



Review Article

Effectiveness of interventions to support healthcare workers' mental health and well-being: An umbrella review of systematic reviews

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ABSTRACT

Objectives: To synthesise evidence from existing systematic reviews on the effectiveness of mental health interventions for healthcare professionals and examine the contextual factors influencing their implementation and impact.

Study design: Umbrella review of systematic reviews evaluating interventions to support the mental health of healthcare workers.

Methods: An umbrella review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Eligible systematic reviews were identified through a comprehensive database search supplemented by manual searching of reference lists. A thematic analysis and narrative synthesis were undertaken to categorise intervention types, examine implementation characteristics and evaluate reported contextual influences.

Results: A total of 882 records were identified, of which 14 systematic reviews met the eligibility criteria for inclusion. Eight categories of interventions were identified: (1) mindfulness-based and mind-body interventions, (2) digital and online-based interventions, (3) cognitive- and behavioural-based interventions, (4) educational- and training-based interventions, (5) organizational, structural and environmental interventions, (6) well-being, reflective and relaxation-based interventions, (7) peer and relational support interventions and (8) medical and clinical interventions. Mindfulness-based and cognitive-behavioural interventions demonstrated the strongest evidence of effectiveness; however, substantial heterogeneity was evident across intervention design, implementation processes and outcome measures.

Conclusions: Although individual interventions show measurable benefits, sustainable improvements in the mental health of the healthcare workforce require integrated multilevel public health approaches. Embedding mental health support within organisational structures, workforce policies and health system governance is essential for strengthening system capacity.

1. Introduction

The mental health of the healthcare workforce is fundamental to the quality, safety and sustainability of health systems.¹ Mental health conditions are common among healthcare professionals and sustained psychological strain has been linked to reduced clinical performance, increased medical errors and workforce attrition.² In recent years, rising

service demand, workforce shortages and the emotional intensity of care delivery have placed increasing pressure on healthcare professionals.³ Evidence consistently demonstrates high levels of stress, burnout and psychological distress across healthcare settings.^{4,5} Protecting the mental health of healthcare workers has therefore become a critical public health priority, as workforce well-being directly influences patient safety, service continuity and health system resilience.

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Mental health outcomes among healthcare workers are shaped by both individual and organizational determinants. Individual factors, such as coping capacity and psychological resilience, influence how healthcare professionals respond to occupational stress. However, workplace conditions, including staffing levels, workload intensity, leadership practices and organisational culture, play a central role in shaping workforce well-being.⁶ Organisational environments influence whether individual-focused strategies can be effectively implemented and sustained. For example, excessive workload, inadequate staffing and poor psychosocial safety climates may limit opportunities for healthcare workers to engage with support programs or apply coping strategies. Consequently, improving workforce mental health requires approaches that address both individual capabilities and the organisational context in which healthcare professionals work. Supportive leadership, positive team culture and collegial work environments have been shown to enhance engagement, psychological safety and mental health among healthcare professionals.^{7,8}

Reflecting this multi-level understanding, a growing body of evidence has examined interventions designed to support the mental health of healthcare professionals particularly in the context of heightened workforce pressures following the coronavirus disease 2019 (COVID-19) pandemic.^{9,10} Existing systematic reviews have evaluated a wide range of approaches, including mindfulness-based and mind-body modalities, cognitive and behavioural therapies, digital and web-based programs and organizational or environmental interventions.^{11–13} However, the evidence base remains fragmented across intervention types, implementation contexts, professional groups and outcome measures.¹⁴

Despite increasing attention to healthcare workforce mental health, evidence on effective interventions remains fragmented across intervention types, healthcare settings and professional groups. This fragmentation limits the ability of healthcare organisations and policymakers to identify which interventions are most effective and under what organisational conditions they can be successfully implemented. To address this gap, we conducted an umbrella review synthesising evidence from published systematic reviews of interventions designed to support the mental health of healthcare professionals.¹⁵ By comparing intervention types and examining organisational and contextual factors influencing implementation and effectiveness across healthcare settings, this review provides consolidated evidence to inform workforce mental health strategies and support evidence-based decision-making for healthcare systems.

2. Methods

2.1. Study Design

Umbrella review of systematic reviews evaluating interventions to support the mental health of healthcare workers.

2.2. Review method

The review method followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, and the study protocol was registered in the Open Science Framework (OSF) after study initiation but prior to data analysis (<https://osf.io/http32>).¹⁶ Consistent with the umbrella review methodology, the unit of analysis was systematic reviews and meta-analyses. Therefore, the interpretation focused on review-level findings rather than re-analysing primary studies.

