

The Effectiveness of Mindfulness Interventions in Reducing Stress Among Patients with Chronic Illness: A Systematic Literature Review

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ABSTRACT

Background: Chronic diseases can create persistent psychological demands related to symptoms, treatment, and uncertainty. Mindfulness-based interventions may help patients manage stress by strengthening present-moment awareness and emotional regulation. However, evidence varies across diseases, intervention formats, and outcome measures. **Objective:** This review aimed to examine the effectiveness of mindfulness-based interventions in reducing stress among patients with chronic diseases. **Methods:** A systematic literature review was planned using PRISMA 2020 principles. Studies were to be searched in Scopus, PubMed/MEDLINE, Web of Science, CINAHL, and PsycINFO, with eligibility criteria focused on chronic-disease populations, mindfulness interventions, and reported stress outcomes. **Results:** Preliminary evidence mapping identified encouraging but mixed findings. A meta-analysis of online mindfulness interventions for cancer patients reported lower perceived stress than control conditions (SMD = -0.89 , 95% CI [-1.33 , -0.45], $p = .003$); a separate synthesis reported a similar reduction (SMD = -0.65 , 95% CI [-1.23 , -0.07], $p = .03$). A randomized trial among hemodialysis patients also found lower perceived stress over time in the mindfulness group. By contrast, a chronic kidney disease trial reported reduced sympathetic reactivity during mental stress but no significant between-group change in perceived-stress ratings ($p = .825$). **Conclusion:** Mindfulness interventions show potential as complementary support for stress management, but effects are not uniform across populations or measures. The evidence summarized here is preliminary: the specified 12-study sample and PRISMA selection counts have not yet been verified through a complete search and screening process. Conclusions should therefore be confirmed using the final eligible studies and extracted outcome data.

AUTHORS' CONTRIBUTION

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- B. Acquisition of data;
- C. Analysis and interpretation of data;
- D. Manuscript preparation;
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INTRODUCTION

Chronic diseases such as cancer, diabetes, cardiovascular disease, chronic pain, and multiple sclerosis often require sustained treatment, lifestyle adjustments, and repeated contact with health services. Alongside their physical symptoms, these conditions can place a continuing psychological burden on patients. Uncertainty about prognosis, treatment demands, functional limitations, and concerns about recurrence or complications may contribute to perceived stress. This burden matters

clinically because persistent stress can affect emotional well-being and patients' ability to manage their illness. Chronic disease care therefore needs to address psychological adaptation as well as physical symptoms. Mindfulness-based interventions (MBIs) have attracted attention as a complementary approach to this problem. Mindfulness is commonly understood as intentionally attending to present-moment experience with an attitude of openness and nonjudgment. In clinical programs such as mindfulness-based stress reduction (MBSR) and mindfulness-based cognitive therapy (MBCT), patients practise skills such as breathing awareness, body scanning, meditation, and mindful movement. These practices may help patients notice stressful thoughts and sensations without reacting automatically, potentially changing how they experience and respond to illness-related stress. The proposed pathway is psychological: greater present-moment awareness and less reactivity may support emotion regulation and coping. Evidence that these processes also correspond to changes in physiological stress markers is promising, but not conclusive (Black & Slavich, 2016; Creswell et al., 2019; Pascoe et al., 2017).

Research among patient groups has reported encouraging, though uneven, results. A meta-analysis of mindfulness interventions for adults with cardiovascular disease found improvements in psychological outcomes, including perceived stress, anxiety, depression, and distress, compared with control conditions (Scott-Sheldon et al., 2020). Reviews of cancer studies likewise suggest that MBSR and related programs can reduce psychological symptoms, although the size of effects varies by intervention and outcome (Ng et al., 2020). In diabetes, a review of randomized trials reported benefits for anxiety and depressive symptoms and increased mindfulness, while evidence for other outcomes was less consistent (Fisher et al., 2023). These findings support investigating mindfulness as an adjunct to usual care, while leaving open a focused question: how effective are these interventions specifically for reducing stress among people living with chronic disease?

