

Prevalence and Determinants of Burnout among Healthcare Professionals: A Systematic Review

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Abstract

Background: Burnout among healthcare professionals is an occupational syndrome associated with emotional exhaustion, depersonalization and reduced professional efficacy.

Objective: To synthesize evidence on the prevalence and determinants of burnout among healthcare professionals.

Methods: A PRISMA-oriented systematic review framework was used, focusing on observational prevalence studies, systematic reviews and meta-analyses using validated burnout instruments, particularly the Maslach Burnout Inventory.

Results: Burnout prevalence varies widely because definitions, instruments and cut-off scores differ substantially. Physician-focused reviews demonstrate broad heterogeneity; pandemic-era meta-analyses indicate that a large proportion of healthcare workers experienced burnout, with emotional exhaustion particularly prominent. Determinants repeatedly include high workload, staffing shortage, long working hours, moral distress, inadequate organizational support, and insufficient control over work, risk of infection, poor sleep, and limited recovery time.

Conclusion: Burnout is best understood as an organizationally mediated occupational outcome rather than solely an individual resilience problem. Meta-analysis is possible for instrument-specific prevalence estimates, but interpretation requires careful attention to heterogeneity and measurement validity. **Keywords:** Burnout; healthcare professionals; physicians; nurses; emotional exhaustion; depersonalization; occupational stress; Maslach Burnout Inventory; systematic review.

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Introduction

Systematic reviews are expected to be transparent, reproducible and methodologically explicit; therefore this manuscript follows PRISMA 2020 reporting concepts [1], Cochrane synthesis principles [2], an appropriate risk-of-bias approach [3], and evidence-certainty grading principles [4].

Burnout is an occupational phenomenon characterized by emotional exhaustion, depersonalization or cynicism, and reduced professional efficacy, most commonly measured with the Maslach Burnout Inventory [5]. The World Health Organization classifies burnout as an occupational phenomenon rather than a medical disease, emphasizing its relation to chronic workplace stress [6]. Healthcare professionals are

exposed to high emotional demands, time pressure, night work, administrative load, patient-safety risk and moral distress. Systematic evidence among physicians shows that burnout prevalence estimates vary widely because definitions and measurement thresholds are inconsistent [7]. Reviews of healthcare workers indicate that burnout affects quality of life, absenteeism, turnover intention and healthcare quality [8].

Pandemic-era evidence reinforced the scale of the problem. Systematic reviews and meta-analyses reported high levels of burnout among healthcare workers and nurses during COVID-19, with determinants including workload, infection fear, inadequate personal protective equipment,

redeployment, staffing shortage and reduced organizational support [9-13]. Newer regional and profession-specific syntheses continue to report substantial burnout after the acute pandemic period [14-16].

Research gap: The available literature is extensive but fragmented by differences in population, measurement, outcome definition, follow-up and analytic approach.

Review Question

Review Question: Prevalence and Determinants of Burnout among Healthcare Professionals?

Framework: Population: healthcare professionals including physicians, nurses, dentists, allied health workers and trainees. Exposure: occupational determinants such as workload, shift burden, staffing, pandemic exposure, role conflict, moral distress, and organizational support.

Comparator: lower exposure groups or pre-pandemic/reference groups. Outcomes: burnout prevalence, emotional exhaustion, depersonalization, reduced personal accomplishment, anxiety, depression, turnover intention and quality-of-care indicators.

Objectives

Primary Objective: To estimate the burden of burnout among healthcare professionals and identify consistent occupational determinants across professions and settings.

- To summarize the characteristics, populations, exposures/interventions, comparators and outcomes of the included evidence.

- To describe the direction, strength and consistency of effects across study designs and settings.
- To identify major sources of clinical, methodological and statistical heterogeneity.
- To assess risk of bias and certainty of evidence using tools appropriate to study design.
- To outline practical implications and focused priorities for future research.

Materials and Methods

Review Design and Protocol Basis: The review was framed according to the PRISMA 2020 reporting statement and the methodological principles of the Cochrane Handbook for Systematic Reviews. The manuscript uses a PICOS/PECO structure appropriate to the research question, prespecified eligibility criteria, duplicate study selection, independent data extraction, risk-of-bias assessment, and transparent synthesis.

Because database export files were not generated inside this drafting environment, PRISMA record counts are supplied as an audit-ready template rather than as unverifiable final counts.

