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# **PTSD in health workers during COVID 19 pandemic: A systematic review**

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**Abstract**--The COVID-19 pandemic has affected both the physical and mental health of frontline health workers (HCWs). Mental health problems have been reported among these HCWs irrespective of any history of psychological illness in the past. Prevention of post-traumatic stress symptoms (PTSS) in healthcare workers (HCWs) facing the current COVID-19 pandemic is a challenge worldwide as HCWs are likely to experience acute and chronic, often unpredictable, occupational stressors leading to PTSD. This review aims to analyse the literature to discover which topics have been focused on occurrence of PTSD and what the latest progresses are in managing the risk in HCWs during the current pandemic. The study involved a systematic review from internet databases such as Pubmed and CINHALL. Following that, databases were accessed to conduct a more detailed search of the literature using key phrases and Boolean operators to create articles pertinent to the issue. 64 records identified. The duplicates and those not matching with the criteria were excluded. 8 articles were filtered using an inclusion/exclusion criterion. Results showed healthcare policies need to take into account preventive and management strategies toward PTSS, and the related psychic sequelae, as soon as possible, including policies to implement regular screening of PTSS in HCWs. There is also a need for urgent intervention to identify and treat HCWs with PTSD, as such an approach can reduce the risk of chronic psychological impairment. It is important to provide tailored mental health support to them, such as observing the trajectory changes of the post-pandemic mental health situation and establishing a nationwide psychological support group, to avoid the occurrence of widespread psychiatric disorders in this population. Otherwise, it would be a noticeable social and economic burden in the long run.

**Keywords**---healthcare worker, PTSD, post-traumatic stress symptoms, COVID-19, PTSS.

## **Introduction**

The COVID-19 pandemic has affected both the physical and mental health of frontline health workers (HCWs). Mental health problems have been reported among these HCWs irrespective of any history of psychological illness in the past (Vardanjani et al., 2020). Healthcare workers (HCWs) are those at risk of confronting outbreaks and pathogens unknown to date and are at high risk of being infected (Kam et al., 2020). In light of the magnitude of the COVID-19 pandemic and the stress experienced by HCWs, intense researches have investigated the psychological impact of the HCWs during the pandemic. Research has shown that HCWs experienced higher psychological morbidity, especially high-risk HCWs (Ali et al., 2020). Post-traumatic stress disorder (PTSD) is a trauma related disorder that is characterized by the presence of one of the four symptoms of intrusion, avoidance, negative mood, and cognitive changes, as well as arousal and reactivity, for at least 1 month. A recent study has found that emergency workers had a 3-fold higher risk of PTSD than the general population (Compean & Hamner, 2019). Post-traumatic stress disorder (PTSD) refers to an individual's delayed appearance and long-lasting mental disorder caused by sudden, catastrophic or threatening life events (Lowell et al., 2018). It was crucial that an important group experiencing severe distress consists of the doctors and nurses caring for COVID-19 patients, which is not surprising as several studies have reported that medical staff comprises one of the most vulnerable sectors in the population during global events (Adler et al., 2017). More than 162 million detected infections worldwide and the pandemic far from being contained, investigating the psychological impact of this pandemic on healthcare workers (HCWs) has become increasingly important, especially the long-lasting impact on those working at the early stage of the pandemic.

## **Justification**

Throughout the COVID-19 pandemic, HCWs have played a vital role by providing direct care for some of the most severely affected patients. They are continually exposed to physical and psychological stressors associated with this work (Nguyen et al., 2021). As a result, many have reported increased feelings of irritability, anger, depressed mood, and emotional instability. These individuals are at a higher risk for developing PTSD when compared with the general population. This risk is partly attributable to a work environment where many HCWs lack appropriate supplies of personal protective equipment. Furthermore, they bear witness to the ongoing suffering and death of many patients (Zhou et al., 2021). One Chinese study showed that the prevalence of PTSD among HCWs during the COVID-19 crisis was about 9.8%. Since health care workers are involved in the direct care of patients, they are more likely to be infected than the general population. This makes them fear of contagion, concern for family health, interpersonal isolation, trust in and support from their organization, information about risks, and stigma (Koh et al., 2011). Consequently, health professionals are under overwhelming psychological pressure, which may lead to various

psychological problems, such as post-traumatic stress disorder, fear, depression, and insomnia (W. Li et al., 2020).

