members and friends, stressful shifts, and little rest among several others. The literature highlights the needs for adequate measures, including proper psychological support.

Conclusion. The conducted review suggests that the behaviours of healthcare professionals during the emergency phase of the Covid-19 pandemic show psychological disorders that can compromise mental health. Therefore, there is a call for those in chief like hospital managers and policymakers to take action, promoting measures like surveillance, monitoring, and psychological support among others, to increase the resilience of healthcare workers, limiting stress and anxiety and allowing them to keep their performance at work.

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Introduction

At the end of December 2019, the Chinese city of Wuhan reported new pneumonia caused by acute respiratory syndrome CoVid-19 coronavirus that later spread rapidly both nationally as well as internationally (1). According to data released by the National Health Commission of China, as of March 2, 2020 the confirmed cases in mainland China increased from 80 to 150, registering them outside the country's borders. On January 30, 2020, the World Health Organization held an emergency meeting and declared the global Covid-19 epidemic a public health emergency of international concern, later defined as a pandemic (2). As of March 30, 2020, more than 720,000 cases and 33,000 deaths attributable to this disease were reported and confirmed. To reduce the spread of the infection, strict public health measures and non-pharmaceutical interventions were implemented all over the world during the spring of 2020 (3-5). As of February, 2021, the world is experiencing another wave, with several countries (like Italy, the UK, France, and Austria among others) under strict lockdown measures again, and with worrying indexes about intensive care units occupation. As of mid February, 2021, over 110 million of people have been infected, with more than 60 million recovered, and almost 2,5 million of deaths. Healthcare workers are once again involved in the front line in the activities of framing, diagnosis, treatment and care of patients affected by Covid-19.

During the so-called emergency phase (6), in spring 2020, several disruptions involved hospitals and healthcare institutions all over the world, calling for a fast reorganization of people, structures, and tools. All the non-urgent clinical activities, like surgery interventions, follow-ups, treatments (7), tests, were suspended (3, 8), leading thus to unmet medical needs, shifting the paradigm from patient-centric to public health ethics (9). Whenever possible, operating rooms

were converted into intensive care units (10, 11). Several healthcare professionals of different specialities were moved to Covid wards, to support their colleagues in the management of the disease, employing a learning-of-the-job approach. Many of them were even devoted to compassionate and palliative care (12, 13) without proper psychological training. Retired clinicians went back to work, to overcome the lack of medical staff. To protect their families, several healthcare professionals had to move out of their homes (3). Still, many of them got infected. Many even died (14).

The literature has highlighted how during healthcare emergencies and crisis (15), such as pandemics, health professionals are at greater risk of developing high levels of suffering and psychological distress (16). For this reason, the World Health Organization (WHO) reiterates the need to protect the health of those workers involved by taking all the necessary measures to protect occupational safety (4).

Starting from these premises, the objective of this study is to investigate the impact of the Covid-19 health emergency on the psychological well-being of health professionals, by conducting a systematic literature review of the works published gathering data from the first wave of the pandemic. Results should allow not only to define the main outcomes on the psychological well-being of healthcare professionals but to offer new research avenues as well as food for thought for policymakers to take action against a worrying phenomenon.

Materials and methods

This review was conducted according to methods recommended by the Cochrane Collaboration and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (17, 18).

Information sources and search strategy

Studies were identified searching the electronic databases PubMed/Medline, Scopus, Web of Science. We combined the search strategy of free-text terms and exploded MESH headings for the topic of Covid-19: Psychological Healthcare Emergency Professional combined as following: ((((((psychological stress) OR psychological assistance) OR related stress [MeSH Terms])) AND (((health personnel) OR nurse) OR doctors[MeSH Terms])) AND ((((((Stress) OR BD) OR Depression) OR Infection Anxiety) OR Post Traumatic Stress Disorder) OR Suicide) OR [MeSH Terms])) AND (((treatment*) OR therap*) OR pharmacotherap*) OR Therapeutics[MeSH Terms]). The choice of keywords, more precisely thesaurus entries, descriptive terms used for the research, was fundamental to

query the databases from which to draw the reference bibliography. The strategy was first developed in MEDLINE and then adapted for use in the other databases (Figure 1). Studies published in English from January 2020 to December 2020 were included. Besides, further studies were retrieved from reference listing of relevant articles and consultation with experts in the field.

Inclusion criteria

Study population and study design

We considered studies that included nurses and doctors on the impact of the Covid-19 crisis on the psychological well-being of health professionals. Studies conducted in a different population were excluded. All experimental and observational study designs were included apart from

