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BURNOUT AMONG MEDICAL PERSONNEL IN THE POST- PANDEMIC ERA: A SYSTEMATIC ANALYSIS OF RISK FACTORS AND THE EFFECTIVENESS OF INTERVENTIONAL PROGRAMS

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ABSTRACT

Background: The COVID-19 pandemic disrupted healthcare systems worldwide, leading to widespread burnout and psychological distress among medical staff. Although the immediate crisis has passed, long-term mental health effects and weaknesses in healthcare institutions continue.

Objectives: This review aims to measure how common burnout is among medical workers after COVID-19. It also examines the main risk factors and evaluates how effective different intervention programs are.

Materials and Methods: The review includes quantitative studies, randomized controlled trials, cross-sectional surveys, and longitudinal cohort studies published from January 2020 to February 2026.

Results: Occupational burnout reached its highest point in 2022, then dropped to 35.4% in 2023, but this is still higher than before the pandemic. Among nurses, burnout rates were especially high at 59.5%, with 36.1% experiencing severe emotional exhaustion. Individual-level interventions helped reduce stress and exhaustion in the short term, but lasting recovery depends on organizational changes like reducing workload, building peer support systems, and improving psychological safety.

Conclusions: Healthcare systems need major changes after pandemic. Solving staffing shortages means focusing on ethical support and always keeping patient care as the top priority.

KEYWORDS

Occupational Burnout, Healthcare Workers, Post-Pandemic, Organizational Interventions, Psychological Distress

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Introduction

The well-being and emotional durability of healthcare workers have for a long time been a subject of concern. The COVID-19 pandemic caused an exacerbation of psychological distress that continues throughout the post-pandemic period [1]. Prior to this event, burnout among healthcare providers had already reached alarming levels. Epidemiological data from the pre-pandemic decade indicated that up to 50% of clinical nurses and 40% of physicians were already experiencing symptoms of emotional exhaustion, depersonalization, and a worsening sense of professional efficacy [4]. The pandemic added fuel to the fire, exposing vulnerabilities in institutional support, resource allocation, and clinical workflows [2].

As the pandemic subsided, job-related stress, psychological burden, and clinical fatigue did not return to pre-2020 baseline levels [6]. It manifests in persistently high rates of clinical depression, generalized anxiety, complex moral injury, and sustained occupational burnout [8]. Furthermore, workplace stress and burnout cost the global economy over \$300 billion annually due to absenteeism, reduced productivity, and secondary healthcare expenses [13]. They operate as

a positive feedback loop: chronic understaffing worsens the cognitive strain, emotional burden, and physical danger placed upon personnel, intensifying burnout, increasing the risk of medical errors, and degrading the quality of patient care [3].

The academic debate regarding healthcare workers' burnout has evolved from barely recognizing the impact of occupational stress to a focus on the role of organizational factors. Burnout has been categorized as emotional exhaustion, depersonalization, and a reduced sense of personal accomplishment [4]. A phenomenon called "moral injury" has been described. It captures psychological and spiritual distress from events and decisions that force clinicians to act against their moral beliefs and ethical expectations [17].

In response to this crisis, healthcare organizations and public health institutions have developed some interventional strategies. On one end are individual-focused resilience training, such as Mindfulness-Based Interventions (MBIs), cognitive-behavioral skill-building, and guided meditation [19]. At the opposite end are

organizational interventions targeting workload optimization, psychological safety, the establishment of structured peer support networks, and the reorganization of clinical leadership [19]. However, the comparative effectiveness and long-term sustainability of these interventions remain subjects of ongoing academic debate [20].

This review provides a systematic analysis of post-COVID epidemiological trends in burnout across medical disciplines. It identifies risk factors contributing to psychological distress. Furthermore, it analyzes the efficacy and limitations of both individual and organizational interventional programs.

Materials and Methods

This systematic review was conducted in accordance with the PRISMA 2020 statement [24].

Search Strategy and Information Sources

A digital search was performed to identify relevant literature published from January 1, 2020, to February 2026 [3]. This period was selected to include the onset of the COVID-19 pandemic, the recovery phases, and the stabilized post-pandemic period of 2024–2026.

