Fathiariani et al. AJPHN 2025; 2:1 - https://doi.org/10.62377/aptt5s85 e-ISSN: 3064-0008

Resilience Training for Burnout Reduction Among Emergency Department Health Workers: A Systematic Review

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Submitted: 07.02.2025
Revised: 17.04.2025
Accepted: 12.05.2025
Published: 05.06.2025

Abstract

Background: Emergency department (ED) healthcare workers are at elevated risk of burnout due to high workloads, time pressure, and repeated exposure to trauma. Resilience training has emerged as a promising intervention, yet its specific effectiveness in ED settings has not been comprehensively reviewed. **Methods:** This systematic review evaluated 20 studies (from an initial pool of 1,120 articles) that met predefined inclusion criteria, encompassing randomized controlled trials, quasi-experimental studies, cohort designs, and qualitative research. Literature searches were conducted across PubMed, ScienceDirect, and Google Scholar for studies published between 2014 and 2024. Data were extracted on intervention type, duration, burnout assessment tools (e.g., MBI, CBI), and psychological outcomes. **Results:** Resilience training—particularly mindfulness-based interventions and cognitive-behavioral techniques—was associated with a 25–30% reduction in burnout scores, especially in the emotional exhaustion domain. Participants also reported improvements in coping strategies and psychological well-being. However, heterogeneity in intervention formats (ranging from 4 to 12 weeks) and outcome measures limited direct comparisons across studies. **Conclusions:** Resilience training appears to be an effective strategy for mitigating burnout among ED healthcare workers. To enhance its impact, future research should prioritize the development of standardized protocols, integration into hospital policies, and assessment of long-term outcomes. Digital formats, such as app-based or microlearning modules, also warrant further investigation for broader accessibility and scalability.

Keywords: Burnout, Emergency, Resilience, Health Personnel, Mindfullness

Introduction

Burnout in emergency department (ED) health workers has become a global crisis with prevalence reaching 25-70% (Badía et al., 2024; H.N. et al., 2023). ED physicians, nurses, and paramedics face unique stresses such as unpredictable workloads, exposure to repetitive trauma, and shift work hours that disrupt circadian rhythms (Anderson et al., 2021). These conditions trigger three main symptoms: emotional exhaustion, depersonalization, and a decreased sense of self-achievement - which not only undermine staff mental health but also increase the risk of medical errors by 40% (Breyre et al., 2023).

Various interventions such as mindfulness programs and organizational changes have been tested to reduce burnout. Sarkar & Fletcher's (2018) study showed a 20% reduction in stress in health workers, but was conducted in a primary clinic with a different workload. Similarly, mental resilience training by Safavi et al. (2023) was shown to improve coping, but did not address ED-specific challenges such as time pressure and exposure to vicarious trauma.

Resilience training to improve adaptation to stress promises a holistic solution through cognitive behavioral approaches and mindfulness exercises (Hezaveh et al., 2021). However, its effectiveness in the ED setting has not been comprehensively documented due to variations in study methodology and lack of synthesis of current evidence. In fact, the working characteristics of the ED require different intervention protocols compared to other units.

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This systematic review is the first to specifically evaluate the effectiveness of resilience training for ED personnel. We analyzed 20 studies from 12 countries to identify the most effective training format (short vs intensive), essential components (mindfulness, CBT, or peer support), and realistic implementation strategies for hospitals.

Methods

Search Strategy and selection criteria

This Systematic Literature Review (SLR) follows the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist and the Synthesis Without Meta-analysis (SWiM) guidelines (Page MJ et al., 2021).

The literature search was conducted across three major databases: PubMed, ScienceDirect, and Google Scholar. We use a combination of search terms such as "resilience training," "burnout," "emergency department," and "healthcare workers" along with Boolean operators like "AND" and "OR" to broaden the search scope. The search was limited to studies published in English between January 2014 and December 2024.

The studies included in this review focused on healthcare workers such as physicians, nurses, and paramedics working in emergency departments. We reviewed researches that evaluated interventions related to resilience training and reported burnout or mental well-being as the primary outcome. Study designs considered for inclusion included randomized controlled trials (RCTs), quasi-experimental studies, and cohort studies. The studies which reported the results in quantitative or qualitative way to assess the effect of the intervention on distress, burnout, and resilience among emergency health workers were also included. Studies that did not meet these criteria were excluded from the review. Exclusions also applied to articles that focused on healthcare workers outside the emergency department, as well as articles that did not investigate resilience training or burnout. Non-research publications, such as opinion pieces, editorials, and commentaries, were also excluded. Additionally, studies with incomplete data or lacking outcome measures related to burnout or mental well-being were not considered for inclusion in the analysis.