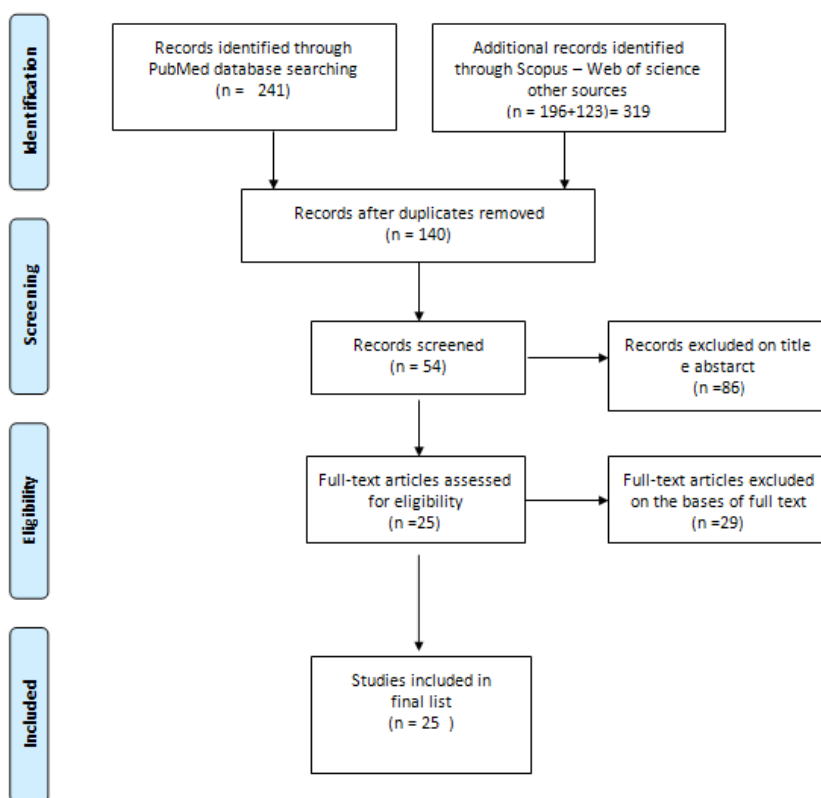


Figure 1 - Flow chart according to Prisma.

case reports and case series. Narrative and systematic reviews, letters to the editor, and book chapters were excluded.

Outcomes

The primary outcome impact of the Covid-19 crisis on the psychological well-being of health professionals. Secondary outcomes were i) strategy monitored and measured ii) and introduction of psychologists and psychotherapists right in hospital facilities iii) strategy support healthcare professionals.

Study selection and data extraction

Identified studies were independently reviewed for eligibility by two authors (AD, FR) in a two-step process. A first screening was performed based on title and abstract, and then full texts were retrieved for a second screening. At both stages, disagreements between the analysts were resolved by consensus. Data were extracted by two authors (AD, PF) and supervised by a third author (PF) using an *ad-hoc* developed data extraction spreadsheet. The data extraction spreadsheet was piloted on ten randomly selected papers and modified accordingly.

The research identified a total of 140 articles, 115 were excluded because they did not address the topic. For the remaining 18 items and subjected to analysis, the full-text was found. The following Table 1 summarizes the primary data extracted from the studies: authors, year and month of publication, journal, and aim of the study.

Results

For the representation of the results, we could identify the presence of five conceptual categories: Stress, Depression and Infection Anxiety, Anguish, Insomnia, Post-Traumatic Stress Disorder (PTSD), and Suicide.

Stress, depression and infection anxiety

All studies have shown that anxiety, stress, and depression are the major problems faced by health care professionals involved in the Covid-19 crisis. The reviewed studies analyze physicians, nurses, support staff, and administrative staff, showing that the level of anxiety score of health care staff during the epidemic is significantly higher than that of administrative staff (19). The authors Lu et

Table 1 - Studies that met inclusion criteria for systematic review

References	Study design	Country	Study population	N at entry/ Retained	Outcomes
Lai et al. 21	cross-sectional study	China	1257 health care workers in 34 hospitals	A total of 1257 of 1830	These findings suggest that, among Chinese health care workers exposed to COVID-19, women, nurses, those in Wuhan, and front-line health care workers have a high risk of developing unfavourable mental health outcomes and may need psychological support or interventions
Kang et al. 30	Quantitative study	China	994 medical and nursing staff working in Wuhan	N.A.	These findings emphasize the importance of being prepared to support front-line workers through mental health interventions at times of widespread crisis

Cai et al. 23	cross-sectional observational study	China	534 front-line medical staff	N.A.	The responses showed that frontline staff workers believed they had a social and professional obligation to continue working long hours. Medical staff ended up anxious regarding their safety and the safety of their families. They reported psychological effects from the rising numbers of deaths because of COVID-19. The availability of strict infection control guidelines, specialized equipment, recognition of their efforts by hospital management and the government, and reduced reported cases of COVID-19 provided psychological benefit.
Xu et al. 32	cross-sectional observational study	China	A total of 120 subjects from the surgical medical staff	N.A.	The anxiety score, depression score, and dream anxiety score of the surgical staff during the outbreak period were positively correlated. The depression score and dream anxiety score of the surgical staff during the outbreak period were strongly positively correlated with the gender
Lu et al. 20	cross-sectional survey	China	A total of 2299 eligible participants were enrolled from the authors' institution, including 2042 medical staff and 257 administrative staff	N.A.	The medical workers, mainly employed in COVID wards, were more susceptible to psychological disorders. Effective strategies toward improving mental health should be provided to these individuals.
Huang et al. 31	cross-sectional survey	China	7,236 self-selected participants	N.A.	Continuous monitoring of the psychological consequences for the high-risk population should become routine as part of targeted interventions during times of crisis
Xiao et al. 25	cross-sectional observational	China	220 medical staff	180 medical staff	An SEM analysis showed that medical staff in China who were treating patients with COVID-19 infection during January and February 2020 had levels of anxiety, stress, and self-efficacy that were dependent on sleep quality and social support.