2.3. Search strategy

A comprehensive search was conducted in the Web of Science, Scopus, and PubMed databases. The search identified systematic reviews and meta-analyses evaluating mental health interventions for healthcare workers. The initial search (April 13, 2025) used Medical Subject

Headings (MeSH) and keywords combined with Boolean operators to identify relevant studies. Key terms included “mental health support,” “mental health interventions,” “coping,” “health professionals,” and “systematic review” or “meta-analysis.” An updated search was conducted on Google Scholar on April 28, 2025, and was limited to English-language publications. Google Scholar served as a supplementary source to identify recent reviews that had not yet been indexed in major databases. The first 10 pages of the results were screened according to recommended practices. Grey literature, preprints and non-peer-reviewed sources were excluded.

2.4. Inclusion and exclusion criteria

The Population, Intervention, Comparison and Outcome (PICO) framework guided the eligibility criteria.¹⁷ Reviews were included if they examined mental health interventions targeting healthcare workers and reported relevant outcomes. Medical students were excluded due to the presence of different stressors. Reviews without outcome data or implementation details were excluded from analysis.

The primary outcome was a change in mental health measures and the secondary outcomes included intervention preferences and perceptions. Systematic reviews were included even if they overlapped in primary studies and the findings were interpreted cautiously to minimise double counting. Formal quantification of study overlap was not performed because of heterogeneity in scope, populations and outcome measures.

2.5. Study selection

Two independent reviewers (MK and AY) screened the titles and abstracts, followed by a full-text assessment. To ensure consistency and reduce selection bias, a third reviewer (DG) independently reviewed the full-text articles using the same eligibility criteria. Discrepancies were resolved through discussion (MK, AY and DG). Eligible studies were imported into Mendeley for reference purposes.

2.6. Data extraction

Two reviewers independently extracted data using a standardised template (AY and DG), which was cross-checked by a third reviewer (MK). The extracted information included the author, publication year, study characteristics, population, setting, intervention type, outcomes and appraisal tool. Missing or unclear information was verified using study protocols or supplementary reports, where available (KR, FC). A thematic synthesis approach was used to integrate findings across reviews. This structured and iterative process began with line-by-line coding of the results sections of each systematic review to identify reported effects, underlying mechanisms and contextual factors. Codes were then grouped into descriptive themes. To enhance methodological rigor, emerging themes were cross-checked against the quality ratings of each review to avoid over-emphasising findings derived primarily from low-quality evidence. Although coding was inductive, theme development was guided by the review aim and informed by the PICO framework.

The synthesis prioritised patterns consistently observed across multiple reviews, while also noting important divergences, such as mixed findings in anxiety outcomes.

2.7. Quality assessment

Methodological quality was assessed using the Assessment of Multiple Systematic Reviews-2 (AMSTAR-2) checklist,¹⁸ which evaluates the risk of bias across 16 items. Items 1, 3, 5, 6, 10, 13, 14, and 16 were scored as “Yes” or “No.” Items 11, 12, and 15 were rated “Yes”, “Partial Yes”, “No”, or “No meta-analysis conducted,” respectively, as appropriate. Each review received an overall quality rating of “High,”

“Moderate,” “Low,” or “Critically Low.”

3. Results

3.1. Study selection

The study selection process is illustrated in a PRISMA 2020 flow diagram (Fig. 1). Database searches identified 882 records from Scopus (n = 87), PubMed (n = 412) and Web of Science (n = 383). After removing duplicates (n = 65), records marked as ineligible by automation tools (n = 48), and records removed for other reasons (n = 7), 762 records remained for title and abstract screening. Of these, 711 records were excluded. Fifty-one reports were sought for full-text retrieval; one report could not be retrieved, leaving fifty articles assessed for eligibility. At this stage, thirty-nine articles were excluded, including twenty-nine that did not meet the PICO criteria and ten that did not report effectiveness outcomes. Consequently, eleven systematic reviews were included from the database search pathway.

An updated search identified six additional studies. Three were subsequently excluded (one duplicate, one not a systematic review, and one without effectiveness data), resulting in three additional eligible reviews. Thus, a total of fourteen systematic reviews were included in this umbrella review (Table 1).

3.2. Characteristics of the included studies

Of the fourteen included reviews, five were systematic reviews with meta-analyses,^{12,13,19–21} and nine were systematic reviews without meta-analysis.^{7,8,10,11,22,14,23–25} These reviews, published between January 2019 and April 2025, collectively covered 343 primary studies, most of which were randomised controlled trials or quasi-experimental designs. Nurses were the primary population in three reviews,^{7,12,21} one review focused exclusively on physicians,¹⁹ and another on frontline

mental health professionals.²³ The remaining ten reviews included mixed groups of healthcare workers. Most studies were conducted in hospital settings and high-income countries, with the United States being the most frequently represented.

A broad range of mental health outcomes were assessed, with stress being the most reported, followed by anxiety. One review examined coping and resilience exclusively,²³ and another focused on well-being and burnout reduction.⁸ The detailed characteristics of the included reviews are presented in Supplementary Table 1.

