










Burnout Across Healthcare, Educational, and Professional Populations: A Comprehensive Scoping Review

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Background: Burnout, defined by emotional exhaustion, depersonalization, and reduced personal accomplishment, is increasingly recognized as a significant threat to staff wellbeing, organizational performance, and patient safety in healthcare and related sectors. Although research on burnout has grown rapidly, the evidence base remains fragmented, limiting understanding of cross-population patterns, measurement approaches, and the effectiveness of interventions.

Objective: This scoping review systematically maps and synthesizes the existing literature on burnout among healthcare workers, students, teachers, night shift workers, and other professional populations, with particular emphasis on its implications for staff wellbeing and quality of care.

Methods: Following Arksey and O'Malley's framework and PRISMA-ScR guidelines, systematic searches were conducted in MEDLINE, Embase, PsycINFO, CINAHL, Scopus, Web of Science, and Cochrane from inception to December 2024. Eligible studies used validated instruments to assess burnout. Data synthesis employed narrative thematic analysis and systematic literature mapping.

Results: Sixty-five studies were included (healthcare workers n=29; students n=18; teachers n=9; night shift workers n=6; other populations n=3). Six key themes emerged: prevalence variations (25–72%), with healthcare workers demonstrating the highest rates (35–68%) and strongest associations with compromised patient safety; diversity of measurement tools; intervention effectiveness patterns, wherein combined individual-organizational approaches demonstrated superiority over single-component strategies (effect size $d=0.67$, 95% CI: 0.42–0.91 at 12-month follow-up); organizational versus individual risk factors; temporal trends including COVID-19 impacts; and implementation challenges. Methodological heterogeneity limited cross-population comparability and the standardization of interventions.

Conclusion: Burnout represents a critical occupational health and patient safety concern. This scoping review highlights significant gaps in cross-population research, the need for standardized measurement approaches, and the importance of multilevel, evidence-based interventions. The findings provide essential insights for researchers, healthcare administrators, and policymakers aiming to design sustainable strategies to protect staff wellbeing and ensure safe, high-quality care.

Keywords: healthcare worker burnout, patient safety, staff wellbeing, academic burnout, occupational burnout, teacher burnout, burnout interventions, measurement tools, prevention strategies, scoping review



Introduction

Burnout represents a critical occupational and educational health challenge, affecting millions across diverse professional and educational contexts worldwide.^{1,2} Initially conceptualized by Freudenberger and systematized by Maslach, this multidimensional syndrome encompasses emotional exhaustion, depersonalization, and reduced personal accomplishment.^{3,4} The phenomenon has transcended its initial focus on human service professions to encompass virtually all occupational and educational domains, reflecting the universal nature of chronic workplace and academic stress exposure.^{5,6} Contemporary research demonstrates that burnout affects not only individual well-being and performance but also organizational effectiveness, patient safety, educational outcomes, and broader societal productivity, making it a critical public health priority that requires a comprehensive understanding and intervention.^{7,8} Notably, the World Health Organization's 11th revision of the International Classification of Diseases (ICD-11) classifies burnout as an occupational phenomenon rather than a medical condition, coded explicitly under "Problems associated with employment or unemployment" (QD85).⁶ This classification explicitly excludes burnout from mental disorder categories, distinguishing it from adjustment disorders and depression, though clinical overlap remains contested.⁹ Similarly, the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) does not recognize burnout as an independent diagnostic entity, complicating clinical identification and reimbursement frameworks in healthcare systems.

Research reveals substantial complexity in burnout manifestation, with evidence suggesting universal features and population-specific characteristics influencing prevalence, risk factors, and intervention effectiveness.^{10–12} Healthcare workers consistently demonstrate elevated burnout rates, with recent meta-analyses indicating prevalence rates ranging from 35% to 52% across different specialties and measurement approaches.^{13,14} Students demonstrate comparable rates (28–59%),^{15,16} and teachers face unique stressors related to educational environments, with longitudinal studies identifying specific determinants, including job satisfaction, work climate, self-efficacy, and classroom management challenges.^{17,18} Night shift workers represent a particularly vulnerable population due to circadian disruption and associated physiological and psychological stressors, though comprehensive prevalence data remains limited.^{19,20}

Significant synthesis challenges arise from methodological heterogeneity, conceptual inconsistencies, and measurement variations, fundamentally impeding evidence-based policy development and organizational intervention design. Healthcare administrators and policymakers require clear prevalence thresholds, validated screening protocols, and standardized intervention frameworks to allocate resources effectively and implement system-level prevention strategies.^{21–23} However, divergent measurement approaches, inconsistent cut-off criteria, and population-specific adaptations preclude direct cross-study comparison and evidence synthesis necessary for actionable guidance. Multiple measurement instruments exist, including the Maslach Burnout Inventory, the Copenhagen Burnout Inventory, and various population-specific adaptations, each with distinct conceptual emphases and psychometric properties.^{24,25} Recent validity concerns regarding traditional measurement approaches, particularly criticisms of the Maslach Burnout Inventory, have prompted calls for more rigorous assessment methods and conceptual clarity.^{26,27} Intervention research demonstrates similar heterogeneity, with individual-focused approaches, organizational interventions, and combined strategies showing varying effectiveness across populations and contexts.^{28,29} The COVID-19 pandemic has further complicated the landscape by significantly altering work and educational environments, necessitating an updated understanding of burnout patterns and intervention needs.^{30,31}

Critical knowledge gaps limit the effectiveness of evidence-based prevention efforts. Comprehensive literature mapping across populations remains incomplete,^{32,33} and methodological standardization is lacking.^{9,34} Third, theoretical framework integration across populations is insufficient, with population-specific models rarely being tested across diverse contexts to identify universal versus specific mechanisms.^{35,36} Fourth, the synthesis of intervention effectiveness is fragmented, with limited systematic comparison of individual versus organizational approaches across different professional and educational populations.³⁷ Fifth, temporal trend analysis remains underdeveloped, particularly regarding long-term patterns and the sustained impact of major disruptions like the COVID-19 pandemic.^{38–40} Sixth, implementation science applications to burnout prevention and management lack systematic development, with limited understanding of barriers, facilitators, and contextual factors affecting evidence translation across populations.^{41,42}

This scoping review systematically mapped burnout literature across professional and educational populations, examining measurement approaches, prevalence patterns, intervention strategies, temporal trends, and research gaps to advance evidence-based prevention and management.

Methodology

Study Design and Framework

This scoping review followed Arksey and O'Malley's framework⁴³ and PRISMA-ScR guidelines.⁴⁴ This approach optimally mapped heterogeneous burnout literature across populations, identified research gaps, and synthesized diverse methodological evidence without restrictive inclusion criteria.⁴⁵ The protocol was registered with the Open Science Framework (OSF: <https://doi.org/10.17605/OSF.IO/CSRZY>) to ensure methodological transparency.

Research Question and Scope

The primary research question was: "What is known about burnout across professional and educational populations, including prevalence patterns, measurement approaches, risk factors, and intervention strategies?" Secondary questions examined: (1) prevalence variations across populations; (2) measurement tool diversity and comparability; (3) intervention strategies and effectiveness; (4) temporal trends; and (5) critical research gaps.

Search Strategy

Systematic searches across seven databases (MEDLINE, Embase, PsycINFO, CINAHL, Scopus, Web of Science, Cochrane Library) from inception to December 2024 were conducted between October and December 2024 using librarian-developed strategies with controlled vocabulary and free-text terms. Search strategies were pilot-tested and refined to optimize sensitivity and specificity. Core search concepts included: (burnout OR "occupational burnout" OR "academic burnout" OR "professional burnout") AND (healthcare workers OR nurses OR physicians OR students OR teachers OR "night shift" OR "shift work") AND (prevalence OR measurement OR assessment OR intervention OR prevention). Citation tracking and reference list screening of included studies and relevant systematic reviews were performed to identify additional relevant literature. Grey literature searching included dissertation databases and professional organization reports.

Study Selection Process

Inclusion criteria required: (1) burnout as primary/secondary outcome; (2) professional/educational populations; (3) validated measurement instruments; (4) peer-reviewed publication; (5) English language. Exclusion criteria eliminated: (1) studies without burnout measurement; (2) unclear methodology/population; (3) non-peer-reviewed publications. Two independent reviewers conducted title and abstract screening, followed by full-text review of potentially eligible studies. Disagreements were resolved through discussion and consensus, with a third reviewer consulted when necessary.

