

Covid-19 and Mental Health of Healthcare Workers: A Systematic Review *

Elsie Lynn Baronia-Locson, MD ¹

Abstract

Background: The novel coronavirus 2019, or COVID-19, has gripped all corners of the world and has created a crisis that significantly affected people's mental health around the globe, including healthcare workers (HCWs).

Purpose: This study aimed to bring the results to the attention of healthcare systems' policymakers and managers so as to fully recognize the severity of the situation and set the groundwork for appropriate interventions to address the condition of HCWs.

Methods: This systematic review searched PubMed, Google, Google Scholar, and Scopus for literature relevant to mental health conditions among healthcare workers during this pandemic. This review includes the searches from March to October 2020.

Results: The main findings were symptoms of anxiety, depression, stress, psychological trauma, insomnia and sleep problems, burnout and fatigue, and distress. Most studies suggest that social and family support, hygiene measures, and physical activity are safeguards for mental health and are among the recommended protective interventions for promoting mental health.

Limitations: The researcher has reservations about the findings' generalizability as the samples may not represent the population.

Conclusion: This review highlights the existing burden of mental health conditions reported by HCWs during the COVID-19 pandemic. It revealed consistent reports of stress, anxiety, and depressive symptoms resulting from COVID-19.

Implications: Longitudinal data will be helpful through surveys of representative samples of the general

population. More relevant and recent data in Asian countries could inform understanding of challenges concerning COVID-19 and the impacts on healthcare workers' mental health and well-being, particularly those in the Philippines.

Keywords: COVID-19 pandemic, mental health, healthcare workers

BACKGROUND

Due to the massive spread of the much-dreaded novel coronavirus (COVID-19), the World Health Organization (WHO) declared an international public health emergency in March 2020. The associated morbidity and mortality affected the world's populations and challenged global healthcare systems. Our HCWs have been placed in the direct care of patients before. They are again called upon to play a vital role in responding to the COVID-19 pandemic.

Some aspects of the COVID-19 pandemic intensified its potential to cause mental health issues among healthcare workers. For one, there is fear of the notion that "no one is safe" due to the astronomic rise in the number of cases reported and countries affected. Media reports compounded its spread in the hospital community and other healthcare facilities with increased death rates among HCWs. Due to the sudden spike in infections, much medical staff was reassigned to higher-risk frontline jobs causing disruptions in standard workplace practices. The WHO called for a collective effort to alleviate the impact on healthcare workers (WHO, 2020).

Maunder et al. (2006) mentioned that HCWs found severe acute respiratory syndrome (SARS) to be stressful. Years later, the 2015 Middle East respiratory syndrome (MERS) put our healthcare professionals in a

* from Dr. Fe del Mundo Medical Center, Quezon City

¹ President, Community Pediatric Society of the Philippines

similar predicament. They experienced depression and stress. Post-traumatic stress disorder (PTSD) also persisted among these frontliners even after an absence from work (Lee et al., 2018). Other studies reported on mental health implications for healthcare workers involved during epidemics. Stuijzand et al. (2020) also suggest that HCWs exposed to patients during an epidemic/pandemic become vulnerable. The HCSw are likely to suffer from mental health problems such as psychological distress, insomnia, alcohol/drug misuse, and symptoms of post-traumatic stress disorder (PTSD), depression, anxiety, burnout, anger, and higher perceived stress. There were heightened anxiety, stress symptoms, and PTSD (Kang et al., 2020; Huang et al., 2020) even after some time had transpired since the end of the emergency (Li et al., 2020). The studies indicate that these mental health problems might compromise the quality of patient care.

Amidst the outbreak of this infectious disease in more than 200 countries, HCWs continue to be indispensable in screening and treating this condition. They are the world's frontliners in health service delivery. While COVID-19 has placed everyone in a constant state of stress, grief, and anxiety, healthcare providers should remain calm so as not to pass the stress on to the patients (WHO, May 2020). As such, HCWs have become highly vulnerable to developing severe psychological consequences. The high number of cases, growing death tolls, limited safety equipment and vaccines, increased workload, inadequate support, and widespread media coverage have resulted in adverse consequences such as HCWs' unwillingness to work, stress, anxiety, and other long-term psychological implications.

The WHO (2020) reported the complexity of HCWs' psychological response to the epidemic of infectious diseases. This observation is secondary to a myriad of factors, such as feelings of vulnerability, loss of control, concerns about one's health, possible infection of colleagues and family, fear of death, and isolation. The economic aspect must also be considered, like employment uncertainty and financial woes. Also, the surge of cases and shortages of PPEs and other supplies further exacerbate the health workers' pressures and concerns.

HCWs, as a result, are highly susceptible to experiencing psychological and mental problems. The preceding suggests that psychological support and interventions should be made accessible to healthcare providers to help ensure the effective execution of their job. Mental health issues like stress, anxiety, and emotional exhaustion affect staff morale adversely, resulting in absenteeism, high turnover rates, and reduced work satisfaction and quality of care.

In this critical situation, the medical staff's mental health should be considered an urgent public health concern. It is, therefore, necessary to prioritize the mental health of our HCWs and support the mitigation of the adverse psychological impact of the COVID-19 pandemic.

Understanding the risks and impacts on healthcare workers' mental health during this COVID-19 pandemic cannot be ignored. This review will investigate the articles addressing HCWs' mental health status during the SARS-CoV-2 outbreak. It aimed to identify, assess, and summarize current evidence on COVID-19 and its impact on healthcare workers' mental health. It focuses on their mental health issues and will, hopefully, contribute to informing where interventions and organizational efforts can support their mental health. Moreover, this initiative needs immediate attention and action, particularly in countries like the Philippines, where healthcare workers struggle against violence and discrimination, on top of the delay in compensation and release of their hazard pay (Philippine Star, January 31, 2021).

This review attempted to address the following questions: 1) After a few months into the pandemic, what is the current status of the COVID-19 research on healthcare workers? 2) Among these types of workers, how impactful is the COVID-19 pandemic in worsening their mental health?

The secondary data gathered was saved in a secured google folder accessed by the researcher only and sharing of secondary data was not allowed. The study was submitted to the Fe del Mundo Medical Center Institutional Review Board (FMMDC IRB) and was approved for exempt from review. Any leak of

information will be reported to FDMMC IRB. Actions in accordance to Philippine Health Research Ethics Board (PHREB) and institutional IRB guidelines will be applied if there is any leak of information.

METHODS

The literature review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The researcher performed a structured literature search to identify studies that reported mental health issues among healthcare workers during the COVID-19 pandemic in the following databases in English: PubMed, Cochrane Library, Scopus, Google Scholar, Center for Diseases Control, World Health Organization (WHO), and local databases like the Philippine National Institute of Health.

Information about these databases was gathered from the internet and recommendations of colleagues who have done similar research. Scopus is a good resource for scholarly literature from almost any discipline. PubMed covers literature in medicine or biological sciences and makes available full-text links to the publisher sites and links to the free PDF. The Cochrane Library's collection is described as high-quality, independent evidence to inform healthcare decision-making. Google Scholar offers a simple way to broadly search the world of scholarly research in many disciplines and sources: articles, theses, books, abstracts, and court opinions, from academic publishers, professional societies, online repositories, universities, and other websites. Search in web-based resources was undertaken on Google and through searching specific websites (WHO, <https://www.who.int> and Centers for Disease Control and Prevention, <https://www.cdc.gov>). The researcher also reviewed selected articles and references from local databases like the Philippine National Institute of Health for additional literature.

INCLUSION CRITERIA

The researcher included any study about healthcare workers during the covid-19 pandemic, with outcomes relating to their mental health. The researcher did not place any restrictions related to the study design

or research locale. The search located studies on which to assess the mental health or psychological impact of the COVID-19 pandemic among healthcare workers and find out what factors protect or prevent adverse consequences of the crisis on their mental health.

The search results were screened based on the pre-set selection criteria. After the individual titles and abstracts were assessed, the following inclusion criteria were applied: primary studies, written in the English language, related to COVID-19 and the mental health of healthcare workers, mental health or mental well-being, or psychological outcomes.

The exclusion criteria were duplicated articles, publication outside the period between March and October 2020, no access to the full article, and no prevalence or absence of mental health issues among healthcare personnel.

LITERATURE SEARCH AND ARTICLE SELECTION

The search covered all types of articles published in March 2020–October 2020 like reviews, commentary, correspondence, letters to the editor, original research articles, full papers, abstracts, interim reports, official documents, and published and unpublished studies that are relevant to the subject of the review. Also included were studies that evaluated the presence of depression, stress, and anxiety among healthcare workers during this pandemic and reports of videoconferences. However, the researcher excluded reviews, theses, position papers, protocol papers, and studies not published in English.