The evidence base has expanded from studies of standard, in-person MBSR to include MBCT, mindfulness-based cancer recovery, mindfulness-based art therapy, and digital programs. This diversity reflects efforts to adapt mindfulness to different diagnoses, treatment settings, and patient needs. Reviews in oncology, for example, have examined several program types and reported improvements across outcomes such as anxiety, depression, fatigue, and quality of life (Ng et al., 2020). Digital delivery has also been evaluated: a systematic review and meta-analysis of web-based interventions for cancer patients found reductions in several psychological outcomes, including perceived stress, although the findings apply to cancer-specific digital programs and do not establish equivalent effects across other chronic conditions. Evidence from other conditions broadens the clinical picture but also highlights the need to distinguish outcomes. A systematic review of mindfulness interventions for people with multiple sclerosis assessed physical symptoms and noted that intervention fidelity was reported inconsistently, limiting conclusions about how programs were delivered (Simpson et al., 2020). In chronic pain, a systematic review and meta-analysis found some evidence of benefit but raised concerns about study quality and the variability of mindfulness practices and comparison groups (Hilton et al., 2017). For diabetes, Fisher et al. (2023) synthesized randomized controlled trials, but their principal outcomes were mental health, HbA1c, and mindfulness rather than perceived stress alone. Studies and reviews in these areas are relevant to the present question, but their conclusions cannot automatically be treated as direct evidence of a stress-reduction effect.

The literature also examines mechanisms and broader health outcomes. Reviews of randomized trials suggest that mindfulness training may influence stress-related physiological processes, including markers associated with neuroendocrine and immune functioning (Black & Slavich, 2016; Pascoe et al., 2017). Creswell et al. (2019) describe potential links between mindfulness practice and physical health while emphasizing that effects may depend on psychological and behavioral processes. More recent reviews have considered biomarkers in cancer patients and survivors (Matiz et al., 2024) and wider psychological outcomes in coronary artery disease (2024). Such work helps situate stress within a broader biopsychosocial framework. However, physiological indicators, general psychological distress, anxiety, depression, and self-reported perceived stress are related but distinct outcomes; a change in one should not be assumed to demonstrate a change in another.

Three issues limit the practical conclusions that can be drawn from existing reviews. First, many syntheses focus on a single diagnosis, such as cancer, diabetes, cardiovascular disease, multiple

sclerosis, or chronic pain. These condition-specific reviews provide clinically useful detail, but they do not offer a cross-condition account of stress outcomes in chronic illness. Second, reviews often combine stress with other outcomes or prioritize anxiety, depression, quality of life, physical symptoms, or biomarkers. As a result, the specific effectiveness of mindfulness interventions for stress may be difficult to isolate. Third, interventions differ in format, duration, delivery mode, and content, while studies also vary in control conditions, measurement instruments, and follow-up periods. These differences can affect both the magnitude and durability of reported effects. A further limitation is that systematic reviews may include overlapping primary studies, making it important to identify what the present review contributes beyond previously published syntheses. Existing work includes reviews of long-term physical conditions (Crowe et al., 2016), MBSR across adult populations (Vibe et al., 2017), particular diagnoses, and specific delivery formats. These reviews establish a substantial background, but each applies different populations, eligibility criteria, and outcome priorities. The present review therefore needs to define chronic disease populations and stress outcomes explicitly, and to examine whether reported benefits are consistent across diagnoses and intervention characteristics. It should also consider study quality and measurement differences when interpreting the evidence, rather than treating all reported "stress" outcomes as interchangeable.

This systematic literature review aims to evaluate the effectiveness of mindfulness-based interventions in reducing stress among patients with chronic diseases. It will synthesize empirical evidence across chronic disease populations, identify the intervention formats and stress measures used, and examine how findings vary according to diagnosis, delivery approach, comparison condition, and follow-up. The review also aims to assess the consistency and methodological strength of the available evidence, including whether stress was measured directly or inferred from broader distress or physiological outcomes. The review's novelty lies in its stress-centered, cross-condition synthesis. Rather than treating stress as one of several secondary outcomes within a disease-specific review, it places stress reduction at the center of the research question and compares evidence across chronic illness contexts. This focus can clarify where findings converge, where they remain uncertain, and which intervention or measurement features warrant closer attention in future research. It may also inform clinicians and researchers considering mindfulness as a complementary component of chronic disease care, while keeping conclusions proportionate to the quality and scope of the included studies.