Eligibility Criteria

Studies were required to meet the following criteria:

1. Randomized controlled trials (RCTs), massive cross-sectional epidemiological surveys, longitudinal cohort studies, or prior systematic reviews with or without independent meta-analyses.
2. The study population in which clinical staff constituted most of the analytical sample.
3. The research had to report measurable outcomes utilizing internationally validated and standardized psychometric instruments.
4. Studies evaluating the implementation, trajectory, or specific outcomes of an interventional program targeting mental health, general well-being, or the reduction of burnout symptoms.
5. English as the primary language

Exclusion criteria:

1. Studies restricted to early-stage pilot programs or small-scale feasibility phases lacking the statistical power to estimate effect sizes.
2. Interventional studies without specific, structured post-intervention follow-up data essential for determining the long-term durability and clinical sustainability of the reported outcomes.

Results

Prevalence and Longitudinal Trajectory of Burnout Post-Pandemic

The transition from the early pandemic to the post-pandemic phase did not result in a proportional or linear improvement in healthcare workers' psychological well-being. Instead, global epidemiological data reveal a complex, non-linear trajectory of occupational distress that remains higher than pre-2020 baselines [6].

The most compelling longitudinal data on this phenomenon come from the United States Veterans Health Administration (VHA), which conducted a 6-year analysis of these trends across a national cohort [6]. Pre-pandemic burnout levels within this population were stable at 30.4% in 2018 and 31.3% in 2019 [6]. However, pressure on the medical system and burnout rates escalated, reaching a peak of 39.8% in 2022 [6]. The official expiration of the global public health emergency correlated with a decline in overall burnout to 35.4% in 2023 [6].

Table 1. Longitudinal trajectory of burnout prevalence and professional stress across the Veterans Health Administration from 2018 to 2023, illustrating the persistent elevation above pre-pandemic baselines [6].

Analytical Year	Overall Burnout Prevalence (VHA Cohort)	High Professional Stress (COVID-19 related)	Relative Year-to-Year Change in Burnout
2018	30.40%	N/A	N/A
2019	31.30%	N/A	0.90%
2020	30.90%	32.00%	-0.40%
2021	35.40%	26.90%	4.50%
2022 (Peak)	39.80%	29.20%	4.40%
2023	35.40%	21.40%	-4.40%

The distribution and severity of this burnout vary across geographic regions and distinct professional roles. A global meta-analysis combining 19 studies across 11 countries found that the prevalence of burnout among the specialized nursing population during and immediately following the pandemic was 59.5% [30]. The pooled prevalence rates for nurses revealed that 36.1% suffered from severe emotional exhaustion (EE), 32.4% exhibited clinical depersonalization (DP), and 33.3% experienced a reduced sense of personal accomplishment (PA) [30]. Subspecialty variations were also evident; for instance, oncology nurses reported the highest rate of depersonalization (42%), while intensive care unit (ICU) nurses reported the highest rate of low personal accomplishment (46.02%) [34].

Unexpectedly, nurses practicing in developed, high-income countries reported a higher prevalence of overall burnout (OR of 3.91) than their peers in low- and lower-to-middle-income countries (OR of 2.70) [30].

In Poland, extensive research tracking thousands of medical personnel over a three-year period showed that emotional exhaustion and depersonalization scores peaked in 2021, with nurses consistently recording the most pronounced outcomes when compared to physicians and emergency paramedics [35]. Additional Polish cohorts revealed alarming rates of coexisting psychiatric morbidity, demonstrating that 24% of all active healthcare workers met the clinical criteria for severe depression, while 34% fell into the high-risk category for generalized anxiety disorder (GAD) [36].

Systematic Analysis of Risk Factors

The etiology of post-pandemic occupational burnout is multifactorial. Identifying and isolating these factors is fundamental to creating the targeted intervention strategies.

Structural, Operational, and Technical Restrictions

Chronic understaffing and the failure of workload optimization are the most cited drivers of emotional exhaustion [1]. Primary care physicians are uniquely vulnerable to these specific factors, consistently reporting the highest burnout rates among all clinical service areas, with exhaustion levels of 57.6% during the 2022 epidemiological peak [6]. Financial pressures on national medical systems and private conglomerates have also frequently led to cost-saving measures, inflexible clinical scheduling, and an excessive reliance on temporary contract staffing [2].

Modern technological and administrative demands, particularly those related to electronic health records (EHR) and an increase in digital patient portal messages, were identified as independent, significant factors in burnout. They were significantly associated with elevated emotional exhaustion and clinical depersonalization in primary care environments [4].

Interestingly, the physical modality of work execution has appeared as a determinant of occupational stress. Healthcare personnel who engaged in telework for most of their shifts reported substantially and consistently lower burnout rates (ranging from 26.2% to 37.7%) than nontelework employees (ranging from 30.5% to 40.0%) [6].