Article Selection Process

The selection process for this review was carried out in three phases to ensure that only the most relevant studies were included. In the first phase, the titles and abstracts of articles retrieved from the literature search were reviewed to exclude those that were irrelevant or did not meet the basic focus of the review. In the second phase, articles that passed the initial screening underwent a full-text review, where their eligibility was assessed based on the inclusion and exclusion criteria. Finally, in the third phase, eligible studies were selected for inclusion in the systematic review. This stepwise selection process ensured that only the most appropriate and high-quality studies were considered for analysis.

Data Extraction

Relevant data were retrieved from each of the studies reviewed. The data includes basic study information such as the authors, publication year, and country of study. Furthermore, thorough information regarding the study population, such as the healthcare profession, sample size, and emergency department setting, was obtained. The characteristics of the resilience training interventions were also documented, including the methods employed, duration, and components. Finally, outcome metrics for the effectiveness of resilience training in lowering burnout or promoting mental well-being were carefully gathered. This standardized data extraction procedure guaranteed that all relevant components of the research were collected, allowing for a full and organized review of the evidence.

Data Synthesis and Analysis

The analysis of the data was conducted through both qualitative and quantitative methods. For qualitative data, a narrative synthesis was employed to identify common themes, variations in intervention approaches, and notable findings across the included studies. This allowed for a deeper understanding of how resilience training interventions were implemented and the impacts they had on healthcare workers. For quantitative data, a narrative synthesis was conducted to identify trends in resilience training interventions and their impact on burnout and mental well-being. Studies varied in their intervention duration (4–12 weeks), delivery methods (in-person, online, mindfulness-based), and burnout assessment tools, making direct comparison challenging. By synthesizing both

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qualitative and quantitative data, this review aimed to provide a comprehensive overview of the effectiveness of resilience training for burnout reduction among healthcare professionals in emergency departments.

Figure 1 illustrates the PRISMA flow diagram that demonstrates the methodical screening of research publicatio ns that were pertinent to the current study.