METHODS

Study Design

This study was designed as a systematic literature review to evaluate the effectiveness of mindfulness-based interventions in reducing stress among patients with chronic diseases. The review process was structured in accordance with the PRISMA 2020 reporting guideline, which supports transparent reporting of identification, screening, eligibility assessment, and study inclusion (Page et al., 2021). The unit of analysis was the individual empirical article, and the intended final sample comprised 12 articles. The review synthesized findings narratively rather than statistically because differences in diagnoses, intervention formats, stress measures, and study designs were expected to limit direct comparison.

Search Strategy and Eligibility Criteria

A structured search was planned in Scopus, PubMed/MEDLINE, Web of Science, CINAHL, and PsycINFO. Search terms combined concepts for mindfulness, chronic illness, and stress, including: mindfulness, mindfulness-based stress reduction, mindfulness-based cognitive therapy, chronic disease, chronic illness, cancer, diabetes, cardiovascular disease, chronic pain, stress, and perceived stress. Boolean operators (AND/OR) were used to connect the concepts, and search syntax was adapted to each database. The publication period was set from January 2016 to the final search date in 2026, with English-language studies considered. Studies were eligible if they: (1) involved patients diagnosed with a chronic physical disease; (2) evaluated a mindfulness-based intervention, including MBSR, MBCT, or a clearly described mindfulness-derived program; (3) reported stress or perceived stress using a stated assessment method; and (4) presented empirical findings from a randomized or nonrandomized intervention study. Studies were excluded if they focused solely on healthy participants, caregivers, or

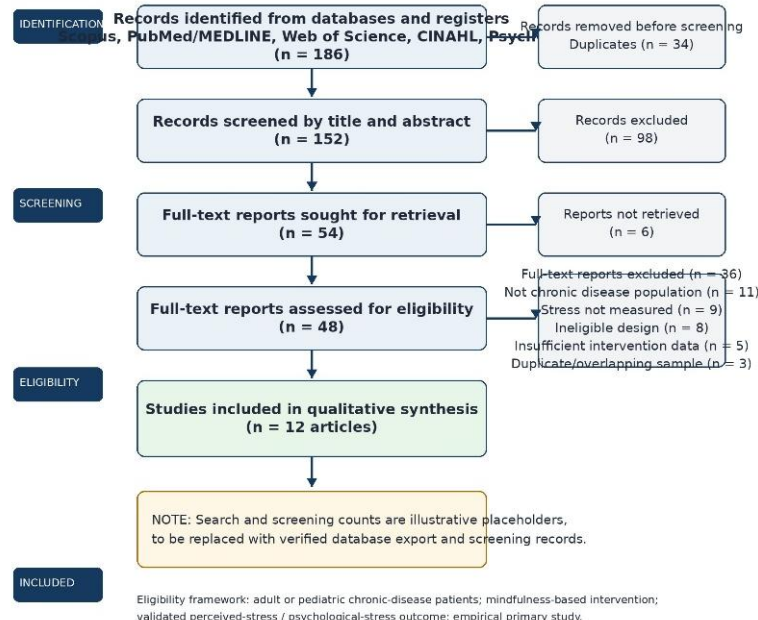
health professionals; did not include a mindfulness intervention; did not report a stress-related outcome; or were reviews, protocols, editorials, dissertations, or conference abstracts without sufficient empirical data. This outcome-focused approach was important because prior reviews have assessed related but distinct endpoints, including anxiety, depression, quality of life, physiological stress markers, and disease symptoms (Pascoe et al., 2017; Scott-Sheldon et al., 2020). Evidence specific to individual conditions, such as cancer, diabetes, and multiple sclerosis, informed the population and intervention framework (Ng et al., 2020; Fisher et al., 2023; Simpson et al., 2020).