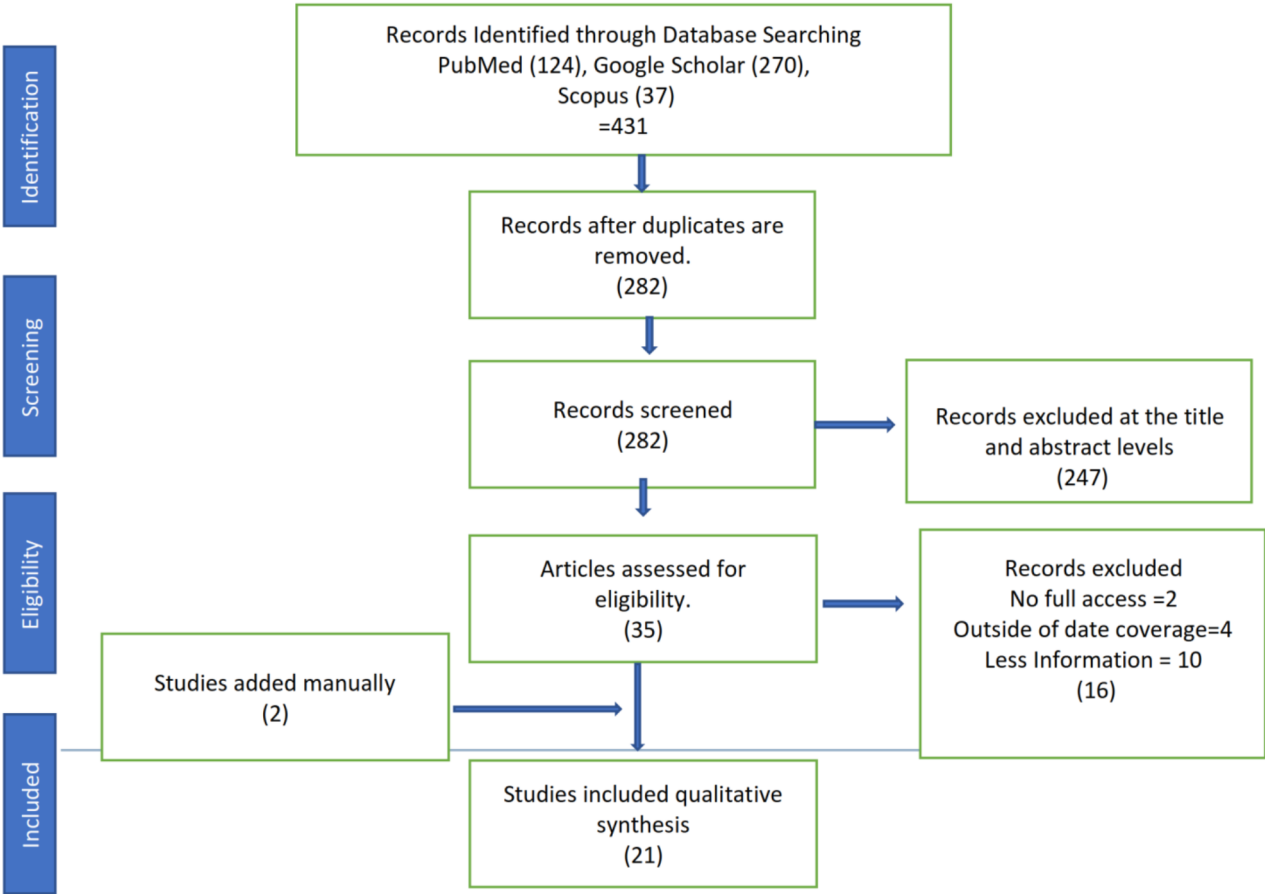
The search was conducted in early 2021 at a time when COVID-19 had taken hold of most of the world. COVID-19 is not the first strain of the coronavirus we have experienced. Therefore, SARS, Ebola, H1N1, and MERS (Middle East respiratory syndrome) were also included.

The researcher set a date range criterion within the search parameters of the literature review due to the constraints she faced. Her time was mostly confined to their hospital's demands when it was declared a covid-19 only accepting facility from March 2020 until October 2021.

In retrieving the studies, the researcher used the following terms in her search: COVID-19 or COVID-19-2019 or COVID-192019 or coronavirus disease 2019 or SARS-CoV-2 or SARS2 or 2019 novel coronavirus infection or coronavirus disease-19 or novel coronavirus or SARS-CoV-2019 or sars-COVID-19 or sars-COVID-192019 or sars-COVID-19 2019 or Wuhan virus or coronavirus, or psychological, or stress, or depression, or anxiety, or mental health, or psychiatric issues, and COVID-19, corona, SARS, SARS-CoV, MERS, MERS-CoV, Middle East respiratory syndrome, novel coronavirus, and HCW, or doctors, or medical staff, or health care professionals, or health care workers, or frontliners, or medical frontliners.

The following data were extracted from the results in a structured table: author/s, date of publication, sample and study location, study design, main findings, mental health issues, and the number of references. The descriptive analyses helped determine the prevalence of mental health issues and risk factors in the covered literature and the strategies to resolve these mental health concerns. Table 1 presents an overview of the articles included in the review.

Table 1. PRISMA



DATA EXTRACTION AND QUALITY ASSESSMENT

An associate researcher assisted the author in conducting the literature search. They participated in the data extraction by screening the acquired studies simultaneously. In order to reconcile the screening process results, Brainstorming and resolution of differences in views were made through private discussions via Zoom.

HCWs do not form a homogeneous population. However, in this review, they were treated as a single group, as evidence suggests that this group may be at risk of experiencing poor mental health due to the COVID-19 pandemic. The reasons for such adverse psychological outcomes include excessive workload, long work hours, inadequate personal protective equipment, over-enthusiastic media news, and inadequate support. The infection rate among medical staff triggers fears and is crucial for such a psychological impact. Also, the role reversal from a healthcare worker to a patient might result in frustration, helplessness, adjustment issues, stigma, and fear of discrimination.

The researcher understands that there is no one-size-fits-all practical approach to supporting HCWs. She stresses the importance of identifying groups within the larger population and appropriately targeting personalized interventions to be made available to support them.

This systematic review incorporated a critique or appraisal of the research evidence. The appraisal assessed the methodological quality of the included studies and ascertained if the possibility of bias in its design, conduct, and analysis has been addressed. The included papers in the review were subjected to the appraisal of the researcher and her colleague. The evaluation data were used as the basis for the synthesis and interpretation of the study's results.

The JBI (Joanna Briggs Institute) Quality Assessment tool was used to assess the quality of the included studies. The summary of the appraisal is shown in Table 2 in the appendix. Most of the studies met the sampling criteria based on the assessment tool, and the

authors clearly defined the inclusion and exclusion guidelines. The participants' demographics, research setting, and time frame were also indicated. Appropriate measurement methods and analytical techniques were used.

There are, however, some limitations. Some samples in the studies were small and limited; thus, they may not represent the populations. Also, other studies were confined to specific groups; hence the generalizability of the application of the results may also be restricted. Because of the cross-sectional design, the researcher could not account for or comment on potential changes in the levels of psychological impact over time. Recruitment for most of the studies occurred shortly after WHO announced COVID-19 as a Public Health Emergency of International Concern and for only seven months, through October 2020. Also, the researcher recognizes that the widespread COVID-19 media coverage and information may have triggered changes in the healthcare workers' perceptions during data collection. Most instruments were self-reported and not confirmed by medical records or other unique evaluations.

The studies used online questionnaires and selected populations with access to the internet, which might have affected their samples' representativeness. Some selection bias may have been present. Health workers without internet access, older healthcare workers, and those who might have been busy with their work duties might have opted not to participate and could not share the pandemic's impact on their mental health. Because results were mainly self-reported and taken from subjected scales, respondent bias should be eliminated.

DATA PRESENTATION AND ANALYSES

The studies included in our review are about healthcare workers during the covid-19 pandemic, with outcomes focusing on their mental health. We also unearthed information on interventions that prevent or reduce adverse mental health impacts on healthcare workers. We also did not restrict our literature review regarding study design and methodology.

In order to delineate content specific to COVID-19, the concepts that were considered relevant to the search criteria were the following: the COVID-19 virus, the classification of COVID-19 as a pandemic, the healthcare workers regardless of classification, and the mental health or psychological impact of the COVID-19 pandemic among healthcare workers.

RESULTS

Search results

The entire text of potentially relevant papers was retrieved for a more intent examination. The 431 records of interest were found from the single search. After 149 duplicates were removed, 282 records were screened. Of these, 35 potentially relevant studies were assessed for eligibility. Twenty-one (21) published studies met the inclusion criteria for the review shown in Table 3 in the appendix. Five of the studies were from China. The rest were from Egypt (1), Italy (2), KSA (2), Nepal (1), Oman (2), Pakistan (1), Philippines (1), Poland (1), Singapore (1), Spain (1), Turkey (2), and Global (1) covering 31 countries from the Western Pacific Region and Eastern Mediterranean. Several validated tools assessed anxiety, depression, insomnia, stress, post-traumatic stress (PTS), and burnout.

The twenty-one (21) studies focused on the psychological impact of the COVID-19 crisis. Validated instruments were used to assess the psychological symptoms as outlined in Table 1 - the summary of included studies. The most common outcomes assessed were stress, fear, anxiety, and depression. Given the unprecedented challenges and effects of COVID-19, exploration of stress, fear, anxiety, and symptoms of depression among healthcare workers was prevalent in the included studies. These studies showed that various factors were associated with mental pressures experienced by healthcare workers. Working in areas with a high incidence of infection was significantly associated with higher stress and psychological disturbance.

The COVID-19 pandemic is more than a medical phenomenon (Shah, 2020; Javed et al., 2020). Its impact extends beyond being a disease. It has affected the

entire world and continues to cause disruption, anxiety, stress, stigma, and xenophobia. Its rapid transmission led nations and governments to institute health protocols to stem the spread of this disease. People have to observe isolation, social distancing, closure of offices and workplaces, and other restrictive measures that undoubtedly have adversely affected individual's mental health, including those of the healthcare workers who attend to the treatment and care of those infected.