3.3. Quality appraisal

Quality was assessed using the AMSTAR-2 tool. Four reviews were rated low quality,^{11,13,19,24} seven were rated as moderate quality,^{7,8,10,22,14,23,25} and three were rated high-quality.^{12,20,21} No reviews were excluded based on their methodological quality. A summary of the methodological quality assessment is presented in Table 1.

3.4. Main findings

A thematic synthesis identified eight categories of interventions: mindfulness-based and mind-body modalities, digital and online interventions, cognitive and behavioural approaches, educational and training programs, organizational and environmental strategies, well-being and relaxation techniques, peer and relational support and medical and clinical care. Many interventions overlapped conceptually; categorisation reflected their dominant focus, as described in the included reviews. A summary of findings is provided in Table 2.

3.4.1. Mindfulness-based interventions (MBI) and mind-body modalities (MBM)

Eleven reviews^{8,10–13,19–22,24,25} reported that MBI and MBM interventions reduce stress, burnout and depressive symptoms and

PRISMA 2020 flow diagram for new systematic reviews which included searches of databases, registers and other sources

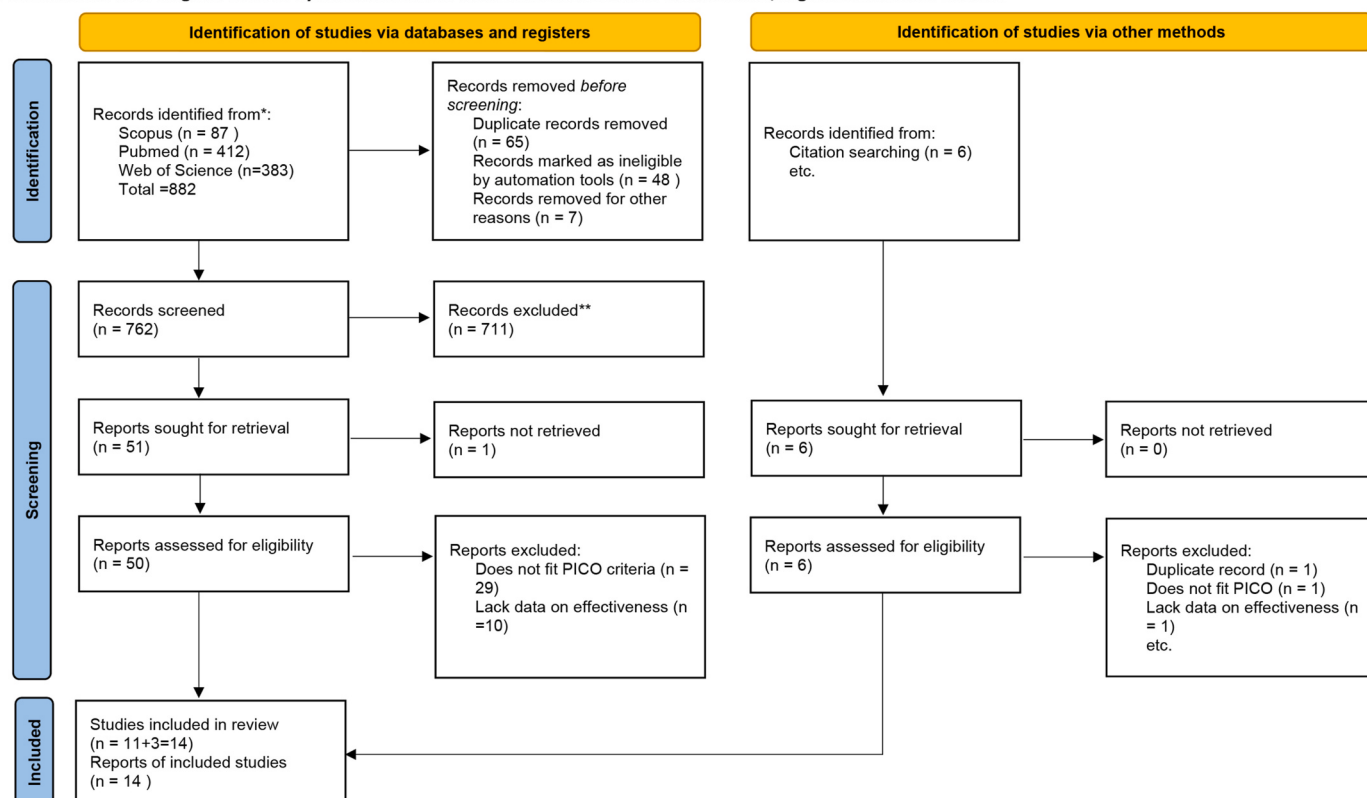


Fig. 1. PRISMA 2020 flow diagram illustrating the study selection process.

Table 1
Methodological quality appraisal of included systematic reviews using the AMSTAR-2 tool.