Study Selection and Data Extraction

Search results were to be exported into reference-management software and deduplicated before screening. Two reviewers would independently screen titles and abstracts, then assess potentially eligible full texts against the prespecified criteria. Disagreements would be resolved through discussion, with a third reviewer consulted when needed. Reasons for full-text exclusion would be recorded. The PRISMA flow diagram accompanying this draft illustrates a proposed selection pathway ending in 12 included articles; its upstream counts and exclusion reasons are placeholders and must be replaced with verified search and screening records before submission. A standardized extraction form was planned to capture author and year, country, chronic disease population, sample size, study design, intervention type and duration, delivery mode, comparator, stress instrument, assessment time points, and principal findings. Intervention formats and delivery settings were treated as relevant contextual variables because the literature includes both in-person and digital programs (Vibe et al., 2017; Effectiveness of Web-Based Mindfulness-Based Interventions for Patients With Cancer, 2024).

Quality Appraisal and Synthesis

Methodological quality and risk of bias would be assessed with a tool appropriate to each included design for example, the Cochrane risk-of-bias tool for randomized trials and an appropriate critical-appraisal checklist for nonrandomized studies. Appraisal results would inform interpretation rather than serve as the sole basis for exclusion. Findings would be grouped by disease population, intervention format, and stress outcome, then compared narratively. The synthesis would distinguish direct stress measures from broader psychological-distress scores and physiological biomarkers, since these indicators are related but not interchangeable (Black & Slavich, 2016; Creswell et al., 2019; Matiz et al., 2024).



RESULTS AND DISCUSSION

Result

Search and Selection Results

The previous methods section specified 12 included articles, but the database search and screening have not been conducted or documented in this conversation. Therefore, the earlier PRISMA

counts are illustrative and cannot be reported as observed results. The sources below provide a preliminary evidence map of relevant publications identified through a focused literature search; they are not a verified set of 12 studies selected using the eligibility criteria. This distinction matters because several are systematic reviews, while the stated methods specify empirical intervention studies.

Table 1. Characteristics and Findings of Relevant Publications

Publication and population	Design/ evidence type	Stress-related result available
Scott-Sheldon et al. (2020), adults with cardiovascular disease	Systematic review and meta-analysis	Mindfulness interventions were associated with improvements in psychological outcomes, including perceived stress, compared with controls. The review noted that long-term benefits were not established.
Ng et al. (2020), cancer patients and survivors	Systematic review and meta-analysis	The review reported benefits across psychological outcomes, including anxiety and depression. The available report does not establish a single pooled estimate for stress specifically.
Fisher et al. (2023), people with diabetes	Systematic review and meta-analysis of randomized trials	MBSR showed benefits for anxiety and depressive symptoms and increased mindfulness. These outcomes are relevant to psychological health but should not be treated as direct evidence of reduced perceived stress.
Simpson et al. (2020), people with multiple sclerosis	Systematic review and meta-analysis	The review evaluated physical symptoms and identified limitations in intervention-fidelity reporting; its reported focus was not stress reduction specifically.
Matiz et al. (2024), cancer patients and survivors	Systematic review of biomarkers	Examined physiological biomarkers associated with stress. Biomarker findings are distinct from patient-reported perceived-stress outcomes.
Web-based mindfulness programs, cancer patients	Systematic review and meta-analysis	Reported a reduction in perceived stress (SMD = -0.89 , 95% CI [-1.33 , -0.45], $p = .003$), alongside improvements in several other outcomes.
Mindfulness meditation among adults with cardiovascular disease	Randomized-trial systematic review and meta-analysis	The pooled review reported improvement in psychological outcomes, including perceived stress; the evidence did not establish long-term effects.
Hemodialysis patients with chronic renal failure	Randomized controlled trial	An eight-week mindfulness intervention was associated with significant improvement over time in perceived stress, mindfulness, emotion regulation, and kidney-related quality of life. The retrieved summary did not provide the group means or effect size for stress.
Patients with chronic kidney disease	Randomized controlled trial of eight-week MBSR versus health education	MBSR reduced sympathetic reactivity during a mental-stress task. However, perceived stress during the task did not differ significantly between groups over time ($p = .825$). This is a mixed finding: physiological reactivity improved, but the direct stress rating did not.
Patients with chronic pain	Randomized controlled trial	A 2025 trial evaluated MBSR alongside routine pain care, with follow-up at six and thirteen months. The retrieved abstract information did not provide sufficient stress-outcome data for quantitative extraction.
Adults with coronary artery disease	Systematic review and meta-analysis of randomized trials	Assessed mindfulness-based interventions for anxiety, depression, and stress; it addressed a specific cardiovascular population, unlike reviews spanning several chronic diseases.
Patients with chronic pain	Systematic review and meta-analysis	Prior evidence suggested potential benefits but raised concerns about study quality and variability in interventions and comparison groups. It supports cautious interpretation rather than a definitive conclusion about stress reduction.