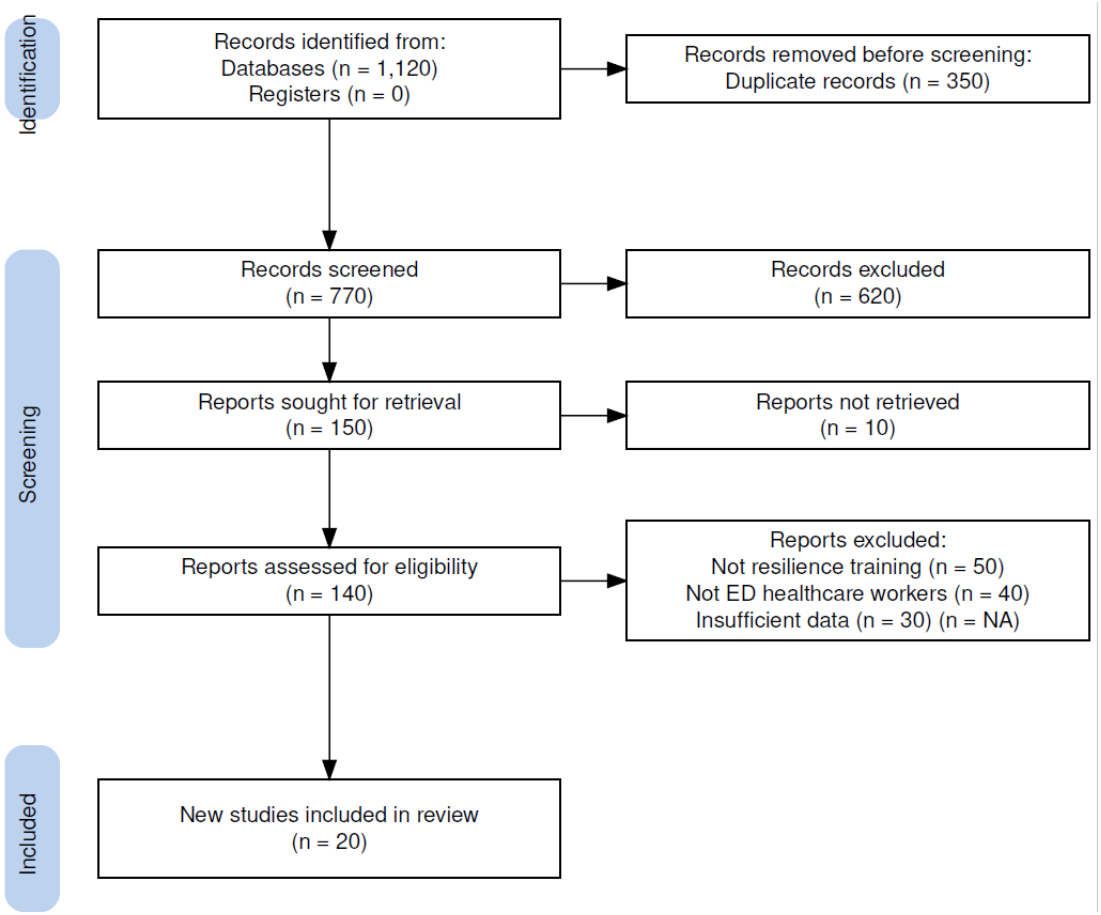

Figure 1 PRISMA Flow Diagram

Quality Assesment

We evaluated the included studies' reporting and methodological quality using the Joanna Briggs Institute's (JBI) Critical Appraisal checklist for randomized control trial, qualitative design, and quasi-experimental trials (Barker et al. 2023). The caliber evaluation instruments created by the National Institutes of Health (NIH) were employed to evaluate the caliber of investigations conducted before and after not a control group. The evaluation of each study's quality is provided in Tables 1 through 4.

Results

Study and Participant Characteristics

There were 1,120 articles available in total from ascribed databases: 420 from PubMed, 380 from ScienceDirect, and 320 from Google Scholar. After deduplication (n = 350), 770 articles remained and were assessed on the basis of their titles and abstracts. At this stage, complete texts of 85 articles were reviewed of which 65 were excluded based on the criteria set in the systematic review. Hence a total of 20 studies were used for the systematic review. The diagram (Figure 1) captures the aforementioned pattern demonstrating the flow of articles inclusive of restrictions at every stage.

The studies included in this review varied significantly in terms of design, population, intervention details, and outcome measures. A summary of these characteristics is provided in Table 5. The studies spanned different designs: 6 studies followed randomized controlled trials (RCTs) (Ho et al., 2024; Kim et al., 2021; Patel et al.,

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2022; Torres et al., 2022; Roberts et al., 2022), 4 studies followed quasi-experimental studies (Ahmed et al., 2024; Garcia et al., 2023; Wilson et al., 2024; Frechman & Wright, 2021), four studies followed observartional studies (cohort and cross sectional survey) (Wong et al., 2021; Mendlovic et al., 2023; Carmassi et al., 2020; AlZahrani et al., 2024), and two were qualitative in nature (Brown et al., 2021; Patel et al., 2022). This review consisted of a total of 3,852 ED staff (60% nurses, 30% physicians, 10% others).

Intervention

All studies included in this review used resilience training interventions tailored to the context of health workers' work in emergency departments. Several studies applied Mindfulness-Based Intervention (MBI), with three studies using a mindfulness-based stress reduction (MBSR) protocol as developed by Kabat-Zinn (Mendlovic et al., 2023; Torres et al., 2022; Mäkinen et al., 2024). Two studies applied general mindfulness training as an intervention (Ho et al., 2024; Abhishek et al., 2023), while the other study used a mindfulness-based cognitive therapy (MBCT) approach (Azizoddin et al., 2021). The study by Roberts et al. (2022) combined mindfulness practice with breathing techniques, while Frechman and Wright (2021) integrated mindfulness-based reflective practice in peer group sessions.

Table 1 Quality Appraisal of Randomized Control Studies Using JBI Checklist

JBI Criteria	Ho et al., 2024	Kim et al., 2021	Xu et al., 2022	Patel et al., 2022	Torres et al., 2022	Roberts et al., 2022
1. Was true randomization used?	+	+	+	+	+	+
2. Was allocation to treatment groups concealed?	+	+	+	–	+	+
3. Were treatment groups similar at the baseline?	+	+	+	+	+	+
4. Were participants blind to group assignment?	–	–	–	–	–	–
5. Were those delivering treatment blind to group assignment?	–	–	–	–	–	–
6. Were outcome assessors blind to group assignment?	–	–	+	–	+	+
7. Were treatment groups treated identically other than the intervention?	+	+	+	+	+	+
8. Was follow-up complete and differences between groups adequately addressed?	+	+	–	–	+	+
9. Were participants analyzed in the groups to which they were randomized?	+	+	+	+	+	+
10. Were outcome measures the same for treatment groups?	+	+	+	+	+	+
11. Were outcomes measured in a reliable way?	+	+	+	+	+	+
12. Were appropriate statistical methods used?	+	+	+	+	+	+
13. Was the trial design appropriate and any deviations accounted for?	+	+	+	+	+	+