Zhang et al. 22	self-design questions	China	1,563	N.A.	More than one-third of the medical staff suffered insomnia symptoms during the COVID-19 outbreak. The related factors included education level, an isolation environment, psychological worries about the COVID-19 outbreak, and being a medical doctor. Interventions for insomnia among medical staff were needed, considering the various sociopsychological factors at play in this situation.
Wu et al. 44	random sample questionnaire survey	China	2110 medical staffs and 2158 college students	N.A.	The emotion, cognition, physical, and mental response of front-line medical staff showed obvious "exposure effect", which calls for a psychological crisis intervention strategy
Chew et al. 33	cross-sectional observational	Singapore - India	906 healthcare workers	N.A.	The demonstrates a significant association between the prevalence of physical symptoms and psychological outcomes among healthcare workers during the COVID-19 outbreak. This association may be bi-directional. Timely psychological interventions for healthcare workers with physical symptoms should be considered once an infection has been excluded.
Tan et al. 19	self-administered questionnaire	Singapore	500 healthcare workers	470	The study highlights that nonmedical health care personnel are at the highest risk for psychological distress during the COVID-19 outbreak. Early psychological interventions targeting this vulnerable group may be beneficial.
Dosil Santamaría et al. 34	cross-sectional observational	Spain	421 healthcare workers	N.A.	The situation looks critical, especially for frontline staff, who experience various psychological issues. Psychological support is, therefore, highly recommended.
He et al. 38	live media, 24-hour hotline consultations, online video intervention and on-site crisis intervention sessions to provide services to those in need	China	223 cases received online video intervention	N.A.	The support model explained in the paper could provide valuable experiences and serve as a reference guide for other countries to offer effective psychological intervention, and reduce detrimental negative mental health outcomes in a public health emergency.
Li et al. 40	self-report questionnaire	China	of 1530 people	N.A.	During the early outbreak of COVID-19, internet hospitals could help relieve psychological burdens and increase disease awareness through the timely and rapid spread of knowledge regarding COVID-19 prevention and control. Internet hospitals should be an essential aspect of a new medical model in public health emergency systems

Erquicia et al.27	A cross-sectional assessment	Spain	395 participants	N.A.	Coping with the Covid-19 pandemic caused a significant impact on the emotional status of healthcare workers involved in the study.
Wanigasooriya et al. 41	A cross-sectional assessment	England	2638 eligible participants	N.A.	The study reports higher rates of clinically significant mental health symptoms among hospital staff following the initial COVID-19 pandemic peak in the UK. The workers with a history of mental health conditions were most at risk. Adequate PPE availability, access to well-being support and reduced exposure to moral dilemmas may protect hospital staff from mental health symptoms.
Marco et al. 42	cross sectional survey	USA	1 3 0 0 emergency physicians	N.A.	A significant number of emergency physicians reported symptoms of stress consistent with PTSD. Higher PCL 5 scores were associated with age younger than 50 years and <10 years in practice.
Robles et al. 43	cross-sectional online study	Mexico	5 , 9 3 8 Mexican healthcare workers	N.A.	The most frequent mental health problems during the common exposure scenario for COVID-19 in Mexico included the short-term psychological consequences of intense adversity. A comprehensive strategy for preventing mental health problems should focus on individuals with cumulative vulnerability and specific risk factors.

Table 2 - Results of selected studies

References	Results
Lai et al.	Front-line health care workers engaged in the direct diagnosis, treatment, and care of patients with COVID-19 were associated with a higher risk of symptoms of depression (OR, 1.52; 95% CI, 1.11-2.09; P=.01), anxiety (OR, 1.57; 95% CI, 1.22-2.02; P<.001), insomnia (OR, 2.97; 95% CI, 1.92-4.60; P<.001), and distress (OR, 1.60; 95% CI, 1.25-2.04; P<.001)
Kang et al.	Of all participants, 36.3% had accessed psychological materials (such as books on mental health), 50.4% had accessed psychological resources available through media (such as online push messages on mental health self-help coping methods), and 17.5% had participated in counselling or psychotherapy.
Cai et al.	Study questionnaires were completed by 534 front-line medical staff. The responses showed that they believed they had a social and professional obligation to continue working long hours. Medical staff were anxious regarding their safety and that of their families and reported psychological effects from reports of mortality from COVID-19 infection. The availability of strict infection control guidelines, specialized equipment, recognition of their efforts by hospital management and the government, and reduction in reported cases of COVID-19 provided psychological benefit.