CWs represent the first-line fighters treating patients with COVID-19, and every day, they face a high risk of being infected and, consequently, of spreading the virus to other people. HCWs are thus facing critical situations that increase their risk of suffering from the psychological impact of dealing with several unfavorable conditions, with consequences that might extend from psychological distress to mental health symptoms (Garzaro et al., 2020). A body of evidence highlights that past infectious disease outbreaks, including the severe acute respiratory syndrome (SARS), the Middle East respiratory syndrome (MERS), and the 2009 novel influenza A (H1N1), were associated with mental health issues among HCWs (Lee et al., 2018), mostly post-traumatic stress symptoms (PTSS) and post-traumatic stress disorder (PTSD).

### **Aim**

This dissertation aims to critically review the best available evidence regarding PTSD in health workers during COVID 19 pandemic

### **Objectives**

1. To critically analyse current literature on PTSD in health workers during COVID 19 pandemic
2. To extract the data from the eligible studies and produce a final list of studies to be included.
3. To draw conclusions from the findings of the eligible studies to enable meta-analysis;
4. To interpret the findings and conclude the suitable recommendations

### **Research Questions**

What the is latest developments are in occurrence and managing the occupational risk of PTSS in HCWs during the current pandemic

### **Literature Review**

The review of literature is a summary of current knowledge about a particular practice, problem and includes what is known and what is unknown about the problem. Literature is reviewed to summarize knowledge for use in practice or to provide a basis for conducting a study.

### **Burden on Health care workers**

The COVID-19 pandemic has challenged and, in many cases, exceeded the capacity of hospitals and intensive care units (ICUs) worldwide. Health-care workers have continued to provide care for patients despite exhaustion, personal risk of infection, fear of transmission to family members, illness or death of friends and colleagues, and the loss of many patients. Sadly, health-care workers have also faced many additional—often avoidable—sources of stress and anxiety,

and long shifts combined with unprecedented population restrictions, including personal isolation, have affected individuals' ability to cope. (Sterling et al., 2020)

As the pandemic unfolded, many health-care workers travelled to new places of work to provide patient care in overwhelmed facilities; those who volunteered in unfamiliar clinical areas were often launched into the pandemic ICU setting with insufficient skills and training. (Mehta et al., 2021). The burden of training and supervising these volunteers fell on already stressed clinicians. Hospital-based health professionals worked long hours wearing cumbersome and uncomfortable personal protective equipment (PPE), after initial shortages of PPE had been addressed. They strived to keep up with emerging knowledge, institutional and regional procedures, and changing PPE recommendations, while trying to distinguish accurate information from misinformation (Poncet et al., 2007). Health-care workers had to adopt new technologies to fulfil patient care and educational responsibilities, including the provision of telemedicine.

### **Effect on wellbeing of HCWs**

HCWs experience emotional exhaustion, which may lead to medical errors, lack of empathy in treating patients, lower productivity, and higher turnover rates. The ability of HCWs to adequately cope with stressors is important for their patients, their families, and themselves (Penwell-Waines et al., 2018). Providers vary in levels of psychological resilience, the ability to positively adapt to adversity to protect themselves from stress. (O'Dowd et al., 2018). Prior to COVID-19, wide-ranging research had established the multifactorial nature of stressors in healthcare: electronic health record duties; insurance and billing issues; any patient dissatisfaction; and balancing busy work-life schedules (Nanda et al., 2017).

