

Anxiety, Depression, Traumatic Stress, Burnout, and Insomnia; COVID-19 Pandemic Effects on Health Care Providers: Insight from Systematic Review

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ABSTRACT

The systematic review was to assess the mental health status of healthcare workers due to the COVID-19 Pandemic. For this systematic review, 25 articles were selected manually from 2021 and 2022. The selected articles focused on the effects of COVID-19 on health workers like burnout, insomnia depression, anxiety, and traumatic stress. Original peer-reviewed observational and descriptive studies were identified using PubMed, and Google Scholar engine. Articles revealed a high significance between health care professionals' post-traumatic stress disorder, sleeplessness, burnout, and depression, whereas few studies mainly indicated the positive correlation between burnout and stress among HCWs, with insomnia highly significant. The systematic review concluded that among healthcare personnel, an elevated risk of developing psychological distress, burnout, sleep quality, and insomnia during the COVID-19 pandemic exists. Our review underlines the requirement for intervention and further longitudinal study designs directed at prevention, treatment, and effective ways to delineate the causation of mental health outcomes in healthcare workers.

Keywords: depression, burn-out, post-traumatic stress disorder, health care providers, COVID-19.

INTRODUCTION

Novel Corona Virus immensely appeared in 2019 and turned out to be a global health concern, as it proved devastating to humankind, distressed society, and an economic disaster [1]. The virus was similar to the previous pathogens like SARS-CoV cases reported, MERS-CoV (Middle East respiratory syndrome coronavirus) discovered in the patient's sputum, linked to the death as another novel coronavirus reported in the history of medicine [1]. This innovative virus was highly destructive with terrible outcomes mentally, physically, and socially for the world. The pathway of conversion of a Pandemic situation to an Epidemic, Alpha to Omni, and symptoms presenting as simple flu to being admitted to ICU, this virus has exposed itself like no other outbreak found in the modern world and history [1]. Moreover, the wrathful virus has been found destructive for all races, and socioeconomic communities of all ages. Who can forget the quarantine, isolation, lockdowns, and social distancing? Like others, the unprecedented time of the deadly COVID-19 was also perplexing for the public health custodian. Especially the health care providers who performed their duty on-site when all other professionals were working from home [2]. This virus has shaken the globe, which still tries to heal through prevention. Despite, all the management and protection many healthcare providers are still facing psychological instability due to this deadly virus.

The second and more deadly version came out at the end of 2019, and initially, the disease became fatal to China [2]. It was noted when patients with acute pneumonia and multiple symptoms appeared out of nowhere in Wuhan, China [3]. Later, a novel version of the coronavirus named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and the sickness known as coronavirus disease 2019 [4]. Nonetheless, this time in November 2020 the disastrous virus shocked the world with its consecutive cases reported worldwide; with a huge number of cases *i.e.* 48,539,872 COVID-19 diseased cases and 1,232,791 deaths due to COVID-19 became terrifying for healthcare teams and policymakers. The deadly COVID-19 engulfed around 215 countries and territories [5]. Pakistan is listed among those unfortunate countries according to the COVID-19 dashboard and situation updates provided by the Ministry of National Health Services Regulation and Cooperation on November 14, 2020. Pakistan currently has confirmed cases totaling 354,461, new cases 2,165, recovered cases 322,414 (98%), and the deaths count is 7109 (2%), with the first case being reported on February 25, 2020 [6].

While the catastrophic COVID-19 was challenging to Politicians, Economists, and Scientists, the most challenging situation was for the health workforce. Although the healthcare providers were gravely affected, still they played a major role to tackle this dilemma and persistently provided essential care to patients. The disease affected front-line workers in a way that they lost their physical as well as mental stability while fighting against it. Various scholars have highlighted this issue in the literature that COVID-19 is extremely dangerous

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as the spread among the front healthcare providers is higher among them. According to preliminary estimates, front-line healthcare providers [6, 7] may make 10–20% of all diagnoses including minority, Asian, and Black ethnicity at risk [8]. A report by WHO in 2021 estimated the number of healthcare worker's death as the sum of 6633 globally out of which European 1395, Americas 4858, Eastern Mediterranean 302, and Western Pacific 78 while Africa and South Africa counted zero. Hence, this COVID-19 surveillance database from January 2020 to May 2021 indicates COVID-19 severity for healthcare workers [8].

Since the healthcare force cannot perform their work from home even during such events, have dual burdens and more responsibilities like overtime, more patient load, and an imbalance work life. Therefore, they are more likely to get affected by the COVID and other psychological effects such as stress, burnout, lack of sleep, anxiety even depression, and addiction have also been reported. Another study found evidence of this group's mental health and psychological welfare which had been recognized as a significant healthcare concern, as shown by the rising incidence of stress, burnout, depression, drug and alcohol dependence, and suicide across various levels of health professionals, in multiple countries [9]. Brooks also explained psychological impacts and affirmed that most healthcare practitioners are psychologically strong individuals who have had training and experience in coping with disease and death [10].

Many studies demonstrated that employees on the treatment team suffered from depression and anxiety during the COVID-19 pandemic. Coping with the critical situation puts medical personnel at risk of mental and emotional disorders. Stress is the most important risk factor as long-term stress can increase the risk for infection. Healthcare providers' high-quality performance and competence depend on the mental health and severity of the perceived as this leads to good services to patients [11].

Frontline healthcare workers' mental and emotional health was affected by COVID-19 due to extreme situations like life-and-death decisions that increased the risk of infection and aggravated previous psychiatric conditions [12].