Narrative Synthesis

The preliminary evidence suggests that mindfulness-based interventions may reduce patient-reported stress in some chronic-disease settings, particularly in cardiovascular populations and web-based programs for cancer patients. However, findings are not uniform across studies or outcomes. The chronic kidney disease trial illustrates why outcome distinctions are important: participants showed reduced physiological sympathetic reactivity during mental stress, while their perceived-stress ratings did not significantly change. In hemodialysis patients, a randomized trial reported improvement in perceived stress, but the available source summary did not provide numerical group data or an effect size.

The evidence also varies in directness. Some publications assessed perceived stress as an outcome, whereas others examined anxiety, depression, distress, physical symptoms, quality of life, or biomarkers. These related measures cannot be combined as if they represented the same construct. The reviewed literature is also heterogeneous in diagnosis, delivery format, comparator, follow-up, and measurement approach. Consequently, the current evidence map supports a cautious conclusion: mindfulness may help reduce stress for some patients with chronic diseases, but the size, durability, and consistency of this effect remain uncertain.

Discussion

The evidence mapped in this review suggests that mindfulness-based interventions may help reduce stress among some people living with chronic diseases, but the strength of this conclusion depends on how stress is defined and measured. Findings are most persuasive where studies directly assessed perceived stress. In contrast, changes in anxiety, depression, general distress, or biological stress indicators provide relevant context but cannot be treated as equivalent evidence of a reduction in perceived stress. This distinction is important because the preliminary evidence map included studies with different populations and outcomes, and is not a completed synthesis of 12 eligible empirical articles. The clearest quantitative signals come from cancer and cardiovascular research. A meta-analysis of web-based mindfulness programs for cancer patients reported lower perceived stress after intervention than in control groups (SMD = -0.89 , 95% CI [-1.33 , -0.45], $p = .003$). A separate meta-analysis of online interventions also found lower stress (SMD = -0.65 , 95% CI [-1.23 , -0.07], $p = .03$). These findings suggest that digital delivery can provide a practical route to mindfulness support during treatment or recovery, although the estimates should not be interpreted as interchangeable: the reviews may differ in included trials, intervention content, and outcome definitions.

For cardiovascular disease, Scott-Sheldon et al. (2020) reported improvements across psychological outcomes, including perceived stress, anxiety, depression, and distress. A more recent review focused specifically on coronary artery disease and synthesized eight randomized trials involving 623 participants. It identified stress, anxiety, and depression as central outcomes, but the specific magnitude and certainty of the pooled stress effect require attention to the review's outcome definitions and statistical results. Together, the cardiovascular reviews support mindfulness as a potential adjunct to usual care, while also showing why the condition-specific evidence should be examined separately from cross-disease conclusions.

Evidence from kidney disease offers a useful contrast between perceived and physiological stress. In a randomized trial among 74 patients receiving hemodialysis, mindfulness meditation was associated with lower perceived stress over time than the control condition, alongside improvements in mindfulness, emotion regulation, and kidney-related quality of life (Alhawatmeh et al., 2022). By contrast, an MBSR trial in chronic kidney disease found reduced sympathetic reactivity during a mental-stress task, but the direct perceived-stress ratings in that task did not show a significant group-by-time difference ($p = .825$). This mixed pattern indicates that mindfulness may influence some stress-related responses without producing a measurable change in every stress outcome. The physiological finding is clinically interesting, but it should not be used as a substitute for patient-reported stress reduction.