### **Burnouts of HCWs**

In the past two decades, several viral outbreaks have occurred, such as SARS, MERS, Ebola, etc. Kisley et al. in a recent review reported that such outbreaks resulted in psychological distress and posttraumatic stress in the HCWs. Of the many causative factors described by Kisely et al., clinical factors (contact with affected patients, forced redeployment to look after affected patients, training perceived to be inadequate), personal factors (fear of quarantine, particularly in staff with children at home, and infected family member), and societal factors (societal stigma against hospital workers) seem to be particularly relevant in Indian healthcare scenario (Kisely et al., 2020). Burnout, apart from being personally harmful, can lead to suboptimal patient care. Globally, while the researchers are pursuing many avenues to prevent and treat the COVID-19 menace, its psychological impact among HCWs has also been assessed. However, not many steps are being taken by the administrators of the healthcare organizations to mitigate the effects of psychological distress on the HCWs. The World Health Organization (WHO) has formally recognized this risk and has released a document about psychosocial consideration during COVID-19 (World Health Organization, 2020).

## Methodology

To investigate details, this chapter will expand on the literature review and emphasise the dissertation's research topic. It will shed light on the significance of a systematic review by outlining the advantages over a literature review. Literature review qualitatively summarizes evidence on a topic using informal or subjective methods to collect and interpret studies whereas Systematic review is a High-level overview of primary research on a focused question that identifies, selects, synthesizes, and appraises all high quality research evidence relevant to that question. The goal of literature review is to provide a summary about the topic whereas systematic review Clearly defines and answerable clinical question. (Phillips, n.d.)Its purpose is to investigate and define the systematic review process through the use of the P.I.C.O. (population, intervention, comparison, and outcome) approach (Booth et al., 2019).

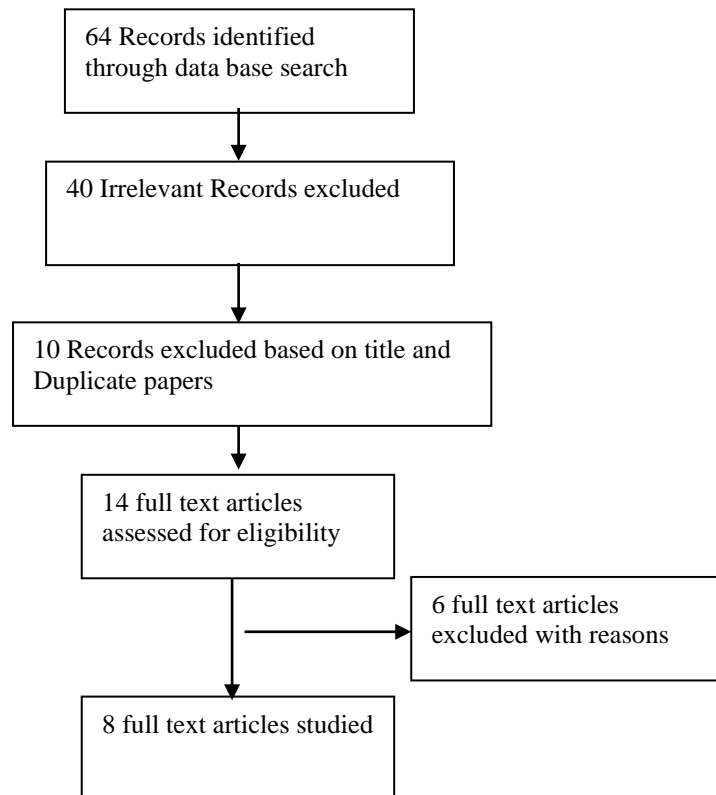
Participants	Health care workers
Intervention	NA
Comparison/Control	NA
Outcome	Adverse Psychological outcome

The data gathered for a SR should employ specific relevant search terms along with the use of a methodical, reliable and precise search process to unite existing information and research literature. This SR analyses eight studies which used a variety of research designs, and which were searched for using particular keywords from specific databases. These selected studies should then be assessed for quality. From this, the findings should be synthesised making sure that there is no bias. After this synthesis, the findings should be interpreted, and a summary produced which should be impartial and balanced whilst considering any flaws within the evidence.