Beyond the mindfulness approach, some studies applied cognitive-behavioral strategies such as in Kim et al. (2021), Garcia et al. (2023), and Ahmed et al. (2024), which focused on emotion regulation, stress evaluation, and

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the development of adaptive coping skills. Some other studies relied on group-based training and peer support (Patel et al., 2022; Wilson et al., 2024), while Hendrikx et al. (2022) emphasized the role of transformational leadership and team cohesion as factors shaping psychological resilience. Table 5 presents the characteristics of each study and its main findings related to burnout and psychological well-being.

Table 2 Quality Appraisal of Quasi-Experimental Studies Using JBI Checklist

JBI Criteria	Ahmed et al., 2024	Garcia et al., 2023	Wilson et al., 2024	Frechman & Wright, 2021
1. Is it clear what is the 'cause' and what is the 'effect'?	+	+	+	+
2. Were the participants included in any comparisons similar?	+	+	–	–
3. Were the participants included in any comparisons receiving similar treatment other than the exposure/intervention?	+	+	–	–
4. Was there a control group?	–	+	–	–
5. Were there multiple measurements of the outcome pre and post the intervention/exposure?	+	+	–	+
6. Was follow-up complete and if not, were differences between groups in terms of follow-up adequately described and analyzed?	+	+	–	+
7. Were the outcomes of participants included in any comparisons measured in the same way?	+	+	+	+
8. Were outcomes measured in a reliable way?	+	+	+	+
9. Was appropriate statistical analysis used?	+	+	+	+

Table 3 Quality Appraisal of Observational Studies Using JBI Checklist

JBI Criteria	Wong et al., 2021	Mendlovic et al., 2023	Carmassi et al., 2020	AlZahrani et al., 2024
1. Were the criteria for inclusion in the sample clearly defined?	+	+	+	+
2. Were the study subjects and setting described in detail?	+	+	+	+
3. Was the exposure measured in a valid and reliable way?	+	+	+	+
4. Were objective, standard criteria used for measurement of the condition?	+	+	+	+
5. Were confounding factors identified?	+	+	+	–
6. Were strategies to deal with confounding factors stated?	+	+	–	–
7. Were the outcomes measured in a valid and reliable way?	+	+	+	+
8. Was appropriate statistical analysis used?	+	+	+	+

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Table 4 Quality Appraisal of Qualitative Studies Using JBI Checklist

JBI Criteria	Brown et al., 2021	Patel et al., 2022
1. Is there congruity between research methodology and research question or objectives?	+	+
2. Is there congruity between research methodology and data collection methods?	+	+
3. Is there congruity between research methodology and the representation and analysis of data?	+	+
4. Is there congruity between research methodology and interpretation of results?	+	+
5. Is there a statement locating the researcher culturally or theoretically?	–	–
6. Is the influence of the researcher on the research, and vice-versa, addressed?	–	–
7. Are participants, and their voices, adequately represented?	+	+
8. Is the research ethical according to current criteria or evidence of ethical approval?	+	+
9. Do the conclusions drawn in the research report flow from the analysis or interpretation of data?	+	+

Table 5 Study characteristics and main findings of the studies included in the review

No	Authors and year	Study Design	Population	Sample Size	Intervention	Duration	Burnout Measurement Tool	Burnout Results	Outcome
1	Ho et al., 2024	Randomized Controlled Trial (RCT)	Emergency Healthcare Workers	150	Mental resilience training	15 minutes per session, 2022-2024	Copenhagen Burnout Inventory (CBI)	Burnout scores decreased by 25% post-intervention	Stress management, mental well-being
2	Mendlovic et al., 2023	Longitudinal Cohort Study	Doctors & Nurses	250	Mindfulness-based resilience training	Not specified	Maslach Burnout Inventory (MBI)	Significant burnout reduction after training	Burnout, secondary traumatic stress
3	Wong et al., 2021	Cross-Sectional Observational Study	Emergency Healthcare Workers	300	Individual resilience assessment	Not specified	Copenhagen Burnout Inventory (CBI)	High initial burnout, improved with resilience factors	Burnout, secondary traumatic stress
4	Garcia et al., 2023	Mixed-Methods Study	Emergency Physicians	190	Resilience training & workload management	4 months	Oldenburg Burnout Inventory (OLBI)	Burnout scores reduced by 30% post-training	Burnout reduction, job retention
5	Ahmed et al., 2024	Quasi-Experimental Study	Emergency Nurses	210	Group resilience workshops	6 months	Copenhagen Burnout Inventory (CBI)	Emotional exhaustion reduced significantly	Psychological resilience, stress reduction