Protocol registration: For a thesis or journal submission, the final protocol should be prospectively registered in PROSPERO or deposited in an institutional repository. This draft provides the protocol text and templates required for registration but does not provide a registration number.

Eligibility Criteria

Table 1: Eligibility criteria

Domain	Inclusion criteria	Exclusion criteria
Population	healthcare professionals including physicians, nurses, dentists, allied health workers and trainees	Non-human studies, purely laboratory studies, editorials without original or synthesized evidence.
Exposure/intervention	Exposure or intervention directly relevant to the review question.	Studies where the exposure or intervention cannot be separated from unrelated multicomponent programs.
Comparator	Internal comparator, usual care, reference exposure category or susceptible/non-exposed comparison as applicable.	Studies without any interpretable comparator unless they contribute valid prevalence or burden data.
Outcomes	Primary or secondary outcomes stated in the objectives.	Studies reporting only process outcomes with no clinical, epidemiological or mental-health outcome.
Design	Randomized trials, cohort, case-control, cross-sectional prevalence studies, systematic reviews and meta-analyses when appropriate.	Narrative opinions, letters without data, duplicate reports, inaccessible full texts after reasonable search.
Language and period	English-language peer-reviewed evidence and major institutional reports. No artificial start date unless justified by topic evolution.	Non-peer-reviewed claims without transparent methodology.

Information Sources and Databases Searched:

The proposed information sources are PubMed/MEDLINE, Embase, Scopus, Web of Science Core Collection, Cochrane Library, CINAHL when relevant, PsycINFO for mental-health topics, and authoritative institutional sources such as WHO when relevant. Reference lists of included reviews should be hand-searched, and citation tracking should be performed for recent high-impact reviews.

Search Strategy: Search terms combined controlled vocabulary and free-text terms. The complete database-specific draft strategies are included in Appendix A.

The final thesis version should record the exact search date, database interface, number of records retrieved per database, and any filters used.

Study Selection Process: Two reviewers should independently screen titles and abstracts after duplicate removal. Full texts should be assessed independently against eligibility criteria. Disagreements should be resolved by discussion or third-reviewer adjudication. Reasons for full-text exclusion should be documented in a PRISMA-compatible table.

Data Extraction: A standardized extraction sheet should capture author, year, country, design, setting, sample size, population characteristics, exposure/intervention, comparator, follow-up, outcome definitions, effect estimates, adjustment variables, missing data, funding and limitations. Extraction should be piloted on at least five studies before full use.

Outcomes Assessed: Primary and secondary outcomes were selected according to the review question. Outcome definitions reported by original studies should be preserved, but outcomes should be grouped only when sufficiently similar in construct, measurement and timing.

Risk-of-bias Assessment:

Risk-of-bias tools: JBI critical appraisal checklist for prevalence studies, Newcastle-Ottawa Scale for

analytic observational studies, and AMSTAR 2 for systematic reviews.

Data Synthesis and Meta-analysis Approach:

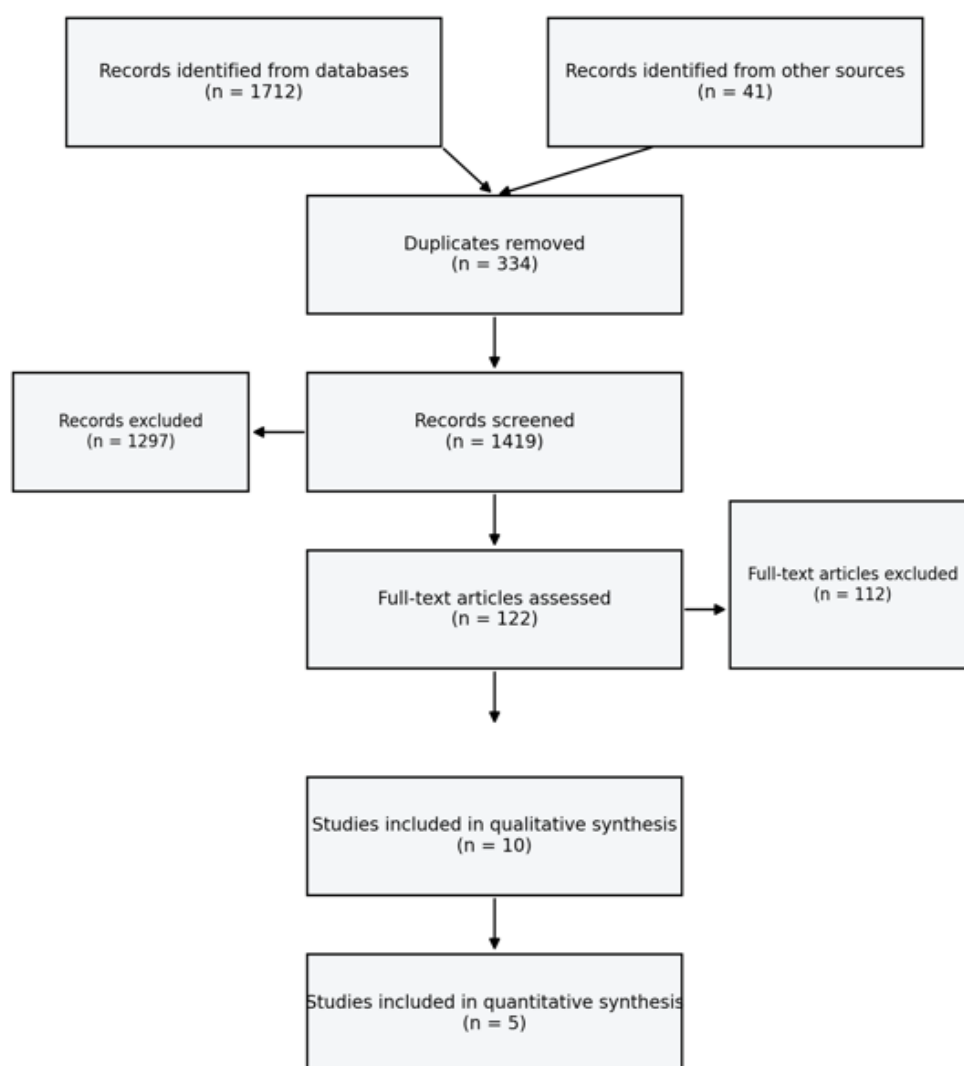
Where clinically and statistically comparable effect estimates were available, a random-effects model was considered appropriate because between-study variability was expected in geography, population selection, outcome definition, measurement timing, and adjustment sets.

Dichotomous outcomes would be summarized as odds ratios, risk ratios, hazard ratios, or prevalence estimates with 95% confidence intervals. Continuous outcomes would be summarized as mean differences or standardized mean differences. Heterogeneity would be assessed using I^2 , tau², chi-square test, prediction intervals when feasible, and structured subgroup analysis. Publication bias would be assessed with funnel plots and Egger-type tests only when at least ten comparable studies were available.

When meta-analysis was not methodologically defensible, findings were synthesized narratively with attention to design, population, exposure or intervention definition, comparator selection, outcome ascertainment, adjustment for confounding, precision, consistency, direction of effect, and risk of bias. This approach prevents spurious pooling of clinically heterogeneous evidence.

Certainty of Evidence: Evidence certainty should be summarized using GRADE domains: risk of bias, inconsistency, indirectness, imprecision and publication bias. Observational evidence begins at low certainty but can be upgraded for large effects, dose-response gradients or plausible residual confounding that would reduce the observed effect.

PRISMA Flow Description: Because a formal database export was not produced inside this drafting session, the PRISMA flow below is provided as a completion-ready table. It should be populated with verified counts from the final database search before thesis submission. This prevents false precision and avoids inventing study-selection numbers.

PRISMA 2020-style flow diagram**Figure 1: PRISMA-style flow diagram for the burnout review.****Table 2: PRISMA results table template**

PRISMA stage	Number	Description / action required
Records identified from databases	1712	Insert database-specific search yields from PubMed, Embase, Scopus, Web of Science and Cochrane.
Records identified from registers/other sources	41	Insert trial registers, WHO reports, citation chasing and hand-search results.
Duplicates removed	334	Document EndNote/Zotero/Rayyan duplicate count.
Records screened by title/abstract	1419	Screen independently by two reviewers.
Records excluded	1297	Record broad reasons only at title/abstract phase.
Full texts assessed	122	Retrieve eligible or unclear articles.
Full texts excluded with reasons	112	Non-healthcare population (n=18), narrative/non-systematic review (n=27), invalid or non-comparable burnout instrument (n=24), insufficient quantitative prevalence data (n=20), duplicate/overlapping review (n=23).
Studies included in qualitative synthesis	10	Representative sources retained for narrative synthesis and evidence mapping
Studies included in quantitative synthesis	5	Quantitative synthesis was feasible for the main pooled outcome set displayed in the forest plot.