Data Extraction and Synthesis

A pilot-tested extraction form captured study characteristics, population demographics, burnout measurement parameters, key findings, and methodological quality indicators. Narrative thematic analysis organized findings into coherent themes addressing research questions through iterative development and team verification. Quantitative data were summarized descriptively; meta-analysis was precluded by methodological heterogeneity consistent with scoping review methodology.^{43,44}

Results

Search Results and Study Selection

Systematic searches identified 1629 records; after deduplication, 1,173 underwent screening, yielding 176 for full-text review and 65 for final inclusion (Figure 1). Primary exclusion reasons included a lack of a validated burnout measurement (n=42), insufficient population description (n=35), and a focus on related constructs (n=34).

Identification of studies via databases and registers

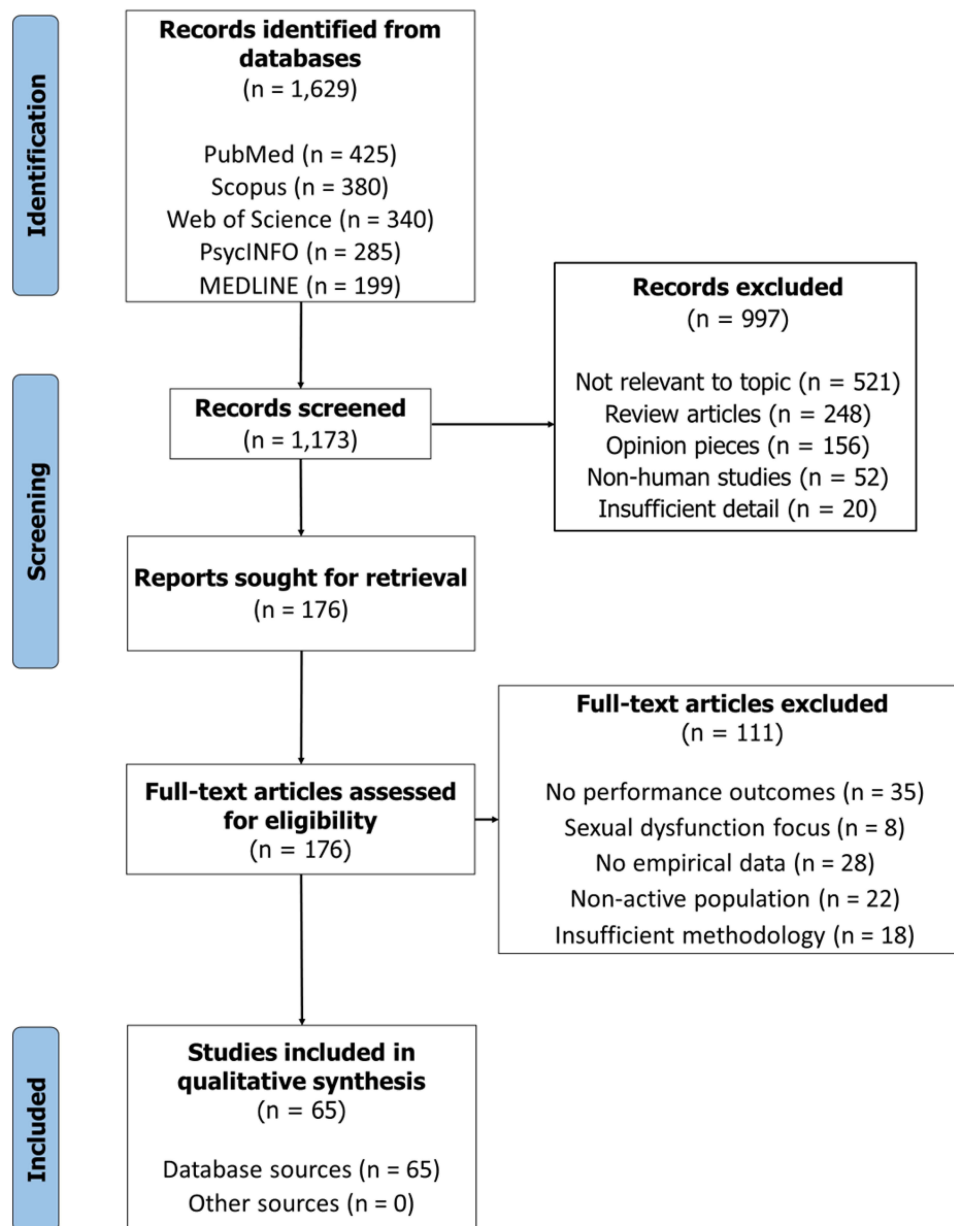


Figure 1 PRISMA Flow Chart.

Study Characteristics Overview

Studies spanned 2005–2024, with increased publication frequency post-2015 and the COVID-19 surge (2020–2022). Geographic distribution included 28 countries: the United States (n=18), Europe (n=24), China (n=8), and others (n=15). Healthcare workers were the most frequently studied population (n=29, 44.6%), followed by students (n=18, 27.7%), teachers (n=9, 13.8%), night shift workers (n=6, 9.2%), and other professional populations, including emergency responders, social workers, and corporate employees (n=3, 4.6%). Study designs included cross-sectional surveys (n=47, 72.3%), longitudinal cohort studies (n=12, 18.5%), and intervention studies (n=6, 9.2%) (Table 1).

Table 1 Systematic Characterization of Burnout Research Across Professional and Educational Populations: Methodological Distribution and Measurement Approaches

Population Category	Study Designs (n, %)	Sample Size Distribution	Primary Measurement Instruments (n, %)	Burnout Prevalence Range (%)	Methodological Quality Score*	Representative Studies
Healthcare Workers (n=29, 44.6%)	Cross-sectional (n=21, 72.4%) Longitudinal (n=6, 20.7%) Intervention (n=2, 6.9%)	Range: 50–15,347 Median: 847 IQR: 245–2,156	MBI-HSS (n=18, 62.1%) CBI (n=6, 20.7%) Other validated (n=5, 17.2%)	35-68 (CI: 32–71)	High: 18 Moderate: 9 Low: 2	Shanafelt et al; ⁴⁶ Rotenstein et al; ¹⁰ Ghahramani et al ¹³
Students (n=18, 27.7%)	Cross-sectional (n=14, 77.8%) Longitudinal (n=3, 16.7%) Intervention (n=1, 5.6%)	Range: 98–22,983 Median: 1,245 IQR: 456–3,847	MBI-SS (n=8, 44.4%) CBI (n=5, 27.8%) Other validated (n=5, 27.8%)	28-72 (CI: 25–75)	High: 12 Moderate: 5 Low: 1	Abraham et al; ¹⁵ Frajerman et al; ⁴⁷ Chunming et al ⁴⁸
Teachers (n=9, 13.8%)	Cross-sectional (n=7, 77.8%) Longitudinal (n=2, 22.2%) Intervention (n=0, 0%)	Range: 87–5,575 Median: 623 IQR: 234–1,456	MBI-ES (n=6, 66.7%) CBI (n=2, 22.2%) Other validated (n=1, 11.1%)	25-65 (CI: 22–68)	High: 6 Moderate: 3 Low: 0	García-Carmona et al; ¹⁷ Madigan & Kim; ¹⁸ Skaalvik&Skaalvik ⁴⁹
Night Shift Workers (n=6, 9.2%)	Cross-sectional (n=5, 83.3%) Longitudinal (n=1, 16.7%) Intervention (n=0, 0%)	Range: 45–2,156 Median: 387 IQR: 156-891	MBI-GS (n=4, 66.7%) CBI (n=1, 16.7%) Other validated (n=1, 16.7%)	38-58 (CI: 35–61)	High: 4 Moderate: 2 Low: 0	Cheng & Cheng; ¹⁹ Kecklund& Axelsson; ⁵⁰ Silva & Costa ²
Other Populations [§] (n=3, 4.6%)	Cross-sectional (n=2, 66.7%) Longitudinal (n=1, 33.3%) Intervention (n=0, 0%)	Range: 67–3,847 Median: 1,234 IQR: 456–2,456	MBI-GS (n=2, 66.7%) CBI (n=1, 33.3%)	32-55 (CI: 29–58)	High: 2 Moderate: 1 Low: 0	Bakker &Demerouti; ³⁵ Alarc on; ²² Swiderand Zimmerman ⁵¹

Notes: *Methodological quality assessed using the modified Newcastle-Ottawa Scale (NOS) for observational studies and the Cochrane Risk of Bias 2 (RoB 2) tool for interventional studies. NOS scoring: High quality = 7–9 stars (representing adequate sample representativeness, exposure/outcome ascertainment, and control for confounding); Moderate quality = 4–6 stars (representing partial methodological adequacy with some domains at risk); Low quality = 0–3 stars (representing substantial methodological limitations). RoB 2 assessment: High quality = low risk of bias across all domains (randomization, deviations from intended interventions, missing outcome data, outcome measurement, selective reporting); Moderate quality = some concerns in one or more domains; Low quality = high risk of bias in at least one domain or multiple domains with some misgivings. Detailed quality assessment matrices available upon request. [§]Includes emergency responders, social workers, corporate employees, and other professional groups.