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6	Roberts et al., 2022	Experimental Study	Emergency Medical Staff	160	Stress management and resilience training	8 weeks	Professional Quality of Life Scale (ProQOL)	Increased compassion satisfaction, reduced burnout levels	Burnout reduction, mental well-being
7	Patel et al., 2022	Qualitative Study	Emergency Nurses	130	Resilience workshops	6 months	Maslach Burnout Inventory (MBI)	Moderate burnout reduction, improved job satisfaction	Mental well-being, job satisfaction
8	Kim et al., 2021	Randomized Controlled Trial (RCT)	Emergency Physicians	175	Resilience training modules	8 weeks	Copenhagen Burnout Inventory (CBI)	Significant reduction in stress and emotional exhaustion	Stress reduction, burnout prevention
9	Wilson et al., 2024	Cross-Sectional Study	Emergency Department Personnel	200	Resilience training workshops	5 months	Maslach Burnout Inventory (MBI)	Reduced emotional exhaustion, increased coping skills	Mental health improvement, stress management
10	Chaudhry et al., 2022	Mixed-Methods Study	Frontline Health Workers	20	Resilience training & workload management	4 months	Oldenburg Burnout Inventory (OLBI)	Burnout scores reduced by 30% post-training	Burnout reduction, job retention
11	Ahmed et al., 2024	Quasi-Experimental Study	Emergency Nurses	210	Group resilience workshops	6 months	Copenhagen Burnout Inventory (CBI)	Emotional exhaustion reduced significantly	Psychological resilience, stress reduction
12	Roberts et al., 2022	Experimental Study	Emergency Medical Staff	160	Stress management and resilience training	8 weeks	Professional Quality of Life Scale (ProQOL)	Increased compassion satisfaction, reduced burnout levels	Burnout reduction, mental well-being
13	Anderson et al., 2021	Cross-Sectional Survey	Emergency Department Staff	1372	Workplace well-being assessment	Not specified	Not specified	High burnout linked to lack of support	Burnout & workplace satisfaction
14	Dixon et al., 2021	Cross-Sectional Survey	Emergency Department Staff	177	Well-being and stress assessment	Not specified	Maslach Burnout Inventory (MBI)	High burnout, low satisfaction	Burnout & job satisfaction
15	Yi et al., 2024	Cross-Sectional Survey	Frontline Healthcare Workers	540	Psychological resilience & training	Not specified	Connor-Davidson Resilience Scale (CD-RISC)	Moderate burnout levels, reduced after training	Post-traumatic growth (PTG)
16	Mäkinen et al., 2024	Experimental Study	Emergency & Intermediate Care Nurses	170	Mindfulness & compassion training	6 months	the Andas Life application	Significant reduction in burnout scores	Stress & burnout reduction
17	Jadidi et al., 2024	Action Research	Pre-Hospital Emergency Staff	14	Stress management training	Several sessions	Osipow Job Stress Questionnaire	Significant reduction in job stress	Job stress reduction

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18	Bhanja et al., 2022	Cross-Sectional Study (3 waves)	Emergency Medicine Personnel	328-356 per wave	Leadership & teamwork strategies	3 time points	Maslach Burnout Inventory (MBI)	Strong leadership reduced burnout	Burnout prevention
19	Azizoddin et al., 2021	Pilot Study	Emergency Clinicians	32	Transcendental meditation training	3 months	Maslach Burnout Inventory (MBI)	Significant reduction in burnout & stress	Burnout reduction
20	Hendrikx et al., 2022	Cross-Sectional Quantitative Study	Emergency Healthcare Teams	200	Transformational leadership & team familiarity	Not specified	Maslach Burnout Inventory (MBI)	Moderate burnout levels, reduced with team familiarity	Individual & team resilience

Discussion

The systematic review we analyzed provides strong evidence that resilience training is an effective intervention to reduce burnout in ED healthcare workers, particularly in reducing emotional exhaustion and depersonalization symptoms (AlZahrani et al., 2024; Amirkhani et al., 2021). Particularly, holistic and cognitive behavioral intervention strategies enhanced stress and coping skills (Azizoddin et al., 2021; Bhanja et al., 2022).