This review reports and examines the psychological impact of the disease among healthcare workers. The results of the studies were categorized according to the psychological impact of COVID-19 on healthcare workers and presented by geographic location.

1. Mental Health Issues by geographic location

1.1 Asia (China, Nepal, Pakistan, Philippines, Singapore)

In China, participants reported having experienced anxiety, depression, insomnia, and other psychological issues like somatization and obsessive-compulsive and post-traumatic stress symptoms. A significant proportion of those who participated in the Lai et al. (2020) study admitted having anxiety, depression, and insomnia symptoms, and more than 70% reported psychological distress. Among physicians and nurses in hospitals with fever clinics or wards for patients with COVID-19 and healthcare workers responding to the spread of COVID-19, high rates of symptoms of depression, anxiety, insomnia, and distress were reported. Lu et al. (2020) disclosed that the medical staff had more significant psychological distress than the administrative staff. The medical front-liners were twice more likely to suffer anxiety and depression than those having close contact with infected patients. Those in critical departments showed higher scores on the fear scale. Que et al. (2020) reported that in general, healthcare workers reported anxiety, depression, or insomnia, with the nurses observed to have the highest prevalence of anxiety symptoms (51.44%); the public health professionals (48.80%) and medical residents (40.53%) revealed depressive symptoms. In Zhang et al. (2020) study, medical health workers had higher prevalence rates of severe insomnia, anxiety,

depression, somatization, and obsessive-compulsive symptoms than nonmedical health workers. Post-traumatic stress (PTS) symptoms were prevalent in this sample of Chinese healthcare professionals (Si et al., 2020), and 40.2% had significant post-traumatic stress disorder symptoms. Perceived threat and passive coping strategies were positively correlated to PTS and DASS (depression, anxiety, stress) scores. Among medical care workers, nurses were the more likely to be anxious during this pandemic.

From a total of 475 Nepali health workers (Khanal et al., 2020), it was reported that 41.9% had anxiety, while some showed symptoms of depression (37.5%) and insomnia (33.9%). High symptom levels of anxiety, depression, and insomnia among the health workers were observed during the beginning of the outbreak. They also admitted to experiencing stigma, as reported by more than half of the participants.

In the study of Sandesh et al. (2020), many Pakistani participants admitted having experienced anxiety, stress, and depression. Around 89% of healthcare workers feared for their families, and 80% feared being infected.

Labrague et al. (2020) reported that of the 325 Filipino nurses who participated in their survey, 123 (37.8%) revealed dysfunctional anxiety levels. Moreover, more than 90% of frontline nurses admitted not being fully prepared to manage COVID-19 patients, and only 20.3% expressed absolute willingness to care for COVID-19 patients.

In Singapore, Tan et al. (2020) study revealed the prevalence of depression, stress, anxiety, and post-traumatic stress disorder (PTSD) among healthcare workers.

1.2 Middle East (Oman, Saudi Arabia, Turkey)

Healthcare workers revealed depression, anxiety, insomnia, and distress symptoms in the Middle East. In Oman, the study of Alshekaili et al. (2020) involving 1139 frontline and non-front-line healthcare workers appeared to conform with other studies suggesting that the COVID-19 pandemic has resulted in

a higher rate of depressive symptoms, anxiety, and insomnia. Findings in another Omani study (Badahdah et al., 2020) revealed a pessimistic portrait of healthcare workers' mental health. Based on the GAD-7, one in four (26%) healthcare workers suffered either from moderate or severe anxiety. In the combined mild, moderate, and severe anxiety categories, two-thirds (65%) of the sample had some degree of anxiety. In this study, female and young healthcare workers were more likely to experience moderate to severe anxiety than males and older ones. The stress level was high, especially among female participants.

Of the healthcare workers in Saudi Arabia (Al-Hanawi, 2020), the proportion of respondents as a percentage of the total sample increased from average (28.9%), through mild (33.7%), to severe (39.9%) distress. The preliminary evidence shows that health workers are at greater risk of psychological distress than non-health workers. There is also a significant trend among frontline health workers, with the percentage growing from normal (13.4%), through mild (15.5%), to severe (24.3%) distress. The evidence showed that 40% of the Saudi sample are distressed due to COVID-19, approximately 33% are mildly distressed, and 7% are severely distressed. The high distress levels are of the young, females, private sector employees, and health workers, especially those working on the frontline. The Tamsah et al. (2020) study showed Saudi staff feeling more anxious about family members contracting the virus than getting infected. Forty-one percent (41%) of staff are more stressed about COVID-19 than from MERS-CoV, and a similar percentage shared that they have similar stress to both infectious diseases. The findings further disclosed the following: On a scale of 0–10 for anxiety, the respondents scored higher anxiety to COVID-19 and MERS-CoV than seasonal influenza. Many healthcare workers reported experiencing mild anxiety 397 (68.25%), followed by moderate anxiety 121(20.8%). In comparison, few had high moderate 47 (8.1%), and the least had very high anxiety 17 (2.9%).

In Turkey, Sahin et al. (2020) reported that female healthcare workers exhibit higher depression, anxiety, insomnia, and distress symptoms. While nurses were found to experience more insomnia and distress symptoms, both nurses nor physicians did not report

any difference in symptoms of depression or anxiety. Depressive symptoms were more prevalent among frontline workers than among second-line workers. Those with a history of psychiatric ailment and receiving psychiatric support revealed depression, anxiety, insomnia, and distress symptoms.

1.3 Europe (Italy, Poland, Spain)

European healthcare workers reported high depressive and post-traumatic stress symptoms (PTSS), anxiety and depressive symptoms, burnout, or psychological conditions. In Piedmont, Italy, Di Tella et al. (2020) presented that healthcare professionals involved in COVID-19 management have high depressive and post-traumatic stress symptoms (PTSS). Depressive and post-traumatic stress symptoms were high among healthcare professionals assigned to the COVID-19 wards. Giusti et al. (2020) reported that health professionals have a high risk of experiencing burnout or psychological conditions due to the COVID-19 pandemic.

In their study, there were two hundred and thirty-five health professionals (71.2%) with scores of state anxiety above the clinical cutoff. There were 88 (26.8%) who had clinical levels of depression, 103 (31.3%) with anxiety, 113 (34.3%) with stress, and 121 (36.7%) with post-traumatic stress. With burnout, 107 (35.7%) had moderate and 105 (31.9%) have severe levels of emotional exhaustion; 46 (14.0%) had moderate, and 40 (12.1%) have severe levels of depersonalization; 132 (40.1%) had moderate and 113 (34.3%) severe levels of reduced personal accomplishment. The findings further revealed that 60% of the population had reduced personal accomplishment together with moderate to severe levels of emotional exhaustion. 25% of the participants exhibited moderate to severe levels of depersonalization.

In Spain, tertiary hospital workers and those working in ambulance services had a higher stress level (Romero et al., 2020). As expected, there was a spike in distress levels in the geographical areas with the highest incidence of COVID-19. Those who felt the need for psychological therapy but failed to receive it were more stressed than those who did not need it.

In the study of Szylińska et al. (2020), participants who had direct contact with COVID-infected patients in the emergency and infectious wards and ICUs were more vulnerable to showing anxiety and depressive symptoms. A significant proportion of these 441 healthcare workers in the Western Pomerania region in Poland had bouts of anxiety, depression, and insomnia. Over 90% of these symptoms were prevalent among those who had direct exposure to persons infected or suspected of having COVID-19.

1.4 Africa (Egypt)

In Egypt, many healthcare workers dealing with COVID-19 in 20 hospitals admitted to having anxiety, depression, insomnia, and stress symptoms (Elkholy et al., 2020).

1.5 Global

With 2097 participants from 31 countries worldwide, the study (Htay et al., 2020) reported that healthcare workers have a substantial burden on mental health and warranted effective mental health support interventions. The data provide evidence of a high prevalence of anxiety (60%) and depression symptoms (53%) among healthcare workers covering the Eastern Mediterranean Region (EMRO) and the Western Pacific Region.

2. Risk Factors and adverse mental health outcomes

This review identified the risk factors linked to adverse mental health outcomes during the COVID-19 pandemic. The author researcher grouped them into the following categories:

2.1 Virus/Medical Concerns

Chinese healthcare workers directly involved with the diagnosis, treatment, and care of patients with COVID-19 are most likely to experience psychological burdens (Lai et al., 2020). Predictors of unfavorable psychological outcomes include exposure to the virus. Lu et al. (2020) mentioned that worrying about being infected and the epidemic would never be controlled as

contributing to their psychological pressure. Si et al. (2020) reported that adverse psychological symptoms were prevalent. Medical care workers admitted to having experienced stigma, fear, risk of infection and transmission to others, and lack of necessary medical supplies. Zhang et al. (2020) mentioned common risk factors for insomnia, anxiety, depression, and obsessive-compulsive symptoms among medical health workers, i.e., currently having organic disease, living in rural areas, and being at risk of contact with COVID-19 patients in hospitals.

In Nepal, medication history for mental health problems was heavily linked to their study's mental health outcomes (Khanal et al., 2020). Also, inadequate precautionary measures were associated with higher anxiety and depression symptoms. The study (Sandesh et al., 2020) found that the most common reason for stress and anxiety among healthcare workers treating COVID-19-positive patients in Pakistan was the fear that they might infect their family members (89.2%), followed by the fear of getting infected themselves (80.3%). Another reason was the lack of PPE (62.5%).