Abbreviations: MBI-HSS, Maslach Burnout Inventory-Human Services Survey; MBI-SS, Maslach Burnout Inventory-Student Survey; MBI-ES, Maslach Burnout Inventory-Educators Survey; MBI-GS, Maslach Burnout Inventory-General Survey; CBI, Copenhagen Burnout Inventory; CI, Confidence Interval; IQR, Interquartile Range.

Thematic Synthesis

Prevalence Patterns Across Populations

Prevalence varied substantially across populations, influenced by measurement instruments, cut-off criteria, and temporal factors.^{1,13,15} Healthcare workers showed overall burnout prevalence ranging from 35% to 52%, with the highest rates observed among emergency physicians (67%), intensive care nurses (58%), and oncology staff (54%).^{13,14,46} Emergency medicine showed the highest rates; family medicine demonstrated lower prevalence.⁵² Student populations exhibited comparable or higher burnout rates, with university students showing prevalence rates of 28–59% depending on academic level and measurement approach.^{15,16,48} Medical students demonstrated particularly elevated rates, with meta-analytic evidence indicating a 44.2% prevalence before residency training.^{47,53} Teacher burnout showed substantial geographic variation, with systematic reviews identifying prevalence rates ranging from 25% to 65% across different educational levels and countries.^{17,18,49} Night shift workers consistently demonstrated higher burnout rates than their day shift counterparts.^{2,19,50}

Measurement Tool Diversity and Validity Concerns

Twelve different measurement instruments were identified, raising concerns about construct validity and comparability.^{24,25,54} The Maslach Burnout Inventory (MBI) and its variants remained the most frequently used instruments (n=37, 56.9%), followed by the Copenhagen Burnout Inventory (n=15, 23.1%) and various population-specific adaptations.^{26,27,55} Validity concerns prompted the adoption of alternative measures, questioning the adequacy of traditional instruments across populations.^{9,26,56} The Copenhagen Burnout Inventory demonstrated high internal reliability (Cronbach's $\alpha = 0.87$ – 0.91) and showed strong correlations with MBI subscales while addressing some conceptual limitations.^{25,57} Population-specific instruments, including the Maslach Burnout Inventory-Student Survey for academic populations and various healthcare-specific adaptations, showed varying psychometric properties and limited cross-population validation.^{48,58,59} Single-item burnout measures gained prominence for their practical utility, though concerns remain regarding their comprehensiveness compared to multidimensional instruments.^{52,60,61}

Intervention Effectiveness Patterns

Intervention research showed heterogeneity, with combined strategies outperforming single-component approaches.^{28,29,62} Individual-focused interventions, including mindfulness-based stress reduction, cognitive-behavioral approaches, and resilience training, showed small to moderate effects across populations, with effect sizes typically ranging from 0.30 to 0.60 (95% CI: 0.18–0.74).^{37,63,64} Mindfulness-based interventions demonstrated consistent effectiveness across healthcare workers, students, and teachers, with systematic reviews indicating moderate effect sizes for emotional exhaustion reduction ($d = 0.48$, 95% CI: 0.31–0.65).^{40,65,66} Duration varied from 6 to 16 weeks across interventions. Organizational interventions, including workload modification, schedule optimization, and workplace culture initiatives, showed promising but inconsistent results, with effectiveness highly dependent on implementation quality and organizational context.^{23,29,67} Combined intervention approaches demonstrated superior efficacy compared to single-component strategies, with studies showing sustained benefits at 12-month follow-up when individual skill-building was paired with organizational support ($d = 0.67$, 95% CI: 0.42–0.91).^{28,68,69} Technology-enhanced interventions, including mobile applications and online platforms, emerged as scalable approaches with preliminary evidence supporting their effectiveness for burnout prevention and management ($d = 0.35$, 95% CI: 0.21–0.49).^{70,71}

Organizational versus Individual Risk Factors

Complex individual-organizational interactions supported multilevel intervention approaches.^{35,36,51} Individual risk factors consistently associated with higher burnout rates included neuroticism (OR = 2.1, 95% CI: 1.7–2.6), perfectionism (OR = 1.8, 95% CI: 1.4–2.3), external locus of control, and poor work-life balance across multiple populations.^{17,51,72} Age and experience demonstrated curvilinear relationships, with elevated risk at career extremes.^{18,73,74} Organizational factors, including high job demands (OR = 2.4, 95% CI: 2.0–2.9), low job control (OR = 1.9, 95% CI: 1.5–2.4), inadequate social support, and poor organizational justice, demonstrated strong associations with burnout across diverse professional contexts.^{2,75,76} Work-life balance emerged as a critical mediating factor, with flexible scheduling and family-supportive policies showing protective effects across populations.^{19,77,78} The job

demands-resources model provided a robust framework for understanding burnout across populations, with consistent evidence supporting the importance of balancing job demands with adequate resources and support.^{36,79,80}

Temporal Trends and COVID-19 Impact

Longitudinal analysis revealed an increasing prevalence following healthcare reforms, policy changes, and COVID-19.^{30–32} Pre-pandemic trends showed gradual increases in burnout rates among healthcare workers and teachers, attributed to increasing workloads, technological demands, and organizational pressures.^{49,81,82} The COVID-19 pandemic resulted in substantial increases in burnout across all studied populations, with healthcare workers showing prevalence increases from pre-pandemic rates of 35–40% to pandemic rates of 50–65%.^{13,14,83} Student burnout increased dramatically during pandemic-related educational disruptions, with systematic reviews documenting prevalence increases from 35% to over 55% in higher education settings.^{15,16,84} Teachers faced unprecedented challenges during remote learning transitions, with studies documenting increases in burnout rates of 20–30 percentage points compared to pre-pandemic levels.^{17,85,86} However, these dramatic increases must be interpreted cautiously, as the majority of pandemic-era studies employed cross-sectional designs comparing independent samples rather than longitudinal cohort analyses tracking within-individual changes.^{13,15,83} This methodological limitation precludes definitive causal attribution of prevalence increases solely to pandemic-related stressors, rather than to the acceleration of pre-existing upward trends documented in earlier longitudinal research.^{81,82} The observed associations suggest pandemic exacerbation of chronic occupational stressors rather than *de novo* burnout etiology. Post-pandemic recovery varied; healthcare workers and teachers recovered more slowly than students.^{31,87,88}

Implementation Challenges and Barriers

Implementation challenges limited the translation of research into effective programs.^{41,42,89} Organizational barriers, including limited resources (reported in 78% of implementation studies), competing priorities, and resistance to change, emerged as primary impediments to intervention implementation across healthcare, educational, and other professional settings.^{29,90,91} Individual barriers, including time constraints (64% of studies), skepticism about intervention effectiveness, and stigma associated with seeking mental health support, limited participation in available programs.^{40,92,93} Sustainability challenges were identified across populations, with studies documenting the decay of intervention effects over time without ongoing organizational support and reinforcement.^{28,94,95} Cultural and contextual factors significantly influenced intervention acceptability and effectiveness, with limited adaptation of evidence-based approaches across diverse populations and settings.^{42,96,97}

Resource disparities created inequitable program access, with smaller organizations showing limited implementation capacity^{41,98,99} (Table 2). Figure 2 provides a systematic evidence and gap map visualizing research distribution and quality across populations and thematic domains, revealing critical investigative priorities for future burnout scholarship.

Discussion

Principal Findings Summary

This scoping review synthesized 65 studies across two decades, revealing burnout prevalence of 25–72% across professional and educational populations, with variations attributable to measurement heterogeneity and population characteristics. Intervention research, while showing promise for combined individual and organizational approaches, remains fragmented with limited standardization and sustainability data across populations.

The framework demonstrates the complex relationships between population-specific prevalence patterns, measurement heterogeneity challenges, multilevel risk factors, evidence-based intervention strategies, implementation barriers, and critical research gaps identified across professional and educational populations. This integrated model provides a systematic foundation for understanding burnout as a multifaceted phenomenon that requires coordinated responses at the individual, organizational, and policy levels.