## Data Collection Strategies

(T et al., 2015) highlight that data collection is a key step in systematic reviews as this data then forms the basis of conclusions which are to be made. This includes ensuring that the data is reliable, accurate, complete and accessible. Relevant literature reporting the interventions for controlling excess weight in children and adolescents was identified through electronic search of papers published from 2012 to 2022 in MEDLINE, PubMed, Web of Science, and Scopus. Keywords such as “healthcare worker”, “PTSD,” “post-traumatic stress symptoms,” “COVID-19,” “PTSS,” were used. The searches yielded 1740 articles.(Pati& Lorusso, 2018)suggest that intentional or accidental bias can be apparent depending on how a search is conducted. This is why it is important to be able to demonstrate that a complete, thorough and broad search was conducted.

### Prisma Flowchart



### Inclusion/exclusion criteria

For this review, a clear strategy was produced in order to identify the relevant inclusion and exclusion criteria (see table below). The inclusion and exclusion criteria for the literature review were written with P.I.C.O. in mind. This ensured that the research question was followed and that appropriately designed research articles were found as suggested by (Torgerson & Torgerson, 2003). (Pati & Lorusso, 2018) highlight that the inclusion and exclusion criteria within a literature search is a source of potential bias therefore higher trust and credibility can be gained by the clear documentation of such exclusion and inclusion criteria.

Inclusion Criteria	Exclusion Criteria
full-text articles	Articles published more than 10 years ago
Articles related to occurrence and management of PTSD due to COVID 19 only	studies focused on PTSS not related to the COVID-19 pandemic
Articles Free to access	Qualitative studies
Articles written in English	

Based on Prisma data extraction and abstraction 64 records identified. 40 records excluded with justification. 10 records excluded based on title. This SR analyses eight papers of that employed a range of research designs and were identified through the use of certain keywords in various databases accessed. The quality of these selected studies should next be determined. The findings should then be synthesized to ensure there is no bias. Following this synthesis, the findings should be evaluated and a summary created that is objective and balanced while taking into account any weaknesses in the evidence.

## Results

All of the above studies are relevant as they fulfil all the guidelines prescribed in the inclusion criteria. Each study is recent, being published 2012 onwards which means that the information is up to date. The table below is used to display an overview of each article <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7828167/>

Author and date	Design	Sample size	Key findings
Tan et al (Singapore) (Tan et al., 2020)	Cross sectional	470	The prevalence of anxiety was higher among non-medical healthcare workers than medical personnel. Non-medical HCWs are at highest risk for psychological distress.
Khasne et al (India) (Khasne et al., 2020)	Cross sectional	2026	Pandemic-related burnout was 1.67 times more frequent in medical doctors and 5 times in support staff.
Ying et al (China) (Ying et al., 2020)	Cross sectional	371	Risk factors for depressive symptoms were more time spent thinking about COVID-19, longer average working time per week worked by family members (that is, HCWs), and being parents and other next of kin of HCWs.
Wang et al (China) (Wang et al., 2020)	Cross sectional	202	TSD 16.83% Job satisfaction and gender were influencing factors of PTSD. PTSD was negatively correlated with positive coping, and positively correlated with negative coping.
Asaoka et al (Japan) (Asaoka et al., 2020)	Cross sectional	331	Anxiety about infection, exhaustion and being a Disaster Psychiatric

			Assistance Team member were associated with PTSS.
Si et al (China)(Si et al., 2020)	Cross sectional	863	Perceived threat and passive coping strategies were positively correlated with PTS and depression, anxiety, and stress. Perceived social support and active coping strategies were negatively correlated to depression, anxiety, and stress.
Chew et al (Singapore, Malaysia, India, Indonesia, vietnam) (Chew et al., 2020)	Cross sectional	1146	Non-medically trained personnel, the presence of physical symptoms, and presence of prior medical conditions were independent predictors of adverse psychological outcome.
Song et al (China) (Song et al., 2020)	Cross sectional	13.879	A higher risk of developing depressive symptoms and PTSD was present in HCWs who were middle-aged, who had worked for fewer years, had longer daily work time, and had lower levels of social support. Being a man was associated with a higher probability of depressive symptoms and PTSD. Nurses had a higher risk of PTSD than doctors.

