

Meta-Analysis on Stress, Anxiety and Depression Among COVID-19-Exposed and Non-COVID-19-Exposed Health Care Employees in India

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Abstract: The dramatic spread of the COVID-19 pandemic has created a major impact on the healthcare sector globally and poses a unique challenge for healthcare workers. Healthcare workers need to have frequent contact with infected individuals without proper protective equipment. When trying to protect the community, doctors and healthcare workers, and their families, were unexpected targets of COVID-19. To meet society's ever-increasing demand, healthcare services must be delivered sustainably. The study shows the COVID-19 pandemic induced stress, anxiety, and depression among healthcare employees in India based on a meta-analysis of literature. To find out how COVID has created an impact on health care workers in India, the forest plot was drawn between COVID and non-COVID exposure for depression, anxiety, and stress. The impact of COVID-19 has created problems for healthcare workers, while also meeting their needs by providing timely support to protect them from Mental Health issues. The meta-analysis and forest plot have shown that depression and anxiety levels were higher for COVID-19 healthcare workers, but stress levels were equal for healthcare workers in hospital management. The mental impact of healthcare workers is influenced by anxiety and depression during COVID-19.

Keywords: Personal Protective Equipment; Health and Care Workers; Health Management; Support Workers; Meta-Analysis and Forest Plot; Healthcare Worker-Based Hospital Management.

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1. Introduction

In January 2020, the WHO declared a public health emergency of international significance due to an epidemic caused by a new coronavirus [38]. This unprecedented global pandemic crisis has placed the healthcare sector at the centre of attention [2]. Compared with many developed countries, India's quick response ensured better outcomes and greater control [1]. The pandemic increased the risk of occupational exposure to a new, fast-spreading disease among health and care workers (HCWs) worldwide, necessitating the adaptation of roles and responsibilities across a wide range of tasks and professional contexts [33]. Health-care professionals have an ethical obligation to support patients [5]. Who 2006 report defines Healthcare workers as anyone who engages in activities with the primary goal of improving health "Health service providers" (e.g. doctor, nurse,

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laboratory technician) are persons who deliver services, whether personal or non-personal". "Health management and support workers," (eg, accountant in a hospital, administrative professional, clerical employees and drivers) includes persons who are not directly involved in the provision of services. In India, as of 2022 February 22 Confirmed Cases were 42,851,929, and deaths were 512,344. When trying to protect the community, doctors, healthcare workers, and their families were unexpected targets of COVID due to shortages of personal protective equipment (PPE) and other equipment [3]; [26]. Out of the 3.45 million COVID-19-related deaths reported to WHO, only 6643 were in HCWs. At the most conservative level, a population-based estimate indicates that around 115,500 HCWs (ranging between 80,000–160 0001) out of the global health and care workforce of 135 million people could have lost their lives [37]. During the COVID-19 pandemic, healthcare workers in a variety of fields, positions, and exposure risk are experiencing anxiety, depression, distress, and sleep problems [2]; [13]. Moreover, all categories of HCWs have the highest rate of client-related burnout pandemic-related [18]; [29]. Burnout is at an all-time high during the present epidemic, compared to the pre-COVID-19 era (Figure 1).



Figure 1: Concept of the study

COVID-19 has a considerable impact on the psychological wellbeing of frontline hospital staff [9]. Frontline healthcare workers had a higher risk of anxiety, sleeplessness, and overall psychological issues than healthcare workers who did not work on the front lines [40]. Health care workers also suffered due to inadequate protection, stress, and burnout [2]. As one of the largest service sectors, healthcare has the potential to impact the economy's overall sustainability significantly. Hospitals' employees have a direct impact on their communities [43]. Healthcare establishments, like other organisations, have been seeking sustainable practices to remain competitive in the sector. The focus is on workers' health and safety [47]. To consistently enhance quality and minimise costs, sustainability in healthcare requires balancing four major variables in its operational processes: environmental concerns, patient requirements, employee needs, and community issues [44]. Internal organisational sustainability is an important component of healthcare companies' long-term existence. Internal organisational sustainability requires human resource management practices that empower health professionals [19]. The involvement of health professionals has been identified as a requirement for achieving healthcare sustainability, suggesting increased employee participation in the managerial dynamics of healthcare organisations and stronger organisational commitment [41]. Employee involvement, in general, refers to the implementation of customised human resource management practices that support employees' participation in work-related decision-making and empower them to improve their working environment [43].