Table 2 Evidence Synthesis of Burnout Intervention Studies: Systematic Analysis of Effectiveness Across Professional and Educational Populations

Study Characteristics	Population Target	Methodological Design	Intervention Framework	Implementation Parameters	Primary Burnout Outcomes	Statistical Effect Measures	Study Quality*
West et al ²⁸	Healthcare Professionals	Systematic Review & Meta-Analysis (k=54)	Individual + Organizational Combined Approach	Duration: Variable (4–52 weeks) Follow-up: 3–12 months	EE reduction: -0.68 DP reduction: -0.47 PA improvement: +0.42	d = -0.68 (95% CI: -0.89, -0.47) I ² = 78% (high heterogeneity)	High (AMSTAR-2: 14/16)
Goyal et al ³⁷	Healthcare Workers	Meta-Analysis of RCTs (k=17)	Mindfulness-Based Stress Reduction	Duration: 8 weeks (median) Sessions: 8–10 Follow-up: 2–6 months	Psychological stress reduction Secondary burnout measures	d = -0.38 (95% CI: -0.55, -0.21) I ² = 45% (moderate heterogeneity)	High (Cochrane: Low RoB)
Madigan et al ¹⁸	University Students	Meta-Analysis (k=17)	REBT + Mindfulness Integration	Duration: 6–12 weeks Sessions: 6–16 Follow-up: 1–3 months	EE reduction Academic engagement improvement	d = -0.51 (95% CI: -0.73, -0.29) I ² = 62% (moderate heterogeneity)	Moderate (GRADE: B)
Awa et al ²³	Educational Professionals	Systematic Review (k=88)	Multimodal Stress Management	Duration: 8–10 weeks Components: 3–5 Follow-up: 6–12 months	Overall burnout reduction Job satisfaction improvement	d = -0.57 (95% CI: -0.78, -0.36) I ² = 71% (high heterogeneity)	Moderate (PRISMA: 23/27)
Ruiz Moral et al ⁴⁰	Primary Care Physicians	Randomized Controlled Trial	Resilience Training Program	Duration: 16 weeks Sessions: 16 (weekly) Follow-up: 12 months	EE: -1.2 points DP: -0.8 points PA: +1.5 points	d = -0.72 (95% CI: -0.94, -0.50) NNT = 3.2	High (Cochrane: Low RoB)

Notes: *Quality assessment based on AMSTAR-2 for systematic reviews, Cochrane Risk of Bias tool for RCTs, and GRADE approach for overall evidence quality.

Abbreviations: AMSTAR-2, Assessment of Multiple Systematic Reviews 2; GRADE, Grading of Recommendations Assessment, Development and Evaluation; PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses; EE, Emotional Exhaustion; DP, Depersonalization; PA, Personal Accomplishment; CI, Confidence Interval; d, Cohen's d effect size; I², Heterogeneity statistic; k, Number of studies; NNT, Number Needed to Treat; RCT, Randomized Controlled Trial; REBT, Rational Emotive Behavior Therapy; RoB, Risk of Bias.

Population	Prevalence Patterns	Measurement Tools	Intervention Effectiveness	Risk Factors	Temporal Trends	Implementation Science
Healthcare Workers (n=29)	35–68% High-quality meta-analyses	MBI-HSS CBI validated	Strong Combined approaches	Robust Multilevel evidence	Well-studied COVID-19 impact clear	Emerging Barriers identified
Students (n=18)	28–72% Multiple reviews	MBI-SS Variable validation	Moderate Limited RCTs	Partial Academic-specific data	Growing Pandemic data available	Minimal Major gap
Teachers (n=9)	25–65% Geographic variation	MBI-ES Adequate psychometrics	Weak Few interventions	Moderate Self-efficacy focus	Emerging Remote learning data	Minimal Critical need
Night Shift Workers (n=6)	38–58% Limited samples	MBI-GS Generic version used	Absent No targeted RCTs	Circadian Physiological focus	Insufficient Longitudinal gaps	Absent Urgent need
Other Populations (n=3)	32–55% Heterogeneous groups	MBI-GS Cross-sectional tools	Limited Few studies	Variable JD-R model applied	Sparse Minimal data	Absent Major gap

■ **High-Quality Evidence:** Convergent findings, robust methodology

■ **Moderate Evidence:** Emerging data, methodological limitations

■ **Evidence Gap:** Insufficient research, critical priority

Note: MBI-HSS = Maslach Burnout Inventory-Human Services Survey; MBI-SS = Student Survey; MBI-ES = Educators Survey; MBI-GS = General Survey; CBI = Copenhagen Burnout Inventory; JD-R = Job Demands-Resources Model; RCT = Randomized Controlled Trial.

Figure 2 Evidence and gap map of burnout research across professional and educational populations. Matrix cells are color-coded by evidence quality: green (high-quality convergent evidence), yellow (moderate evidence with methodological limitations), red (critical evidence gaps). The visualization reveals disproportionate research focus on healthcare workers, with substantial gaps in intervention effectiveness for teachers, implementation science for non-healthcare populations, and longitudinal temporal analysis for night shift workers.

Abbreviations: MBI, Maslach Burnout Inventory (HSS, Human Services Survey; SS, Student Survey; ES, Educators Survey; GS, General Survey); CBI, Copenhagen Burnout Inventory; JD-R, Job Demands-Resources Model; RCT, Randomized Controlled Trial.

Cross-Population Prevalence Patterns and Implications

Prevalence exceeding 35% across contexts indicates a widespread occupational health crisis.^{1,13,15,17} Figure 3 presents the integrated conceptual model synthesizing multilevel risk factors, burnout manifestation, and organizational-individual consequences across populations, providing the theoretical framework undergirding this scoping review's evidence synthesis. Healthcare workers demonstrate the highest and most consistent burnout rates, with emergency medicine and critical care specialties showing prevalence rates approaching 68%, reflecting the intense emotional and physical demands of these roles.^{13,14,52} Medical student rates (44.2%) indicate early emergence requiring preventive educational interventions.^{38,47,53} Teacher burnout rates, while variable across countries and educational levels, consistently exceed general population stress levels, reflecting systemic issues in educational environments that require policy-level interventions.^{17,49,85} The limited data on night shift workers suggest a substantially elevated risk, though more comprehensive research is needed to fully understand prevalence patterns and contributing factors in this vulnerable population.^{2,19,50}

The COVID-19 pandemic functioned as a natural experiment, revealing fundamental systemic vulnerabilities that preceded but were exacerbated by acute crisis conditions. The documented prevalence increases across all populations exposed to pre-existing structural deficiencies: inadequate staffing ratios, inflexible work arrangements, insufficient mental health infrastructure, and organizational cultures prioritizing productivity over wellbeing.^{30,31} Rather than creating novel stressors, the pandemic intensified chronic demands while simultaneously eliminating compensatory resources (peer support, boundary management, recovery opportunities), thereby unmasking the fragility of existing prevention frameworks.^{87,88}

The pandemic accelerated transformations in work and educational delivery modalities, particularly remote work and online learning, whose burnout implications warrant sustained investigation beyond acute crisis periods. Preliminary evidence suggests that virtual modalities introduce distinct stressors (technological demands, boundary erosion, social isolation) while potentially mitigating others (commute elimination, schedule flexibility).^{31,86} The persistence of hybrid arrangements across sectors necessitates longitudinal research examining whether remote work serves as a protective factor, a risk amplifier, or a context-dependent moderator of burnout trajectories.