Xu et al.	By comparing the capital data of surgical staff from different periods of the epidemic, there was no significant difference in the age, gender, and marital status of the surgical team in the two periods ($P > 0.05$). According to statistics, the anxiety score of surgical staff during the outbreak period was 7.817 ± 2.508 , of which 28 were positive (≥ 8 points). The anxiety score of surgical staff during the non-outbreak period was 5.283 ± 1.738 , of which 6 were anxiety positive. The anxiety score of the surgical staff during the non-outbreak period was significantly higher than that of the surgical staff during the outbreak period ($t = 6.432, P < 0.001$). The depression score of surgical staff during the outbreak period was 7.333 ± 2.508 , of which 24 were positive for depression (≥ 8 points). The depression score of surgical staff during the non-outbreak period was 4.933 ± 2.154 , of which 7 were positive for depression. The depression score of surgical staff during the outbreak was higher than that of surgical staff during the non-outbreak ($t = 4.531, P < 0.001$). Simultaneously, the dream anxiety score and SF-36 of the surgical staff during the outbreak were significantly higher than those of the surgical staff during the non-outbreak ($t = 17.365, P < 0.001; t = 1.974, P < 0.001$). Besides, the anxiety score, depression score, and dream anxiety score of the surgical staff during the outbreak period were positively correlated, and the depression score and dream anxiety score of the surgical staff during the outbreak period were strongly positively correlated. A gender effect emerged.
Lu et al.	The occurrence of fear, anxiety and depression were measured by the numeric rating scale (NRS) on fear, Hamilton Anxiety Scale (HAMA), and Hamilton Depression Scale (HAMD), respectively. A total of 2299 eligible participants were enrolled from the authors' institution, including 2042 medical staff and 257 administrative staff. The severity of fear, anxiety and depression were significantly different between two groups. Furthermore, as compared to the non-clinical staff, front line medical staff with close contact with infected patients, including working in the departments of respiratory, emergency, infectious disease, and ICU, showed higher scores on fear scale, HAMA and HAMD, and they were 1.4 times more likely to feel fear, twice more likely to suffer anxiety and depression
Huang et al.	The overall prevalence of anxiety symptoms, depressive symptoms, and poor sleep quality were 35.1%, 20.1%, and 18.2%, respectively. People aged < 35 years reported a higher prevalence of anxiety symptoms and depressive symptoms than people aged ≥ 35 years. Healthcare workers have the highest rate of poor sleep compared to other occupations. Healthcare workers/younger people who spent a high level of time (≥ 3 hours/day) had a particular higher prevalence of anxiety symptoms than in those who spent less time (< 1 hours/day and 1-2 hours/day) on the outbreak.
Xiao et al.	Levels of social support for medical staff were significantly associated with self-efficacy and sleep quality and negatively associated with the degree of anxiety and stress. Levels of anxiety were significantly associated with the levels of stress, which negatively impacted self-efficacy and sleep quality. Anxiety, stress, and self-efficacy were mediating variables associated with social support and sleep quality.
Zhang et al.	Five-hundred-and-sixty-four (36.1%) participants had insomnia symptoms according to the Insomnia Severity Index (ISI) (total score ≥ 8). A multiple binary logistic regression model revealed that insomnia symptoms were associated with an education level of high school or below (OR = 2.69, $p = 0.042$, 95% CI = 1.0-7.0), being a doctor (OR = 0.44, $p = 0.007$, 95% CI = 0.2-0.8), currently working in an isolation unit (OR = 1.71, $p = 0.038$, 95% CI = 1.0-2.8), is worried about being infected (OR = 2.30, $p < 0.001$, 95% CI = 1.6-3.4), perceived lack of helpfulness in terms of psychological support from news or social media with regard to COVID-19 (OR = 2.10, $p = 0.001$, 95% CI = 1.3-3.3), and having very strong uncertainty regarding effective disease control (OR = 3.30, $p = 0.013$, 95% CI = 1.3-8.5).
Wu et al.	Results revealed that medical staff scored significantly higher on all items of psychological stress in all provinces of China than college students ($P < .001$). In Wuhan, medical teams scored substantially higher than college students in all items of psychological stress ($P < .001$). While among medical staffs, the group in Wuhan area scored significantly higher than the group outside Wuhan on the following items: "Thought of being in danger," "The possibility of self-illness," "Worrying about family infection" ($P < .05$), "Poor sleep quality," "Needing psychological guidance," and "Worrying about being infected" ($P < .01$) in the Psychological Stress Questionnaire, but on the item "Confidence in the victory of the epidemic," the group in Wuhan area scored significantly lower than the group outside Wuhan ($P < .05$).

Chew et al.	Out of the 906 healthcare workers who participated in the survey, 48 (5.3%) screened positive for moderate to very-severe depression, 79 (8.7%) for moderate to extremely severe anxiety, 20 (2.2%) for moderate to extremely-severe stress, and 34 (3.8%) for moderate to severe levels of psychological distress. The commonest reported symptom was headache (32.3%), with many participants (33.4%) reporting more than four symptoms. Participants who had experienced symptoms in the preceding month were more likely to be older, have pre-existing comorbidities and a positive screen for depression, anxiety, stress, and PTSD. After adjusting for age, gender and comorbidities, it was found that depression (OR 2.79, 95% CI 1.54-5.07, $p = 0.001$), anxiety (OR 2.18, 95% CI 1.36-3.48, $p = 0.001$), stress (OR 3.06, 95% CI 1.27-7.41, $p = 0.13$), and PTSD (OR 2.20, 95% CI 1.12-4.35, $p = 0.023$) remained significantly associated with the presence of physical symptoms experienced in the preceding month. Linear regression revealed that physical symptoms were associated with higher mean scores in the IES-R, DASS Anxiety, Stress and Depression subscales.
Tan et al.	Of 500 invited health care workers, 470 (94%) participated in the study. Sixty-eight (14.5%) participants screened positive for anxiety, 42 (8.9%) for depression, 31 (6.6%) for stress, and 36 (7.7%) for clinical concern of PTSD. The prevalence of anxiety was higher among nonmedical health care workers than medical personnel (20.7% versus 10.8%; adjusted prevalence ratio, 1.85 [95% CI, 1.15 to 2.99]; $P = 0.011$), after adjustment for age, sex, ethnicity, marital status, survey completion date, and presence of comorbid conditions. Similarly, higher mean DASS-21 anxiety and stress subscale scores and higher IES-R total and subscale scores were observed in nonmedical health care workers.
Dosil Santamaría et al.	The results show that the COVID-19 pandemic has generated symptoms of stress, anxiety, depression and insomnia among healthcare personnel, with higher levels among women and older professionals. Variables such as having been in contact with the virus or fear at work triggered more significant symptoms.
He et al.	An integrated psychological intervention model coined 'COVID-19 Psychological Resilience Model' was developed in Chengdu, China including live media, 24-hour hotline consultations, online video intervention and on-site crisis intervention sessions to provide services to those in need. A total of 45 episodes of live media programs on COVID-19 outbreak-related psychological problems were broadcasted with over 10 million views. A total of 4,236 hotline consultations were completed. More than 50% of the clients had positive feedback about the hotline consultations. A total of 223 cases received online video intervention, of which 84.97% were redirected from the hotline consultation and 15.03% from COVID-19-designated hospital and community-based observation spots. Seventy one-on-one psychological interventions were conducted with 39 COVID-19 patients, and one-third were treated with medication. Additionally, 5 training sessions were conducted to 98 front-line medical staff. This 'COVID-19 Psychological Resilience Model' is proven effective to the general population during the COVID-19 pandemic.
Li et al.	The total number of internet consultations was 4120. The consultation topics mainly included respiratory symptoms such as cough, expectoration, fever (2489/4120, 60.4%), disease knowledge, anxiety, and fear (1023/4120, 24.8%). A total of 1530 people filled out the questionnaires before and after the internet consultation. Of these people, 1398/1530 (91.4%) experienced psychological stress before the internet consultation, which significantly decreased after consultation (260/1530, 17.0%) ($t_{21}=1704.8$, $P<.001$). There was no significant difference in the number of people who expressed concern about the COVID-19 pandemic before and after the internet consultation ($t_{21}=0.7$, $P=.43$). However, after the internet consultation, the degree of concern was significantly alleviated ($t_{2699}=90.638$, $P<.001$). The main worries before and after the talk were the dangers posed by the disease and the risk of family members' infection. The self-assessment risk scores after the internet consultation were significantly lower than those before consultation ($t_{3058}=95.694$, $P<.001$). After the consultation, the participants' knowledge of the symptoms, transmission routes, and preventive measures of COVID-19 was significantly higher than before the consultation ($t_{3058}=-106.105$, -80.456 , and -152.605 , respectively; all $P<.001$). The hospital treatment need score after the internet consultation decreased from 3.3 (SD 1.2) to 1.6 (SD 0.8), and the difference was statistically significant ($t_{3058}=45.765$, $P<.001$).