As this issue has arisen across the world, the front-line workforce of Pakistan has been bearing the same concern as highlighted by a recent cross-sectional study among 112 participants, conducted in May 2020 at several hospitals located in Karachi, Pakistan. While Using the Depression Anxiety Stress Scale-21 (DASS-21) the results were alarming as the average scores for stress, depression, and anxiety were 20, 12, 10, 19, and 9. A prevalence of 85.7% for moderate to extremely severe anxiety, 72.3% for moderate to extremely severe sadness, and 90.1% for moderate to intense tension was

noted [13]. This is a huge concern for the psychological condition of healthcare professionals comprising of nurses, physicians, pharmacists, and paramedics as they play an important role in the provision of efficient care, hence reducing morbidity and death [14]. The purpose of this systematic review is to identify the effect of Corona Virus Disease-2019 on the mental health status of healthcare providers from existing literature. Multiple studies have been conducted in Pakistan and globally using various study designs. The data for this review were taken from multiple studies conducted nationally and globally as well to answer our research question of whether anxiety, depression burnout, and insomnia affected healthcare providers during COVID-19.

MATERIALS AND METHODS

Study Design and Setting

To assess the psychological symptoms of depression, anxiety, traumatic stress, and insomnia among Health care providers throughout the COVID-19 Pandemic evolution a systematic review was conducted, as per the recommendation of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). For the systematic review, we selected 25 articles published during one year, in 2021 and 2022. The selected articles were focused on Health Care Workers' mental health impaired due to COVID-19 Pandemic leading to depression, anxiety, traumatic stress, burnout, and insomnia.

Data Sources

This review aimed to investigate the latest literature on depression, anxiety, traumatic stress, and insomnia among healthcare providers during the COVID-19 pandemic. The study searched for original observational and descriptive studies from Scopus, PubMed, and Google Scholar between 2021 and 2022, with a focus on web-based surveys. The study excluded systematic reviews and studies with less than 30 participants. The authors independently participated in each phase of the review, including screening, eligibility, and inclusion. The selection process involved manual review and physical gathering of articles, with only English-language articles considered for the study. The study included global articles with a particular emphasis on articles specific to Asia. The articles related to healthcare professionals working in hospitals, medical centers, and clinics who treat COVID-19 patients were eligible. The study also included published articles where healthcare workers such as doctors, pharmacists, nurses, biomedical staff, OT technicians, and other front-line professionals reported information on the psychological impact of COVID-19. The review provided insight through a widespread analysis of the latest literature on the psychological impacts of the COVID-19 pandemic on healthcare providers, highlighting the importance of supporting their mental health during this challenging time.

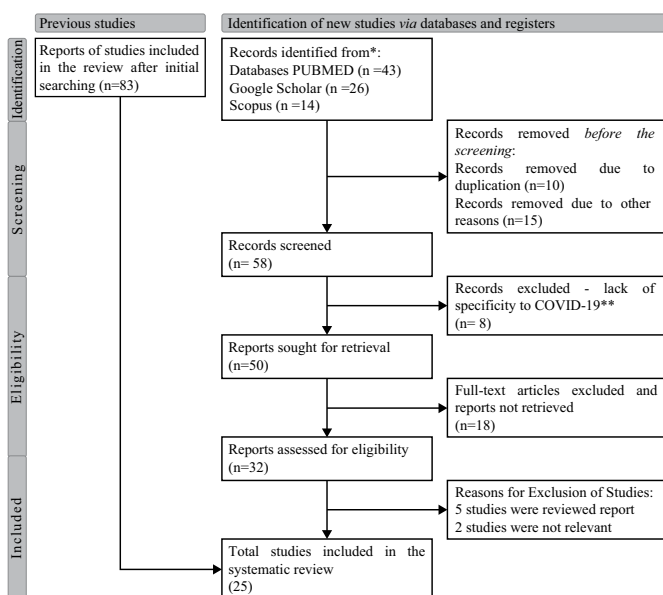


Fig. (1): PRISMA Chart.

Search Strategy

To conduct the study, we made the strategy to search using Boolean search strategies for the following keywords in the title

“Depression*” OR “Sadness” OR “Sorrow” AND “Anxiety*” AND “Stress*” OR “Tension” AND “Insomnia*” OR “Sleeplessness” OR “Sleep Disorder” OR “Lack of Sleep” AND “Frontline* AND Health Care Professionals*” OR “Healthcare Workers” OR “Healthcare Providers” OR “Frontline Staff” OR “Hospital Staff”, AND “COVID-19*” OR “Corona Outbreak” OR “COVID-19 Pandemic” OR “Corona Virus Disease” OR “Corona”, Depression AND Anxiety AND Traumatic Stress AND Insomnia among Health Care Workers during COVID-19 OR Anxiety among Health Care Workers during Corona Outbreak OR Psychological Distress due to Pandemic among HCWs OR Post Traumatic Stress among Frontline Healthcare force due to COVID OR Impacts of Corona Outbreak on Mental Health of Health Care Workers OR Burnout AND Depression among HCWs Due to Corona OR Pandemic effects on Mental Health of Health Care Workers AND Psychological response of Health Care Professionals against Pandemic OR Psychological responses of Hospital-Based Nurses against COVID-19 OR Psychological effects of COVID-19 on Paramedical Staff.

Study Selection

For the review, the selection of publications is based on their titles, abstracts, eligibility criteria, and findings. It also looked at factors including demographic state, gender, physical and mental health, profession, job hours, and direct interaction with COVID-19 wards and COVID-19 patients.

Furthermore, only papers written on COVID-19 Pandemic and its psychological effects were Peer Reviewed, published in English, and met eligibility requirements were included in the final report.