## Results

(Tan et al., 2020) conducted a study on Health care workers included “medical” (physicians, nurses) and “nonmedical” personnel (allied health professionals, pharmacists, technicians, administrators, clerical staff, and maintenance workers) prevalence of depression, stress, anxiety, and posttraumatic stress disorder (PTSD) among all health care workers. Secondary outcomes were comparison of the prevalence of depression, anxiety, stress, and PTSD, and mean DASS-21 and IES-R scores between medical and nonmedical health care workers. The Pearson  $\chi^2$  test and Student *t* test were used to compare categorical and continuous outcomes, respectively, between the 2 groups. Multivariable regression was used to adjust for the a priori defined confounders of age, sex, ethnicity, marital status, presence of comorbid conditions, and survey completion date.

Khasne et al reported that the prevalence of personal burnout was 44.6% (903), work-related burn-out was only 26.9% (544), while greater than half of the respondents (1,069, 52.8%) had pandemic-related burnout. Younger respondents

(21-30 years) had higher personal and work-related burnout. The prevalence of personal and work-related burnout was significantly ( $p < 0.01$ ) higher among females. The doctors were 1.64 times, and the support staff were 5 times more likely to experience pandemic-related burnout.(Khasne et al., 2020). Ying et al mentioned that Risk factors for anxiety symptoms included more time (hours) spent thinking about the COVID-19, and whether or not family members (that is, HCWs) had direct contact with confirmed or suspected COVID-19 patients while high participants' self-reported safety scores for HCW's protective equipment was a protective factor. More time (hours) spent thinking about COVID-19, longer average working time per week worked by family members (that is, HCWs), and being parents and other next of kin of HCWs were risk factors for depressive symptoms. Compared to participants who were HCWs, participants who were private sector workers were more likely to develop depressive symptoms, while government or institutional employees were less likely to suffer from depressive symptoms.(Ying et al., 2020)

Wang et al reported that the incidence of PTSD in Nurses exposed to COVID-19 was 16.83%, the PCL-C score was 27.00 (21.00-34.00), and the highest score in the three dimensions was avoidance dimension 9.50 (7.00-13.25); multivariable stepwise linear regression analysis showed that job satisfaction and gender were independently associated with lower PCL-C scores (both  $P < .001$ ); PCL-C scores were correlated with positive coping ( $r = -0.151$ ,  $P = .032$ ), negative coping ( $r = 0.154$ ,  $P = .029$ ).Nurses exposed to COVID-19 from HuBei China with job satisfaction, male and positive coping had low PCL-C scores which necessitate reducing the PTSD level by ways of improving job satisfaction, positive response, and strengthening the psychological counseling of female nurses in order to reduce the risk of psychological impairment.(Wang et al., 2020)

Asaoka et al reported that among 807 DMAT and DPAT members who were deployed to COVID-19-related activities, 414 agreed to participate in this study, and 331 (41.0%) completed all questions. Among the participants, 105 (31.7%) had had contact with a COVID-19 patient during deployment. Study showed that anxiety about infection assessed by the SRQ, exhaustion assessed by the SRQ, PDI, and being DMAT members were associated with PTSS. The results of a univariate regression analysis of each PDI item showed that items such as "I felt I might pass out" and "I had difficulty controlling my bowel and bladder" were strongly significantly associated with PTSS(Asaoka et al., 2020)