The overall psychological well-being of healthcare workers in Oman (Badhadha et al., 2020) revealed that working closely with COVID-19 patients is worrying and detrimental to psychological health. Temsah's (2020) study was conducted at a tertiary care teaching hospital in Saudi Arabia. The authors initiated and administered a pilot-validated self-reported questionnaire to the healthcare workers. They assessed their concerns, worries, and knowledge regarding COVID-19, past exposure to MERS-COV (proven or suspected patients), intended behavior during the pending pandemic, and whether these factors were associated with psychological stress. These were considered some risk factors --the possible transmission to a family member, virulence, and lack of effective treatment.

Meanwhile, the findings in the Al-Hanawi et al. (2020) study hinted that health workers in Saudi Arabia working in close contact with infected people, not only for fear of infection, were more likely to experience mild and severe distress.

Sahin et al. (2020) in Turkey reported that a history of psychiatric illness is a factor that predicts chances of depression, anxiety, insomnia, and distress symptoms. Another risk factor for insomnia and distress symptoms is being tested for COVID-19. The findings in another study in Turkey (Yalcin et al., 2020) revealed that the COVID-19 pandemic affected the mental health of hospital workers, but the difference is observed among work areas. According to those who stated that the infection measures taken in the hospital were insufficient, depression, anxiety, and stress rates were significantly higher than those who claimed they were sufficient. Those with a history of psychiatric illness are also more inclined to experience depression, anxiety, and stress.

In Italy, Di Tella et al. (2020) reported factors closely linked to the prevalence of acute mental health conditions among healthcare workers in Italy, including the harsh, unyielding spread of the virus, the threat of being infected, limited supply of medical protective equipment. Giusti et al. (2020) reported that psychological comorbidities and fear of infection were risk factors. For emotional exhaustion and depersonalization, the predictor was contact with COVID-19 patients.

2.2 Work-related Issues

Working as front liners is a predictor of unfavorable psychological outcomes among Chinese health workers (Lai et al., 2020). Other possible risk factors linked to psychological problems are the nature of work, e.g., working in the isolation ward (Lu et al., 2020; Que et al., 2020), exposure to pandemic-related information, receipt of negative feedback from front liners, and uncertainty or unwillingness to join frontline work (Que et al., 2020). Medical care workers in China admitted to having experienced too much workload (Si et al., 2020). Medical health workers in rural areas might worry about being infected with the same COVID-19 during the fight against the epidemic due to a different workplace involving different medical skills and medical conditions. Zhang et al. (2020)

On the other hand, inadequate precautionary measures were associated with higher anxiety and

depression symptoms. Compared with other health workers in Nepal, nurses had higher odds of developing anxiety (Khanal et al., 2020). In Pakistan, the most common reason for stress and anxiety among 64.2% of healthcare workers treating COVID-19-positive patients was increased workload (Sandesh et al., 2020).

In Oman, those who attended to COVID-19 patients experienced lower well-being. They confirmed that working closely with COVID-19 patients is worrying and detrimental to psychological health. As expected, those who cared for COVID-19 patients had a higher level of stress and poorer psychological well-being (Badhadha et al., 2020).

A study (Al-Hanawi et al., 2020) showed that being a frontline health worker is related to distress in KSA. They also hinted that health workers are more likely to experience mild and severe distress due to increased workload and long working hours, considering the growing number of COVID-19 cases.

In Turkey, another risk factor for insomnia and distress symptoms resulting in depression is being assigned as front-liners. Also, working in a rural area is more likely to cause anxiety, while the occupation is a risk factor for insomnia and distress (Sahin et al., 2020). The COVID-19 pandemic affected the mental health of hospital workers, but the difference is observed among work areas in Turkey (Yalcin et al., 2020). Stress is more likely to occur in those assigned to emergency services. Emergency room workers revealed a higher level of Post-traumatic stress disorder symptoms.

Di Tella et al. (2020) identified factors, i.e., lack of sufficient rest, workload, and if exposed for a longer time to events like the death of patients and colleagues, and other traumatic events as closely linked to the prevalence of acute mental health conditions in Italy's healthcare workers. For emotional exhaustion and depersonalization, the predictors were working in the hospital and being in contact with COVID-19 patients. The reduced personal accomplishment was also predicted by age (Giusti et al., 2020).

In this Polish study (Szylińska et al., 2020), healthcare workers who work with patients with COVID-

19 in emergency and infectious wards and ICUs are more likely to develop anxiety and depressive symptoms and experience sleep disorders.

In a global study in Eastern Mediterranean Region (EMRO) (52.0%) and Western Pacific Region (WPRO) (25.4%), those respondents working in a hospital were at a higher risk of anxiety than those working in the laboratory and other workplaces (Htay et al., 2020).

2.3 Personal and Other Factors

Adverse psychological symptoms were prevalent among medical care workers in China during the COVID-19 epidemic. As expected, several factors contributed to the expansion of psychological pressure, including a shortage of protective equipment and feeling lonely due to isolation from loved ones (Lu et al., 2020). Lack of social support and maladaptive coping were risk factors for healthcare workers' adverse psychological outcomes (Si et al., 2020). Zhang et al. (2020) mentioned that being female is a common risk factor for insomnia, anxiety, depression, and obsessive-compulsive symptoms among medical health workers.

Among healthcare workers treating COVID-19-positive patients, the most common reasons for stress and anxiety were the lack of security (62.5%) and lack of awareness about COVID-19 among the general population (46.4%) (Sandesh et al., 2020). Stigma and being female nurses were heavily linked to all the mental health outcomes in Khanal et al.'s (2020) study.

Meanwhile, in the study of Al-Hanawi et al. (2020) in Saudi Arabia, the findings showed that being a young person, a female, and a private sector employee is related to distress.

In Oman, poor psychological well-being was found among female healthcare workers and those who attended to COVID-19 patients. Female healthcare workers fared worse than males and showed elevated anxiety and stress levels and poor psychological well-being. Moreover, older healthcare workers seemed to have developed better coping skills, faring well than young healthcare workers (Badhadha et al., 2020).

Sahin et al. (2020) reported that being female is a factor that predicts chances of depression, anxiety, insomnia, and distress symptoms in Turkey. Also, Yalcin et al. (2020) revealed that stress is more likely to occur among female health workers. Higher levels of post-traumatic stress, depression, anxiety, and stress were observable among women.

Di Tella et al. (2020) described factors closely linked to the prevalence of acute mental health conditions among healthcare workers. These include frequent isolation from family and other traumatic events. Certain predisposing factors among healthcare professionals working in COVID-19 wards are being female and not in a relationship for depressive symptoms and being female and older for PTSS. Perceived support from friends was the predictor of burnout, and for emotional exhaustion and depersonalization, the predictor was a female nurse (Giusti et al., 2020). Moreover, healthcare workers are less likely to experience anxiety if they are staying with family and friends (Htay et al., 2020).

3. Interventions recommended addressing the adverse mental health outcomes

Mental health (WHO, 2005) is described as a state of well-being in which the individual realizes his or her abilities, can cope with the everyday stresses of life, can work productively and fruitfully, and can contribute to his or her community. In this positive sense, mental health is the foundation for well-being and effective functioning for an individual in a community. As has been consistently pointed out, the mental health of our healthcare workers needs to be promoted, particularly during the pandemic.

While there is no consistent evidence found in the literature to support any one particular approach, studies suggest that implementing a mental health program has great potential to improve the mental health of our healthcare workers. Since mental health issues vary and people differ, staffing issues, personality traits, other demographics, and other conditions need to be looked into for interventions to be effective.

Lai et al. (2020) stressed in their study that a significant portion of public health measures for addressing the current pandemic is the protection of healthcare workers. They contended that interventions to promote the mental well-being of healthcare workers exposed to COVID-19, particularly women, nurses, and front liners, must be implemented without delay. Lu et al. (2020) stressed that effective strategies for improving mental health should be provided to healthcare workers. Que et al. (2020) stated that healthcare workers' knowledge and skills must be improved to cope adequately and competently with infectious diseases. They suggested that steps should be taken to provide the necessary support to reduce the risk of infection and improve the work environment. The study by Si et al. (2020) bared the prevalence of adverse psychological symptoms among medical care workers in China during this epidemic. The authors argued that screening for adverse psychological outcomes and developing corresponding preventive measures would be beneficial in decreasing adverse psychological outcomes. They also pointed to the importance of providing tailored mental health support and including observing the trajectory changes of the post-pandemic mental health situation and establishing a nationwide psychological support group to curb the potential spike in psychiatric cases before it develops into social and economic burdens. In addition, they favor appropriate intervention measures based on the psychological assessment in each stage of the pandemic (present and future, if any) to include counseling and screening, development of positive coping strategies, and a more friendly social environment and mass media network. For Zhang et al. (2020), adequate working conditions and recovery programs seem necessary to ensure the health workers' best physical, mental, and social conditions for optimal health. Some recommendations to support medical staff have been raised to include reduced job demands and workload.

To improve the healthcare workers' mental well-being, Khanal et al. (2020) recommended focusing on stigma reduction, equipping health workers with protective measures, and ensuring personal and family support for those with a history of mental health issues. Sandesh et al. (2020) affirmed that the government and healthcare agencies should take responsibility. Both

should ensure a healthy work environment. The high prevalence of anxiety, depression, and stress among healthcare workers treating COVID-19 patients necessitates investing resources to promote their mental health; this should be given priority.