For the review, suitable studies selected were Cross-Sectional, Longitudinal Online Survey, Correlation study, and Prospective Cohort studies, besides that Study Reports, Incident Reports, and any articles with sample sizes of fewer than 30 were omitted from the study.

RESULTS

The search identified using the Boolean searching method and shortlisted 83 studies from PubMed, google scholar, and Scopus that were related closely to mental health and COVID-19 among healthcare workers (Fig. 1). After removing duplicates or unavailability of full-text, articles 58 publications were retrieved, to fulfill the requirements for inclusion in the study. The titles and abstract of 32 studies were reviewed and due to a lack of specificity for depression, anxiety, post-traumatic stress, burnout, and insomnia among healthcare providers, 25 studies were extracted meeting eligibility criteria and finally full text was assessed. The extracted studies had 21 cross-sectional studies, 02 were correlation and 02 were longitudinal online surveys. The findings of extracted articles have been organized in Table 1.

A review of 25 studies exhibited that depression was reported by 10 studies [13-21], twelve studies identified anxiety [13-15, 17-26], post-traumatic stress was present in 15 studies [13, 14, 16, 17, 20, 22, 24, 25, 27-33] among healthcare professionals globally. Furthermore, the other reported conditions were burnout, lack, and burnout of sleep. Of the selected articles only 05 studies showed a positive association between burnout [13, 22, 34-36], 08 studies showed insomnia [15, 16, 18, 24, 29, 30, 36, 37] and 06 studies showed worsened sleep quality [19-21, 25, 36, 37] among HCWs during COVID-19.

DISCUSSION

Healthcare workers (HCWs) who were directly and indirectly, combatting the pandemic were under a great deal of stress because of COVID-19’s swift global spread, potentially raising the threat of adverse effects on mental health [38]. Unfortunately, there have been high incidents of suicides among medical workers as they deal with mounting psychological pressure and a strong fear of passing away [15]. The crisis’ psychological effects were felt by healthcare professionals from various disciplines, even surgeons and anesthesiologists, in addition to frontline healthcare providers like doctors, nurses, and paramedic staff specifically respiratory and intensive care units [16].

It was discovered that 36.7% of participants had severe levels of PTSD symptoms, and 56.8% of participants exhibited PTSD symptoms as in studies from China (53.8%) [17]. New York, US (57%) Italy (55%) [18] Spain (56.6%) [19] and the UK (60.6%) Chinese nurses (16.8%), Mexican nurses (27.7%), Italian nurses (36.7%) [17]. Additionally, a recent research review revealed that 11.4% to 74.4% of HCPs experience PTSD symptoms [20].

Table 1: Characteristics of the selected research studies.

Study Authors	Study Design	Sample Size	Study Setting	Results
Pappa <i>et al.</i> [27]	A multi-center, cross-sectional study	464 self-selected HCWs	COVID-19 reference hospitals of Greece (six hospitals)	Many healthcare workers (HCWs) experience moderate/severe depression, anxiety, and traumatic stress, along with high levels of burnout, including severe depersonalization and emotional exhaustion (92% and 65% respectively) and low/moderate personal accomplishment (51%).
Alsulimani <i>et al.</i> [28]	A cross-sectional study.	646 HCWs	Healthcare settings of different regions in Saudi Arabia.	Burnout affected 75% of HCWs and was linked to various factors such as age, job title, years of experience, increased working hours due to the pandemic, reduced average hours of sleep per day, exposure to COVID-19 patients, frequency of COVID-19 testing, and feeling pressured to care for COVID-19 patients.
Teo <i>et al.</i> [29]	A 6-month multi-center prospective study, Online survey, Cross-Sectional Study	2744 HCWs	Four tertiary hospitals in Singapore.	The study found that the majority of the sample were female HCWs (81%) and nurses (60%). At the baseline, a significant proportion reported elevated perceived stress (33%), anxiety (13%), and job burnout (24%). The percentage of HCWs reporting stress and job burnout increased by approximately 1% per month. Long working hours were linked to higher odds of experiencing stress, anxiety, and job burnout, while factors such as teamwork and feeling appreciated at work were associated with lower odds. Notably, there was no significant increase in anxiety over time.
Orrù <i>et al.</i> [30]	Cross-sectional study, conducted with thorough an online survey	184 HCWs	45 different countries and 5 continents	Out of 184 HCWs surveyed, a considerable proportion reported symptoms of STS (41.3%), emotional exhaustion (56.0%), and depersonalization (48.9%). STS prevalence was higher in frontline HCWs (47.5%) and those exposed to patients' death (67.1%). Perceived stress, emotional exhaustion, and exposure to patients' death were significant predictors of STS in the final model of the stepwise multiple regression analysis
Apaydin <i>et al.</i> [31]	Cross-sectional survey	147 HCWs	Two clinics of one Veterans Health Administration (VA) regional healthcare network	In the study, 43% of HCWs experienced burnout. The likelihood of burnout was lower when HCWs reported better job-person fit in the areas of recognition or appreciation at work (OR 0.26, 95% CI 0.10 to 0.67) and congruent worker-organization goals and values (OR 0.30, 95% CI 0.11 to 0.76).
Jordan <i>et al.</i> [32]	Longitudinal online survey	3834 and 2898 HCWs	Online Survey	The study revealed that a significant number of healthcare workers reported experiencing moderate to severe symptoms of depression, anxiety, post-traumatic stress, and insomnia during two time periods. Despite this, psychological well-being among healthcare workers remained stable between November 2020 and February 2021. Poor communication within the organization was associated with higher levels of anxiety, depression, post-traumatic stress, and insomnia in HCWs, according to multiple linear regression models.
Prasad <i>et al.</i> [33]	National Survey Cross-Sectional Study	20,947 HCWs	Multiple healthcare sectors United States	According to the study, nursing assistants, medical assistants, social workers, inpatient workers, women, and people of color experienced higher levels of stress, which were linked to their workload and mental health. The study also found that feeling valued was linked to lower levels of stress.
Martin-Rodriguez <i>et al.</i> [34]	Cross-sectional study	800 Registered Nurses	COVID units and nursing homes in Navarre, Spain	In the study of 800 nurses, 68% reported some level of depression, anxiety, insomnia, and distress, with 38% experiencing moderate or severe symptoms. Nurses working in COVID units and nursing homes showed a greater impact on their mental health.
Huang <i>et al.</i> [35]	Cross-Sectional studies	151 participants	Taiwan	31.1% of the sample had insomnia and 33.8% had PTSD. Protective factors for insomnia were service duration and trait resilience, while fear of COVID-19 was a risk factor. Risk factors for PTSD were fear of COVID-19, self-stigma, and smartphone addiction, while trait resilience was a protective factor.
Mensingher <i>et al.</i> [36]	Cross-sectional survey	467 Hospital-based RNs	United States (US)	During the acute phase of the COVID-19 pandemic, US-based RNs reported significantly higher rates of traumatic stress, depressive symptoms, and insomnia comparatively high than worldwide rates reported in two meta-analyses. Rates of anxiety symptoms were similar to one meta-analysis but significantly higher than the other.
Stafseth <i>et al.</i> [37]	Cross-sectional study	484 ICU professionals	27 hospitals throughout Norway.	The study found that a significant proportion of healthcare professionals working in COVID-ICUs experienced social isolation (53%) and fear of infecting others (67%). Furthermore, 12.5% of registered nurses, 11.6% of physicians, and 4.1% of leaders reported experiencing symptoms of distress, were identified as having probable cases of anxiety and depression. Symptom-defined PTSD was reported in 7.1% of nurses, 4.1% of leaders, and 2.3% of physicians.
Lupo <i>et al.</i> [38]	Observational, cross-sectional, multicenter study	770 physicians and nurses	COVID-ICUs in Italy	The study identified a significant difference in the STAI-1 assessment. Both physicians and nurses reported experiencing mild to moderate levels of anxiety. With 4% reporting higher levels of symptoms (Optional). In summary, the study found that a significant proportion of healthcare professionals working in COVID-ICUs experienced psychological