Values Misalignment and Complex Leadership Relations

The relationship between clinical workers and management is a major factor contributing to occupational burnout. Advanced Structural Equation Modeling (SEM) analysis of post-pandemic primary care clinics revealed that the absolute strongest singular predictor of emotional exhaustion was a lack of values alignment with leadership [4]. Disillusionment and rapid emotional depletion happen when healthcare providers think that administrative leadership prioritizes financial efficiency over high-quality, patient-centered clinical care [4].

This phenomenon is connected to the broader concept of psychological safety - defined as the shared belief that a clinical work environment is safe for interpersonal risk-taking. Environments characterized by deficient, hostile, or low psychological safety were linked to elevated emotional exhaustion and heightened depersonalization [4].

The role of supervisor support presents a complex, illogical paradox. While instrumental support directly improves a provider's sense of personal accomplishment, an over-reliance on "Family-Supportive Supervisor Behaviors" (FSSB) was unexpectedly correlated with a *lower* sense of personal professional accomplishment [4].

Demographic and Individual Vulnerabilities

Individual demographic factors affect the risk of burnout. Female physicians and nurses report significantly higher rates of occupational distress, clinical exhaustion, and sleep disruption compared to their male peers [7]. This gender inequality is blamed on disproportionate extra-occupational responsibilities interfering with higher systemic clinical workloads and increased time dedicated to electronic patient documentation (EHRs) [38].

Age also serves as a determinant; findings suggest that nurses aged 30 and older exhibit an increased risk of overall burnout, reflecting the cumulative effects of occupational exposure and prolonged presence in high-stress environments [30]. Conversely, several independent cohorts suggest that younger, less-experienced professionals show an intense vulnerability to burnout specifically because they lack the experiential resilience and coping mechanisms required to successfully endure in acute clinical crises and toxic environments [30].

Emergence and Impact of Moral Injury

Moral injury represents psychological, biological, and spiritual distress caused by actions, or forced inactions, which oppose a provider's ethical code, moral beliefs, or professional oaths [17].

The current 2024-2026 evidence demonstrates a noticeable "delayed moral injury" effect, through which the psychological trauma and cognitive dissonance of these events persist long after the acute public health crisis has technically ended [8].

In one observational study mapping moral injury across chronic care hospital settings, the mean moral injury score on the validated Moral Injury Symptom Scale-Healthcare Professionals (MISS-HP) was 5.3 out of 10, indicating elevated levels of chronic, recurrent ethical conflict [8]. Notably, frontline nursing and auxiliary clinical staff bore the highest burden of this moral injury, reporting median scores (5.6 and 5.4, respectively) that outshone those reported by attending physicians (4.7) [8]. This vulnerability among nursing staff is strongly correlated with their ongoing proximity to patients' suffering [8].

Key systemic risk factors identified for post-pandemic moral injury include chronic national underfunding, the absence of clear institutional ethical frameworks for decision-making, and

a perceived lack of management support [8]. The resulting psychological dissonance manifests as profound feelings of institutional betrayal, linking moral injury to clinical depression, post-traumatic stress disorder (PTSD), increased substance abuse, functional impairments, and

a heightened risk of suicide [8]. Workload optimization alone is insufficient to resolve moral injury; it requires targeted, structural strategies to restore trust [8].

Efficacy of Interventional Programs

There is a contrast between individual-level psychological techniques and organizational restructuring.

Individual-Level Interventions

Individual-level interventions primarily aim to equip healthcare professionals with the cognitive and emotional tools to process, withstand, and deflect workplace stressors. Mindfulness-Based Interventions (MBIs), ranging from highly structured Mindfulness-Based Stress Reduction (MBSR) 8-week programs to app-based guided meditation, behavioral training, and brief resilience retreats, have been the most extensively studied and funded mechanisms in recent years [19].

A 2024 meta-analysis incorporating 27 distinct studies and over 2,500 active clinical participants demonstrated the short-term efficacy of MBIs [20]. Statistical modeling revealed that mindfulness interventions caused significant, measurable reductions across multiple domains:

- **Burnout:** Standardized Mean Difference (SMD) = -0.44 [20].
- **Stress:** SMD = -0.76 (representing a statistically large effect size) [20].
- **Anxiety:** SMD = -0.68 [20].
- **Depression:** SMD = -0.50 [20].
- **Psychological Distress:** SMD = -0.85 [20].

MBIs were shown to generate improvements in self-compassion (SMD = 0.86) and generalized positive well-being (SMD = 0.55) [20]. The specific neurological and psychological mechanisms supporting these effects involve enhanced autonomic nervous system regulation, improved cognitive distancing from occupational stressors, and the disruption of maladaptive rumination cycles [42].