Even in the Philippines, the need to design and implement interventions to address the adverse effects of the pandemic on healthcare workers' mental health is highly recognized. Labrague et al. (2020) opined that providing adequate mental and psychological support should be prioritized in addressing the dysfunctional levels of COVID-19 anxiety, as this may adversely affect nurses' mental health and well-being. The nurse managers looked up to in terms of being responsible for instituting evidence-based strategies to promote the mental health of nurses should ensure that they have extended access to psychological treatment or psychotherapy, including materials and resources to support mental health. The authors affirm that nurse managers should prioritize and promote self-care among nurses. These initiatives may include flexible or shorter duty hours, adequate breaks, and time scheduling to assuage the negative impact of the crisis and alleviate nurses' anxiety.

Al-Hanawi et al. (2020) argue that increased efforts in raising public awareness of COVID-19 and providing supportive psychological programs and verified social networks, in both the immediate and long term, remain vital in mitigating the psychological distress among the affected Saudis. The authors are hopeful that the results may be shared and applied in KSA and even in Arabian Gulf countries with their shared backgrounds, culture, religion, and challenges.

In Oman, Badhadha et al. (2020) noted that support for healthcare workers, especially those who display signs of trauma and stress, is critical, particularly during this pandemic. They also mentioned the factors that can endanger healthcare workers' mental health. These include fear of infection, stress, anxiety, and concern for their well-being and significant others. If not addressed soon, many psychological problems might result in maladaptive coping behaviors, such as substance abuse and suicide. These problems have been observed in previous disease outbreaks. The

authors underscore the urgency and importance of extending administrative and psychological support and educating and providing healthcare workers with up-to-date and accurate information about the COVID-19 virus.

Sahin et al. (2020) noted the high levels of depression, anxiety, insomnia, and distress symptoms experienced by healthcare workers. While the Turkish Health Ministry and several other associations and institutions have already established units, helplines, and other support measures, it was observed that healthcare workers generally had not applied to receive such support. There should be programs to promote these services and amplify interventions, and other simple, practical interventions like electronic devices may be initiated.

Yalcin et al. (2020) describe several factors to promote mental well-being in healthcare workers: adequate working conditions, especially for women, nurses, and frontline workers; necessary and adequate medical protective equipment; adequate resting periods; and multidisciplinary programs such as psychological support. They insist that these should be provided and immediately put into practice. They also noted that providing scientific and regular information to healthcare workers during the pandemic management prevents psychological stress levels from escalating. In addition to all these measures and interventions, they acknowledge the importance of psychological support in enhancing and improving the quality of medical services.

Giusti et al. (2020) claimed that health professionals in Italy had high levels of burnout and psychological symptoms during the COVID-19 emergency. Therefore, they advocate the monitoring and timely treatment of these conditions to preserve the professionals' health and enhance the healthcare systems' preparedness to face the medium- and long-term consequences of the COVID-19 pandemic.

In Poland, Szylińska et al. (2020) hold that an essential public health task in the fight against the COVID-19 pandemic is to protect health professionals, especially the front liners.

Elkholy et al. (2020) stressed the importance of protecting healthcare workers in Egypt during this pandemic. They agreed on the immediate implementation of particular interventions to promote the healthcare workers' mental well-being and mitigate the pandemic's effects on their current mental health. Interventions may include raising awareness of the early symptoms of depression, anxiety, and stress, initiating individual coping strategies (acceptance, behavioral activation, and mindfulness), resilience building, social interactions, and peer-support programs.

DISCUSSION

This systematic review identified studies about healthcare workers' mental health during the covid-19 pandemic. The total of 21478 participants included frontline nurses, doctors, and other healthcare workers who provided clinical care, administration, or other clinical tasks. The studies reported various outcomes and situations, including implementing interventions to prevent or reduce mental health problems, other resources, and strategies utilized by healthcare workers.

The sampled healthcare workers in the included studies reported anxiety, depression, fear, distress, and sleep problems. The incidence of stress, regardless of culture and background, was higher in situations involving healthcare workers on the front lines. The main risk factors and conditions that worsen or trigger mental health issues include age, direct contact with infected patients, not being knowledgeable enough about COVID-19, prolonged work hours, and limited PPEs and supplies. In general, hospital safety and preparedness, reliable and updated education on the disease's transmission and prevention, adequate PPEs and supplies, and self-care activities may work positively to curtail "coronaphobia" and other adverse psychological reactions among healthcare workers. The crucial and massive front liner role of healthcare workers during pandemics makes them anxious and stressed out due to a long list of factors (Lai et al., 2020; Si et al., 2020; Zhang et al., 2020; Sandesh et al., 2020; Badhadha et al., 2020; Temsah, 2020; Al-Hanawi et al., 2020; Di Tella et al., 2020; Giusti et al., 2020). The working conditions during pandemics adversely affect healthcare workers' mental health. The workload and work-related pressure

vis-à-vis the rising cases may have contributed to the mental health concerns reported in the studies. Exposure to patients with covid-19, a lack of personal protective equipment, and subsequent fear of getting infected or infecting colleagues and loved ones contribute to the healthcare workers' distress.

Healthcare workers are generally recognized for their emotional resilience, even before the COVID-19 pandemic. While trained to be robust and constant exposure to infected patients makes them susceptible to distress and fear. Also, they are faced with additional responsibilities, physical hardships, and tough mental and psychological challenges this time. Reports confirmed their anxiety over patient care, the threat of getting infected, and the possible infection of family members. With the continued mutation of the virus, we need clarification and clarity about how to combat this virus and stem its transmission effectively.

In the prior period of viral outbreaks, there was also the prevalence of anxiety, depression, distress, and insomnia among healthcare workers. Various infectious diseases hounded the world in the past, i.e., SARS-CoV-1, H1N1 influenza, and Ebola virus, and were triggers of mental health issues that impacted healthcare workers (Lee, S. M. et al., 2018; E.Y. Kim et al., 2016; H. Jeong, et al., 2016; J.S. Ro et al., 2017). What complicates people's perceptions and exacerbates their fear originates from the comprehensive media coverage of the COVID-19 pandemic. Information spreads faster than the previous SARS outbreaks, H1N1 flu, MERS-CoV, or even Ebola, owing to massive public fear, panic, and stress. During the first few months, we saw many infected healthcare workers; some even died. Health workers get affected as they are not exempt from emotional reactions and psychological distress. Hospitals are encouraged to conduct educational campaigns targeting healthcare workers to improve their knowledge and awareness about COVID-19 before the pending pandemic hits the actual facility. This action is crucial to minimize staff stress and prepare them for the COVID-19 pandemic (Temsah, M. H, 2020).

More interventions towards improving the knowledge and skills of HCWs, as well as reassuring them of the efficiency of proper infection prevention and

control measures, and providing a safe environment, are needed (Temsah, M. H, 2020). The authors further argued that this high degree of stress came out since COVID-19 is a newly emerging virus with uncertain contagiousness, high transmission rate, and degree of information associated with it (Temsah, M. H, 2020). The same observation of stress and anxiety has been noticed during the H1N1 Influenza pandemic. Healthcare workers reported significant concerns about acquiring COVID-19 and transmitting it to a family member. This finding is expected and reproduced from previous similar studies (Temsah, M. H, 2020).

When SARS broke out, there was an unprecedented threat and a great challenge to health professionals in Hong Kong. In this study, many participants reported a high-stress level, with about 57% having experienced psychological distress. Their psychological morbidity was better understood in terms of personal vulnerability, stress, and support in the workplace (Tam et al., 2003). During the SARS epidemic, healthcare workers were anxious and scared; some even resorted to leaving their jobs (Chen et al., 2006).

When SARS broke out, there was an unprecedented threat and a great challenge to health professionals in Hong Kong. In this study, many participants reported a high-stress level, with about 57% having experienced psychological distress. Their psychological morbidity was better understood in terms of personal vulnerability, stress, and support in the workplace (Tam et al., 2003). During the SARS epidemic, healthcare workers were anxious and scared; some even resorted to leaving their jobs (Chen et al., 2006).

The studies in this review reported that isolation and high-risk workplaces and contact with infected people caused much stress and trauma—the fact of human-to-human transmission and the presence of infected but asymptomatic persons triggered anxiety and fear among healthcare workers. Similarly found, in the study of Maunder et al. (2004), distress in response to the severe acute respiratory syndrome outbreak is more significant in nurses and those who care for patients with the severe acute respiratory syndrome. Even years after epidemics, healthcare workers on the

frontline still experienced psychological distress. The Ebola and SARS outbreaks disclosed these outcomes (Khalid et al., 2016).

Health fear becomes real due to the inevitability of providing care to patients with contagious diseases, including SARS, MERS, and SARS-CoV-2. They are responsible for their patients and are concerned about becoming infected and transmitting the disease to their family members (Chen et al., 2006). Quarantined healthcare workers reported fear, stigma, and frustration during the SARS outbreak. The authors contend that advice on coping and stress management techniques for healthcare workers are needed in preparation for potential future outbreaks of infectious diseases.

During the COVID-19 outbreak, healthcare workers find themselves in a dilemma trying to find justifiable answers to questions about their duty to provide care to patients, their obligations to protect their families, and even their right to look after and protect their health. In the Philippines alone, healthcare workers, due to too much workload, a rising number of patients to attend to, and resource challenges, have been experiencing psychological and emotional issues. As reported in the study of Labrague et al. (2020), nonmedical front liners are more overwhelmed with mental health status disorders (e.g., fear, anxiety, and panic). Therefore, strategies on the individual and organizational levels must be designed for the healthcare workers' mental health and overall wellness. With optimism, we remain steadfast that the patient's safety is not compromised.