Erquicia et al.	A significant proportion of professionals reported symptoms of anxiety (31.4%) and depression (12.2%) from moderate to severe intensity. Symptoms of acute stress were reported by 14.5% of participants. We performed a regression analysis, which explained 30% of the variance associated with the degree of emotional distress ($R^2 = 0.30$). The final model reveals that females (or young males), who are working in the front-line as nursing assistants, caretakers or radiology technicians, with the uncertainty of a possible infection, the perception of inadequate protection measures and having experienced the death of a close person by Covid-19, showed a heightened risk of experiencing psychological distress.
Wanigasooriya et al.	There were 2638 eligible participants who completed the survey (female: 79.5%, median age: 42 years, interquartile range: 32–51). The rates of clinically significant symptoms of anxiety, depression and PTSD were 34.3%, 31.2% and 24.5%, respectively. In adjusted analysis a history of mental health conditions was associated with clinically significant symptoms of anxiety (odds ratio (OR) = 2.3, 95% CI 1.9–2.7, $P < 0.001$), depression (OR = 2.5, 95% CI 2.1–3.0, $P < 0.001$) and PTSD (OR = 2.1, 95% CI 1.7–2.5, $P < 0.001$). The availability of adequate personal protective equipment (PPE), well-being support and lower exposure to moral dilemmas at work demonstrated significant negative associations with these symptoms ($P \leq 0.001$).
Marco et al.	Among 1300 emergency physicians, a significant number of participants (22.3%; 95% confidence interval, 20.3–24.3%) reported symptoms of stress consistent with PTSD (PCL score ≥ 33). Higher PCL-5 scores were associated with age younger than 50 years ($P < 0.05$) and < 0.05). The major sources of stress identified by participants included disinformation about COVID-19, computer work/electronic medical record, personal protective equipment concerns, and workload. The most common consequences of workplace stress were feeling distant or cut off from other people and sleep disturbance, such as trouble falling or staying asleep.
Robles et al.	The identified mental health problems were insomnia, depression, and post-traumatic stress disorder (PTSD), all of which were more frequent in front-line healthcare workers (52.1, 37.7, and 37.5%, respectively) and women (47.1, 33.0 %, and 16.3%, respectively). A lack of rest time was the leading risk factor for insomnia (OR = 3.1, 95%CI 2.6-3.7, $p \leq 0.0001$). Mourning the death of friends or loved ones due to COVID-19 was the leading risk factor for depression (OR = 2.2, 95%CI 1.8-2.7, $p \leq 0.0001$), and personal COVID-19 status was the leading risk factor for PTSD (OR = 2.2, 95%CI 1.7-2.9, $p \leq 0.0001$).

al. (20) state that health care workers aged 25-40 years, who had spent a high time ≥ 3 hours / day in Covid wards had a higher prevalence of symptoms of anxiety, stress and depression than those who had spent less time < 1 hours / day and 1-2 hours / day. The latter are particularly at risk of psychological repercussions when they spend too much time reflecting on the pandemic. The authors suggest to balance leisure time with other activities (for instance, fitness exercises at home) and try to control the time of receiving information about the pandemic to less than 2 hours per day, focusing only on the necessary information (such as facts and data) without receiving even many harmful entries.

In one study, Lai et al. (21), analyze health care workers, aged between 26 and 40 years, in 20 hospitals in Wuhan, in the front-line, describing a strong development of levels of anxiety, depression, and stress because

of the fear of infecting their family, friends and colleagues, also warning reluctance to work and contemplating resignation. Also the authors Zhang et al. (22) revealed a significantly high score compared to the idea of being in danger, the possibility of becoming ill, and the concern of infecting a family member and/or friends.

The authors Cai et al. (23) showed in an analysis of 906 health workers that $N=79$ (8.7%) were positive for moderate/severe depression, $N= 20$ (2.2%) developed moderate/extremely severe anxiety, $N=34$ (3.8%) had moderate/extremely severe stress levels, while 34 had moderate/severe psychological distress. Also, about one out of five health care workers presented depressive symptoms, anxiety and stress, indicating that the uncertainty of the pandemic's progression would cause increased psychological pressure. According to the authors, the

possible reason for these mental problems could be related to concerns about the infection and the fast spread of the virus.