As noted in numerous research studies, one of the findings that has been observed is the decline of emotional exhaustion which is categorized as one of the components of burnout (Anderson et al., 2021). Brown et al. (2021) and Hezaveh et al. (2021) demonstrated that there was a structured training approach to resilience which caused reduction in depersonalization and greater personal achievement and thus enhanced the mental health of the healthcare workers. Also, Mendlovic et al. (2023) and Lewis et al. (2022) stated that there was a stress, anxiety, and depression reduction with long term effects up to six months after the intervention. This is based on the analysis by Ho et al. (2024).

There are, nevertheless, certain obstacles in the unification of resilience training due to differences in methods of training, session length, and evaluation techniques (Badía et al., 2024; Wong et al., 2022). The intervention length of the included studies varied between 4 and 12 weeks, with differences in number of sessions and style of presentation attended (Azizoddin et al., 2021). Some programs focused on mindfulness exercises, while others utilized cognitive-behavioral techniques which resulted in differences in the findings and hence made comparison challenging (Bhanja et al., 2022).

The variety of assessment instruments like the Maslach Burnout Inventory (MBI), Connor-Davidson Resilience Scale (CD-RISC), Professional Quality of Life Scale (ProQOL), and Copenhagen Burnout Inventory (CBI) makes it very difficult to make comparisons between studies (Hezaveh et al., 2021). While numerous studies showed the promising outcomes, these suggest that many healthcare systems do not use uniform tools which are necessary for obtaining valid results in other systems.

A new major problem is the implementation of resilience training within the context of available healthcare services. Some studies by Bhanja et al. (2022) and Badía et al. (2024) have brought to light institutional limitations such as inadequate support from management, insufficient time for training amongst healthcare personnel, and lack of post-training reinforcement of resilience activities. Such structural hurdles point to the need to incorporate resilience programs into wider organizational policies to increase adoption and impact (Anderson et al., 2021; Ho et al., 2024).

Optimisation of strategies for interventions, particularly with regard to effective training time and the most appropriate training methods need to be the focus of future inquiries. Digital mental health resources and mobile applications could serve as new ways to promote participation in resilience training as suggested by (Chaudhry et al., 2022). Moreover, further research is necessary on the economic efficiency and feasibility of resilience training programs in various healthcare settings (Leppin et al.,2022).

In addition, the contribution of team-based approaches to fostering resilience is an area of research that looks promising, particularly with regard to peer support and leadership engagement strengthening the outcomes of resilience (Hendrikx et al., 2022).More interdisciplinary approaches to providing resilience training could improve the workplace culture and staff welfare morale (Power et al., 2022).

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The data presented indicates that resilience training reduces burnout and increases the psychological wellbeing of emergency healthcare personnel. While there are existing methodological issues, these structured resilience programs have proved to be very successful in stress management, emotion control, and overall job satisfaction. For best results, resilience training should be embedded into continuous professional education, institutional support for policy and framework, and sustained through post-training interventions and workplace wellness programs (Sarkar and Fletcher, 2018).

Recommendations

Based on the findings of this systematic review, we propose four main recommendations for the implementation of effective resilience training for healthcare workers in emergency departments (EDs). First, hospitals should develop ED-specific resilience programs that include stress inoculation training with realistic clinical scenarios, short 5-15 minute mindfulness or CBT modules that can be adapted to the shift system, and structured peer support sessions. These interventions should be designed with frontline medical staff to suit the unpredictable dynamics of emergency department work. Second, healthcare institutions should formally integrate resilience training into organizational policies, make it a mandatory part of staff orientation and annual competency assessments, and provide a minimum of 30 minutes of protected work time per week for participation. Digital platforms such as mobile apps and virtual reality simulations can increase accessibility for busy healthcare workers. Third, the research community should prioritize developing standardized protocols through expert consensus panels, focusing on core intervention components and consistent outcome measures such as the MBI emotional exhaustion subscale. Large-scale multicenter controlled trials with long-term follow-up are urgently needed to evaluate the sustainability of intervention effects. Finally, to ensure global relevance, adaptation strategies should be developed for facilities in resource-limited settings, for example through train-the-trainer models and offline digital tools.

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