AMSTAR 2 Criteria	Anger et al., 2024 ¹¹	Aust et al., 2024 ⁷	Cohen et al., 2023 ⁸	de Oliveira Santana et al., 2024 ²¹	Doedens et al., 2025 ²³	Henshall et al., 2022 ¹⁰	Ilola et al., 2024 ¹³	Karo et al., 2024 ¹²	Kwon et al., 2022 ²⁴	Paleri et al., 2024 ²⁵	Petrie et al., 2019 ¹⁹	Varela et al., 2023 ²²	Yang et al., 2023 ²⁰	Zaçe et al., 2021 ¹⁴
1. Did the research questions and inclusion criteria for the review include the components of PICO?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2. Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?	No	Yes	Partial Yes	Yes	Partial Yes	Partial Yes	Partial Yes	Yes	Partial Yes	Yes	Yes	Yes	Yes	Yes
3. Did the review authors explain their selection of the study designs for inclusion in the review?	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	No	No	No	No
4. Did the review authors use a comprehensive literature search strategy?	Partial Yes	Partial Yes	Yes	Partial Yes	Partial Yes	Partial Yes	Partial Yes	Partial Yes	Partial Yes	Partial Yes	Partial Yes	Partial Yes	Partial Yes	Partial Yes
5. Did the review authors perform study selection in duplicate?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6. Did the review authors perform data extraction in duplicate?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
7. Did the review authors provide a list of excluded studies and justify the exclusions?	Partial Yes	Partial Yes	Yes	Partial Yes	Partial Yes	Partial Yes	Partial Yes	Partial Yes	Partial Yes	Partial Yes	No	Partial Yes	Yes	Partial Yes
8. Did the review authors describe the included studies in adequate detail?	Partial Yes	Partial Yes	Partial Yes	Yes	Partial Yes	Partial Yes	Partial Yes	Yes	Partial Yes	Partial Yes	Partial Yes	Partial Yes	Partial Yes	Yes
9. Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?	Partial Yes	Partial Yes	Partial Yes	Partial Yes	Partial Yes	Partial Yes	Partial Yes	Yes	Yes	Partial Yes	Partial Yes	Yes	Yes	Partial Yes
10. Did the review authors report on the sources of funding for the studies included in the review?	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No
11. If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results?	NA	NA	NA	Yes	NA	NA	Yes	Yes	Yes	NA	Yes	NA	Yes	NA
12. If meta-analysis was performed, did the review authors assess the potential impact of RoB in individual studies on the results of the meta-analysis or other evidence synthesis?	NA	NA	NA	Yes	NA	NA	Yes	Yes	No	NA	Yes	NA	Yes	NA
13. Did the review authors account for RoB in individual studies when interpreting/ discussing the results of the review?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
14. Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes
15. If they performed quantitative synthesis did the review authors carry out an adequate investigation of	NA	NA	NA	Yes	NA	NA	No	Yes	No	NA	Yes	NA	Yes	NA

(continued on next page)

Table 1 (continued)

AMSTAR 2 Criteria	Anger et al., 2024 ¹¹	Aust et al., 2024 ⁷	Cohen et al., 2023 ⁸	de Oliveira Santana et al., 2024 ²¹	Doedens et al., 2025 ²³	Henshall et al., 2022 ¹⁰	Ilola et al., 2024 ¹³	Karo et al., 2024 ¹²	Kwon et al., 2022 ²⁴	Paleri et al., 2024 ²⁵	Petrie et al., 2019 ⁹	Varela et al., 2023 ²²	Yang et al., 2023 ²⁰	Zaęe et al., 2021 ¹⁴
publication bias (small study bias) and discuss its likely impact on the results of the review?														
16. Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Score	Low	Moderate	Moderate	High	Moderate	Moderate	Low	High	Low	Moderate	Low	Moderate	High	Moderate

improve resilience and work engagement. However, the evidence for anxiety reduction is mixed. The limitations of this study include its small sample size, lack of control groups and short follow-up periods.

3.4.2. Digital and online-based interventions

Six reviews evaluated web-based programs, mobile applications and virtual training.^{10,13,20,22,23,25} These interventions supported resilience, coping and emotional regulation and showed improvements in well-being, self-efficacy and stress. Web-based mindfulness programs have demonstrated mild-to-moderate effects on anxiety, depression and stress. Some digital tools, such as biofeedback and aggression management-modules, enhanced confidence in managing workplace challenges. However, the evidence base was limited by small sample sizes, inconsistent outcome measures and brief follow-up periods.

3.4.3. Cognitive and behavioural-based interventions

Nine reviews evaluated cognitive-behavioural therapy (CBT), acceptance and commitment therapy (ACT) and related approaches.^{10–12,14,19,20,22,23,25} These interventions enhance mental health, coping, emotional regulation and stress management. CBT and ACT are particularly effective in improving maladaptive thought patterns and behavioural responses to work-related stress. Variations in format, duration and outcomes have limited the comparability of these studies.