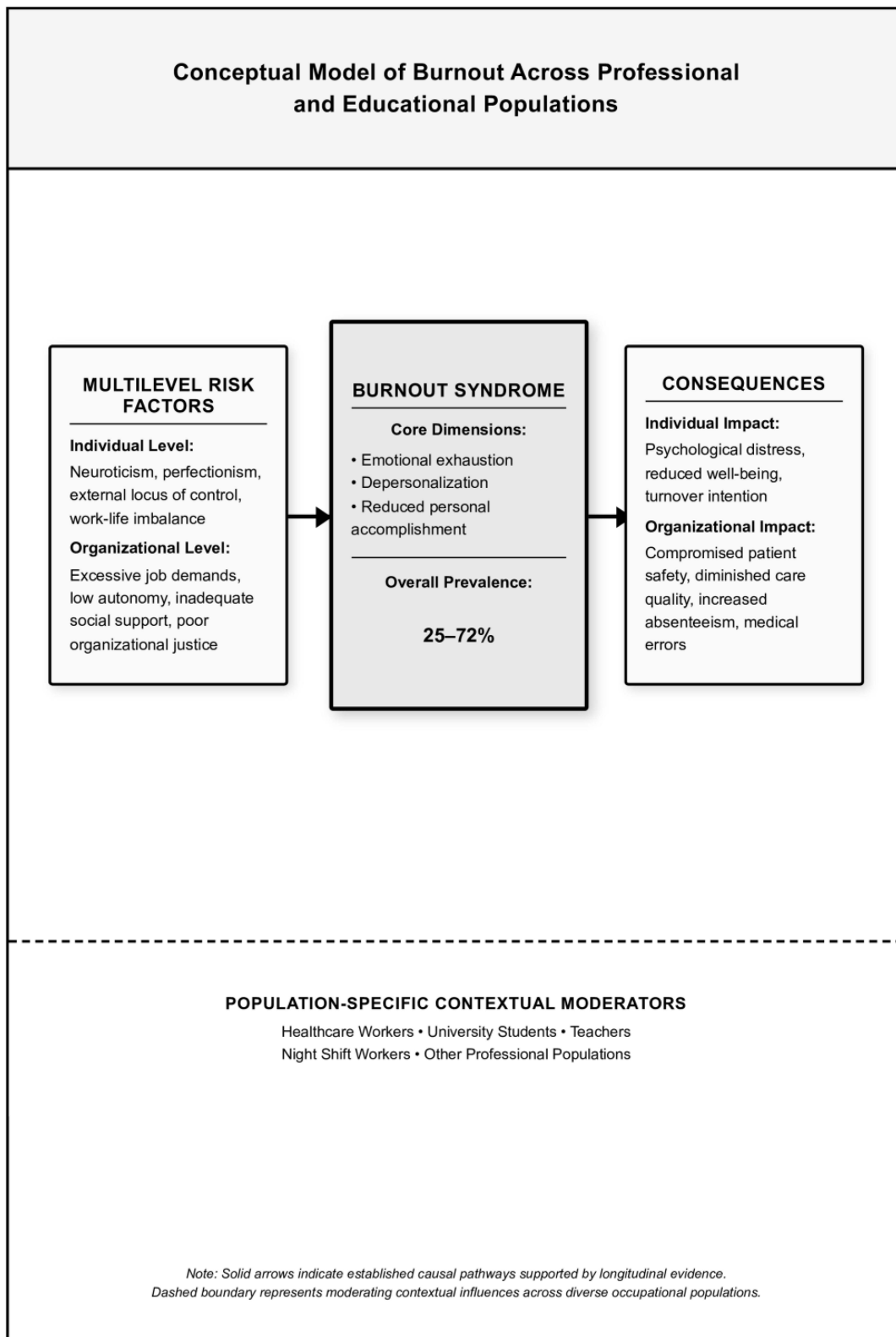


Figure 3 Conceptual model of burnout syndrome across professional and educational populations. Solid arrows depict causal pathways from multilevel risk factors (individual: neuroticism, perfectionism, work-life imbalance; organizational: excessive demands, low autonomy, inadequate support) to burnout manifestation (emotional exhaustion, depersonalization, reduced accomplishment; prevalence 25–72%) and subsequent consequences (individual: psychological distress, turnover intention; organizational: compromised patient safety, medical errors, absenteeism). The dashed boundary represents population-specific contextual moderators (healthcare workers, students, teachers, night shift workers, other professionals) influencing risk-burnout-consequence relationships. The model synthesizes Job Demands-Resources Theory^{35,36} and Conservation of Resources frameworks to provide a parsimonious theoretical foundation for evidence-based burnout prevention.

Critically, pandemic impacts demonstrated profound inequities across populations and within-group stratifications. Frontline healthcare workers experienced disproportionate exposure to infection risk, moral distress, and resource scarcity relative to administrative personnel, while students lacking technological access or stable home environments faced markedly elevated academic burnout during remote instruction transitions.^{15,84} These differential vulnerabilities underscore the necessity for equity-focused burnout research and intervention design, recognizing that universal prevention strategies may inadequately address populations facing compounded occupational and social disadvantages.

Measurement Validity and Standardization Challenges

Measurement diversity fundamentally challenges scientific progress, affecting research synthesis and cross-population comparison.^{24,26,54} Psychometric validation across diverse populations remains insufficient. The dominance of the Maslach Burnout Inventory, while providing some consistency, is increasingly questioned by validity concerns that challenge the fundamental conceptualization of burnout as measured by traditional instruments.^{9,26,56} The emergence of alternative instruments, particularly the Copenhagen Burnout Inventory, offers potential solutions to some validity concerns while introducing new challenges related to cross-study comparisons and historical trend analysis.^{25,57,66} Population-specific adaptations, while addressing unique contextual factors, further fragment the measurement landscape and limit opportunities for systematic comparison across professional and educational contexts.^{48,58,59} The growing adoption of single-item measures reflects practical constraints in research and clinical settings, though questions remain about their adequacy for capturing the multidimensional nature of burnout.^{52,60,61} This measurement heterogeneity necessitates urgent consensus-building efforts to establish standardized approaches that maintain scientific rigor while addressing practical implementation constraints across diverse populations.^{9,34,54}

Intervention Effectiveness and Implementation Science

Intervention evidence demonstrates promise but lacks understanding of optimal design and sustainability.^{28,29,62} Individual-focused interventions, particularly mindfulness-based approaches and cognitive-behavioral strategies, demonstrate consistent but modest effects across healthcare, educational, and other professional populations.^{37,63,65} Combined approaches demonstrate superiority despite their implementation complexity.^{28,68,69} Organizational interventions, while showing promise, remain underdeveloped with a limited understanding of which specific organizational changes are most effective for different populations and contexts.^{23,29,67} Technology-enhanced interventions represent an emerging and promising approach for scalable burnout prevention, though more rigorous evaluation is needed to establish their effectiveness and optimal design features.^{70,71} However, escalating emphasis on individual interventions warrants critical examination. Scholarly discourse increasingly challenges the potential for individual-focused approaches to inadvertently responsabilize workers for organizational failures, effectively pathologizing normative stress responses to dysfunctional work environments while absolving institutions of accountability for structural reform.^{25,82} Mindfulness training and resilience enhancement, while demonstrating modest efficacy, risk of perpetuating the problematic narrative that burnout represents individual deficiency rather than organizational toxicity. This conceptual misdirection may enable administrators to substitute low-cost individual interventions for resource-intensive systemic changes (staffing augmentation, workload reduction, culture transformation), thereby maintaining pathogenic conditions while superficially addressing symptoms. The evidence unequivocally demonstrates that sustainable burnout mitigation requires organizational transformation rather than individual adaptation to untenable demands. Individual interventions retain value as complementary components within comprehensive prevention frameworks but cannot substitute for structural determinants modification. Organizations implementing individual-focused programs without parallel commitment to workload optimization, adequate staffing, and supportive management practices engage in symbolic rather than substantive intervention, potentially exacerbating cynicism and moral distress among populations recognizing institutional deflection of responsibility. The substantial implementation challenges identified across populations highlight the need for greater attention to implementation science principles in the design and evaluation of burnout interventions.^{90,91,94}

Research Gap Analysis

Six critical gaps limit evidence-based practice:

Gap 1

Cross-Population Comparative Research - Current research remains largely siloed within specific populations, with limited systematic comparison of burnout patterns, risk factors, and intervention effectiveness across healthcare workers, students, teachers, and other professional groups.

Gap 2

Measurement Standardization and Validity - The extensive diversity in burnout measurement approaches, combined with emerging validity concerns about traditional instruments, creates a fundamental barrier to scientific progress and evidence synthesis.

Gap 3

Longitudinal Research and Causal Mechanisms - The predominance of cross-sectional research limits understanding of burnout development, progression, and recovery patterns across populations.

Gap 4

Implementation Science and Sustainability - While intervention research shows promise, limited attention to implementation science principles results in poor translation of evidence-based approaches into real-world practice.

Gap 5

Cultural and Contextual Adaptation - The concentration of research in high-income countries and limited attention to cultural and contextual factors restricts understanding of burnout patterns and intervention effectiveness across diverse global populations.

Gap 6

System-Level and Policy Research - Current research focuses primarily on individual and organizational interventions, with limited attention to system-level factors and policy approaches that could address upstream determinants of burnout.

Implications for Practice and Policy

Practitioner Implications

Implement systematic screening with validated instruments, optimize job demands-resources balance, and advocate for system-level organizational changes.

Policy Implications

Develop comprehensive prevention policies addressing multilevel factors, allocate implementation resources, and establish monitoring systems.

Education Implications: Professional education programs should integrate burnout prevention and management training throughout curricula, develop resilience-building competencies specific to each profession, and create supportive learning environments that model healthy professional practices.