Study Authors	Study Design	Sample Size	Study Setting	Results
				distress, with rates of probable anxiety and depression ranging from 4.1% to 12.5%, and symptom-defined PTSD ranging from 2.3% to 7.1%. T, A 4% reporting higher levels of anxiety symptoms found too among them.
Biber <i>et al.</i> [39]	Cross-sectional study with The Health Care Worker Stress Survey	122 frontline HCWs	Three multispecialty care delivery organizations in the US	Approximately 50% of healthcare workers reported more than minimal levels of anxiety related to COVID-19, including 22.5% reporting moderate to severe levels of anxiety. Two-thirds of the sample reported less than good sleep quality, and one-third to one-half of the sample reported other sleep-related problems.
Hassanvandi <i>et al.</i> [26]	A correlational study	180 healthcare workers	Tehran, Iran	Healthcare workers reported COVID-19 anxiety at a rate of 23.3%, with lower levels among those on morning shifts and those with master's degrees. Low sleep quality was associated with a 3.11 times greater chance of experiencing intense COVID-19 anxiety.
Oteir <i>et al.</i> [40]	Cross-sectional design	122 frontline HCWs	Jordan	The high rates of anxiety, depression, and insomnia related to COVID-19, with no significant differences based on demographic factors, were reported in HCWs. Increased severity of insomnia was the only factor associated with higher scores on anxiety, depression, and insomnia scales.
Zarzour <i>et al.</i> [41]	A cross-sectional survey	628 healthcare workers	Lebanon	Half of healthcare workers reported moderate to severe levels of anxiety related to COVID-19, with higher levels observed among younger and female workers. Two-thirds reported less than good sleep quality (50% anxiety, 66.7% poor sleep quality).
Özçelik <i>et al.</i> [42]	Cross-sectional study	1,111 healthcare workers	Turkey	Factors associated with a higher risk of anxiety symptoms were: female sex, young age, poor sleep quality, and living with the elderly (22.2% had relatives affected by COVID-19, 12.9% were excessively exposed to media, 31.2% increased substance/alcohol consumption).
Rojas <i>et al.</i> [43]	Cross-sectional design	303 female physicians	Mexico	The prevalence of depression, anxiety, sleep quality disturbances, and PTSD symptoms were 72.6%, 64.3%, 77.8%, and 19.4%, respectively. Having a previous history of any mental health disorder was the main risk factor for all outcomes (72.6% depression, 64.3% anxiety, 77.8% poor sleep quality, 19.4% PTSD).
Pataka <i>et al.</i> [44]	Cross-sectional observational study	574 were included in the first wave, 514 in the second wave, and 469 were followed throughout the study	Hospitals and healthcare centers of Thessaloniki, Greece	The rates of anxiety and depression were significantly higher during the second wave compared to the first wave, with 32.8% of participants experiencing anxiety and 37.7% experiencing depression during the second wave, compared to 12.7% and 15.8% respectively during the first wave. Additionally, during the second wave, healthcare professionals scored significantly higher in measures of distress (DAR-5) and life satisfaction (LS) and reported worse sleep quality SCI compared to the first wave.
Ayalew <i>et al.</i> [45]	Cross-sectional study design	387 randomly selected HCWs	Hospitals of Southern Ethiopia (Sidama National Regional State)	56.8% of participants exhibited symptoms consistent with PTSD. Being female, married, and a nurse increased the risk of PTSD symptoms while working in inpatient/wards, OPD, and other units decreased risk (56.8% PTSD, AOR 1.91 for females, AOR 3.31 for nurses, AOR 0.43 for inpatient/wards).
Hassanvandi <i>et al.</i> [46]	Correlational study	180 healthcare workers	Medical centers of Khorramabad, Lorestan, Iran	51.7% of healthcare workers showed severe symptoms of post-traumatic stress ($p < .05$). PTSD symptoms varied in different work shifts and levels of education, with morning shifts and master's degrees having the lowest mean scores of PTSD symptoms. There was a significant positive correlation between PTSD symptoms and COVID-19 anxiety and all dimensions of sleep quality (51.7% severe PTSD symptoms, positive correlation with COVID-19 anxiety and sleep quality).
Cybulska <i>et al.</i> [47]	Cross-Sectional, Diagnostic survey method	264 healthcare workers	Healthcare Sectors of Poland	Insomnia and poor sleep quality were common among respondents (81.06% and 78.03%, respectively). Education, marital status, and working with COVID-19 patients were linked to insomnia. Age was related to aggression and anger, while gender was linked to physical aggression, anger, and hostility. Better sleep quality correlated with lower aggression levels.
Canal-Rivero <i>et al.</i> [48]	Longitudinal Cohort study design	251 HCWs answered in November 2020. 1432 HCW	Online	Healthcare workers reported an increase in physical symptoms, and gender played a role in all aspects of the GHQ-28 survey. The somatic and anxiety dimensions, as well as the overall GHQ-28 score, were significantly influenced by the interaction between time and gender. The main predictors of psychological distress were stress from the COVID-19 pandemic and feeling overwhelmed at work, with each domain having specific predictors.
Drager <i>et al.</i> [49]	Cross-sectional study, online survey	4,384 health professionals	Brazil	This study, included mostly female healthcare workers (76%) with a mean age of 44 years, 55.7% were working with COVID-19 patients and 9.2% had previously had COVID-19. The primary outcome of new or worsening insomnia was found in 32.9% of respondents, with 13% using new pharmacological treatments. Factors associated with this outcome included age, female gender, weight changes, anxiety, burnout, reduced family income, and working with COVID-19 patients. Sleep quality worsened for 61.4% of respondents, with 43.5% reporting reduced sleep duration and 22.8% reporting new-onset nightmares.