3.4.4. Educational and training-based interventions

Six reviews examined educational programs designed to strengthen knowledge, skills and preparedness for managing stress.^{8,11,14,21–23} These interventions improved confidence, self-efficacy and perceived coping ability; however, they alone produced limited effects on mental health outcomes, such as stress, anxiety and burnout. Stronger results were reported when educational strategies were combined with mindfulness or cognitive-behavioural components.

3.4.5. Organisational, structural and environmental-based interventions

Five reviews have examined system-level strategies aimed at addressing the structural sources of workplace stress.^{7,8,11,13,14} The reported benefits include improved mental health, job satisfaction and perceived organisational support. Although these interventions hold strong long-term potential, they are complex to implement and exhibit variability in delivery and evaluation methods.

3.4.6. Well-being, reflective and relaxation-based interventions

Eight reviews evaluated approaches such as music therapy, gratitude journaling and guided relaxation.^{8,11–13,19,20,22,24} These interventions supported emotional recovery and short-term reductions in stress and mood disturbances. Their effects were modest when used alone, but more sustained when integrated with psychological or organizational interventions.

3.4.7. Peer and relational support

Seven reviews covered interventions, including peer support programs, mentoring and team-based initiatives.^{7,8,10,11,14,19,22} These approaches strengthen social connectedness, emotional safety and peer communication and reduce feelings of isolation. Variations in structure and outcome reporting have limited cross-study comparability.

3.4.8. Medical and clinical interventions

Three reviews described pharmacological treatments and clinician-led therapeutic care for individuals with moderate-to-severe mental health conditions.^{22,11,23} These approaches, delivered within stepped care-models, reduce mental stress and improve functional outcomes. However, evidence remains limited and population-level effects have not been established.

Table 2

Summary of intervention categories and key findings identified through thematic synthesis of included systematic reviews.

Intervention Category	Number of Systematic Reviews	Review Author, Year	Effectiveness Summary
Mindfulness-based Interventions and Mind-Body Modalities	11	Anger et al., 2024 ¹¹ ; Cohen et al., 2023 ⁸ ; de Oliveira Santana et al., 2024 ²¹ ; Henshall et al., 2022 ¹⁰ ; Ilola et al., 2024 ¹³ ; Karo et al., 2024 ¹² ; Kwon et al., 2022 ²⁴ ; Paleri et al., 2024 ²⁵ ; Petrie et al., 2019 ¹⁹ ; Varela et al., 2023 ²² ; Yang et al., 2023 ²⁰	Significantly reduces stress and depression; less consistent effects on anxiety; no significant impact on trauma or self-efficacy.
Digital and Online-based Interventions	6	Henshall et al., 2022 ¹⁰ ; Varela et al., 2023 ²² ; Ilola et al., 2024 ¹³ ; Yang et al., 2023 ²⁰ ; Doedens et al., 2025 ²³ ; Paleri et al., 2024 ²⁵	Potentially effective, feasible and widely accepted.
Cognitive and Behavioral-based Interventions	9	Henshall et al., 2022 ¹⁰ ; Varela et al., 2023 ²² ; Anger et al., 2024 ¹¹ ; Karo et al., 2024 ¹² ; Zaçe et al., 2021 ¹⁴ ; Petrie et al., 2019 ¹⁹ ; Yang et al., 2023 ²⁰ ; Doedens et al., 2025 ²³ ; Paleri et al., 2024 ²⁵	Improves mental health, enhances coping and resilience.
Educational and Training-based Interventions	6	Cohen et al., 2023 ⁸ ; Varela et al., 2023 ²² ; Anger et al., 2024 ¹¹ ; Zaçe et al., 2021 ¹⁴ ; Yang et al., 2023 ²⁰ ; Doedens et al., 2025 ²³	Improves mental health; boosts confidence; better effects when combined with other therapeutic components.
Organizational, Structural and Environmental-based Interventions	5	Anger et al., 2024 ¹¹ ; Aust et al., 2024 ⁷ ; Cohen et al., 2023 ⁸ ; Ilola et al., 2024 ¹³ ; Zaçe et al., 2021 ¹⁴	Improves mental health; boosts confidence.
Well-being, Reflective and Relaxation-based Interventions	8	Anger et al., 2024 ¹¹ ; Cohen et al., 2023 ⁸ ; Ilola et al., 2024 ¹³ ; Karo et al., 2024 ¹² ; Kwon et al., 2022 ²⁴ ; Petrie et al., 2019 ¹⁹ ; Varela et al., 2023 ²² ; Yang et al., 2023 ²⁰	Improves mental health; better effects when combined with other therapeutic components.
Peer and Relational Support	7	Aust et al., 2024 ⁷ ; Cohen et al., 2023 ⁸ ; Henshall et al., 2022 ¹⁰ ; Varela et al., 2023 ²² ; Anger et al., 2024 ¹¹ ; Zaçe et al., 2021 ¹⁴ ; Petrie et al., 2019 ¹⁹	Improves mental health; enhances empathy and cohesion.
Medical and Clinical Interventions	3	Varela et al., 2023 ²² ; Anger et al., 2024 ¹¹ ; Doedens et al., 2025 ²³	Significantly reduces depression and anxiety.