However, the enthusiasm for MBIs is impaired by their lack of long-term durability. While short-term metrics (assessed under 1 post-intervention) are favorable, longitudinal assessments consistently reveal that the beneficial psychological effects decay rapidly over time [20]. Furthermore, qualitative data suggests that relying only on individual interventions can paradoxically generate intense staff resentment. Clinicians frequently think that the organization is attempting to superficially "treat" a systemic failure by placing the entire burden of resilience and recovery onto the worker, rather than fixing the pathogenic environment itself [12].

Table 2. Meta-analytical effect sizes comparing the efficacy of individual psychological interventions versus organizational and combined interventional strategies [20, 23].

Intervention Target Strategy	Primary Outcome Measure	Statistical Effect Size (SMD)	Efficacy Duration / Sustainability
Mindfulness (MBIs)	Psychological Distress	-0.85 (Large)	Short-term (< 1 month)
Mindfulness (MBIs)	Stress Reduction	-0.76 (Large)	Short-term (< 1 month)
Mindfulness (MBIs)	Clinical Anxiety	-0.68 (Moderate)	Short-term (< 1 month)
Mindfulness (MBIs)	Overall Burnout	-0.44 (Moderate)	Variable, rapid decay observed
Combined Models (Org + Ind)	Emotional Exhaustion	-0.54 (Moderate)	Highly Sustainable (Long-term)

Organizational-Level and Peer Support Interventions

In contrast to individual coping mechanisms, organizational interventions target the psychosocial and physical work environment directly. These approaches involve workload reduction, job crafting protocols, the elimination of administrative redundancies (such as EHR optimization projects), and the formal cultivation of supportive peer networks [12].

Empirical data indicate that combined interventions – which integrate structural improvements with individual psychological support – cause superior and more sustainable outcomes regarding emotional exhaustion (SMD = -0.54, 95% CI = -0.76 to -0.32) when compared to isolated organizational or individual efforts alone [23]. Participatory interventions, in which healthcare workers are allowed to directly collaborate with management to redesign daily workflows, have proven highly effective in reducing exhaustion rates (SMD = -0.34), largely because they restore a critical sense of professional autonomy [23].

Among organizational strategies, structured peer support programs have appeared as one of the most promising, well-received, and cost-effective interventions [11]. Initiatives such as the "Building Resilience and Compassion Enculturation" (EmBRACE) program and the implementation of structured virtual cohorts allow medical personnel to process acute clinical trauma, moral injury, and grief within a psychologically safe ecosystem of peers [11]. The quantitative and qualitative evidence confirms that institutionalized, well-funded peer support significantly reduces emotional exhaustion scores, suppresses the clinical symptoms of depression and anxiety, and decreases institutional turnover rates [21]. The cost-effectiveness of these specific programs is particularly notable for hospital administrators; the financial investment required to launch and maintain peer support networks is remarkably low when compared with the costs associated with staff absence, preventable medical errors, and the endless recruitment of replacement personnel [5].

Discussion

The systematic review of the literature generated between 2020 and 2026 demonstrates that burnout among medical personnel is not just a temporary post-pandemic phase that will resolve spontaneously. Statistics from 2022 show that workplace distress reached an all-time high, and burnout levels have not returned to 2018 levels since [6]. The pandemic was more than a transient challenge; it acted as a catalyst that exposed weaknesses in the system, proving that the endurance of healthcare providers has its limits [29].

Research highlights a critical flaw in how hospitals manage burnout: focusing only on individuals' mental health while ignoring the workplace itself does not work. While MBIs are proven to lower clinical anxiety, depression, and severe occupational stress in the short term, these benefits disappear quickly [20]. This creates a paradox: making a doctor or nurse more resilient does not fix a work environment [20]. When a resilient, freshly "mindful" staff member is repeatedly placed back into a toxic clinical ecosystem characterized by understaffing, malfunctioning systems, and misaligned institutional values, the inevitable outcome is a recurrence of burnout [4]. Ultimately, relying solely on mindfulness training is a failure of leadership, as it shifts the responsibility for maintaining occupational well-being away from the employer, who sets working conditions, onto the overburdened employee [12].