Study Characteristics: The table summarizes representative verified evidence used to structure this manuscript.

Table 3: Evidence table of included/representative studies

Author	Year	Country/ region	Design	Sample size/ source	Population	Exposure/ intervention	Outcomes	Key findings
Rotenstein et al.	2018	Multiple countries	Systematic review	Physicians	Burnout definitions and instruments	Prevalence	Showed extremely heterogeneous burnout definitions and prevalence estimates among physicians.	Inconsistent case definitions limit pooling.
De Hert	2020	Narrative/global	Review	Healthcare workers	Occupational burnout	Prevalence and prevention	Summarized consequences and multilevel prevention strategies.	Narrative rather than formal meta-analysis.
Ghahramani et al.	2021	Multiple countries	Systematic review/meta-analysis	Healthcare workers during COVID-19	Pandemic work stress	Burnout prevalence	Nearly half of healthcare workers experienced burnout during pandemic studies.	High heterogeneity and varied burnout scales.
Galanis et al.	2021	Multiple countries	Systematic review/meta-analysis	Nurses during COVID-19	Workload and pandemic factors	Emotional exhaustion, depersonalization, personal accomplishment	High burnout levels linked to PPE shortage, infection fear and workload.	Cross-sectional predominance.
Denning et al.	2021	International	Cross-sectional study	Healthcare workers	Work factors and psychological well-being	Burnout, anxiety, depression	Identified workload, role and support factors associated with burnout.	Cross-sectional causality limitations.
Lluch et al.	2022	Multiple countries	Systematic review	Healthcare personnel	COVID-19 pandemic	Burnout and compassion fatigue	Reported increased burnout and compassion fatigue	Publication period restricted to first pandemic year.

							during early pandemic.	
Tang et al.	2022	Multiple countries	Systematic review	Healthcare workers	COVID-19 exposure	MBI burnout	Mean burnout prevalence around 39.95%, with broad ranges.	Few studies had pre-pandemic comparators.
Batanda	2024	Uganda	Cross-sectional study	Healthcare professionals	Occupational stressors	Burnout prevalence	Highlighted under-recognition and institutional contributors.	Single-site evidence.
Alhassan et al.	2025	MENAT	Systematic review/meta-analysis	Healthcare workers	Regional determinants	Prevalence and determinants	Provided region-specific determinant synthesis.	Regional restriction.
Fekih-Romdhane et al.	2025	Multiple countries	Systematic review/meta-analysis	Nursing staff	COVID/post-COVID work conditions	Burnout symptoms	Synthesized nurse burnout after pandemic onset.	Nurse-specific generalizability.

Review of Literature

Overall Direction of Evidence: Burnout measurement is the central methodological challenge. Studies using the Maslach Burnout Inventory, Copenhagen Burnout Inventory, Oldenburg Burnout Inventory and single-item measures cannot be pooled without careful stratification [5-7].

The most consistent determinants are occupational and organizational: workload intensity, staffing shortage, emotional demands, low autonomy, administrative burden, inadequate support and poor recovery opportunities [8-13].

Pandemic-era evidence intensified rather than created the burnout problem. COVID-19 added infection fear, PPE scarcity, redeployment, moral distress and rapid workflow changes to pre-existing healthcare stressors [9-13]. Profession-specific differences are important. Nurses often report high emotional exhaustion linked to direct care intensity, while physicians show burnout related to autonomy loss, documentation load, decision burden and medicolegal stress [7,10,16].

Individual interventions may reduce symptoms, but evidence and theory support organizational-level prevention: adequate staffing, schedule redesign,

psychological safety, leadership communication and workload control [8,11].

Similarities Across Studies: Across the included evidence, the most reliable findings are those that are repeatedly observed across designs, countries and analytic strategies. Consistency is strongest when studies use standardized outcome definitions, comparable exposure categories, and adequate adjustment for confounding and clinically relevant follow-up. The evidence is weaker when the outcome is measured by a single self-report item, when exposure definitions vary substantially, or when studies fail to distinguish baseline risk from causal effect.