4. Discussion

This umbrella review synthesised evidence from 14 systematic reviews examining interventions designed to support the mental health of healthcare workers. Across reviews, individual-level psychological interventions particularly mindfulness-based approaches, CBT and ACT showed the most consistent improvements in stress, depressive symptoms, coping and resilience. Mindfulness and mind-body interventions produced moderate reductions in stress and depression among healthcare professionals.^{12,21,24} CBT and ACT were associated with improvements in cognitive regulation and maladaptive thinking patterns.²² Effects on anxiety were less consistent, likely reflecting variations in intervention duration, delivery format and outcome measures.

Digital and online interventions have expanded substantially following the coronavirus disease 2019 (COVID-19) pandemic,^{10,13,26} and offer scalable approaches for workforce mental health support. Evidence across reviews indicates that digital interventions are more effective when combined with facilitation, coaching, or peer interaction, which improves engagement and adherence.^{13,25} Educational, reflective, and peer-support interventions have also shown moderate benefits when embedded within organizational structures. Clinical interventions remain essential for workers experiencing moderate-to-severe psychological distress.^{19,27} Overall, individual psychological interventions can improve mental health outcomes; however, their sustainability is influenced by the organizational environments in which they are implemented. These findings align with previous research showing that psychological interventions can strengthen coping capacity and emotional regulation among healthcare professionals.^{22,12} Mindfulness-based interventions appear particularly effective in reducing stress and depressive symptoms, potentially through mechanisms such as attentional regulation, self-compassion, and psychological flexibility.^{21,24} These mechanisms may explain why improvements in overall well-being are sometimes observed even when anxiety-specific outcomes are inconsistent.

The review also confirms the rapid growth of digital mental health interventions following COVID-19.^{10,13,26} However, evidence consistently shows that fully self-guided digital programs often achieve lower engagement than interventions incorporating human support.^{13,25} At the same time, structural stressors within healthcare systems including

heavy workloads, staffing shortages and administrative burden continue to affect workforce well-being.⁹ When these conditions remain unresolved, the impact of individual interventions may be limited. A key insight from this review is that intervention effectiveness is strongly influenced by the organizational context. Psychological interventions strengthen individual coping resources; however, organizational conditions determine whether these resources can be applied and sustained in practice. Leadership practices, staffing adequacy, workload distribution and psychosocial safety climates shape the capacity of healthcare workers to engage with and benefit from mental health programs.^{7,8}

Therefore, healthcare workers' mental health should be understood as a multilevel system outcome produced through the interaction between individual psychological resources and organizational working conditions. Intervention outcomes cannot be evaluated independently of the environments in which programs are delivered. Workforce well-being is co-produced by individuals and organisations rather than being determined by either level alone. These findings have important implications for workforce policy and service design. Mental health interventions should be implemented within integrated, multilevel workforce support strategies rather than as isolated programs. A stepped-care approach may be particularly useful. Low-intensity supports, such as digital mindfulness tools, psycho-educational resources and peer-support initiatives, can serve as entry points for staff experiencing mild distress. Workers requiring additional support can then be referred to facilitated psychological interventions or clinical care.^{19,27,28}

Digital interventions can expand access, particularly for shift-based or geographically dispersed staff. However, hybrid models combining digital delivery with facilitation or peer interaction appear more effective than purely self-directed programs.^{1,13} Healthcare organisations would also benefit from adopting standardised outcome measures and longer follow-up periods when evaluating workforce mental health programs. Such approaches allow benchmarking across institutions and support integration with organizational quality and safety systems.

Organisational leadership and governance remain critical. Effective workforce mental health strategies require safe staffing and rostering practices, leadership development focused on psychological safety, protected time for program participation and governance frameworks that prioritise workforce well-being along with patient safety indicators.^{7,9}

Equity considerations are essential when implementing workforce mental health interventions. Digital and program-based initiatives may unintentionally widen disparities if the barriers faced by certain groups are not addressed. Healthcare workers in rural and remote settings, those in shift-based roles, those from culturally diverse backgrounds, or those with limited digital access may experience reduced access to support. Ensuring equitable implementation requires flexible delivery formats, culturally responsive resources, and organisational policies that support participation across diverse workforce groups.

Resilience theory provides a useful lens for interpreting these findings. Contemporary models emphasise that resilience emerges from the interaction between individual capabilities and environmental resources, rather than being solely an individual trait. In healthcare settings, psychological skills developed through interventions such as mindfulness or CBT represent only one component of resilience. Organisational conditions, including staffing adequacy, leadership capability, workload management, and workplace culture, shape whether workers can apply these skills effectively.