Study Authors	Study Design	Sample Size	Study Setting	Results
Fournier <i>et al.</i> [50]	Cross-Sectional, Online survey	4370 professionals	Hospital of France	57% of healthcare professionals suffered from psychological distress and 21% showed symptoms of potential post-traumatic stress due to high workload and media focus on the crisis. The groups most impacted by stress were radiology, quality/hygiene/security, and nurses' aides. To alleviate the impact of stress on mental health, positive thinking was identified as an effective coping strategy.

There is abundant evidence from cross-sectional research indicating frontline HCWs who come forward to join the COVID-19 outbreak response team underwent increased workload and burnout to a very high degree [21-26].

This review presented findings regarding mental health issues among HCWs during the COVID-19 pandemic. HCWs experienced a variety of things, including an increased workload and a shortened rest schedule, anxiety, and insomnia, which increased their susceptibility to high levels of stress.

The review showed that mental health issues such as depression, PTSD, burnout, and anxiety might arise among HCWs during the COVID-19 pandemic; however, other causes may also increase the possibility of depression, anxiety, traumatic stress insomnia, and burnout. Along with COVID-19 among other reasons like HCW imbalance work and life, physical health of staff, and workplace environment may provoke such illnesses overall.

Furthermore, this review is an effort to add more value to the present literature. Patient advocacy groups and charitable foundations have been noted to advocate for millions of the affected people who had no voice for their incapacitating conditions more than healthcare institutions and decision-makers in the field of global health. Numerous social media platforms are working around the clock to generate money for research, create clinician groups, and encourage the government to support its efforts to combat COVID-19. However, still, there is a need to focus on healthcare staff too who never stood behind in to win the battle against Corona Virus.

To our knowledge, the study has many significant points there are very fewer studies conducted on this eye-opening fact in Pakistan, but it has several limitations such as the data collected from secondary sources, which should be ideally conducted on primary respondents too for identifying the potential risks for psychological impact. Meanwhile, the study emphasized causality only which also needs to be considered further in the future.

CONCLUSION

In this systematic review, we conclude that among healthcare providers, a great threat of developing psychological distress, sleep quality, and insomnia during the COVID-19 pandemic exists. The review emphasized the importance of the mental health of frontline healthcare personnel, during the COVID-19 Pandemic

situation with a greater chance to develop depression, anxiety, traumatic stress, burnout, and insomnia among frontline healthcare workers in Pakistan.