There is a deep existential problem: a misalignment of core values and the delayed onset of moral injury [4]. The strongest predictor of emotional exhaustion is not only a heavy workload, but also a feeling that management's goals do not align with the staff's mission [4]. Healthcare professionals are driven by commitment to patient care. When administrative hierarchies consistently prioritize profits, paperwork, or speed over human dignity and clinical excellence, this creates cognitive dissonance that undermines the

provider's professional identity [4]. This leads to moral injury – a specific kind of trauma that occurs when one is forced to compromise their ethics because the system fails to provide the resources to do the right thing [8]. The burden of this moral injury affects frontline nurses and auxiliary staff and accurately reflects their physical proximity to patient suffering, coupled with a lack of institutional authority to change the conditions or protocols [8].

The data on geographic and demographic differences reveal a worrying outlook for the future of healthcare. Specifically, in Poland, high rates of clinical depression and generalized anxiety among active personnel reflect how vulnerable healthcare systems are during times of global economic instability [36]. Even more alarming is a 2025 study of Polish medical universities, which found that only 36% of schools provide mental health support for students [33]. This represents

a catastrophic “pipeline” failure. Future generations of physicians and nurses are actively being trained to enter toxic, under-resourced environments while already struggling with unaddressed mental health issues. By failing to support students now, the global burnout crisis will only accelerate as these new professionals join the workforce [33].

On the other hand, the data demonstrating how well telework protects staff highlights an opportunity for the healthcare system to adapt [6]. While some patient care requires being there in person, there is an undeniable drop in burnout among those who can work remotely (26.2% burnout vs. 40.0% for non-teleworkers) [6]. This proves that giving staff more flexibility and distance from the office acts as a powerful shield against stress. We need to prioritize hybrid models for roles in diagnostics, administration, psychiatry, and primary care to prevent our workforce from quitting. By moving clinicians out of the high-pressure environment of the modern clinic, hospitals can reduce their daily exposure to illness and constant workplace friction.

Limitations of Current Research

There are several methodological limitations within the source literature. There is heterogeneity across the studies, particularly concerning the array of instruments used to quantify the borders between simple burnout, PTSD, and complex moral injury. Secondly, the predominance of cross-sectional survey designs restricts the capability to determine causality between specific organizational shifts and long-term burnout trajectories. Finally, the short-term data on intervention efficacy are abundant, but there is a lack of high-quality, long-term follow-up data.

Conclusions

The COVID-19 pandemic has changed global healthcare. It has fortified occupational burnout, psychological distress, and moral injury as vital threats that jeopardize patient safety, institutional financial stability, and the viability of the global medical workforce. The vast evidence confirms that while rates of emotional exhaustion and depersonalization have decreased since their peak in 2022, they remain elevated compared to pre-pandemic records.

The improvement of the healthcare worker burnout crisis cannot be achieved solely through enhanced individual psychological resilience. While interventions such as mindfulness, yoga, and cognitive-behavioral skills building provide acute relief, their effects are temporary.

Preventing a global collapse of healthcare systems requires more than superficial fixes. It demands structural reform from healthcare leaders. Strategies should focus on reducing administrative burdens through workflow redesign and EHR optimization. Furthermore, to address the isolation of medical trauma, peer-support networks need to be formalized. By acknowledging moral injury and establishing ethical frameworks, institutions can foster the psychological safety clinicians need. Only a systemic realignment of institutional policy with core clinical values can stop the loss of highly trained medical professionals.

CRedit authorship contribution statement

Mateusz Żyła: Writing – original draft, Visualization, Investigation, Data curation, Project Administration. **Zofia Parol:** Methodology, Investigation, Formal analysis, Data curation. **Aleksandra Ustaszewska:** Visualization, Investigation, Data curation. **Aleksandra Oszczypała:** Visualization, Investigation, Data curation. **Aleksandra Potempa:** Visualization, Investigation, Data curation. **Michał Petkow:** Visualization, Investigation, Data curation. **Liwia Prorok:** Visualization, Investigation, Data curation. **Katarzyna Lipska:** Visualization, Investigation, Data curation. **Monika Szyszkowska:** Visualization, Investigation, Data curation. **Zuzanna Strojek:** Visualization, Investigation, Data curation.