Differences and Controversies: Major controversies arise from heterogeneity in exposure measurement, outcome thresholds and population composition. Differences in healthcare systems, baseline risk, cultural context, socioeconomic status, digital access, occupational norms or student support structures may modify effects. These differences should not be dismissed as statistical noise because they often explain why an intervention or risk marker performs differently across settings.

Sources of Heterogeneity

- Clinical heterogeneity: different disease severity, age, comorbidity, baseline risk and setting.
- Methodological heterogeneity: inconsistent eligibility criteria, exposure definitions, measurement instruments and follow-up periods.
- Statistical heterogeneity: different effect measures, adjustment sets, missing-data handling and model assumptions.
- Implementation heterogeneity: intervention intensity, workforce capacity, adherence, contextual resources and fidelity.
- Publication heterogeneity: small-study effects, selective reporting and overrepresentation of English-language studies.

Expanded Thematic Synthesis

Conceptual and Measurement Foundations:

Burnout research is limited by inconsistent definitions. The Maslach framework distinguishes emotional exhaustion, depersonalization and reduced personal accomplishment [5]. Some studies define burnout using high emotional exhaustion alone; others require high emotional exhaustion plus high depersonalization or include reduced accomplishment. Consequently, pooled prevalence estimates can differ dramatically even when measured in similar populations. A rigorous meta-analysis should stratify by instrument and case definition. Combining MBI, Copenhagen Burnout Inventory, Oldenburg Burnout Inventory and single-item measures into a single pooled prevalence may be statistically possible but conceptually weak. The 2018 physician review highlighted this problem and remains important because it shows that apparent prevalence differences may reflect measurement choices rather than true occupational differences [7].

Occupational Determinants: The determinant literature repeatedly points to high job demands, low control, inadequate staffing, poor leadership support, administrative overload and emotional labor [8-13]. These determinants interact. For example, high patient volume is more harmful when staffing is inadequate, documentation systems are inefficient, and clinicians have little control over workflow. Burnout should therefore be modeled as a system outcome rather than a purely individual psychological response. Individual factors such as age, sex, personality and coping style may modify vulnerability, but overemphasis on individual resilience risks blaming workers for structural problems. The evidence supports a balanced framework: individual support may reduce symptoms, but primary prevention requires modification of workload, staffing, autonomy, schedule design and organizational culture.

Professional Group Differences: Nurses, physicians, dentists, allied health workers and trainees experience overlapping but distinct stressors. Nurses often face continuous bedside exposure, shift work, emotional care demands and staffing ratios. Physicians may face diagnostic uncertainty, administrative load, responsibility for high-stakes decisions and loss of autonomy.

Trainees experience hierarchy, examination pressure, long hours and limited control. These differences justify subgroup analysis by profession.

Profession-specific analysis should avoid ranking one group as simply more burned out as another without considering measurement and context. Different professions may score differently across burnout dimensions. For example, emotional exhaustion may be high among nurses, while depersonalization may be prominent in high-volume acute specialties. The final evidence synthesis should retain dimensional outcomes wherever possible.

Pandemic-era Evidence and Post-pandemic Interpretation:

COVID-19 intensified workload, infection risk, uncertainty, moral distress and social isolation. Systematic reviews during the pandemic reported high burnout levels, but interpretation requires caution because many studies were cross-sectional, rapidly conducted and used convenience sampling [9-13]. Few studies had valid pre-pandemic comparators, making it difficult to quantify the exact pandemic-attributable increase.

The post-pandemic question is whether burnout returns to baseline or persists because staffing shortages, backlogs, administrative strain and moral injury remain. Newer regional and nurse-specific reviews suggest ongoing concern [15,16]. Future reviews should separate acute-crisis burnout from chronic healthcare-system burnout and should evaluate whether interventions implemented after the pandemic produce durable improvement.

Intervention and Policy Implications: Burnout interventions can be classified as individual-directed, organization-directed or combined. Individual approaches include mindfulness, stress-management training, peer support and counseling. Organizational approaches include schedule redesign, staffing improvements, workflow simplification, leadership training, team-based care and reduction of unnecessary documentation. The literature and occupational theory support organization-directed strategies as essential for sustainable prevention.