Bohlken et al. (24) and Xiao et al. (25) suggested that the levels of anxiety-related symptoms increased when severe infectious disease occurred and that women were more likely to experience such issues than men, revealing so a gender perspective. Similar to Bohlken et al., the authors Modesto Leite Neto et al (26) in their study demonstrated the severity of mental symptoms based on age, gender, type of activity and proximity to Covid-19 patients. Likewise, Erquicia et al. (27) formulated a model that reveals that female or young male workers working in the front-line as nursing assistants, caretakers, or radiology technicians, showed a heightened risk of experiencing psychological distress. Main factors were identified as the uncertainty of a possible infection, the perception of inadequate protection measures, and having experienced the death of a close person because of Covid-19. Coping with the Covid-19 pandemic caused a significant impact on the emotional status of most healthcare workers involved in the study. The authors Preti et al. (28) identified similar factors, concluding how high levels of stress at work were related to lack of primary prevention with personal protective equipment, inadequate communication, fear of infection and social isolation. Again, Xiao et al. (25) showed that the increasing number of confirmed and suspected cases, overwhelming workload, exhaustion of personal protective equipment, wide media coverage about the pandemic, lack of specific drugs and inadequate supportive feelings, could contribute to the increase of psychological issues of healthcare workers. The need to wear constantly protective masks and specific clothing led to additional stress. Similar results were got by Fofana et al. (29).

The authors Kang et al. (30) in their study divided all participants into three subgroups based on the possibility of having contact

with Covid-19 patients: high risk (working in the emergency department, intensive care units and infectious diseases), low risk (working in other clinical departments) and non-clinical (working in administrative or technical operations), showing that the staff of the high-risk contact subgroup was twice more likely to suffer from anxiety, stress and depression than the workers of the non-clinical subgroup.

As shown in a review of the early Covid-19 literature by Huang et al. (31), the long-term impact on the mental health of healthcare workers requires significant effort by psychiatrists. In Xu et al. (32) study of 994 health workers, where the majority were women between 25 and 40 years of age, 36.3% received psychological support material, 50.4% received support through the media, and 17.5% participated in group psychological counselling.

Moreover, Chew et al. (33) state that factors like the availability of strict infection control guidelines, specialized equipment, recognition of the workers' efforts by the hospital management and government, and the reduction in the total reported cases of Covid-19 have demonstrated an increase in the psychological gratification and benefit of healthcare staff.

Some authors concentrated more on solutions rather than issues. The social support proved to be fundamental for health workers to reduce anxiety, stress and depression. The authors Dosil Santamaría et al. (34) and El-Hage et al. (35) emphasized how social relationships and family members' support could help health workers to reduce anxiety levels since social interactions reduce negative emotions and can impact on the mood in a positive way.

More recent studies started to quote the need to develop resilience as its related skills, like Albott et al. (36) and Barelló et al. (37) The authors Zongling He et al. (38) coined an integrated psychological intervention model coined "COVID-19 Psychological

Resilience Model,” according to the Chengdu experience. The model includes live media, 24-hour hotline consultations, online video intervention, and on-site crisis intervention sessions to provide services to those in need. The model provides valuable experiences and may represent a reference guide for other countries to offer effective psychological intervention, reducing detrimental negative mental health outcomes in a public health emergency. The same approach is recommended by Barello et al. (37), who report how empirical evidence underlines the need to address the detrimental effects of pandemic outbreaks on healthcare workers’ mental health. Recommendations should include the assessment and promotion of coping strategies and resilience, special attention to front-line staff, provision of adequate protective supplies, and organization of online support services. Talevi et al. (39) highlighted the need to provide psychological first aid to all populations that have been victims of emergencies and disasters, before, during and after the event. The authors highlight the need for a new psychological crisis intervention model for healthcare workers involved in the pandemic, following the Chinese online mental health services. Li et al. (40) highlighted the role of internet hospitals as useful tools to help relieve psychological burdens and increase disease awareness through the timely and rapid spread of knowledge regarding Covid-19 prevention and control.

Anguish

During the pandemic, anguish represents a conscious psychic state of an individual characterized by an intense feeling of anxiety and apprehension, whose causes and origins are apparent, i.e. not direct or immediately identifiable. The studies analyzed Lai et al. (20) show that first-line healthcare professionals involved in the direct diagnosis, treatment and care of patients with Covid-

19 are exposed to a higher risk of anguish. The analysis conducted among health care workers in hospitals throughout Hubei Province showed that the majority of women, 522 out of 964, aged between 19 and 40 years, 71% of cases developed anxiety.

The psychological distress of the epidemic was evaluated by Kang et al. (30) using IES- R25, a 22-element validated self-report measuring subjective distress caused by traumatic events, reporting that about 4.8% out of 946 participants suffered from distress. From the studies analyzed, other fundamental elements that generate anxiety during the pandemic are the fear of having to deal with dangerous situations, the change in the person’s habits, the inability to care for their families in hospital, long shifts and failure to rest, thus occurring in the immediate future the occurrence of psychological problems. Several authors, like Lai et al. (21) state that being in the front line, directly involved in the acute phase of the Covid-19 pandemic develops high levels of anxiety and fear of not being able to embrace the loved ones without infecting them.