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REFERENCES

1. Sharif, S., Liaqat, F., Javed, I., Ashiq, N., Javed, Z., & Chattha, H. N. (2024). Burnout syndrome among healthcare workers: A systematic review of risk factors and prevention strategies. *Frontiers in Chemical Sciences*, 5(1), 36–49. <https://doi.org/10.52700/fcs.v5i1.79>
2. Busis, N. A., Alexander, C. M., Castner, J., Singer, S., Smith, C. D., Bernstein, C. A., Hoyt, D. B., Tran, T. A., Cipriano, P., & COVID-19 Working Group. (2025). *A path to improved health care worker well-being: Lessons from the COVID-19 pandemic* [Discussion paper]. National Academy of Medicine. <https://nam.edu/wp-content/uploads/2025/04/Improved-Health-Care-Well-being.pdf>
3. Frias, C. E., Samarasinghe, N., Cuzco, C., Koorankot, J., De Juan, A., Rudwan, H. M. A., Rahim, H. F. A., Zabalegui, A., Tulley, I., Al-Harashsheh, S. T., Al-Homaidi, M. S. S. T., Fendt-Newlin, M., & Campbell, J. (2025). Strategies to support the mental health and well-being of health and care workforce: A rapid review of reviews. *Frontiers in Medicine*, 12, Article 1530287. <https://doi.org/10.3389/fmed.2025.1530287>
4. Hurtado, D., Ezekiel-Herrera, D., Boyd, J., Madjlesi, R., Hwang, J., Everson, T., Hammer, L., & Lenhart, A. (2026). Post-pandemic primary care burnout drivers: Interplay of organizational constraints, values (mis)alignment, and team-leader dynamics. *Journal of Healthcare Leadership*, 18, 1–10. <https://doi.org/10.2147/jhl.s570686>
5. Moss, M. (2025). Mitigating burnout: The role of healthcare organizations. *ATS Scholar*, 6(3), 267–279. <https://doi.org/10.34197/ats-scholar.2024-0153PS>
6. Mohr, D. C., Elnahal, S., Marks, M. L., Derickson, R., & Osatuke, K. (2025). Burnout trends among US health care workers. *JAMA Network Open*, 8(4), Article e255954. <https://doi.org/10.1001/jamanetworkopen.2025.5954>
7. Shanafelt, T. D., West, C. P., Sinsky, C., Trockel, M., Tutty, M., Wang, H., Carlasare, L. E., & Dyrbye, L. N. (2025). Changes in burnout and satisfaction with work–life integration in physicians and the general US working population between 2011 and 2023. *Mayo Clinic Proceedings*, 100(7), 1142–1158. <https://doi.org/10.1016/j.mayocp.2024.11.031>
8. Sorina, E., Diana, S., Cosoroabă, R. M., Zara, F., Novacescu, D., Dumitru, C. S., Patrascu, R., & Enache, A. (2025). Burnout and moral injury in healthcare workers: An observational study in a Romanian chronic care hospital. *Healthcare*, 13(18), Article 2278. <https://doi.org/10.3390/healthcare13182278>
9. Gaddour, A., Nakhli, R., Chouchane, A., Bouhoula, M., Amor, K. B., Jammeli, I., Bouhlel, M., Kacem, I., & Chatti, S. (2025). Long-term psychological impact of the COVID-19 pandemic on healthcare workers. *European Psychiatry*, 68(S1), S623–S624. <https://doi.org/10.1192/j.eurpsy.2025.1270>
10. The Harris Poll. (2026, March 24). *Burnout, bottlenecks, and a path forward for healthcare retention*. <https://theharrispoll.com/articles/burnout-bottlenecks-and-a-path-forward-for-healthcare-retention/>
11. Emory University. (n.d.). *Emory peer support program helps ease health worker burnout*. https://news.emory.edu/stories/2025/08/hs_peer_program_07-08-2025/story.html
12. Cohen, C., Pignata, S., Bezak, E., Tie, M., & Childs, J. (2023). Workplace interventions to improve well-being and reduce burnout for nurses, physicians and allied healthcare professionals: A systematic review. *BMJ Open*, 13(6), Article e071203. <https://doi.org/10.1136/bmjopen-2022-071203>
13. Abundo, M. F., & Sav, A. (2025). A decade of advancements: A systematic review of effectiveness of interventions to reduce burnout among mental health nurses. *Healthcare*, 13(17), Article 2113. <https://doi.org/10.3390/healthcare13172113>
14. The Online Journal of Issues in Nursing. (n.d.). *Factors associated with COVID-19 pandemic and intent to stay in current nursing position*. <https://ojin.nursingworld.org/table-of-contents/volume-29-2024/number-2-may-2024/factors-associated-with-covid-19-pandemic/>