4.1. Strengths and limitations

This umbrella review provides a comprehensive synthesis of interventions addressing healthcare workers' mental health across multiple professional groups and healthcare settings. By integrating findings from systematic reviews covering psychological, digital, educational, and organizational interventions, the review offers a consolidated overview of intervention effectiveness and implementation contexts. However, several limitations should be noted. Considerable heterogeneity exists across intervention types, delivery formats, participant characteristics, and outcome measures, limiting the direct comparison between studies. The overlap of primary studies across systematic reviews cannot be excluded. Restricting inclusion to English-language publications may have introduced selection bias. Many included reviews also reported relatively small samples and limited follow-up periods, which reduces confidence in long-term effectiveness estimates.

4.2. Conclusion

This umbrella review demonstrates that psychological interventions, particularly mindfulness-based and cognitive behavioural approaches, can improve stress, depressive symptoms, coping, and resilience among healthcare workers. Digital interventions can broaden access, especially when combined with facilitation or peer support. However, individual interventions alone cannot address the systemic drivers of workforce distress. Sustainable improvements in healthcare workers' well-being require integrated, multilevel strategies that combine individual psychological support with organizational and system-level actions. Individual interventions strengthen coping capacity; however, organizational systems determine whether resilience can be sustained.

Ethical approval

Ethical approval was not required for this study, as it was an umbrella review of a systematic review that did not involve primary data collection or interaction with human participants.

Declaration of generative AI and AI-assisted technologies in the manuscript preparation process

The authors used Microsoft Copilot and Paperpal to minimise the word count and check the grammar during the preparation of this work. After using these tools/services, the authors reviewed, edited and verified all the generated content as needed and took full responsibility for the accuracy and integrity of the final manuscript.

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Declaration of competing interests

The authors declare that they have no competing interests.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.puhe.2026.106392>.

References

- Søvdal LE, Naslund JA, Kousoulis AA, et al. Prioritizing the mental health and well-being of healthcare workers: an urgent global public health priority. *Front Public Health*. 2021;9, 679397. <https://doi.org/10.3389/fpubh.2021.679397>.
- De Hert S. Burnout in healthcare workers: prevalence, impact and preventative strategies. *Local Reg Anesth*. 2020;13:171–183. <https://doi.org/10.2147/LRA.S240564>.
- Looi JC, Allison S, Bastiampillai T, Hensher M, Kisely S, Robson SJ. Australian specialised mental healthcare labour shortages: potential interventions for consideration and further research. *Australas Psychiatry*. 2024;32(5):446–449. <https://doi.org/10.1177/10398562241267138>.
- 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;88:901–907. <https://doi.org/10.1016/j.bbi.2020.05.026>.
- Maqbal MA, Alsayed A, Hughes C, Hacker E, Dickens GL. Stress, anxiety, depression and sleep disturbance among healthcare professional during the COVID-19 pandemic: an umbrella review of 72 meta-analyses. *PLoS One*. 2024;19(5), e0302597. <https://doi.org/10.1371/journal.pone.0302597>.
- Bhugra D, Liebrecht M, Ventriglio A, et al. World psychiatric association-asian journal of psychiatry commission on public mental health. *Asian J Psychiatry*. 2024; 98, 104105. <https://doi.org/10.1016/j.ajp.2024.104105>.
- Aust B, Leduc C, Cresswell-Smith J, et al. The effects of different types of organisational workplace mental health interventions on mental health and well-being in healthcare workers: a systematic review. *Int Arch Occup Environ Health*. 2024;97(5):485–522. <https://doi.org/10.1007/s00420-024-02065-z>.
- Cohen C, Pignata S, Bezak E, Tie M, Childs J. Workplace interventions to improve well-being and reduce burnout for nurses, physicians and allied healthcare professionals: a systematic review. *BMJ Open*. 2023;13(6), e071203. <https://doi.org/10.1136/bmjopen-2022-071203>.
- Sipos D, Goyal R, Zapata T. Addressing burnout in the healthcare workforce: current realities and mitigation strategies. *Lancet Reg Health - Europe*. 2024;42, 100961. <https://doi.org/10.1016/j.lanepe.2024.100961>.
- Henshall C, Ostinelli E, Harvey J, et al. Examining the effectiveness of web-based interventions to enhance resilience in health care professionals: systematic review. *JMIR Med Educ*. 2022;8(3), e34230. <https://doi.org/10.2196/34230>.
- Anger WK, Dimoff JK, Alley L. Addressing health care workers' mental health: a systematic review of evidence-based interventions and current resources. *Am J Publ Health*. 2024;114(S2):213–226. <https://doi.org/10.2105/AJPH.2023.307556>.
- Karo M, Simorangkir L, Daryanti Saragih I, Suarilah I, Tzeng HM. Effects of mindfulness-based interventions on reducing psychological distress among nurses: a systematic review and meta-analysis of randomized controlled trials. *J Nurs Scholarsh*. 2024;56(2):319–330. <https://doi.org/10.1111/jnu.12941>.
- Ilola T, Malmisalo M, Laukka E, et al. The effectiveness of digital solutions in improving nurses' and healthcare professionals' mental well-being: a systematic review and meta-analysis. *J Res Nurs*. 2024;29(2):97–109. <https://doi.org/10.1177/17449871241226914>.
- Zaqe D, Hoxhaj I, Orfino A, Viteritti AM, Janiri L, Di Pietro ML. Interventions to address mental health issues in healthcare workers during infectious disease outbreaks: a systematic review. *J Psychiatr Res*. 2021;136:319–333. <https://doi.org/10.1016/j.jpsychires.2021.02.019>.
- Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*. 2021;29, n71. <https://doi.org/10.1136/bmj.n71>. Published online March.
- Maharajan M, Nadzir A, Gopinath D, Rajiah K. Effectiveness of mental health support for health professionals; an umbrella review. Published online <https://osf.io/kja9x>; August 30, 2025. Accessed January 12, 2026.
- Huang X, Lin J, Demner-Fushman D. Evaluation of PICO as a knowledge representation for clinical questions, 2006. In: *AMIA Annu Symp Proc*. 2006: 359–363. PMID: 17238363; PMCID: PMC1839740.
- Shea BJ, Hamel C, Wells GA, et al. AMSTAR is a reliable and valid measurement tool to assess the methodological quality of systematic reviews. *J Clin Epidemiol*. 2009;62(10):1013–1020. <https://doi.org/10.1016/j.jclinepi.2008.10.009>.
- Petrie K, Crawford J, Baker STE, et al. Interventions to reduce symptoms of common mental disorders and suicidal ideation in physicians: a systematic review and meta-analysis. *Lancet Psychiatry*. 2019;6(3):225–234. [https://doi.org/10.1016/S2215-0366\(18\)30509-1](https://doi.org/10.1016/S2215-0366(18)30509-1).