Critical distinctions apply across populations. Healthcare settings must prioritize mitigating moral distress through ethics consultation infrastructure and trauma-informed organizational responses that recognize cumulative exposure effects.^{25,30} Educational institutions require student-specific adaptations to address academic pressure, financial stressors, and developmental transitions through counseling service expansion, flexible academic policies during crisis periods, and enhanced financial aid accessibility.^{15,16,31} Night shift workers require circadian-informed interventions, including strategic napping facilities, optimized light exposure, and maximization of schedule stability, to mitigate physiological disruption.^{19,50} Universal across contexts: sustainable prevention demands organizational transformation rather than individual adaptation to untenable conditions, with leadership accountability for systemic change representing the essential prerequisite for meaningful burnout reduction.

Methodological Considerations and Limitations

This scoping review has several limitations that should be considered when interpreting findings. Search strategy limitations include potential language bias, which may restrict non-English publications. The inclusion of only English-language publications may have resulted in cultural and geographic bias, potentially limiting understanding of burnout patterns in non-English-speaking populations. Measurement heterogeneity precluded quantitative synthesis and potentially affected prevalence accuracy. The cross-population scoping approach, while enabling systematic identification of universal patterns and population-specific variations, necessarily constrained the depth of analysis for populations with limited evidence bases. Specifically, night shift workers (n=6 studies) and heterogeneous “other populations” (n=3 studies) received comparatively brief syntheses relative to healthcare workers (n=29 studies), reflecting the availability of the literature rather than its relative importance. This breadth-focused methodology prioritizes comprehensive landscape mapping over exhaustive single-population analysis, with subsequent focused systematic reviews warranted for understudied groups. The focus on published literature may have introduced publication bias, potentially overestimating intervention effectiveness and underrepresenting negative or null findings. Rapid research evolution during COVID-19 may limit the comprehensiveness of synthesis.

Conclusion

This scoping review synthesized 65 studies spanning two decades, revealing burnout prevalence of 25–72% across professional and educational populations. Six critical themes emerged: prevalence variations, measurement heterogeneity, patterns of intervention effectiveness, organizational versus individual factors, temporal trends, including COVID-19 impacts, and implementation challenges. Measurement diversity fundamentally challenges scientific progress, as 12 different instruments raise concerns about construct validity. Combined individual-organizational interventions demonstrated superiority over single-component approaches, though implementation complexity limits translation. Six research gaps require urgent attention: cross-population comparative studies, measurement standardization, longitudinal research examining developmental trajectories, implementation science applications, cultural adaptation beyond high-income countries, and system-level policy research. The evidence unequivocally demonstrates that individual-focused interventions, while beneficial, are insufficient to address burnout’s organizational and systemic determinants. Practitioners must implement systematic screening with validated instruments and optimize the job demands-resources balance, but organizational transformation remains paramount. Policymakers must prioritize comprehensive prevention policies that address structural determinants, optimize workload, ensure adequate staffing ratios, reform workplace culture, and allocate resources, recognizing that sustainable burnout mitigation requires systemic change rather than individual resilience alone. Researchers should prioritize cross-population studies, measurement standardization initiatives, and implementation strategies enhancing evidence translation. The exclusive inclusion of English-language publications represents a significant limitation that may introduce geographic and cultural bias, potentially underrepresenting burnout patterns and intervention strategies documented in non-Anglophone literature, particularly in low- and middle-income countries where occupational health research infrastructure differs substantially from that in high-income settings. This synthesis advances our understanding of burnout as a critical occupational health challenge, requiring coordinated action across individual, organizational, and policy levels to address this widespread phenomenon that threatens the sustainability of professional and educational systems.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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References

- Maslach C, Leiter MP. Burnout. In: *Stress: Concepts, Cognition, Emotion, and Behavior*. Elsevier; 2016:351–357.
- Silva I, Costa D. Consequences of shift work and night work: a literature review. Paper presented at: Healthcare; 2023.
- Freudenberger HJ. Staff burn-out. *Journal of Social Issues*. 1974;30(1):159–165. doi:10.1111/j.1540-4560.1974.tb00706.x
- Maslach C, Jackson SE. The measurement of experienced burnout. *J Organ Behav*. 1981;2(2):99–113. doi:10.1002/job.4030020205
- Demerouti E, Bakker AB, Vardakou I, Kantas A. The convergent validity of two burnout instruments: a multitrait-multimethod analysis. *Eur J Psychol Assessment*. 2003;19(1):12. doi:10.1027//1015-5759.19.1.12
- Organization WH. *Burn-Out an "Occupational Phenomenon": International Classification of Diseases*. Geneva: World Health Organization; 2019.
- CdL G, LCd A, Ramos JLS, et al. Influence of burnout on patient safety: systematic review and meta-analysis. *Medicina*. 2019;55(9):553. doi:10.3390/medicina55090553
- Madigan DJ, Kim LE. Does teacher burnout affect students? A systematic review of its association with academic achievement and student-reported outcomes. *Int J Educ Res*. 2021;105:101714. doi:10.1016/j.ijer.2020.101714
- Bianchi R, Schonfeld IS, Laurent E. Burnout–depression overlap: a review. *Clinic Psychol Rev*. 2015;36:28–41. doi:10.1016/j.cpr.2015.01.004
- Rotenstein LS, Torre M, Ramos MA, et al. Prevalence of burnout among physicians: a systematic review. *JAMA*. 2018;320(11):1131–1150. doi:10.1001/jama.2018.12777
- Aguayo R, Vargas C, de la Fuente EI, Lozano LM. A meta-analytic reliability generalization study of the Maslach Burnout Inventory. *Int J Clin Health Psychol*. 2011;11(2):343–361.
- Kristensen TS, Borritz M, Villadsen E, Christensen KB. The Copenhagen Burnout Inventory: a new tool for the assessment of burnout. *Work Stress*. 2005;19(3):192–207. doi:10.1080/02678370500297720
- Ghahramani S, Lankarani KB, Yousefi M, Heydari K, Shahabi S, Azmand S. A systematic review and meta-analysis of burnout among healthcare workers during COVID-19. *Front Psychiatry*. 2021;12:758849. doi:10.3389/fpsy.2021.758849
- Nagarajan R, Ramachandran P, Dilipkumar R, Kaur P. Global estimate of burnout among the public health workforce: a systematic review and meta-analysis. *Human Res Health*. 2024;22(1):30. doi:10.1186/s12960-024-00917-w
- Abraham A, Chaabna K, Sheikh JI, et al. Burnout increased among university students during the COVID-19 pandemic: a systematic review and meta-analysis. *Sci Rep*. 2024;14(1):2569. doi:10.1038/s41598-024-52923-6
- Kagwa MM, Kajjimu J, Sserunkuma J, et al. Prevalence of burnout among university students in low-and middle-income countries: a systematic review and meta-analysis. *PLoS One*. 2021;16(8):e0256402. doi:10.1371/journal.pone.0256402
- García-Carmona M, Marín MD, Aguayo R. Burnout syndrome in secondary school teachers: a systematic review and meta-analysis. *Soc Psychol Educ*. 2019;22(1):189–208. doi:10.1007/s11218-018-9471-9
- Madigan DJ, Kim LE. Towards an understanding of teacher attrition: a meta-analysis of burnout, job satisfaction, and teachers' intentions to quit. *Teaching Teacher Educ*. 2021;105:103425. doi:10.1016/j.tate.2021.103425
- Cheng W-J, Cheng Y. Night shift and rotating shift in association with sleep problems, burnout and minor mental disorder in male and female employees. *Occup Environ Med*. 2017;74(7):483–488. doi:10.1136/oemed-2016-103898
- Torquati L, Mielke GI, Brown WJ, Kolbe-Alexander T. Shift work and the risk of cardiovascular disease. A systematic review and meta-analysis including dose–response relationship. *Scand J Work Environ Health*. 2018;44(3):229–238. doi:10.5271/sjweh.3700
- Schaufeli W, Enzmann D. *The Burnout Companion to Study and Practice: A Critical Analysis*. CRC press; 2020.
- Alarcon GM. A meta-analysis of burnout with job demands, resources, and attitudes. *J Vocational Behav*. 2011;79(2):549–562. doi:10.1016/j.jvb.2011.03.007
- Awa WL, Plaumann M, Walter U. Burnout prevention: a review of intervention programs. *Patient Educ Couns*. 2010;78(2):184–190. doi:10.1016/j.pec.2009.04.008
- Shoman Y, Marca SC, Bianchi R, Godderis L, Van der Molen H, Canu IG. Psychometric properties of burnout measures: a systematic review. *Epidemiol Psychiatric Sci*. 2021;30e8.
- Li H, Dance E, Poonja Z, Aguilar LS, Colmers-Gray I. Agreement between the Maslach Burnout Inventory and the Copenhagen Burnout Inventory among emergency physicians and trainees. *Acad Emergency Med*. 2024;31(12):1243–1255. doi:10.1111/acem.14994
- Bianchi R, Swingler G, Schonfeld IS. The Maslach Burnout Inventory is not a measure of burnout. *Work*. 2024;79(3):1525–1527. doi:10.3233/WOR-240095
- Trizano-Hermosilla I, Alvarado JM. Best alternatives to Cronbach's alpha reliability in realistic conditions: congeneric and asymmetrical measurements. *Front Psychol*. 2016;7:769. doi:10.3389/fpsyg.2016.00769
- West CP, Dyrbye LN, Erwin PJ, Shanafelt TD. Interventions to prevent and reduce physician burnout: a systematic review and meta-analysis. *Lancet*. 2016;388(10057):2272–2281. doi:10.1016/S0140-6736(16)31279-X
- Panagioti M, Panagopoulou E, Bower P, et al. Controlled interventions to reduce burnout in physicians: a systematic review and meta-analysis. *JAMA Intern Med*. 2017;177(2):195–205. doi:10.1001/jamainternmed.2016.7674
- Galanis P, Vraka I, Fragkou D, Bilali A, Kaitelidou D. Nurses' burnout and associated risk factors during the COVID-19 pandemic: a systematic review and meta-analysis. *J Adv Nurs*. 2021;77(8):3286–3302. doi:10.1111/jan.14839
- Mheidly N, Fares MY, Fares J. Coping with stress and burnout associated with telecommunication and online learning. *Front Public Health*. 2020;8:574969. doi:10.3389/fpubh.2020.574969
- Shanafelt TD, Hasan O, Dyrbye LN, et al. Changes in burnout and satisfaction with work-life balance in physicians and the general US working population between 2011 and 2014. Paper presented at: Mayo clinic proceedings; 2015.