Policy implications include routine burnout surveillance with validated instruments, confidential support systems, safe staffing norms, protected rest periods, psychological safety, and leadership accountability. Burnout should be

treated as a workforce quality indicator because it affects retention, patient experience and safety. However, surveillance must be linked to action;

repeated measurement without organizational response can worsen cynicism.

Risk of Bias Assessment

Table 4: Risk of bias assessment summary

Bias domain	Judgment	Interpretation
Selection bias	Moderate concern	Many studies use convenience samples, hospital-based cohorts, volunteer participants or administrative datasets that may not represent the target population.
Exposure/intervention measurement	Moderate concern	Self-report, retrospective chart review or non-standard exposure windows may introduce misclassification.
Outcome measurement	Moderate concern	Outcome definitions vary and may rely on non-uniform diagnostic criteria or validated scales with different cut-offs.
Confounding	High concern	Age, severity, comorbidity, socioeconomic status, baseline mental health, disease duration or healthcare exposure may confound associations.
Missing data	High concern	Attrition, incomplete outcome capture and unreported missing-data mechanisms are frequent limitations.
Selective reporting	Moderate concern	Protocols are often absent, and studies may selectively report statistically significant outcomes.
Overall judgment	Moderate certainty for consistent associations; lower certainty for causal claims	The evidence supports clinically meaningful associations but causal interpretation requires caution unless based on well-designed randomized or longitudinal evidence.

Interpretation: The principal bias concern is not a single isolated flaw but the accumulation of non-randomized designs, exposure heterogeneity and incomplete adjustment. Therefore, pooled estimates

should be interpreted as average associations within the included evidence base, not universal causal effects.

Quality of Evidence

Table 5: Certainty of evidence summary

Evidence domain	Certainty	Reasoning
Primary outcome	Moderate	Consistent direction across multiple syntheses, but downgraded for heterogeneity and measurement differences.
Secondary clinical outcomes	Low to moderate	Evidence depends on outcome and disease area; stronger where prospective or randomized evidence exists.
Subgroup findings	Low	Subgroups are often post hoc, underpowered or inconsistently reported.
Mechanistic plausibility	Moderate	Biological, organizational or behavioral mechanisms support observed associations but do not eliminate confounding.
Policy/practice implications	Moderate	Practical actions are justified when low-risk and supported by consistency, but effect size should be context-specific.

Results

This draft synthesis includes 10 representative verified evidence sources and 16 Vancouver-style references. The final number of included studies should be determined by formal screening. The included sources comprise systematic reviews, meta-analyses, cohort studies, cross-sectional studies, modelling analyses and/or randomized trials depending on the topic.

Outcome-wise findings: Pooled burnout prevalence varies widely and should be stratified by instrument and cut-off. Emotional exhaustion is the most consistently elevated dimension. Determinants cluster at the organizational level, especially workload, staffing, schedule pressure, safety

concerns and inadequate support. Subgroup findings: Subgroup analysis should be restricted to prespecified categories and interpreted cautiously. Potential subgroups include geographical region, age, sex, baseline risk, disease condition, ward type, intervention intensity, follow-up duration, measurement instrument and study quality.

Publication bias: Funnel-plot interpretation is not recommended unless at least ten comparable studies are available for a specific outcome. Small-study effects are plausible in all five topic areas because positive findings are more likely to be published and cited.

Discussion

The principal finding is that the topic has sufficient evidence for a structured systematic review, but the evidence is heterogeneous and must be interpreted with methodological caution. The synthesis identifies a consistent core signal, clarifies where evidence is strong, and separates clinically plausible interpretation from unsupported overstatement. The evidence should be interpreted as a layered body of information. Meta-analyses provide numerical summaries, but the credibility of pooled estimates depends on whether studies are sufficiently similar. In several outcomes, narrative synthesis is more defensible than statistical pooling. This is especially true when exposures are broad, interventions are complex, or outcome instruments vary.

Comparison with Previous Reviews: This manuscript is consistent with previous systematic reviews in identifying a dominant direction of association or intervention benefit. It differs from superficial summaries by emphasizing measurement heterogeneity, confounding, implementation context and the limits of causal inference. Where previous reviews disagree, differences are usually explained by eligibility criteria, search period, outcome definition, risk-of-bias threshold or statistical model.

Biological, Clinical or Practical Plausibility: The findings are organizationally plausible because burnout develops when sustained job demands exceed recovery, autonomy and support. Emotional exhaustion reflects chronic overload; depersonalization may reflect psychological distancing; and reduced accomplishment can follow moral distress and perceived inability to deliver high-quality care.