20. Yang JM, Ye H, Long Y, et al. Effects of web-based mindfulness-based interventions on anxiety, depression, and stress among frontline health care workers during the COVID-19 pandemic: systematic review and meta-analysis. *J Med Internet Res*. 2023; 25, e44000. <https://doi.org/10.2196/44000>.
21. de Oliveira Santana K, Figueira Pereira C, Silva Ramos M, et al. The effectiveness of mindfulness for the management of anxiety in the nursing staff: systematic review and meta-analysis. *Arch Psychiatr Nurs*. 2024;50:129–146. <https://doi.org/10.1016/j.apnu.2024.03.016>.
22. Varela C, Montero M, Serrano-Ibáñez ER, De La Vega A, Pulido MAG. Psychological interventions for healthcare professionals during the COVID-19 pandemic: a systematic review. *Stress Health*. 2023;39(5):944–955. <https://doi.org/10.1002/smi.3246>.
23. Doedens P, Kiel-Clayton LM, Daams JG, de Haan L. Effectiveness of interventions to improve coping and resilience of frontline mental healthcare professionals towards workplace violence on psychiatric Wards-A systematic review. *Int J Ment Health Nurs*. 2025;34(1), e70016. <https://doi.org/10.1111/inm.70016>.
24. Kwon CY, Lee B. Systematic review of mind-body modalities to manage the mental health of healthcare workers during the COVID-19 era. *Healthcare (Basel)*. 2022;10(6):1027. <https://doi.org/10.3390/healthcare10061027>.
25. Paleri V, Valmaggia L, Kaleva I, Martland R, Riches S. Digital staff support interventions for the psychological well-being of healthcare professionals: a systematic review. *J Technol Behav Sci*. 2024;10(2):250–282. <https://doi.org/10.1007/s41347-024-00434-6>.
26. Aye LM, Tan MM, Schaefer A, et al. Self-help digital mental health intervention in improving burnout and mental health outcomes among healthcare workers: a narrative review. *Digit Health*. 2024;10, 20552076241278313. <https://doi.org/10.1177/20552076241278313>.
27. Boucher VG, Dahl M, Lee J, Faulkner G, Beauchamp MR, Puterman E. An umbrella review and meta-analysis of 87 meta-analyses examining healthcare workers' mental health during the COVID-19 pandemic. *J Affect Disord*. 2025;375:423–436. <https://doi.org/10.1016/j.jad.2025.01.109>.
28. Piso B, Nußbaumer-Streit B, Gartlehner G. WHO-Leitlinie zur psychischen Gesundheit am Arbeitsplatz. *Gesundheitswesen*. 2024;86(3):216–219. <https://doi.org/10.1055/a-2249-5787>.