2. Review of Literature

During COVID-19, HCWs are experiencing significant stress, anxiety, depression, and insomnia [18]. Insomnia is defined by the presence of an individual's report of difficulty with sleep [31]. Depression is a serious medical condition and a profound public health concern.

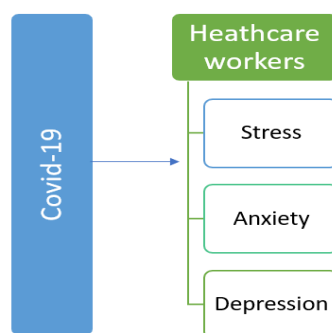


Figure 2: Impact of COVID-19 on healthcare workers

Depression is the most common psychiatric disorder reported in most of the community-based studies [35]. On causes of perceived stress, different types of HCWs were influenced differently [7]. Among the healthcare workers, Doctors had the highest level of anxiety [6]. Depression and anxiety were shown to be strongly linked to COVID-19 exposure [42]. A large proportion of healthcare personnel are suffering from mental exhaustion. Anxiety levels were higher among resident doctors and medical officers [10]. HCWs describe significant changes in their work-life balance. There were a variety of family-related difficulties. Separation from family, caring, especially for females with infants and children, and fears of infecting family members are the biggest challenges [11]. This crisis has had a significant psychological impact [14]. Frontline HCPs are at high risk of psychological stress because of the COVID-19 epidemic (Figure 2). Women had a two-fold increased risk of experiencing moderate or high-level stress, as well as depressed symptoms that required treatment, while women residing in a hostel or temporary lodging had a two-fold increased risk of developing depression or anxiety symptoms [15]; [8].

2.1. Objective

- To identify Mental problems faced by the Healthcare Workers.
- To find out the mental impact of COVID-19 on workers based on an Analysis.
- To study the delivery of healthcare services under sustainability.
- Compare the depression, anxiety, and stress of healthcare workers on COVID and non-COVID.

3. Methodology

The study examines the overall mental impact of COVID on workers' healthcare, based on evidence from the literature. There is a dearth of information about these challenges in many developing countries, including India.

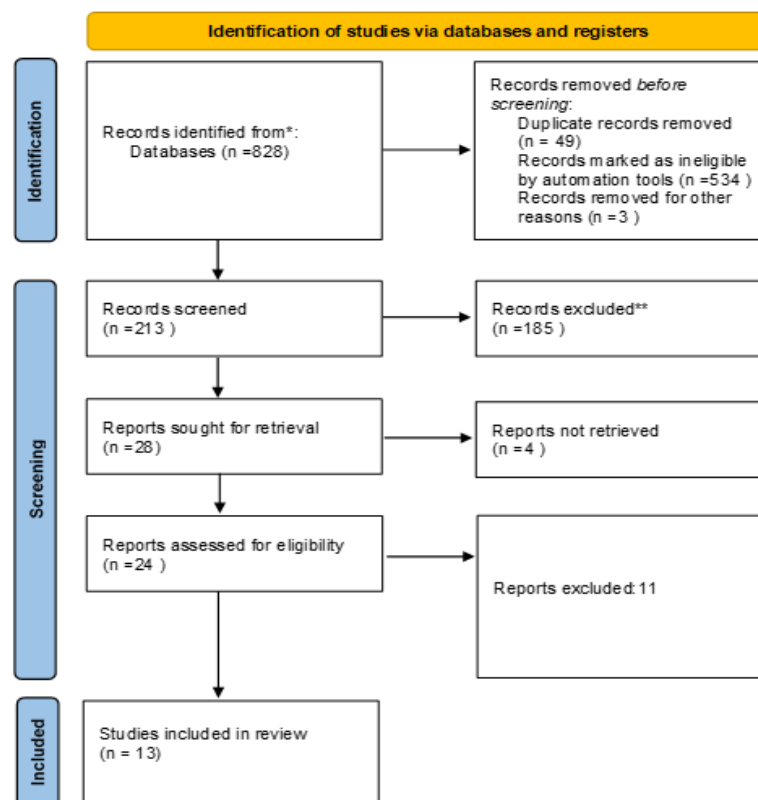


Figure 3: PRISMA diagram for selecting articles

The objectives of the current review were to identify the mental problems, such as anxiety, depression, stress, and insomnia, faced by HCWs due to the impact of COVID-19. Between December 2021 and February 2022, a qualitative review was conducted by using data sources. All types of articles published in the last 2 years, January 2020-February 2022, that were relevant to the subject of the review were searched. The characteristics and findings of the included studies were summarised