Our review underlines the requirement for intervention and further longitudinal study designs directed at prevention, treatment, and effective ways to delineate the causation of mental health outcomes in healthcare workers. Hence, to prevent such risks policymakers should develop strategies to take preventive actions for the well-being and performance of healthcare providers.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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REFERENCES

- Zaki AM, van Boheemen S, Bestebroer TM, Osterhaus ADME, Fouchier RAM. Isolation of a Novel Coronavirus from a Man with Pneumonia in Saudi Arabia. *N Engl J Med* 2012; 367(19): 1814-20. DOI: <https://doi.org/10.1056/nejmoa1211721>
- Wang C, Horby PW, Hayden FG, Gao GFJT. A novel coronavirus outbreak of global health concern. *Lancet* 2020; 395(10223): 470-3. DOI: [https://doi.org/10.1016/s0140-6736\(20\)30185-9](https://doi.org/10.1016/s0140-6736(20)30185-9)
- Jiang S, Xia S, Ying T, Lu L. A novel coronavirus (2019-nCoV) causing pneumonia-associated respiratory syndrome. *Cell Mol Immunol* 2020; 17(5): 554. DOI: <https://doi.org/10.1038/s41423-020-0372-4>
- Yang P, Wang X. COVID-19: a new challenge for human beings. *Cell Mol Immunol* 2020; 17(5): 555-7. DOI: <https://doi.org/10.1038/s41423-020-0407-x>
- Xu H, Zhong L, Deng J, Peng J, Dan H, Zeng X, *et al.* High expression of ACE2 receptor of 2019-nCoV on the epithelial cells of oral mucosa. *Int J Oral Sci* 2020; 12(1): 1-5. DOI: <https://doi.org/10.1038/s41368-020-0074-x>
- CDC COVID-19 Response Team. Characteristics of health care personnel with COVID-19 - United States, February 12–April 9, 2020. *MMWR Morb Mortal Wkly Rep* 2020; 69(15): 477-81. DOI: <https://doi.org/10.15585/mmwr.mm6915e6>
- Lazzerini M, Putoto G. COVID-19 in Italy: Momentous decisions and many uncertainties. *Lancet Glob Health* 2020; 8(5): e641-2. DOI: [https://doi.org/10.1016/s2214-109x\(20\)30110-8](https://doi.org/10.1016/s2214-109x(20)30110-8)
- Kirby T. Evidence Mounts on the Disproportionate Effect of COVID-19 on Ethnic Minorities. *Lancet Respir Med* 2020; 8(6): 547-8. DOI: [https://doi.org/10.1016/s2213-2600\(20\)30228-9](https://doi.org/10.1016/s2213-2600(20)30228-9)
- Carrieri D, Briscoe S, Jackson M, Mattick K, Papoutsis C, Pearson M, *et al.* 'Care Under Pressure': a realist review of interventions to tackle doctors' mental ill-health and its impacts on the clinical workforce and patient care. *BMJ Open* 2018; 8(2): e021273. DOI: <http://dx.doi.org/10.1136/bmjopen-2017-021273>