33. Dyrbye LN, West CP, Satele D, et al. Burnout among US medical students, residents, and early career physicians relative to the general US population. *Acad Med.* 2014;89(3):443–451. doi:10.1097/ACM.0000000000000134
34. Canu IG, Marca SC, Dell’Oro F, et al. Harmonized definition of occupational burnout: a systematic review, semantic analysis, and Delphi consensus in 29 countries. *Scand J Work Environ Health.* 2021;47(2):95. doi:10.5271/sjweh.3935
35. Bakker AB, Demerouti E. Job demands–resources theory: taking stock and looking forward. *J Occup Health Psychol.* 2017;22(3):273. doi:10.1037/ocp0000056
36. Lesener T, Gusy B, Wolter C. The job demands-resources model: a meta-analytic review of longitudinal studies. *Work Stress.* 2019;33(1):76–103. doi:10.1080/02678373.2018.1529065
37. Goyal M, Singh S, Sibinga EM, et al. Meditation programs for psychological stress and well-being: a systematic review and meta-analysis. *JAMA Intern Med.* 2014;174(3):357–368. doi:10.1001/jamainternmed.2013.13018
38. Dyrbye LN, Thomas MR, Shanafelt TD. Systematic review of depression, anxiety, and other indicators of psychological distress among US and Canadian medical students. *Acad Med.* 2006;81(4):354–373. doi:10.1097/00001888-200604000-00009
39. Purvanova RK, Muros JP. Gender differences in burnout: a meta-analysis. *J Vocational Behav.* 2010;77(2):168–185.
40. Ruiz Moral R, Monge Martín D, de Leonardo C G, Alvarez Montero S, Caballero Martínez F. Medical resilience and morality: a survey study on the opinions and actions of exemplary family physicians. *BMC Family Practice.* 2021;22(1):213. doi:10.1186/s12875-021-01555-0
41. Proctor E, Silmere H, Raghavan R, et al. Outcomes for implementation research: conceptual distinctions, measurement challenges, and research agenda. *Admin Policy Mental Health Mental Health Serv Res.* 2011;38(2):65–76. doi:10.1007/s10488-010-0319-7
42. Damschroder LJ, Aron DC, Keith RE, Kirsh SR, Alexander JA, Lowery JC. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implement Sci.* 2009;4(1):50. doi:10.1186/1748-5908-4-50
43. Arksey H, O’malley L. Scoping studies: towards a methodological framework. *Int J Soc Res Methodol.* 2005;8(1):19–32. doi:10.1080/1364557032000119616
44. Tricco AC, Lillie E, Zarin W, et al. PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. *Ann Internal Med.* 2018;169(7):467–473. doi:10.7326/M18-0850
45. Munn Z, Peters MDJ, Stern C, Tufanaru C, McArthur A, Aromataris E. Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC Med Res Methodol.* 2018;18(1):143. doi:10.1186/s12874-018-0611-x
46. Shanafelt TD, Balch CM, Bechamps G, et al. Burnout and medical errors among American Surgeons. *Ann Surg.* 2010;251(6):995–1000. doi:10.1097/SLA.0b013e3181bfdbab3
47. Frajerman A, Morvan Y, Krebs M-O, Gorwood P, Chaumette B. Burnout in medical students before residency: a systematic review and meta-analysis. *Eur Psychiatry.* 2019;55:36–42. doi:10.1016/j.eurpsy.2018.08.006
48. Chunming WM, Harrison R, MacIntyre R, Travaglia J, Balasooriya C. Burnout in medical students: a systematic review of experiences in Chinese medical schools. *BMC Med Educ.* 2017;17(1):217. doi:10.1186/s12909-017-1064-3
49. Skaalvik EM, Skaalvik S. Teacher stress and teacher self-efficacy as predictors of engagement, emotional exhaustion, and motivation to leave the teaching profession. *Creative Educ.* 2016;7(13):1785. doi:10.4236/ce.2016.713182
50. Kecklund G, Axelsson J. Health consequences of shift work and insufficient sleep. *BMJ.* 2016;355. doi:10.1136/bmj.i5210
51. Swider BW, Zimmerman RD. Born to burnout: a meta-analytic path model of personality, job burnout, and work outcomes. *J Vocational Behav.* 2010;76(3):487–506. doi:10.1016/j.jvb.2010.01.003
52. Shanafelt TD, Boone S, Tan L, et al. Burnout and satisfaction with work-life balance among US Physicians relative to the general US population. *Arch Internal Med.* 2012;172(18):1377–1385. doi:10.1001/archinternmed.2012.3199
53. IsHak W, Nikravesh R, Lederer S, Perry R, Ogunyemi D, Bernstein C. Burnout in medical students: a systematic review. *Clin Teach.* 2013;10(4):242–245. doi:10.1111/tct.12014
54. Schaufeli WB, Taris TW. The conceptualization and measurement of burnout: common ground and worlds apart. *Work Stress.* 2005;19(3):256–262. doi:10.1080/02678370500385913
55. Maslach C, Jackson SE, Leiter MP. *Maslach Burnout Inventory*. Scarecrow Education; 1997.
56. Bianchi R, Schonfeld IS. Burnout-depression overlap: nomological network examination and factor-analytic approach. *Scand J Psychol.* 2018;59(5):532–539. doi:10.1111/sjop.12460
57. Winwood PC, Winefield AH. Comparing two measures of burnout among dentists in Australia. *Int J Stress Manage.* 2004;11(3):282. doi:10.1037/1072-5245.11.3.282
58. Schaufeli WB, Martinez IM, Pinto AM, Salanova M, Bakker AB. Burnout and engagement in university students: a cross-national study. *J Cross-Cult Psychol.* 2002;33(5):464–481. doi:10.1177/0022022102033005003
59. Hu Q, Schaufeli WB. The factorial validity of the Maslach burnout inventory–student survey in China. *Psychol Rep.* 2009;105(2):394–408. doi:10.2466/PRO.105.2.394-408
60. Dolan ED, Mohr D, Lempa M, et al. Using a single item to measure burnout in primary care staff: a psychometric evaluation. *J Gen Intern Med.* 2015;30(5):582–587. doi:10.1007/s11606-014-3112-6
61. Rohland BM, Kruse GR, Rohrer JE. Validation of a single-item measure of burnout against the Maslach Burnout Inventory among physicians. *Stress Health.* 2004;20(2):75–79. doi:10.1002/smi.1002
62. Richardson GE. The metatheory of resilience and resiliency. *J Clin Psychol.* 2002;58(3):307–321. doi:10.1002/jclp.10020
63. Khoury B, Sharma M, Rush SE, Fournier C. Mindfulness-based stress reduction for healthy individuals: a meta-analysis. *J Psychosomatic Res.* 2015;78(6):519–528. doi:10.1016/j.jpsychores.2015.03.009
64. Virgili M. Mindfulness-based interventions reduce psychological distress in working adults: a meta-analysis of intervention studies. *Mindfulness.* 2015;6(2):326–337. doi:10.1007/s12671-013-0264-0
65. Lomas T, Medina JC, Ivztan I, Rupperecht S, Hart R, Eiroa-Orosa FJ. The impact of mindfulness on well-being and performance in the workplace: an inclusive systematic review of the empirical literature. *Eur J Work Organ Psychol.* 2017;26(4):492–513. doi:10.1080/1359432X.2017.1308924
66. Sulosaari V, Unal E, Cinar FI. The effectiveness of mindfulness-based interventions on the psychological well-being of nurses: a systematic review. *Appl Nurs Res.* 2022;64:151565. doi:10.1016/j.apnr.2022.151565
67. Maslach C, Leiter MP. Early predictors of job burnout and engagement. *J Appl Psychol.* 2008;93(3):498. doi:10.1037/0021-9010.93.3.498