in a narrative and in Table 1. The flowchart of the search strategy and study selection process is shown in Figure 3. We initially identified 826 studies, after removing duplicates and studies after the first screening, 25 articles were read in full. Finally, 13 studies were included in the present meta-analysis. For meta-analyses, Review Manager (RevMan) software was selected based on a literature review. For the prevalence outcome, the number of events and the total number of participants were used. The results were presented as a prevalence rate with a 95 percent confidence interval (CI). In contrast, the mean $\pm$ standard deviation (SD) was used for continuous outcomes, and results were presented as the mean $\pm$ 95% confidence interval (CI).

The odds ratio (OR) is the ratio of the odds of disease between an exposed group and an unexposed group. An odds ratio (OR) of 1 means that there is no difference in odds across groups. An OR value greater than 1 means that the odds are higher in the exposed group, which is seen as a positive link between disease and exposure [45]. On the other hand, an OR value less than 1 means that the probabilities are lower in the exposed group. This is seen as the link between having the disease and not being exposed. The interpretation of OR is akin to that of RR; nevertheless, they exhibit identical values solely when the risks in both groups are minimal, for instance, $p < 0.1$. The 95% confidence interval (CI) is used to estimate the precision of the OR. A large CI indicates a low level of precision of the OR, whereas a small CI indicates a higher precision of the OR [46]. Variability among studies in a systematic review is called heterogeneity. If 0% to 40%: might not be important; 30% to 60%: may represent moderate heterogeneity; 50% to 90%: may represent substantial heterogeneity; 75% to 100%: considerable heterogeneity. The importance of the observed value of I^2 depends on (i) the magnitude and direction of effects and (ii) the strength of evidence for heterogeneity (e.g., P value from the chi-squared test, or a confidence interval for I^2 [48].

3.1. Evidence for the Risk Associated with Outcome on Healthcare Workers During COVID-19 in India

An individual's biological, psychological, and social/environmental characteristics, as well as their interactions, predispose them to mental health disorders [12]. Stress, anxiety, and depressive symptoms in HCWs because of COVID-19 [4]. HCPs are at an increased risk for high levels of stress, anxiety, poor sleep quality, depression, burnout, and posttraumatic stress disorder during the pandemic [24]. Stress, anxiety, depressive symptoms, insomnia, denial, anger, and fear were the major mental health manifestations of the COVID-19 pandemic [23]. Health professionals experienced emotions of fear, anxiety, and stigma during the pandemic (Table 1).

Table 1: Evidence for the risk associated with outcome on healthcare workers during COVID-19

No.	Author	Sample size	Outcomes		
			Stress	Depression	Anxiety
1	Chatterjee et al. [6]	140	Low_20.7% Moderate_72.9% High_6.4%	NA	NA
2	Selvaraj et al. [10]	538	Normal_96.4% Mild_1.85% Moderate_1.6%	Normal_87.5% Mild_8.73% Moderate_3.7%	Normal_73.4% Mild_7.43% Moderate_13.75% Severe_4.27%
3	Raj et al. [14]	300	NA	74.5%	81.5%
4	Wilson et al. [15]	350	Low_17.4% Moderate_78.9% High_3.7%	Non-Minimal_50.6% Mild_38.0% Moderate_8.6% Moderately severe_2.0%	Non-Minimal_33.7% Mild_48.6% Moderate_13.7% Severe_4%
5	Jain et al. [25]	512	NA	NA	No_25.8% Mild_31.8% Moderate_25.2% Severe_17.2%
6	Sunil et al. [16]	313	High_6.4% Moderate_47.6% Low_46.0%	Severe_6.7% Moderate_8.0% Mild_32.3% Normal_53%	
7	Jakhar et al. [20]	450	Normal_66.2% Mild_8.9% Moderate_12.4% Severe_9.3% Extremely severe_3.1%	Normal_56.4% Mild_15.1% Moderate_13.3% Severe_6.7% Extremely Severe_8.4%	Normal_61.1% Mild_5.6% Moderate_15.8% Severe_5.8% Extremely Severe_11.8%