The studies in the review also described possible risk and protective/resilience factors. Healthcare workers reported their junior status, exposure, health fear, infected family member, lack of practical and social support, stigma, and younger age as risk factors. On the other hand, they identified protective factors such as access to adequate personal protective equipment, adequate rest, and family and psychological support.

Some studies have recommended improving the psychological health and well-being of healthcare workers faced with COVID-19 challenges. With more research on what works or what may work given the

circumstances, we can provide our modern-day heroes the support they most direly need. From the researcher's perspective, comparing mental health outcomes among countries may not be the priority consideration. The enemy cannot be seen. That alone makes it scary. With an undisclosed enemy, the researcher thinks it is customary to exhibit these symptoms mentioned in all the studies included in the review.

During this COVID-19 pandemic, healthcare systems face unprecedented challenges in whatever part of the globe. Easing the psychological burden among healthcare workers is one. Thus, strategic interventions for their mental health should be available and accessible. Many other initiatives mentioned in the studies would help build healthcare workers' resilience by reinforcing positive coping strategies and self-efficacy and enhancing social support. While the psychological aspect is taken care of, the implementation of a safe work environment, provision of adequate PPEs and supplies, and information updates about the disease, including relevant training programs, can lead to improved healthcare workers' morale and overall state of health. As the pandemic continues, essential clinical and policy strategies are needed to support healthcare workers.

Adequately placed intervention strategies and resources are necessary for promoting mental health during pandemics like COVID-19. The studies, generally cross-sectional, presented a variety of healthcare workers' mental health responses and outcomes. They also include interventions recommended to prevent or reduce mental health problems and other resources and strategies healthcare workers utilize to cope with the COVID-19 pandemic. Several patterns were shown, e.g., healthcare workers were for social support to relieve mental health impacts, feared virus transmission to the families, were overwhelmed by the workload and believed the healthcare systems/organizations should address healthcare workers' mental health concerns.

Strengths and limitations

The strength of this review is that it was systematically conducted, and the studies were conducted in Asia and from other continents. This review provides an essential reference for future studies

on healthcare workers worldwide. The results are consistent with reports from other studies on the impacts of COVID-19 on healthcare workers' mental health. While we see some value, the present study acknowledges some limitations. The study only covered data from March to October 2020; thus, the mental health outcomes might reflect conditions different from recent events. The present review was limited by search strategies designed to retrieve publications focusing on healthcare workers' mental health during the COVID-19 pandemic; thus, studies exclusively about the physical protection, infection, and transmission rates in populations were not retrieved. Also, the search was conducted in a few databases, and the reviewer, with her associate researcher, undertook the screening. Other studies with the same theme could have skipped our attention and analyses. However, we did our best to adopt a comprehensive search strategy and cover a broad range of evidence beyond Asia. Finally, as the current review's searches were carried out early in the pandemic, it will be valuable to consider emerging research from the global arena in light of this review's findings.

Moreover, this review uses descriptive analysis rather than meta-analysis because the data collected were limited, particularly in the Philippines. The period covered is for seven months before the surge of cases. It lacks a longitudinal analysis of data. The review is focused on the impact on the healthcare workers' mental health in general and does not compare the symptoms according to the types of healthcare workers. This shows the need for longitudinal, multi-center studies with more respondents. Also, the number of participants in some studies was small, limiting the generalizability of findings. Most results were based on self-reported questionnaires that investigated psychological problems, which may differ from clinical diagnostic interview findings.

Most papers utilized non-probability sampling methods, with participant numbers between 112 and 3109. The number of respondents seems incomparable, and sample procedures must confirm representativeness to the general population. It relied on convenience samples and may not, therefore, be representative of all healthcare workers. While there may have been well-defined sampling criteria, the lack of

information on samples due to the nature of online surveys is an acknowledged limitation. This results in profound implications as to the applicability to healthcare workers in other settings. Caution in interpretation should be exercised since the findings cannot be generalized and may not apply to other healthcare workers.

The 21 studies were mainly cross-sectional and survey-based, prohibiting us from concluding causality. However, more longitudinal research may identify the causes of mental health problems among healthcare workers. There is a broad stream of literature about the COVID-19 pandemic, but mostly rapidly published. While the researcher tried to qualify the symptoms prevalent in the countries of the included studies, similarities were more evident than differences. The sample distribution is heavy on single-country representations except for China, with five studies, thus restricting a fair comparison of results.

This review has synthesized and discussed the current literature on the psychological impact of the COVID-19 pandemic on healthcare workers' mental health. The researcher sees this as a strength because this pandemic is unique, unprecedented, and, therefore, worth assessing in its own right. It has affected every country and disrupted every person's life across the globe.

The role of the pandemic in the rise of mental health issues needs to be evaluated using a longitudinal study design. Selection bias might be present in most studies. There might be health workers with no or limited internet access, older ones, and those preoccupied with work due to busy schedules who might have opted to pass participation in the studies. Respondent bias may not have been eliminated as the findings were self-reported primarily by health workers and based on a subjective scale. Also, the tools used in the studies should be taken into consideration.

Despite its limitations, this review provides early evidence of the mental health status among health workers during the COVID-19 pandemic in different areas. There is valuable data on risk factors and suggestions to resolve mental health issues during

pandemics. Again, particularly in the Philippines, where there is growing discontent among healthcare workers, studies on this subject are scant. The publications, media, and other fora have long stressed the interventions needed by the general public during this pandemic. We should not forget our healthcare workers, who also need extended support regarding their psychological, emotional, and spiritual well-being. One case in point is our country's healthcare workers. Not only is there a lack of personal protective equipment, but our front liners are underpaid. They also experience pressure, stress, insomnia, denial, anger, and fear, despite constant exposure to the COVID-19 virus. WHO head Tedros Adhanom Ghebreyesus has noted, "Even if we do everything else right, if we do not prioritize protecting health workers, many people will die because the health worker who could have saved their lives is sick." (Wilson & Parra, 2020).

Salvation et al.(2017) argued that burnout is associated with increased risks of both physical and psychological long-term detrimental consequences and can increase sick leave, absenteeism, job withdrawal, and poor work efficiency. The pandemic is unprecedented, and its duration is uncertain. We, thus, have to brace for its potentially worse impact. The virus's mutations have caused cases to balloon, and without a doubt, the pandemic is now viewed as a political, social, and biological phenomenon (Bloomberg, September 13, 2021). There is no single approach to the pandemic. Actions should be multi-layered as it has become messy, complicated, and elusive to manage now and probably in the years to come.

Research about the impact of the COVID-19 pandemic on the mental health of healthcare workers, and physician wellness in general, continues to evolve just as the definite profile of the virus remains elusive and challenging to understand fully. Therefore, updated reviews will be necessary for the coming months. Or years. Psychologically, health workers face the same fear and experience similar symptoms wherever they may be deployed. The coronavirus is an emerging novel, and its outbreak surprised the world. On the other hand, access to PPEs and other safety resources and strict observance of health protocols provide them with a semblance of safety. They feel protected from infection

and somehow reduce the fear and anxiety of infecting families and loved ones. Despite reports of their complaints about disturbed sleeping patterns and feelings of isolation, anxiety, and helplessness, healthcare workers remain heroes during this pandemic. This inner strength may be attributed to their sense of meaning and purpose -- the profound resolve to serve humanity.

Implications

Individuals engaged in the fight against the COVID-19 pandemic have grown in number. Among them are healthcare workers who have worked extremely long hours in high-pressure environments and continue to be commissioned to work under highly challenging conditions. COVID-19 places a unique challenge on our healthcare workforce. These healthcare workers might have been directly exposed to the formidable challenges of high-quality care delivery, the limitation posed by limited experience or lack of resources, and even the problem of understaffing. Also, those caring for patients with COVID-19 are at high risk of infection, and as a result, they fear the transmission, that is, the risk of infecting their families. While healthcare workers can thrive in stressful circumstances, protecting their mental health and identifying those who experience psychological injuries is imperative to provide them with appropriate evidence-based support or care.

Our healthcare workers will likely continue to face tough challenges now and in the future. This review confirms that the impact of COVID-19 on healthcare workers' mental health is considerable, with significant levels of anxiety, depression, insomnia, and distress.

The studies included in this review were focused on hospital settings. This is a big concern since, in reality, deaths happen in the community and even in nursing and care homes. Therefore, future studies may tap into other workplaces where other healthcare workers may have been deployed. This suggests that different contexts and cultures may reveal different findings.

Several risk factors emerged in the review of the studies. Those with the most substantial evidence were inadequate PPE, fear of infection, and heavy workload. Some studies suggest that being younger or female may be a risk factor. Another observation is that many of the studies measured adverse mental health outcomes. Future studies may also focus on our healthcare workers' protective factors or coping mechanisms.

Although the current evidence is scarce concerning the direct effects of COVID-19 on mental health, there are indications of increased PTSS and depression following the COVID-19 infection. Regarding the indirect effects of COVID-19 on general mental health, there seems to be evidence of an increase in depressive and anxiety symptoms and a negative impact on general mental health, particularly among healthcare workers. We must welcome research that evaluates the direct psychological consequences and indirect effects on mental health to improve treatment, health care planning, and preventive measures during potential subsequent pandemics.