Si et al reported that Posttraumatic stress (PTS) were prevalent in this sample of health care professionals, and 40.2% indicated positive screens for significant posttraumatic stress disorder symptoms. The proportion of having mild to extremely severe symptoms of depression, anxiety and stress were 13.6, 13.9 and 8.6%, respectively. Perceived threat and passive coping strategies were positively correlated to PTS and DASS scores, while perceived social support and active coping strategies were negatively correlated to DASS scores. Nurses were more likely to be anxious than others among medical care workers during the COVID-19 epidemic. Adverse psychological symptoms were prevalent among medical care workers in China during the COVID-19 epidemic. Screening for adverse psychological outcomes and developing corresponding preventive measures would be beneficial in decreasing negative psychological outcomes. (Si et al., 2020)

Chew et al reported that despite having the lowest volume of cases, Vietnam displayed the highest prevalence of PTSD. In contrast, Singapore reported the highest case volume, but had a lower prevalence of depression and anxiety. In the multivariable analysis, we found that non-medically trained personnel, the presence of physical symptoms and presence of prior medical conditions were independent predictors across the participating countries. highlights that the varied prevalence of psychological adversity among healthcare workers is independent of the burden of COVID-19 cases within each country. Early psychological interventions may be beneficial for the vulnerable groups of healthcare workers with presence of physical symptoms, prior medical conditions and those who are not medically trained.(Chew et al., 2020)

Song et al reported that the prevalence rates of depressive symptoms and post-traumatic stress disorder (PTSD) were 25.2% and 9.1%, respectively. Men were more likely to have depressive symptoms and PTSD than women. Those who were middle aged, worked for fewer years, had longer daily work time, and had lower levels of social support were at a higher risk of developing depressive symptoms and PTSD. Working in the Hubei province was associated with a higher risk of depressive symptoms, while those working in the Hubei province but residing in another province had a lower risk of depressive symptoms and PTSD. Being a nurse was associated with a higher risk of PTSD. The findings suggest that targeted psychological interventions to promote the mental health of medical staff with psychological problems need to be immediately implemented. Special attention should be paid to local medical staff(Song et al., 2020)

## **Discussion**

During the current COVID-19 pandemic, HCWs face unprecedented scenarios often outside their ordinary levels of experience and training, as they are at the forefront of the fight against the virus worldwide. This critical situation increases HCWs' risk of suffering from symptoms ranging from psychological distress to psychiatric disorders, as a result of the effort to continuously fight with several COVID-related unfavorable conditions (Carmassi et al., 2020). To better clarify the characteristics of the pandemic-related traumatic experiences, we conducted a review of literature on PTSS in HCWs employed in hospital settings during the COVID-19 pandemic, focusing on risk assessment, risk management, and occurrence rates. During the early stages of the COVID-19 pandemic, Wang et al investigated the psychological impact of the COVID-19 pandemic on the general public in China using the DASS-21 scale, and found that 16.5%, 28.8% and 8.1% of its respondents reported moderate-severe depressive, anxiety and stress levels, respectively(Wang et al., 2020)

Of note, nonmedical health care workers had higher prevalence of anxiety even after adjustment for possible confounders. Our findings are consistent with those of a recent COVID-19 study demonstrating that frontline nurses had significantly lower vicarious traumatization scores than non-frontline nurses and the general public(Z. Li et al., 2020). Reasons for this may include reduced accessibility to formal psychological support, less first-hand medical information on the outbreak, less intensive training on personal protective equipment and infection control measures. As the pandemic continues, important clinical and policy

strategies are needed to support health care workers. Our study identified a vulnerable group susceptible to psychological distress. Educational interventions should target nonmedical health care workers to ensure understanding and use of infectious control measures. Psychological support could include counselling services and development of support systems among colleagues.