8	Singh et al. [28]	348	NA	Mild_ 30.75 Moderate_12.93 Severe_10.34	Mild_25.97 Moderate_9.77% Severe_8.91%
9	Jamaludin et al. [41]	200	Low COVID exposure_37% High COVID exposure_23.5%	Low COVID exposure_15.5% High COVID Exposure_17.7%	Low COVID exposure_8% High COVID exposure_10.5%
10	Mathur et al. [27]	200	Normal_84.1% Mild_5.8% Moderate_4.3 Severe_9.3% Extremely severe_1.4%	Normal_78.3% Mild_5.8% Moderate_7.2% Severe_5.2% Extremely severe_2.9%	Normal_71% Mild_8.7% Moderate_10.1% Severe_4.3% Extremely severe_5.8%
11	George et al. [23]	87	Almost never_37.5 Sometimes_48.4 Often_7.8 Almost always_6.3	NA	Almost never_26.6 Sometimes_59.4 Often_10.9 Almost always_3.1
12	Sil et al. [36]	41	26.82%	29 82%	NA
13	Boone [43]	217	35.5%	24.9%	33.2%

3.1.1. Depression

Depression is assessed in 2184 participants in 6 studies of COVID exposure (experimental group) and non-COVID exposure (control group) healthcare workers was odd ratio 1.61 IV (95% Confidence Interval [CI]: 1.31 to 1.98) According to Kim [45], if odd ratio value larger than 1 indicates increased odds in exposed group, interpreted as a positive association between having disease and having exposure. Significant value (P value is less than 0.001) (Figure 4). The forest plot showed that depression levels were lower among non-COVID-exposed health care workers. Thus, this result proved that depression is higher due to the COVID-19 epidemic [32]; [34].

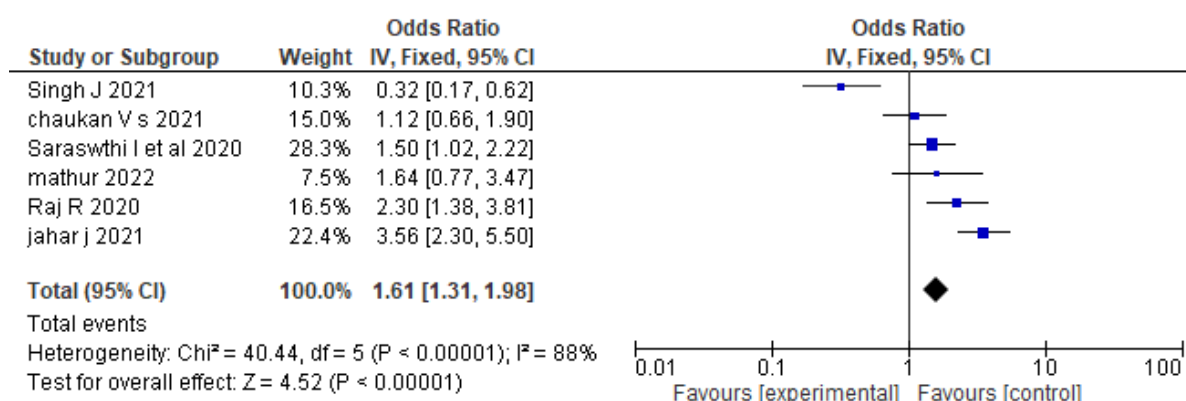


Figure 4: Forest plot for depression

From the above graph, the heterogeneity value I2 is 88%, indicating a 75% to 100% range in depression between COVID-exposed and non-COVID-exposed workers: considerable heterogeneity [48]. The above graph shows that healthcare workers who work in COVID exposure are 1.61 times more likely to suffer from depression than those who work in non-COVID exposure.

3.1.2. Anxiety

Anxiety is assessed in 6 out of 13 articles between COVID and non-COVID exposure healthcare workers. Anxiety among 1884 participants in 6 studies had an odds ratio of 1.83 (95% Confidence Interval [CI]: 1.46 to 2.30). According to Kim [45], an odds ratio value greater than 1 indicates increased odds in the exposed group, interpreted as a positive association between disease and exposure. Significant value (P value is less than 0.001) (Figure 5). From the forest plot, it is seen that the anxiety level is

also lower for non-COVID exposure health care workers. This result also proved that anxiety is higher due to the possible usage of a safety kit for COVID-19, like a PPE kit.