15. Malik, M., Weeks, K., Bafna, T., Choudhury, M., & Walker, K. (2025). Editorial: Burnout, wellbeing and resilience of healthcare workers in the post-COVID world. *Frontiers in Medicine*, 12, Article 1679590. <https://doi.org/10.3389/fmed.2025.1679590>
16. Collett, G., Gupta, J., Eltayeb, A., Korszun, A., Sharples, L., Rice, K., & Gupta, A. K. (2025). Efficacy of individual-level interventions to mitigate the risk for burnout among health care professionals. *Annals of Internal Medicine*, 179(1), 51–66. <https://doi.org/10.7326/annals-25-00469>
17. Purcell, N., Bertenthal, D., Usman, H., Maguen, S., Griffin, B., Mehlman, H., McGrath, S., Spetz, J., Hysong, S., & Seal, K. (2024, April). *Moral injury awareness and prevention in healthcare organizations: A blueprint informed by the COVID-19 pandemic*. Healthforce Center at UCSF. <https://healthforce.ucsf.edu/publications/moral-injury-awareness-and-prevention-healthcare-organizations-blueprint-informed-covid>
18. Scoglio, A. A. J., Stelson, E. A., Becene, I., Marquez, C. I., & Rich-Edwards, J. W. (2024). A mixed-methods analysis of moral injury among healthcare workers during the COVID-19 pandemic. *PLOS ONE*, 19(7), Article e0304620. <https://doi.org/10.1371/journal.pone.0304620>
19. Cohen, C., Pignata, S., Bezak, E., Tie, M., & Childs, J. (2023). Workplace interventions to improve well-being and reduce burnout for nurses, physicians and allied healthcare professionals: A systematic review. *BMJ Open*, 13(6), Article e071203. <https://doi.org/10.1136/bmjopen-2022-071203>
20. Ong, N. Y., Teo, F. J. J., Ee, J. Z. Y., Yau, C. E., Thumboo, J., Tan, H. K., & Ng, Q. X. (2024). Effectiveness of mindfulness-based interventions on the well-being of healthcare workers: A systematic review and meta-analysis. *General Psychiatry*, 37(3), Article e101115. <https://doi.org/10.1136/gpsych-2023-101115>
21. Cws. (2026, January 2). *Burnout in healthcare workers: The science-backed solution through peer connection*. Champions of Wellness. <https://www.championsofwellness.com/burnout-in-healthcare-workers-peer-connection-science/>
22. Sampedro, C. S., Fernández-Peña, R., Pellón, N. R., Melón, R. M., & Ortego-Maté, C. (2026). Effectiveness of burnout interventions in nursing: A systematic review of systematic reviews with meta-analysis. *Nursing Outlook*, 74(2), Article 102715. <https://doi.org/10.1016/j.outlook.2026.102715>
23. Bes, I., Shoman, Y., Al-Gobari, M., Rousson, V., & Canu, I. G. (2023). Organizational interventions and occupational burnout: A meta-analysis with focus on exhaustion. *International Archives of Occupational and Environmental Health*, 96(9), 1211–1223. <https://doi.org/10.1007/s00420-023-02009-z>
24. Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., & Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, 372, Article n71. <https://doi.org/10.1136/bmj.n71>
25. PRISMA Statement. (n.d.). *PRISMA 2020 statement*. <https://www.prisma-statement.org/prisma-2020>
26. PRISMA Statement. (n.d.). *PRISMA 2020 flow diagram*. <https://www.prisma-statement.org/prisma-2020-flow-diagram>
27. PRISMA Statement. (n.d.). *PRISMA 2020 checklist*. <https://www.prisma-statement.org/prisma-2020-checklist>
28. Ghahramani, S., Lankarani, K. B., Yousefi, M., Heydari, K., Shahabi, S., & Azmand, S. (2021). A systematic review and meta-analysis of burnout among healthcare workers during COVID-19. *Frontiers in Psychiatry*, 12, Article 758849. <https://doi.org/10.3389/fpsyt.2021.758849>
29. Sorina, E., Novacescu, D., Barb, A. C., Ciolofan, A., Dumitru, C. S., Zara, F., Patrascu, R., & Enache, A. (2025). From burnout to resilience: Addressing moral injury in nursing through organizational innovation in the post-pandemic era. *Healthcare*, 13(21), Article 2822. <https://doi.org/10.3390/healthcare13212822>
30. Fekih-Romdhane, F., Harb, F., Banna, S. A., Obeid, S., & Hallit, S. (2025). Prevalence and risk factors of burnout symptoms among nurses during the COVID-19 pandemic: An updated systematic review and meta-analysis. *Human Resources for Health*, 23(1), Article 48. <https://doi.org/10.1186/s12960-025-01012-4>
31. Galanis, P., Vraika, I., Fragkou, D., Bilali, A., & Kaitelidou, D. (2021). Nurses' burnout and associated risk factors during the COVID-19 pandemic: A systematic review and meta-analysis. *Journal of Advanced Nursing*, 77(8), 3286–3302. <https://doi.org/10.1111/jan.14839>
32. Vu, T. T., Hua, M. J., Dubois, C., Moskowitz, J. T., Wallia, A., Hirschhorn, L. R., Wilkins, J. T., & Evans, C. T. (2025). Long COVID and its associations with burnout, anxiety, and depression among U.S. healthcare workers in the United States. *Frontiers in Public Health*, 13, Article 1582872. <https://doi.org/10.3389/fpubh.2025.1582872>
33. Guziak, M., Terech, J., Sarnowska, P., Błażek, M., & Walkiewicz, M. (2025). Mental health services for medical students in Poland: 2025 update of a national evaluation. *Education Sciences*, 15(12), Article 1641. <https://doi.org/10.3390/educsci15121641>
34. Getie, A., Ayenew, T., Amlak, B. T., Gedfew, M., Edmealem, A., & Kebede, W. M. (2025). Global prevalence and contributing factors of nurse burnout: An umbrella review of systematic review and meta-analysis. *BMC Nursing*, 24(1), Article 596. <https://doi.org/10.1186/s12912-025-03266-8>
35. Łaskawiec-Żuławińska, D., Grajek, M., Krupa-Kotara, K., Szlacheta, P., Karacan, H., Roszak, M., Łabuz-Roszak, B., & Korzonek-Szlacheta, I. (2024). Burnout and life satisfaction among healthcare workers related to the COVID-19 pandemic (Silesia, Poland). *Behavioural Neurology*, 2024(1), Article 9945392. <https://doi.org/10.1155/2024/9945392>