10. Brooks S, Amlôt R, Rubin GJ, Greenberg N. Psychological resilience and post-traumatic growth in disaster-exposed organisations: overview of the literature. *BMJ Mil Health* 2018; 166(1): 52-6. DOI: <https://doi.org/10.1136/jramc-2017-000876>
11. Wayessa ZJ, Melesse GT, Hadona EA. Anxiety and stress due to COVID-19 pandemic and associated factors among healthcare workers in West Guji Zone Southern Ethiopia. *J Racial Ethn Health Disparities* 2023; 10(3): 1499-1507. DOI: <https://doi.org/10.1007/s40615-022-01335-1>
12. Rakhshan M, Hakimi H, Mousazadeh N, Dorri S. Challenges of mental health in medical staffs during COVID-19 outbreak: A systematic review. *Medicina Clínica Práctica* 2023; 6(2): 100361. DOI: <http://dx.doi.org/10.1016/j.mcpsp.2022.100361>
13. Sandesh R, Shahid W, Dev K, Mandhan N, Shankar P, Shaikh A, *et al.* Impact of COVID-19 on the mental health of healthcare professionals in Pakistan. *Cureus* 2020; 12(7): e8974. DOI: <https://doi.org/10.7759%2Fcurrents.8974>
14. Malik UR, Atif N, Hashmi FK, Saleem F, Saeed H, Islam M, *et al.* Knowledge, Attitude, and Practices of Healthcare Professionals on COVID-19 and Risk Assessment to Prevent the Epidemic Spread: A Multicenter Cross-Sectional Study from Punjab, Pakistan. *Int J Environ Res Public Health*. 2020; 17(17): 6395. DOI: <https://doi.org/10.3390%2Fijerph17176395>
15. Que J, Shi L, Deng J, Liu J, Zhang L, Wu S, *et al.* Psychological impact of the COVID-19 pandemic on healthcare workers: a cross-sectional study in China. *General Psychiatry* 2020; 33(3): e100259. DOI: <https://doi.org/10.1136/gpsych-2020-100259>
16. Pappa S, Ntella V, Giannakas T, Giannakoulis VG, Papoutsis E, Katsaounou P. Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. *Brain Behav Immun* 2020; 88: 901-7. DOI: <https://doi.org/10.1016/j.bbi.2020.05.026>
17. Montemurro N. The emotional impact of COVID-19: from medical staff to common people. *Brain Behav Immun* 2020; 87: 23-4. DOI: <https://doi.org/10.1016/j.bbi.2020.03.032>
18. Xu J, Xu Q, Wang C, Wang J. Psychological status of surgical staff during the COVID-19 outbreak. *Psychiatry Res* 2020; 288: 112955. DOI: <https://doi.org/10.1016/j.psychres.2020.112955>
19. Wang YX, Guo HT, Du XW, Song W, Lu C, Hao WN. Factors associated with post-traumatic stress disorder of nurses exposed to corona virus disease 2019 in China. *Medicine (Baltimore)* 2020; 99(26): e20965. DOI: <https://doi.org/10.1097/md.000000000020965>
20. Conti C, Fontanesi L, Lanzara R, Rosa I, Porcelli P. Fragile heroes. The psychological impact of the COVID-19 pandemic on healthcare workers in Italy. *PLoS One* 2020; 15(11): e0242538. DOI: <https://doi.org/10.1371/journal.pone.0242538>
21. Liu Z, Wu J, Shi X, Ma Y, Ma X, Teng Z, *et al.* Mental Health Status of Healthcare Workers in China for COVID-19 Epidemic. *Ann Glob Health*. 2020; 86(1): 128. DOI: <https://doi.org/10.5334%2Fagoh.3005>
22. Kwaghe AV, Ilesanmi OS, Amede PO, Okediran JO, Utulu R, Balogun MS. Stigmatization, psychological and emotional trauma among frontline health care workers treated for COVID-19 in Lagos State, Nigeria: a qualitative study. *BMC Health Serv Res* 2021; 21(1): 855. DOI: <https://doi.org/10.1186/s12913-021-06835-0>
23. Kwaghe AV, Kwaghe VG, Habib ZG, Kwaghe GV, Ilesanmi OS, Ekele BA, *et al.* Stigmatization and psychological impact of COVID-19 pandemic on frontline healthcare workers in Nigeria: a qualitative study. *BMC Psychiatry* 2021; 21(1): 518. DOI: <https://doi.org/10.1186/s12888-021-03540-4>
24. Liu Q, Luo D, Haase JE, Guo Q, Wang XQ, Liu S, *et al.* The experiences of health-care providers during the COVID-19 crisis in China: a qualitative study. *The Lancet Glob Health* 2020; 8(6): e790-8. DOI: [https://doi.org/10.1016/s2214-109x\(20\)30204-7](https://doi.org/10.1016/s2214-109x(20)30204-7)
25. Okediran JO, Ilesanmi OS, Fetuga AA, Onoh I, Afolabi AA, Ogunbode O, *et al.* The experiences of healthcare workers during the COVID-19 crisis in Lagos, Nigeria: A qualitative study. *Germes* 2020; 10(4): 356-66. DOI: <https://doi.org/10.18683%2Fgermes.2020.1228>
26. Hassanvandi S, Mohammadi M, Shahyad S. Predicting the severity of COVID-19 anxiety based on sleep quality and mental health in health care workers. *Novel Clin Med* 2022; 1(4): 184-91. DOI: <https://doi.org/10.22034/ncm.2022.344007.1048>
27. Pappa S, Athanasiou N, Sakkas N, Patrinos S, Sakka E, Barmpareassou Z, *et al.* From recession to depression? prevalence and correlates of depression, anxiety, traumatic stress and burnout in healthcare workers during the COVID-19 pandemic in Greece: a multi-center, cross-sectional study. *Int J Environ Res Public Health* 2021; 18(5): 2390. DOI: <https://doi.org/10.3390/ijerph18052390>
28. Alsulimani LK, Farhat AM, Borah RA, AlKhalifah JA, Alyaseen SM, Alghamdi SM, *et al.* Health care worker burnout during the COVID-19 pandemic. *Saudi Med J* 2021; 42(3): 306-14. DOI: <https://doi.org/10.15537/smj.2021.42.3.20200812>
29. Teo I, Chay J, Cheung YB, Sung SC, Tewani KG, Yeo LF, *et al.* Healthcare worker stress, anxiety and burnout during the COVID-19 pandemic in Singapore: A 6-month multi-centre prospective study. *PLoS One* 2021; 16(10): e0258866. DOI: <https://doi.org/10.1371/journal.pone.0258866>
30. Orrù G, Marzetti F, Conversano C, Vagheggini G, Miccoli M, Ciacchini R, *et al.* Secondary traumatic stress and burnout in healthcare workers during COVID-19 outbreak. *Int J Environ Res Public Health* 2021; 18(1): 337. DOI: <https://doi.org/10.3390/ijerph18010337>
31. Apaydin EA, Rose DE, Yano EM, Shekelle PG, McGowan MG, Antonini TL, *et al.* Burnout among primary care healthcare workers during the COVID-19 pandemic. *J Occup Environ Med* 2021; 63(8): 642-5. DOI: <https://doi.org/10.1097/jom.0000000000002263>
32. Jordan JA, Shannon C, Browne D, Carroll E, Maguire J, Kerrigan K, *et al.* COVID-19 staff wellbeing survey: longitudinal survey of psychological well-being among health and social care staff in Northern Ireland during the COVID-19 pandemic. *BJPsych Open* 2021; 7(5): e159. DOI: <https://doi.org/10.1192/bjo.2021.988>
33. Prasad K, McLoughlin C, Stillman M, Poplau S, Goelz E, Taylor S, *et al.* Prevalence and correlates of stress and burnout among U.S. healthcare workers during the COVID-19 pandemic: A national cross-sectional survey study. *EClinicalMedicine* 2021; 35: 100879. DOI: <https://doi.org/10.1016/j.eclinm.2021.100879>
34. Martín-Rodríguez LS, Escalda-Hernández P, Soto-Ruiz N, Ferraz-Torres M, Rodríguez-Matesanz I, García-Vivar C. Mental health of Spanish nurses working during the COVID-19 pandemic: A cross-sectional study. *Int Nurs Rev* 2022; 69(4): 538-45. DOI: <https://doi.org/10.1111/inr.12764>
35. Huang PC, Hung CH, Chen GW, Cashin C, Griffiths MD, Yang WC, *et al.* COVID-19-related self-stigma, post-traumatic stress disorder, insomnia, and smartphone addiction among frontline government workers with COVID-19 pandemic control duties. *Psychol Res Behav Manag* 2022; 15: 3069-80. DOI: <https://doi.org/10.2147/prbm.s383842>
36. Mensinger JL, Brom H, Havens DS, Costello A, D'Annunzio C, Durning JD, *et al.* Psychological responses of hospital-based nurses working during the COVID-19 pandemic in the United States: A cross-sectional study. *Appl Nurs Res* 2022; 63: 151517. DOI: <https://doi.org/10.1016/j.apnr.2021.151517>
37. Stafseth SK, Skogstad L, Ræder J, Hovland IS, Hovde H, Ekeberg Ø, *et al.* Symptoms of anxiety, depression, and post-traumatic stress disorder in health care personnel in Norwegian ICUs during the first wave of the COVID-19 pandemic, a prospective, observational cross-sectional study. *Int J Environ Res Public Health* 2022; 19(12): 7010. DOI: <https://doi.org/10.3390/ijerph19127010>
38. Lupo R, Botti S, Rizzo A, Lezzi A, Calabrò A, Conte L, *et al.* Anxiety, depression and post-traumatic stress disorder in physicians compared to nurses during the COVID-19 pandemic: an observational, cross sectional, multicentric study. *Psych* 2022; 4(3): 465-74. DOI: <https://doi.org/10.3390/psych4030036>
39. Biber J, Ranes B, Lawrence S, Malpani V, Trinh TT, Cyders A, *et al.* Mental health impact on healthcare workers due to the COVID-19 pandemic: a U.S. cross-sectional survey study. *J Patient Rep Outcomes* 2022; 6: 63. DOI: <https://doi.org/10.1186%2F41687-022-00467-6>