CONCLUSION

HCWs in varying circumstances have been reporting problems such as anxiety, depression, distress, and sleep deprivation during the covid-19 pandemic. For those in the immediate, the lack of adequate rest and sleep is strongly related to the pressures and burdens of work. This is often exacerbated by inadequate personal protective equipment or insufficient training. Over time, many more HCWs may struggle with mental health and somatic complaints. The studies in the review recommended mental health interventions, and these should be proactive organizational approaches as these are seen to be more effective and less stigmatizing. Furthermore, incorporating high-quality research in pandemic-preparedness planning must also be on the priority list.

This review confirmed that the COVID-19 pandemic adversely affects HCWs' mental health. The studies showed that the healthcare workforce experiences anxiety, depression, insomnia, and distress amid the pandemic. However, it must be pointed out that most studies draw only from the hospital setting, and it is highly possible that other contextual

circumstances may yield different results. In this regard, the researcher recommends conducting more research in primary and social care settings and keeping abreast with rapidly emerging evidence in different parts of the world. This also calls for broader societal and risk factors analysis, including gender, socio-economic disparities, age, and types/categories of HCWs. Although this is not part of the researcher's current review and analysis, these may have the ability to influence the state of mental health in a particular setting.

Given the adverse impact on psychological well-being, there has been a clamor across the globe for more research to identify action points to address mental health issues, particularly during pandemics. A call to action for individual interventions to strengthen psychological resistance and protection against adverse mental health outcomes is essential. The researcher proposes that boosting psychological resilience in an approach that considers both personalized and holistic aspects may effectively protect our healthcare workers from adverse mental health outcomes. It will include significant structural changes to create a healthy, safe, and supportive work environment. Because of the virus' profile that prevents face-to-interventions, digitally-based measures and programs are more likely to be preferred.

Lastly, supporting and protecting healthcare workers' mental health is morally justified. If done well, this should reduce the risk of mental health issues and provide optimum opportunity for staff to experience psychological growth from overcoming the formidable challenges during this trying time. Much could be done to support and protect healthcare workers' physical and mental health as they willingly put themselves in the line of fire to protect and save other people's lives.

REFERENCES

1. Al-Hanawi, M. K., Mwale, M. L., Alshareef, N., Qattan, A. M., Angawi, K., Almubark, R., & Alsharqi, O. (2020). Psychological distress amongst health workers and the general public during the COVID-19 pandemic in Saudi Arabia. *Risk management and healthcare policy*, pp. 13, 733.
2. Alshekaili, M., Hassan, W., Al Said, N., Al Sulaimani, F., Jayapal, S. K., Al-Mawali, A., ... & Al-Adawi, S. (2020). Factors associated with mental health outcomes across healthcare settings in Oman during COVID-19: frontline versus non-frontline healthcare workers. *BMJ open*, 10(10), e042030.
3. Badahdah, A., Khamis, F., Al Mahyijari, N., Al Balushi, M., Al Hatmi, H., Al Salmi, I., ... & Al Norman, J. (2020). The mental health of healthcare workers in Oman during the COVID- 19 pandemic. *International Journal of Social Psychiatry*, 0020764020939596.
4. Chatzittofis, A., Karanikola, M., Michailidou, K., & Constantinidou, A. (2021). Impact of the COVID-19 Pandemic on the Mental Health of Healthcare Workers. *International Journal of Environmental Research and Public Health*, 18(4), 1435.
5. Chen, R., Chou, K. R., Huang, Y. J., Wang, T. S., Liu, S. Y., & Ho, L. Y. (2006). Effects of a SARS prevention program in Taiwan on nursing staff's anxiety, depression, and sleep quality: a longitudinal survey. *International journal of nursing studies*, 43(2), 215-225.
6. Chew, N. W., Ngiam, J. N., Tan, B. Y. Q., Tham, S. M., Tan, C. Y. S., Jing, M., ... & Sharma, V. K. (2020). Asian-Pacific perspective on the psychological well-being of healthcare workers during the evolution of the COVID-19 pandemic. *BJPsych open*, 6(6).
7. De Kock, J. H., Latham, H. A., Leslie, S. J., Grindle, M., Munoz, S. A., Ellis, L., ... & O'Malley, C. M. (2021). A rapid review of the impact of COVID-19 on healthcare workers' mental health: implications for supporting psychological well-being. *BMC Public Health*, 21(1), 1–18.
8. Di Tella, M., Romeo, A., Benfante, A., & Castelli, L. (2020). The mental health of healthcare workers During the COVID-19 pandemic in Italy. *Journal of evaluation in clinical practice*, 26(6), 1583-1587.
9. Doherty, A. M., Collieran, G. C., Durcan, L., Irvine, A. D., & Barrett, E. (2021). A pilot study of burnout and long covid in senior specialist doctors. *Irish Journal of Medical Science (1971-)*, 1-5.

10. Elkholy, H., Tawfik, F., Ibrahim, I., Salah El-din, W., Sabry, M., Mohammed, S., ... & Omar, A. N. (2020). The mental health of frontline healthcare workers exposed to COVID-19 in Egypt: a call for action. *International Journal of Social Psychiatry*, 0020764020960192.
11. Giusti, E. M., Pedroli, E., D'Aniello, G. E., Badiale, C. S., Pietrabissa, G., Manna, C., ... & Molinari, E. (2020). The psychological impact of the COVID-19 outbreak on health professionals: a cross-sectional study. *Frontiers in Psychology*, p. 11.
12. Goulia, P., Mantas, C., Dimiroula, D., Mantis, D., & Hyphantis, T. (2010). General Hospital staff worries, perceived sufficiency of information, and associated psychological distress during the A/H1N1 influenza pandemic. *BMC infectious diseases*, 10(1), 1-11.
13. Htay, M. N. N., Marzo, R. R., AlRifai, A., Kamberi, F., El-Abasiri, R. A., Nyamache, J. M., ... & Abas, A. L. (2020). The immediate impact of COVID-19 on mental health and its associated factors among healthcare workers: a global perspective across 31 countries. *Journal of Global Health*, 10(2).
14. Javed, B., Sarwer, A., Soto, E. B., & Mashwani, Z. U. R. (2020). The coronavirus (COVID-19) pandemic's impact on mental health. *The International journal of health planning and management*, 35(5), 993-996.
15. Khalid, I., Khalid, T. J., Qabajah, M. R., Barnard, A. G., & Qushmaq, I. A. (2016). Healthcare worker's emotions, perceived stressors and coping strategies during a MERS-CoV outbreak. *Clinical medicine & research*, 14(1), 7-14.
16. Khanal, P., Devkota, N., Dahal, M., Paudel, K., & Joshi, D. (2020). Mental health impacts among health workers during COVID-19 in a low resource setting: a cross-sectional survey from Nepal. *Globalization and health*, 16(1), 1-12.
17. Labrague, L. J., & De los Santos, J. A. A. (2020). COVID-19 anxiety among frontline nurses: Predictive role of organizational support, personal resilience, and social support. *Journal of nursing management*, 28(7), 1653-1661.
18. Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, Wu J, Du H, Chen T, Li R. Factors associated with mental health outcomes among healthcare workers exposed to coronavirus disease 2019.
19. Lee, S. M., Kang, W. S., Cho, A. R., Kim, T., & Park, J. K. (2018). The psychological impact of the 2015 MERS outbreak on hospital workers and quarantined hemodialysis patients. *Comprehensive Psychiatry*, 87, 123-127.
20. Lu, W., Wang, H., Lin, Y., & Li, L. (2020). Psychological status of medical workforce during the COVID-19 pandemic: A cross-sectional study. *Psychiatry Research*, 288, 112936.
21. Maunder, R. G., Lancee, W. J., Rourke, S., Hunter, J. J., Goldbloom, D., Balderson, K., ... & Fones, C. S. (2004). Factors associated with the psychological impact of severe acute respiratory syndrome on nurses and other hospital workers in Toronto. *Psychosomatic Medicine*, 66(6), 938-942.
22. Michelle Fay Cortez, September 13, 2021. Bloomberg
23. Moukaddam N, Shah A. Psychiatrists beware! The impact of COVID-19 and pandemics on mental health. *Psychiatric Times*. 2020.
24. Ornell, F., Halpern, S. C., Kessler, F. H. P., & Narvaez, J. C. D. M. (2020). The impact of the COVID-19 pandemic on the mental health of healthcare professionals. *Cadernos de saude publica*, 36, e00063520.
25. Ornell, F., Schuch, J. B., Sordi, A. O., & Kessler, F. H. P. (2020). "Pandemic fear" and COVID-19: mental health burden and strategies. *Brazilian Journal of Psychiatry*, 42(3), 232-235. Philippine Star, January 31, 2021
26. Que, J., Le Shi, J. D., Liu, J., Zhang, L., Wu, S., Gong, Y., ... & Lu, L. (2020). Psychological impact of the COVID-19 pandemic on healthcare workers: a cross-sectional study in China. *General psychiatry*, 33(3).
27. Romero, C. S., Delgado, C., Catalá, J., Ferrer, C., Errando, C., Iftimi, A., ... & Otero, M. (2020). COVID-19 psychological impact in 3109 healthcare workers in Spain: The PSIMCOV group. *Psychological medicine*, 1-7.
28. Şahin, M. K., Aker, S., Şahin, G., & Karabekiroğlu, A. (2020). Prevalence of depression, anxiety,