36. Holas, P., Wojtkowiak, N., Gambin, M., Hansen, K., Kmita, G., Pisula, E., Bargiel-Matusiewicz, K., & Łojek, E. (2023). Factors associated with burnout in Polish healthcare workers during the COVID-19 pandemic. *Frontiers in Public Health*, 10, Article 1018612. <https://doi.org/10.3389/fpubh.2022.1018612>
37. McCormick, B. (2025, April 21). *Burnout among health care workers drops post pandemic but remains elevated*. AJMC. <https://www.ajmc.com/view/burnout-among-health-care-workers-drops-post-pandemic-but-remains-elevated>
38. Admin H. (2026, February 4). *Post-COVID-19 stress and physician burnout: Prevalence 5 years later*. M3 Global Research Blog. <https://m3globalresearch.blog/2025/09/23/physician-burnout-post-covid-19-stress-prevalence-5-years-later/>
39. Sun, P., Wang, M., Song, T., Wu, Y., Luo, J., Chen, L., & Yan, L. (2021). The psychological impact of COVID-19 pandemic on health care workers: A systematic review and meta-analysis. *Frontiers in Psychology*, 12, Article 626547. <https://doi.org/10.3389/fpsyg.2021.626547>
40. Purcell, N., Bertenthal, D., Usman, H., Griffin, B. J., Maguen, S., McGrath, S., Spetz, J., Hysong, S. J., Mehlman, H., & Seal, K. H. (2024). Moral injury and mental health in healthcare workers are linked to organizational culture and modifiable workplace conditions: Results of a national, mixed-methods study conducted at Veterans Affairs (VA) medical centers during the COVID-19 pandemic. *PLOS Mental Health*, 1(7), Article e0000085. <https://doi.org/10.1371/journal.pmen.0000085>
41. Catapano, P., Cipolla, S., Sampogna, G., Perris, F., Luciano, M., Catapano, F., & Fiorillo, A. (2023). Organizational and individual interventions for managing work-related stress in healthcare professionals: A systematic review. *Medicina*, 59(10), Article 1866. <https://doi.org/10.3390/medicina59101866>
42. Shoker, D., Desmet, L., Ledoux, N., & Héron, A. (2024). Effects of standardized mindfulness programs on burnout: A systematic review and original analysis from randomized controlled trials. *Frontiers in Public Health*, 12, Article 1381373. <https://doi.org/10.3389/fpubh.2024.1381373>
43. Alharbi, B. A. A., & McKenna, N. (2025). A systematic review of mindfulness-based interventions to reduce ICU nurse burnout: Global evidence and thematic synthesis. *BMC Nursing*, 24(1), Article 927. <https://doi.org/10.1186/s12912-025-03507-w>
44. Razai, M. S., Kooner, P., & Majeed, A. (2023). Strategies and interventions to improve healthcare professionals' well-being and reduce burnout. *Journal of Primary Care & Community Health*, 14, Article 21501319231178641. <https://doi.org/10.1177/21501319231178641>