Insomnia

Insomnia consists of a condition of dissatisfaction with the quantity or quality of sleep, characterized by a difficulty in starting or maintaining sleep. In our literature review, six studies have evaluated and seen insomnia as one of the outcomes of healthcare workers dealing with the management of the Covid-19 pandemic. The healthcare staff following night shifts shows the highest rate of loss of rest hours. In the study conducted by Huang et al. (31), almost one out of five participants has sleep problems, because of the uncertainty about the progression of the pandemic, as well as the high number of working hours. These factors lead to a loss of rest time, chronic stress, and psychological discomfort. In more severe cases, post-traumatic stress disorder (PTSD) symptoms may also occur, which is highly

correlated with insufficient sleep as reported by Bohlken et al. (24).

Lai et al. (21) used the ISI scale to assess insomnia, reporting how 1% of health care staff developed elevated insomnia problems due to the fear of infecting their family members. A study conducted by Xu et al. (32) at Wuhan Hospital, highlighted how most women, aged 25 to 40 years, developed insomnia as a result of anxiety and the perception of risk of infection for themselves and their families.

The authors El-Hage et al. (35) state that the quality of sleep is a crucial indicator of health and well-being, impacting on the performance at work. Indeed, being rested helps to treat patients more efficiently, also affecting the optimal immune function to prevent the infection.

Huang et al. (31) emphasized how interventions to prevent insomnia among healthcare workers look necessary, considering the various sociopsychological factors during the pandemic.

Post Traumatic Stress Disorder - PTSD

Post-Traumatic Stress Disorder (PTSD) can be defined as a form of mental distress following highly traumatic experiences. Considering the features and the outcomes of the pandemic, it has been studied in healthcare professionals. The study by Wanigasooriya et al. (41) highlights that working as a doctor or a nurse were associated with a 20% lower likelihood of reporting clinically significant PTSD symptoms. However, being based on in-patient wards, in emergency departments or on ICUs, were significantly associated with the risk of developing PTSD. Marco et al. (42) also underlined that among 1,300 emergency physicians, a significant number of participants reported symptoms of stress consistent with PTSD. Higher PTSD levels were associated with those younger than 50 years and more than ten years in practice. They concluded that in comparison with pre COVID PTSD prevalence, their results

suggest an increased prevalence of PTSD during COVID 19. Such results are in line with those of Robles et al and Wu et al. (43, 44) who reported greater levels of PTSD, which are more common in front-line health care provider, in those working at a COVID-19 centers, and women. This appears as the only study which investigated the differences among healthcare professionals with different roles. The authors underlined that medical doctors were less likely to have significant PTSD symptoms than nurses and other healthcare workers.

Suicide

A much-studied but still little-known topic is the suicide following the pandemic. Quarantine and enforced social distancing measures and restrictions could play a relevant role in the genesis of tragic accidents or suicidal attempts in this tough time of health emergency, not just in individuals at risk. This question has not, however, been adequately discussed in the literature yet. The effect of the global pandemic could change the way suicide cases are assessed. In this perspective, it is essential to rethink and evaluate the different risk categories in the future, but above all to examine alternative approaches to prevent the rise in lethal incidents associated with the emergency, which duration is still uncertain (45).

For the last 50 years, the rates of medical doctors' and nurses' burnout, depression, and suicide have been rising. These professionals have held stable amid increased exposure to these issues over the past decade. These figures are estimated to indicate a steep rise in the age of COVID-19 due to increased job pressures, social alienation, reduced self-care, and increased vulnerability at work and home to emotionally stressful incidents. Generally, the theoretical solutions to these challenges remain the same; however, more hurdles are currently set to those solutions (46). As an example, a 34-year-old Italian nurse committed suicide after testing positive

for coronavirus. This was the second case of suicide by a nurse in an Italian hospital and occurred only a few days after the first suicide. These suicides, which happened a few days apart, arose concern, stressing the need to investigate and address, in Italy and elsewhere, the medical staff's psychological issues following the pandemic to prevent more cases to happen (45).

Discussion and conclusions

During the Covid-19 pandemic, the scientific literature has shown that the healthcare sector is characterized by the presence of several psycho-social risk factors, affecting the professionals' well-being. Moreover, the shortage of personnel and the mandatory adoption of invasive personal protective equipment contribute significantly to the increase of stress (2-4). Last but not least, direct exposure within the work environment can cause multiple psychological trauma and affect the mental health of health workers, significantly impacting relationships with friends and / or close relatives (2).

Healthcare professionals are aware of the emotional burden of their chosen job, and the need to manage feelings of pain and suffering related to illness and death. Still, healthcare emergencies and disasters like the current Covid-19 pandemic push the healthcare staff to the limit, especially front-line ones. Longer shifts, the need to carry on other jobs and tasks than the usual ones in Covid wards, the fear of being infected and to spread the infection among family members and friends influence the well-being of many workers, leading to stress, depression anxiety, anguish, insomnia, PTSD, and suicide thoughts. Therefore, more than ever before, it is necessary to intervene promptly when a health emergency occurs, to avoid the appearance of psychological problems with repercussions on the work

performance, especially for those who work in the front-line (4).

Our review suggests that the behaviours of health care professionals during the emergency phase of Covid-19 show psychological disorders that can compromise mental health. Therefore, surveillance and monitoring of symptoms should be guaranteed daily to all professionals to prevent the onset of psychological disorders. Anxiety, found in all studies, is seen as a state of psychological and physical tension that implies a general activation of all the resources of the individual, thus allowing the implementation of initiatives and behaviours useful for adaptation. The sense of fear and imminent danger triggers an internal reaction such as to cause psychological problems (5). Interesting enough, in addition, the severity of mental symptoms is influenced by age, gender, occupation, specialization, type of activities performed and close proximity to Covid-19 patients. Levels of psychological distress can also be exacerbated by the fear of being carriers of the virus, causing transmission among other health care workers and their families (33). Although suicidal thinking was not one of the primary outcome studied during this phase of the COVID-19 pandemic, one study reported its higher frequency among front line professionals than those working in different roles (42). Although only a minority of those who report it ever engage in overt self-harm, identifying those most likely to attempt suicide appears as a critical preventive measure since most suicides entertained suicidal thoughts before their acts.