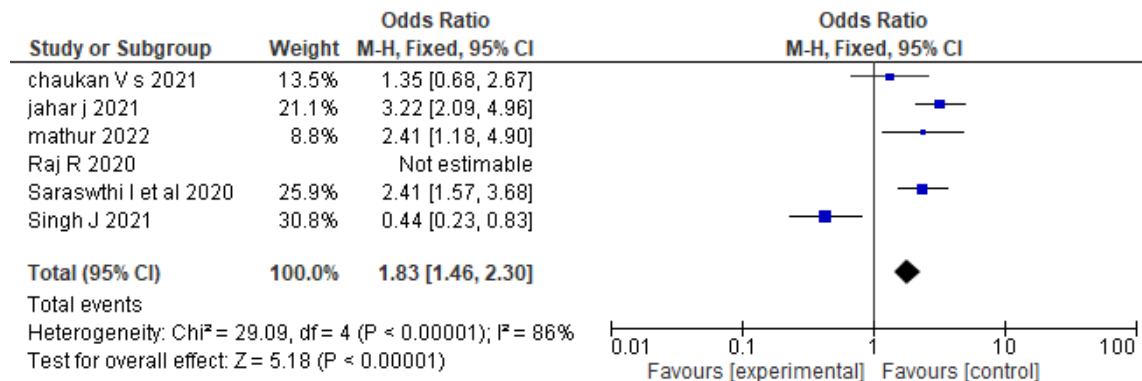


Figure 5: Forest plot for anxiety

From the above graph, the heterogeneity value I^2 is 86%, indicating considerable variation in anxiety among COVID-exposed and non-COVID-exposed workers (75% to 100%) [48]. The above graph shows that healthcare workers who work in COVID exposure are 1.83 times more likely to suffer from anxiety than those who work in non-COVID exposure.

3.1.3. Stress

Stress was assessed in 4 of 13 healthcare workers exposed to COVID and in 4 of 13 exposed to non-COVID. Stress among 1536 participants in 4 studies had an odds ratio of 2.07 (95% Confidence Interval [CI]: 1.61 to 2.66). According to Kim [45], an odds ratio value greater than 1 indicates increased odds in the exposed group, interpreted as a positive association between disease and exposure. Significant value (P value is less than 0.001). The forest plot showed that stress levels were equal across both conditions. Thus, the forest plot shows that the stress levels of health care workers are equal, which may be due to hospital management and patient care (Figure 6).

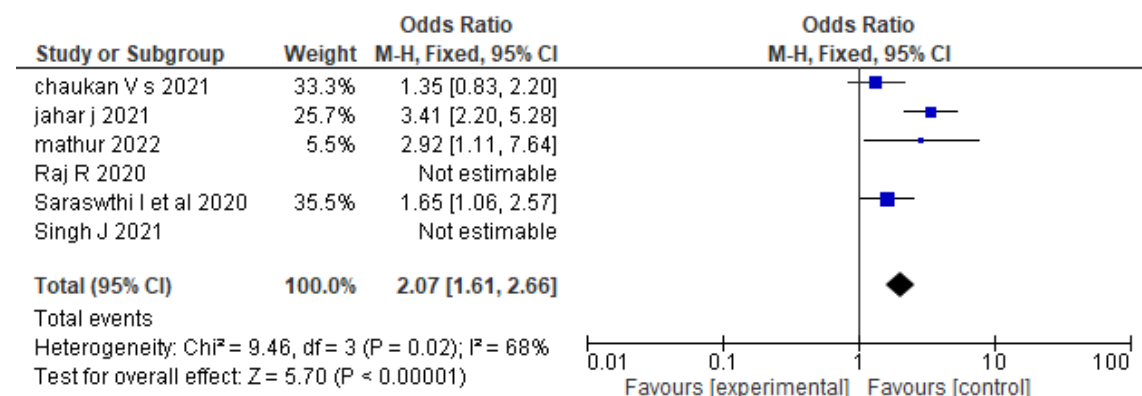


Figure 6: Forest plot for stress

From the above graph, the heterogeneity value I^2 is 68%, indicating a 50% to 90% variation in stress between COVID-exposed and non-COVID-exposed workers; this may represent substantial heterogeneity [48]. The above graph shows that healthcare workers who work in COVID exposure are 2.07 times more likely to suffer from stress than those who work in non-COVID exposure.