- distress and insomnia and related factors in healthcare workers during COVID-19 pandemic in Turkey. *Journal of Community Health*, 45(6), 1168–1177.
29. Sandesh, R., Shahid, W., Dev, K., Mandhan, N., Shankar, P., Shaikh, A., & Rizwan, A. (2020). Impact of COVID-19 on the mental health of healthcare professionals in Pakistan. *Cureus*, 12(7).
30. Sarwar, M. A. A., & Sarwar, H. (2020). The Impact of COVID-19 on the Mental Health of Healthcare Professionals. *J Coll Physicians Surg Pak*, pp. 83–83.
31. Shah, K., Kamrai, D., Mekala, H., Mann, B., Desai, K., & Patel, R. S. (2020). Focus on mental health during the coronavirus (COVID-19) pandemic: applying learnings from the past outbreaks. *Cureus*, 12(3).
32. Shreffler, J., Petrey, J., & Huecker, M. (2020). The impact of COVID-19 on healthcare worker wellness: A scoping review. *Western Journal of Emergency Medicine*, 21(5), 1059.
33. Si, M. Y., Su, X. Y., Jiang, Y., Wang, W. J., Gu, X. F., Ma, L., ... & Qiao, Y. L. (2020). Psychological impact of COVID-19 on medical care workers in China. *Infectious diseases of poverty*, 9(1), 1-13.
34. Stuijzand, S., Deforges, C., Sandoz, V., Sajin, C. T., Jaques, C., Elmers, J., & Horsch, A. (2020). Psychological impact of an epidemic/pandemic on the mental health of healthcare professionals: a rapid review. *BMC Public Health*, 20(1), 1-18.
35. Surrati, A. M. Q., Mansuri, F. M. A., & Alihabib, A. A. (2020). Psychological impact of the COVID-19 pandemic on healthcare workers. *Journal of Taibah University Medical Sciences*, 15(6), 536-543.
36. Tam, C. W., Pang, E. P., Lam, L. C., & Chiu, H. F. (2004). Severe acute respiratory syndrome (SARS) in Hong Kong in 2003: stress and psychological impact among frontline healthcare workers. *Psychological medicine*, 34(7), 1197-1204.
37. Temsah, M. H., Al-Sohime, F., Alamro, N., Al-Eyadhy, A., Al-Hasan, K., Jamal, A., ... & Smiley, A. M. (2020). The psychological impact of the COVID-19 pandemic on healthcare workers in a MERS-CoV endemic country. *Journal of infection and public health*, 13(6), 877-882.
38. Wańkowicz, P., Szylińska, A., & Rotter, I. (2020). Assessment of mental health factors among health professionals depending on their contact with COVID-19 patients. *International Journal of Environmental Research and Public Health*, 17(16), 5849.
39. Wilson, J., & Parra, A. (2020). “We are collapsing”: Virus pummels medics in Spain and Italy. *ABC News*. Available online at <https://abcnews.go.com/Health/wirestory/collapsing-virus-pummels-medics-Spain-Italy-69789413> (accessed March 26, 2020).
40. WHO – World Health Organization, ‘Promoting mental health: concepts, emerging evidence, practice. World Health Organization, Geneva, 2005.
41. World Health Organization. (2020). COVID-19 Public Health Emergency of International Concern (PHEIC). Global research and innovation forum: towards a research roadmap.
42. World Health Organization [Internet]. (2020b). Coronavirus disease 2019 (COVID-19) situation report 131. World Health Organization. Retrieved August 27, 2021, from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200530-covid-19-sitrep-131.pdf?sfvrsn=d31ba4b3_2
43. YALÇIN, G., SAYINBATUR, B., Karay, E., & Karakaş, M. (2020). Psychological Stress of Healthcare Workers Caused by the COVID-19 Pandemic. *Dicle Tıp Dergisi*, 47(3), 525-541.
44. Zhang, W. R., Wang, K., Yin, L., Zhao, W. F., Xue, Q., Peng, M., ... & Wang, H. X. (2020). Mental health and psychosocial problems of medical health workers during the COVID-19 epidemic in China. *Psychotherapy and psychosomatics*, 89(4), 242-250.
45. Zhu, Z., Xu, S., Wang, H., Liu, Z., Wu, J., & Li, G. & Zhu, S.(2020). COVID-19 in Wuhan: Immediate Psychological Impact on 5062 Health Workers. *medRxiv*.

APPENDIX

Table 1. PRISMA

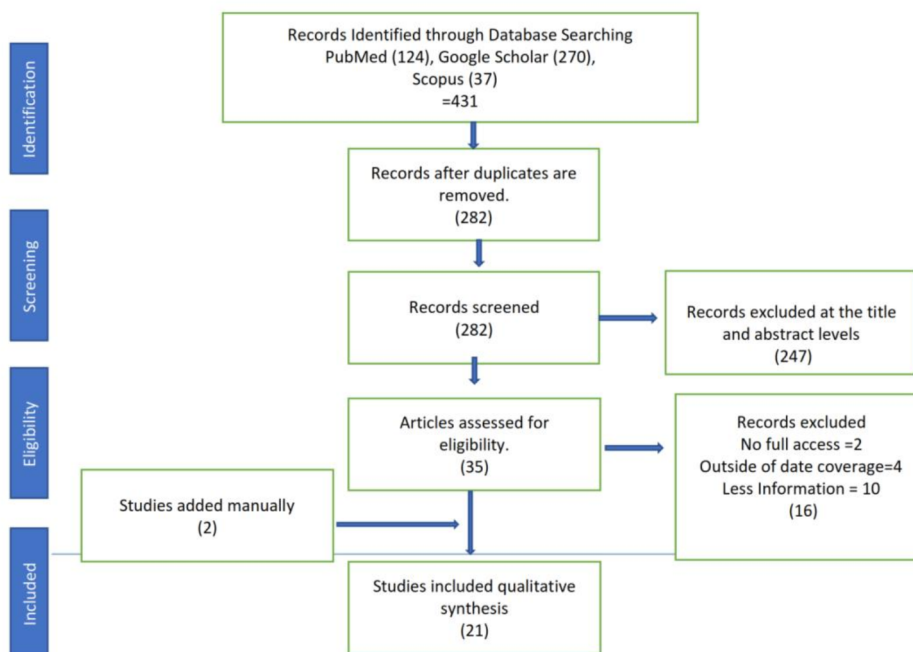


Table 2. Quality assessment of 21 studies including the Joanna Briggs Institute quality assessment tool

	1	2	3	4	5	6
1. Were the criteria for inclusion in the sample clearly defined?	YES	YES	YES	YES	YES	YES
2. Were the study subjects and the setting described in detail?	YES	YES	YES	YES	YES	YES
3. Was the exposure measured in a valid and reliable way?	YES	YES	YES	YES	YES	UC
4. Were objective, standard criteria used for measurement of the condition?	YES	YES	YES	YES	YES	UC
5. Were confounding factors identified?	YES	YES	YES	NA	YES	YES
6. Were strategies to deal with confounding factors stated?	YES	YES	UC	NA	UC	UC
7. Were the outcomes measured in a valid and reliable way?	YES	YES	YES	YES	YES	UC
8. Was appropriate statistical analysis used?	YES	YES	YES	YES	YES	YES

JBI Critical appraisal checklist for analytical cross-sectional studies

Yes / No / Unclear (UC) / Not applicable (NA)

	7	8	9	10	11	12
1. Were the criteria for inclusion in the sample clearly defined?	NO	YES	YES	YES	YES	YES
2. Were the study subjects and the setting described in detail?	YES	YES	YES	YES	YES	YES
3. Was the exposure measured in a valid and reliable way?	YES	YES	YES	YES	YES	YES
4. Were objective, standard criteria used for measurement of the condition?	YES	YES	YES	YES	YES	YES
5. Were confounding factors identified?	YES	YES	YES	YES	YES	YES
6. Were strategies to deal with confounding factors stated?	YES	UC	UC	YES	YES	YES
7. Were the outcomes measured in a valid and reliable way?	YES	YES	YES	YES	YES	YES
8. Was appropriate statistical analysis used?	YES	YES	YES	YES	YES	YES

	13	14	15	16	17	18
1. Were the criteria for inclusion in the sample clearly defined?	NO	YES	YES	YES	YES	YES
2. Were the study subjects and the setting described in detail?	NO	YES	YES	YES	YES	YES
3. Was the exposure measured in a valid and reliable way?	YES	YES	YES	YES	YES	YES
4. Were objective, standard criteria used for measurement of the condition?	YES	YES	YES	YES	YES	YES
5. Were confounding factors identified?	YES	YES	YES	YES	YES	YES
6. Were strategies to deal with confounding factors stated?	YES	YES	YES	YES	YES	YES
7. Were the outcomes measured in a valid and reliable way?	YES	YES	YES	YES	YES	YES
8. Was appropriate statistical analysis used?	YES	YES	YES	YES	YES	YES

	19	20	21
1. Were the criteria for inclusion in the sample clearly defined?	NO	YES	YES
2. Were the study subjects and the setting described in detail?	YES	YES	NO
3. Was the exposure measured in a valid and reliable way?	YES	YES	YES
4. Were objective, standard criteria used for measurement of the condition?	YES	YES	YES
5. Were confounding factors identified?	YES	YES	YES
6. Were strategies to deal with confounding factors stated?	YES	UC	UC
7. Were the outcomes measured in a valid and reliable way?	YES	YES	YES
8. Was appropriate statistical analysis used?	YES	YES	YES