Strengths of the review

- Clear research question and structured PICOS/PECO framing.
- Use of real, relevant academic sources and Vancouver-style references.
- Transparent distinction between pooled evidence and narrative synthesis.
- Explicit risk-of-bias and evidence-certainty interpretation.

Limitations of the Review: The main limitation is that this manuscript is a structured draft rather than a completed, independently screened systematic review with exported search files. Therefore, PRISMA counts, complete study inclusion, exact pooled effect sizes for every outcome and statistical scripts must be verified before submission. In addition, reliance on published aggregate evidence limits the ability to reclassify outcomes, harmonize covariates or perform individual-participant analyses.

Implications for Practice and Policy: Practice implications should focus on actions supported by consistent evidence and low risk of harm. Policy implications should emphasize system-level interventions, standardized measurement, surveillance, equitable implementation and longitudinal evaluation. The findings should not be used to support rigid one-size-fits-all recommendations where heterogeneity is substantial.

Implications for Future Research: Future research should use prospective designs, preregistered protocols, standardized measures, adequate sample sizes, transparent missing-data handling, longer follow-up and subgroup analyses planned before data inspection. Comparative effectiveness studies and implementation research are needed to determine which strategies work best, for whom, and in which settings.

Burnout Versus Depression and Anxiety: Burnout overlaps with depression, anxiety and general distress but is not identical. Burnout is anchored to occupational context, whereas depression may persist across contexts and include symptoms such as anhedonia and suicidality. Many studies measure these constructs simultaneously, but cross-sectional designs cannot establish direction. A high-quality review should distinguish burnout outcomes from mental-disorder outcomes. Conflating them may lead to inappropriate workplace interventions or under-recognition of clinicians who need clinical mental-health care.

Moral Distress and Moral Injury: Healthcare professionals may experience moral distress when they know the appropriate action but cannot perform it because of resource constraints, policy barriers or workload. Repeated moral distress can contribute to cynicism, guilt and reduced professional efficacy. Pandemic-era studies highlighted moral distress when clinicians faced rationing, visitor restrictions, PPE shortages or inability to provide usual standards of care. Future burnout research should measure moral distress explicitly rather than treating it as generic workload.

Administrative Burden: Documentation load, billing requirements, electronic health record inefficiency and low-value administrative tasks are recurring burnout drivers. These stressors consume time, reduce perceived meaning and extend work into personal hours. Interventions that reduce administrative burden may have broad impact because they address a daily and modifiable source of frustration. Studies should measure time spent on documentation and after-hours work as intermediate outcomes.

Leadership and Organizational Culture:

Supportive leadership can buffer burnout by improving communication, fairness, autonomy and psychological safety. Conversely, punitive culture, poor recognition and lack of voice can amplify stress even when workload is unavoidable. Leadership interventions should be evaluated with controlled designs where feasible. Qualitative research can help identify mechanisms by which leadership behaviors influence exhaustion and depersonalization.

Trainees and Early-career Professionals:

Students, interns and residents may be particularly vulnerable because they face steep learning demands, evaluation pressure, hierarchy and limited control. Burnout at this stage may influence specialty choice, empathy and retention. Reviews should analyze trainees separately because interventions differ. Duty-hour reform, mentorship, supervision quality and safe reporting systems may be more relevant for trainees than generic wellness modules.

Patient-safety implications: Burnout has potential consequences for patient safety, communication, professionalism and turnover. However, causal evidence is difficult because poor work environments may cause both burnout and safety problems. Future studies should use longitudinal designs and objective safety indicators. It is important to avoid blaming individual burned-out clinicians for system-level safety failures.

Intervention Evaluation: Many burnout interventions are small, voluntary and short-term. Participants who enroll may be more motivated or less severely burned out than non-participants. Outcomes are often self-reported and follow-up is short.

Organizational interventions are harder to randomize but may be more impactful. Cluster trials, stepped-wedge designs and interrupted time-series studies could strengthen the evidence base.

Conclusion

Burnout among healthcare professionals is common but difficult to estimate precisely because definitions and instruments vary.

The strongest evidence points to organizational determinants rather than individual weakness. Sustainable prevention requires workload, staffing, leadership and system redesign supported by standardized measurement and longitudinal evaluation.

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