4. Discussion

These studies showed that various factors were associated with mental pressures experienced by the HCWs. Sources of emotional distress may include rapidly evolving practice environments, witnessing large volumes of infections and deaths, experiencing burnout, and a lack of PPE availability at the hospital [24]. The most common worries, in decreasing order of reporting, were excessive workload, inadequate personal protective equipment (PPE), infecting family/loved ones, fear of

getting infected, inadequate training, and getting quarantined [21]. Inconvenient personal protective equipment usage, periods of quarantine, and Excessive workload with erratic timing [11]. Isolating experience, leading to feelings of loneliness [32]. The fear of not using PPE properly because of a lack of adequate practice [17]. PPE can cause fainting, tiredness, exhaustion, sweating, suffocation, headache, dehydration, and rashes [30]. FHWs have worked continuously during the Corona pandemic, but irregularity in salary payment and temporary job positions have caused more mental distress to them.

Moreover, our empirical findings show that social factors such as joint family, social isolation, and having an elderly member in the family are responsible for increasing the mental stress level. Economic factors such as duty in the COVID ward, staying in the staff quarter, and a temporary job position increase the stress level during the COVID-19 pandemic [22]. Fear of contracting COVID-19 infection during work [19]. Carrying infection home to family members [19]. Concern about the spread of infection to family was High [15]. The challenge of caregiving, especially for females with infants and children, and fears around infecting family females with infants and children, and fears around infecting family [11]. Patient stigma is a major cause of suppression of travel history and jumping quarantine [17]. Stigma from the community and peers, fuelled by the fear of infection, was manifested through avoidance and rejection [11]. Online entertainment (74.3), talking with friends, and Physical fitness will be HCW leisure-time activities [15].

4.1. Human Resource Practices to Improve the Mental Health of Employees

To establish a consistent framework for workforce development, HR policy should specify the values and goals of mental health [37]. Staff motivation is critical to the quality and effectiveness of the services offered. Motivation affects an organisation's ability to adopt or initiate change [40]. Healthcare executives and decision-makers should strive to set an example by reducing the stigma around mental health concerns among their employees and fostering a work culture of transparency, trust, respect, openness, equality, empathy, and support. Instead of comparison and competition, healthcare executives should focus on establishing a culture of inclusiveness, collaboration, and support [39]. Another key issue is workforce training. Human resources personnel must consider the makeup of the health workforce across skill categories and training levels [40].

5. Conclusion

Healthcare workers are still on the front lines of the global fight against COVID-19. They must care for patients while following treatment regimens, safety protocols, and management strategies that change frequently. The epidemic has underscored the need for reliable, long-lasting healthcare services. It is therefore important to make sure that healthcare workers are physically and mentally well to keep the healthcare system strong and successful. A thorough meta-analysis of the current literature indicates that healthcare workers in India have encountered significant levels of stress, anxiety, and depression during the COVID-19 pandemic. The results of the investigation clearly show that frontline healthcare personnel, especially those who were directly involved in caring for COVID-19 patients, had higher levels of despair and anxiety than those who worked in general hospital administration jobs. However, stress levels were roughly the same in both groups, which shows that the general hospital work environment during the epidemic put a lot of emotional burden on people. The findings also indicate the substantial impact of patient-related stigma. Many patients feared discrimination, so they didn't want to share their travel history or symptoms. This made it harder for healthcare workers to follow quarantine rules and made their jobs more stressful.

Healthcare workers also had to deal with very difficult physical problems. Wearing personal protective equipment (PPE) for long periods caused several physical problems, including fainting, dizziness, dehydration, migraines, fatigue, rashes, excessive sweating, and trouble breathing. These problems not only made them less physically efficient, but they also made them mentally and emotionally exhausted. Because of these problems, it is important to establish systematic programs to support healthcare workers during and after the epidemic. Healthcare professionals can become much more resilient if they receive mental health counselling, stress-relief programs, peer support systems, breaks, and better working conditions. Strengthening institutional policies that promote psychological well-being will not only enhance job satisfaction but also mitigate the long-term dangers of posttraumatic stress disorders linked to extended exposure to the crisis. The study highlights the critical need to prioritise the emotional and physical health of frontline workers to ensure a sustained and effective healthcare response during public health emergencies such as COVID-19.

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Conflicts of Interest Statement: The authors declare that there are no conflicts of interest associated with this study. All sources used have been properly acknowledged, and the work is entirely original.

Ethics and Consent Statement: This study was conducted in accordance with established ethical standards, and informed consent was obtained from all participants.

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