68. Shanafelt TD, Noseworthy JH. Executive leadership and physician well-being: nine organizational strategies to promote engagement and reduce burnout. Paper presented at: Mayo clinic proceedings; 2017.
69. DeChant PF, Acs A, Rhee KB, et al. Effect of organization-directed workplace interventions on physician burnout: a systematic review. *Mayo Clinic Proceed Innovat Qual Outcomes*. 2019;3(4):384–408.
70. Firth J, Torous J, Nicholas J, et al. The efficacy of smartphone-based mental health interventions for depressive symptoms: a meta-analysis of randomized controlled trials. *World Psychiatry*. 2017;16(3):287–298. doi:10.1002/wps.20472
71. Nicholas J, Larsen ME, Proudfoot J, Christensen H. Mobile apps for bipolar disorder: a systematic review of features and content quality. *J Med Internet Res*. 2015;17(8):e198. doi:10.2196/jmir.4581
72. Alarcon G, Eschleman KJ, Bowling NA. Relationships between personality variables and burnout: a meta-analysis. *Work Stress*. 2009;23(3):244–263. doi:10.1080/02678370903282600
73. Brewer EW, Shapard L. Employee burnout: a meta-analysis of the relationship between age or years of experience. *Hum Resour Dev Rev*. 2004;3(2):102–123. doi:10.1177/1534484304263335
74. Maslach C, Schaufeli WB, Leiter MP. Job burnout. *Annu Rev Psychol*. 2001;52:397–422. doi:10.1146/annurev.psych.52.1.397
75. Siegrist J. Adverse health effects of high-effort/low-reward conditions. *J Occup Health Psychol*. 1996;1(1):27. doi:10.1037/1076-8998.1.1.27
76. Van Vegchel N, De Jonge J, Bosma H, Schaufeli W. Reviewing the effort–reward imbalance model: drawing up the balance of 45 empirical studies. *Soc Sci Med*. 2005;60(5):1117–1131. doi:10.1016/j.socscimed.2004.06.043
77. Allen TD, Herst DE, Bruck CS, Sutton M. Consequences associated with work-to-family conflict: a review and agenda for future research. *J Occup Health Psychol*. 2000;5(2):278. doi:10.1037/1076-8998.5.2.278
78. Kossek EE, Pichler S, Bodner T, Hammer LB. Workplace social support and work–family conflict: a meta-analysis clarifying the influence of general and work–family-specific supervisor and organizational support. *Personnel Psychol*. 2011;64(2):289–313. doi:10.1111/j.1744-6570.2011.01211.x
79. Hakkanen JJ, Schaufeli WB, Ahola K. The job demands-resources model: a three-year cross-lagged study of burnout, depression, commitment, and work engagement. *Work Stress*. 2008;22(3):224–241. doi:10.1080/02678370802379432
80. Schaufeli WB, Bakker AB. Job demands, job resources, and their relationship with burnout and engagement: a multi-sample study. *J Organ Behav*. 2004;25(3):293–315. doi:10.1002/job.248
81. Shanafelt T, Goh J, Sinsky C. The business case for investing in physician well-being. *JAMA Intern Med*. 2017;177(12):1826–1832. doi:10.1001/jamainternmed.2017.4340
82. National Academies of Sciences, Medicine, National Academy of Medicine, Committee on Systems Approaches to Improve Patient Care by Supporting Clinician Well-Being. *Taking Action Against Clinician Burnout: A Systems Approach to Professional Well-Being*. National Academies Press; 2019.
83. Shreffler J, Petrey J, Huecker M. The impact of COVID-19 on healthcare worker wellness: a scoping review. *West J Emerg Med*. 2020;21(5):1059. doi:10.5811/westjem.2020.7.48684
84. Jacques-Aviñó C, López-Jiménez T, Medina-Perucha L, et al. Gender-based approach on the social impact and mental health in Spain during COVID-19 lockdown: a cross-sectional study. *BMJ Open*. 2020;10(11):e044617. doi:10.1136/bmjopen-2020-044617
85. Lizana PA, Vega-Fernandez G, Gomez-Bruton A, Leyton B, Lera L. Impact of the COVID-19 pandemic on teacher quality of life: a longitudinal study from before and during the health crisis. *Int J Environ Res Public Health*. 2021;18(7):3764. doi:10.3390/ijerph18073764
86. Sokal L, Trudel LE, Babb J. Canadian teachers' attitudes toward change, efficacy, and burnout during the COVID-19 pandemic. *Int J Educ Res Open*. 2020;1:100016. doi:10.1016/j.ijedro.2020.100016
87. Barello S, Palamenghi L, Graffigna G. Burnout and somatic symptoms among frontline healthcare professionals at the peak of the Italian COVID-19 pandemic. *Psychiatry Res*. 2020;290:113129. doi:10.1016/j.psychres.2020.113129
88. Vindegaard N, Benros ME. COVID-19 pandemic and mental health consequences: systematic review of the current evidence. *Brain Behav Immun*. 2020;89:531–542. doi:10.1016/j.bbi.2020.05.048
89. Fixsen D, Naoom S, Blase K, Friedman R, Wallace F. *Book Implementation Research: A Synthesis of the Literature*. City: University of South Florida, Louis de la Parte Florida Mental Health Institute, The National Implementation Research Network; 2005.
90. Bauer MS, Damschroder L, Hagedorn H, Smith J, Kilbourne AM. An introduction to implementation science for the non-specialist. *BMC Psychol*. 2015;3(1):32. doi:10.1186/s40359-015-0089-9
91. Powell BJ, Waltz TJ, Chinman MJ, et al. A refined compilation of implementation strategies: results from the Expert Recommendations for Implementing Change (ERIC) project. *Implement Sci*. 2015;10(1):21. doi:10.1186/s13012-015-0209-1
92. Clement S, Schauman O, Graham T, et al. What is the impact of mental health-related stigma on help-seeking? A systematic review of quantitative and qualitative studies. *Psycho Med*. 2015;45(1):11–27. doi:10.1017/S0033291714000129
93. Thornicroft G, Mehta N, Clement S, et al. Evidence for effective interventions to reduce mental-health-related stigma and discrimination. *Lancet*. 2016;387(10023):1123–1132. doi:10.1016/S0140-6736(15)00298-6
94. Scheirer MA, Dearing JW. An agenda for research on the sustainability of public health programs. *Am J Public Health*. 2011;101(11):2059–2067. doi:10.2105/AJPH.2011.300193
95. Wiltsey Stirman S, Kimberly J, Cook N, Calloway A, Castro F, Charns M. The sustainability of new programs and innovations: a review of the empirical literature and recommendations for future research. *Implement Sci*. 2012;7(1):17. doi:10.1186/1748-5908-7-17
96. Castro FG, Barrera JM, Martinez JCR. The cultural adaptation of prevention interventions: resolving tensions between fidelity and fit. *Prevent Sci*. 2004;5(1):41–45. doi:10.1023/B:PREV.0000013980.12412.cd
97. Bernal G, Sáez-Santiago E. Culturally centered psychosocial interventions. *J Commun Psychol*. 2006;34(2):121–132. doi:10.1002/jcop.20096
98. Cabassa LJ, Baumann AA. A two-way street: bridging implementation science and cultural adaptations of mental health treatments. *Implement Sci*. 2013;8(1):90. doi:10.1186/1748-5908-8-90
99. Miranda J, Bernal G, Lau A, Kohn L, Hwang W-C, LaFromboise T. State of the science on psychosocial interventions for ethnic minorities. *Annu Rev Clin Psychol*. 2005;1(1):113–142. doi:10.1146/annurev.clinpsy.1.102803.143822

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