Burnout in HCWs, particularly doctors, has been shown to cause increased medical errors. It can lead to decreased patient satisfaction and thus increases the chances of litigation. In personal life, there are increased chances of depression, possibly leading to substance abuse. There is deterioration in interpersonal relationship. Many physicians will retire due to burnout, adding to the loss of an already scarce resource.(Gergen Barnett, 2017). The psychological distress for HCWs working in pandemic has been attributed to various factors such as possibility of quarantine, fear of infections due to contagious nature of disease, concern for self and family, job stress, interpersonal isolation, perceived stigma, fear of doing unfamiliar work (for non-ICU/ED HCWs), etc.(Maunder et al., 2006) The effect of the pandemic can be long lasting as well. Maunder et al. assessed the long-term psychological effects in Canadian HCWs, after 1–2 years of the SARS pandemic. As compared to their colleagues who did not look after the SARS patients, the HCWs in Toronto and Hamilton had significantly higher burnout (MBI-EE) scores (30.4 vs 19.2,  $p = 0.003$ ), psychological distress scores (44.9 vs 30.2,  $p < 0.001$ ), and posttraumatic stress scores (13.8 vs 8.4,  $p = 0.06$ )(Maunder et al., 2006)

Given the amount of stress experienced by the medical care workers during the pandemic, it is important to provide tailored mental health support to them, such as observing the trajectory changes of the post-pandemic mental health situation and establishing a nationwide psychological support group, to avoid the occurrence of widespread psychiatric disorders in this population. Otherwise, it would be a noticeable social and economic burden in the long run (Sani et al., 2020). In addition, appropriate intervention measures should be adopted based on the psychological assessment in each stage of the pandemic, including timely counselling and screening, development of positive coping strategies, and create a more friendly social environment and mass media network. This would be applicable to similar epidemics in the future. The medical care workers experienced numerous threats including stigmatization, risk of being infected or infecting others, lack of necessary medical supplies and overwhelming workload. Lack of social support and maladaptive coping were important risk factors for occurrence of negative psychological outcomes among them. Preventive measures and mitigation strategies among medical care workers to prevent early traumatic stress reactions developing into chronic PTSD would be beneficial in decreasing adverse psychological outcomes.

### **Limitations**

The purpose of this dissertation was to determine the PTSD among health care workers in COVID-19. The search process involved searching the databases for relevant literature. This was carried out by using keywords with Boolean operators. This review is limited to few countries in Asia only. The cross-sectional profile of all the selected studies limits the possibility of drawing strong

conclusions; therefore, caution should be taken in generalizing the findings. This evidence can obviously constitute a bias and somehow orient the reading of the topic on the basis of specific cultural backgrounds. Finally, the wide range of occurrence rates observed is attributable to different (1) healthcare settings investigated and (2) timing of the studies; for this reason, a direct comparison between the data provided by the different studies is not always possible and can in some cases be misleading.

### **Conclusion and Recommendations**

The SARS-CoV2 pandemic represented a challenge at multiple levels: for the management of public health, for the discovery of new therapeutic and vaccine resources, for the understanding of etiology and pathogenesis. However, it also posed a great challenge for healthcare workers forced to measure themselves against a disease that was risky for their own health as well as that of their patients. This systematic review of the literature showed young age, low work experience, female gender, heavy workload, working in unsafe settings, and lack of training and social support as predictors of PTSS. Moreover, the need for urgent interventions aimed at protecting HCWs from the psychological impact of traumatic events related to the pandemic and leading to PTSS is increasingly a key issue in the management of COVID-19 pandemic. Finally, there is an urgent need to define new healthcare policies devoted to preventive and management strategies toward PTSS, and the related psychic sequelae, in HCWs. A special effort is required to prevent PTSD as a secondary effect of the SARS-Cov-2 pandemic among HCWs facing COVID-19 patients. Therefore, healthcare policies need to take into account preventive and management strategies toward PTSS, and the related psychic sequelae, as soon as possible, including policies to implement regular screening of PTSS in HCWs. There is also a need for urgent intervention to identify and treat HCWs with PTSD, as such an approach can reduce the risk of chronic psychological impairment.

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