Our literature review highlights many suggestions for all health professionals who have to fight against the unknown, and for those in chief like hospital managers or policymakers. The appearance of anxiety, depression and stress, is closely linked to the fear of contracting the disease and transmitting it to family members, creating a state of psychological and physical tension,

such as to activate pathological behaviour. Ensuring periods of rest and psychological assistance looks fundamental to continue the working activity without psychological damage, fostering resilience. Adequate and comfortable protective equipment provided by hospitals has been considered one of the most important motivational factors to encourage continued work in future outbreaks, together with the availability of strict infection control guidelines and the recognition of the efforts by the hospital management and government. Experiencing the reduction of reported cases of Covid-19 has also provided psychological benefits. In this perspective, it will be interesting to assess the psychological impact of the Covid-19 vaccination campaign on the healthcare population. As of mid-February, 2021, most healthcare professionals worldwide did receive the brand new vaccine, and should, therefore, result immune to an eventual new wave. The protection granted by the vaccine may support the psychological well-being of the healthcare staff. Still, this new perspective should be investigated.

The review shows that providing support and timely psychological intervention to health care staff is essential to meet the daily commitment of healthcare professionals in the current pandemic. Intervention can be aimed at introducing techniques and procedures to solve or limit the problem, such as telephone support from the psychologist and daily briefings between the team.

The review was done analyzing the published results of the first wave of the pandemic, covering a limited number of months. More results may be gathered in the following months, as the situation evolves, maybe even adding publications in languages different than English. Moreover, the lack of evaluation of the methodological quality of the studies included in the review does not allow to offer an exhaustive overview of the problem. The early literature was concentrated on most samples of Chinese

healthcare professionals. The results of the research may change, adding more different countries, with their own critical issues and social and health characteristics. Future research avenues may take these limitations into consideration, also investigating in-depth new perspectives, like gender, race, age, and the role of healthcare professionals. More in details, the gender perspective appears a promising line of research, since several studies underlined how female workers seem more affected than man (23, 26, 31, 32).

In conclusion, we can state that, since the number of patients affected by Covid-19 is increasing, there is a call to support healthcare professionals in dealing with the pandemic. As recognized by the literature, strategies for policymakers and hospital managers may include the reduction of long working hours, adequate rest time, comfortable personal protective equipment, and of course, tailored psychological support (47, 48). Practical tools may be related, for instance, to the introduction of psychologists and psychotherapists right in hospital facilities, to promote psychological support to healthcare personnel (7). Some hospitals, especially in China, which were the first ones to face the crisis, offered psychological support paths to their healthcare workers (3). Even Italy adopted some measures (49). The efficacy of such tools should be monitored and measured, to allow redesign and adaption whenever necessary. Still, even with adequate tools, healthcare workers remain exposed to a high level of psychological stress: the fear of contracting or transmitting the disease, long-time separation from the family, the loss of a colleague, the awareness about the high mortality rates, the potential isolation as a result if tested positive, and the physical fatigue of having to adapt to the use of protective equipment (3). When such factors occur, immediate support is needed to avoid the onset of serious psychological problems, affecting the well-being of workers in a severe way (9).

Riassunto

L'impatto della pandemia da Covid-19 sul benessere psicologico dei professionisti della salute: una revisione della letteratura

Introduzione. La pandemia da Coronavirus (Covid-19) è stata individuata per la prima volta nel dicembre 2019 nella città di Wuhan, in Cina, causando una grave crisi sanitaria nella maggior parte dei sistemi sanitari di tutto il mondo. L'emergenza sanitaria Covid-19 ha coinvolto gli operatori sanitari in prima linea, al fine di affrontare tutte le difficoltà legate ai problemi assistenziali. Uno degli aspetti più significativi e probabilmente sottovalutati è lo stress psicologico del personale sanitario che gestisce l'emergenza. L'obiettivo della revisione è quello di analizzare l'impatto della pandemia da Covid-19 sul benessere psicologico degli operatori sanitari.

Metodologia. Abbiamo condotto una revisione sistematica degli articoli pubblicati sull'argomento nei mesi da gennaio 2020 a Dicembre 2020, cercando nei database di Pub Med, Scopus e Web of Science.

Risultati. La maggior parte dei temi possono essere riassunti in cinque categorie concettuali: Stress, Depressione, Ansia da contagio, Angoscia, Insonnia, Suicidio e Disturbo post traumatico. La letteratura identifica molti fattori che contribuiscono all'insorgenza di ansia, depressione e stress, come la paura di contrarre la malattia e di trasmetterla a familiari e amici, turni di lavoro stressanti e poco riposo. Inoltre si evidenziano la necessità di misure adeguate di supporto psicologico e protezione individuale.

Conclusione. La revisione condotta suggerisce che i comportamenti degli operatori sanitari durante la fase di emergenza della pandemia di Covid-19 mostrano disturbi psicologici che possono compromettere la salute mentale. Pertanto, è indispensabile che i responsabili, dirigenti ospedalieri e politici promuovano misure di sorveglianza, monitoraggio e sostegno psicologico. Al fine di per incrementare la resilienza degli operatori sanitari, limitando lo stress e l'ansia e consentendo loro di mantenere le prestazioni adeguate sul posto di lavoro.

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