40. Oteir AO, Nazzal MS, Jaber AF, Alwidyan MT, Raffee LA. Depression, anxiety and insomnia among frontline healthcare workers amid the coronavirus pandemic (COVID-19) in Jordan: a cross-sectional study. *BMJ Open* 2022; 12(1): e050078. DOI: <https://doi.org/10.1136/bmjopen-2021-050078>
41. Zarzour M, Hachem C, Kerbage H, Richa S, El Choueifaty D, Saliba G, *et al.* Anxiety and sleep quality in a sample of Lebanese healthcare workers during the COVID-19 outbreak. *Encephale* 2022; 48(5): 496-503. DOI: <https://doi.org/10.1016/j.encep.2021.06.016>
42. Özçelik N, Kesin HV, Telatar G, Özyurt S, Yılmaz Kara B, Gümüş A, *et al.* 'COVID-Somnia' in healthcare workers during the pandemic. *Hosp Pract (1995)* 2022; 50(4): 273-81. DOI: <https://doi.org/10.1080/21548331.2022.2102777>
43. Rojas DL, Torres FC, Ornelas BG, Rodríguez-de-Ita J. Mental health outcomes and risk factors among female physicians during the COVID-19 pandemic. *Heliyon* 2022; 8(5): e09325. DOI: <https://doi.org/10.1016/j.heliyon.2022.e09325>
44. Pataka A, Kotoulas S, Tzinias A, Kasnaki N, Sourla E, Chatzopoulos E, *et al.* Sleep disorders and mental stress of healthcare workers during the two first waves of COVID-19 pandemic: separate analysis for primary care. *Healthcare (Basel)* 2022; 10(8): 1395. DOI: <https://doi.org/10.3390/healthcare10081395>
45. Ayalew M, Deribe B, Abraham Y, Reta Y, Tadesse F, Defar S. Post-traumatic stress disorder symptoms and its predictors among healthcare workers following COVID-19 pandemic in Southern Ethiopia: a cross-sectional study. *Front Psychiatry* 2022; 12: 818910. DOI: <https://doi.org/10.3389/fpsy.2021.818910>
46. Hasanvandi S, Saadat SH, Shahyad S. Predicting the possibility of post-traumatic stress disorder based on demographic variables, levels of exposure to COVID-19, COVID-19 anxiety and sleep quality dimensions in health care workers. *Trauma Monthly* 2022; 27 (Special Issue (COVID-19 and Emergency Medicine)): 8-17. DOI: <https://doi.org/10.30491/tm.2021.293711.1326>
47. Cybulska AM, Weymann A, Rachubińska K, Grochans S, Wójcik G, Grochans E. Factors associated with insomnia and aggression among healthcare workers during COVID-19 pandemic. *Int J Environ Res Public Health* 2023; 20(2): 1433. DOI: <https://doi.org/10.3390%2Fijerph20021433>
48. Canal-Rivero M, Montes-García C, Garrido-Torres N, Moreno-Mellado A, Reguera-Pozuelo P, Ruiz-Veguilla M, *et al.* The impact of COVID-19 pandemic on the psychological well-being among health care workers: a 6-month cohort longitudinal survey study. *Rev Psiquiatr Salud Ment* 2023; 16: 25-37. DOI: <https://doi.org/10.1016/j.rpsm.2022.08.001>
49. Drager LF, Pachito DV, Moreno CRC, Tavares AR, Conway SG, Assis M, *et al.* Insomnia episodes, new-onset pharmacological treatments, and other sleep disturbances during the COVID-19 pandemic: a nationwide cross-sectional study in Brazilian health care professionals. *J Clin Sleep Med* 2022; 18(2): 373-82. DOI: <https://doi.org/10.5664/jcsm.9570>
50. Fournier A, Laurent A, Lheureux F, Ribeiro-Marthoud MA, Ecartot F, Binquet C, *et al.* Impact of the COVID-19 pandemic on the mental health of professionals in 77 hospitals in France. *PLoS One* 2022; 17(2): e0263666. DOI: <https://doi.org/10.1371/journal.pone.0263666>