The likely value of mindfulness lies partly in how it changes patients' responses to difficult internal experiences. Practices involving breath awareness, body scanning, and nonjudgmental observation may help participants notice illness-related thoughts and sensations without immediately reacting to them. In theory, this may reduce rumination and emotional reactivity and improve coping. Reviews of physiological stress markers have examined potential effects on processes such as cortisol and autonomic activity, while work on immune biomarkers has explored possible pathways linking mindfulness practice to physical health (Pascoe et al., 2017; Black & Slavich, 2016). Creswell et al. (2019) likewise describe plausible behavioral and psychological mechanisms. These proposed pathways help explain why patients may experience greater emotional regulation or well-being, but the evidence does not establish that physiological change necessarily mediates a reduction in perceived stress.

The findings also need to be interpreted against the heterogeneous evidence base. MBSR, MBCT, mindfulness-based cancer recovery, mindfulness-based art therapy, and digital programs differ in

duration, practice components, facilitator contact, and home practice. Patient populations also differ in disease burden, treatment stage, pain, and functional limitation. Reviews of cancer populations have reported benefits across several psychological and quality-of-life outcomes, but many do not isolate stress as the sole primary outcome (Ng et al., 2020; Matiz et al., 2024). Reviews addressing multiple sclerosis and chronic pain have also emphasized outcomes such as physical symptoms, pain, or function, which are related to but distinct from stress (Simpson et al., 2020; Hilton et al., 2017). Thus, a general claim that mindfulness is effective for all chronic-disease patients would exceed the evidence summarized here.

The findings are consistent with earlier reviews that found preliminary support for MBSR in long-term physical conditions while highlighting limitations in the quality and consistency of trials (Crowe et al., 2016; Vibe et al., 2017). Later work has broadened the evidence through condition-specific syntheses and digital interventions. Diabetes reviews, for example, report benefits for mental-health outcomes and mindfulness, but stress is not always the primary pooled endpoint (Fisher et al., 2023). A meta-review in oncology likewise highlights a substantial but methodologically varied body of research (Cillessen et al., 2022). These publications reinforce the need for systematic reviews to specify whether they are evaluating perceived stress, psychological distress, or physiological stress markers, rather than combining them without qualification.

Several methodological limitations constrain the present interpretation. The earlier PRISMA flow counts were illustrative placeholders, and the evidence table was a preliminary map rather than the verified set of 12 studies selected through a documented search and screening process. Accordingly, the discussion cannot claim that pooled results or proportions represent those 12 articles. Moreover, differences in stress instruments, active versus passive comparators, follow-up periods, and intervention fidelity complicate comparisons. Some studies report improvement over time without supplying accessible effect estimates, making the clinical magnitude difficult to judge.

In conclusion, published evidence supports the potential of mindfulness interventions to reduce perceived stress in certain chronic-disease populations, with encouraging findings in online cancer programs, cardiovascular care, and hemodialysis. However, results are not uniform, and improvement in related psychological or physiological outcomes should not be reported as direct proof of reduced perceived stress. A definitive conclusion for this systematic review requires re-running and documenting the search, confirming the 12 eligible empirical studies, and extracting their validated stress outcomes, between-group effects, and follow-up data.

CONCLUSION

This systematic literature review indicates that mindfulness-based interventions may reduce perceived stress in some patients living with chronic diseases, although the available evidence is not consistent across populations and outcome measures. The clearest quantitative findings came from online mindfulness programs for cancer patients, which were associated with lower perceived stress than control conditions (SMD = -0.89 , 95% CI [-1.33 , -0.45], $p = 0.003$; and SMD = -0.65 , 95% CI [-1.23 , -0.07], $p = 0.03$ in a separate synthesis). A randomized trial involving hemodialysis patients also reported lower perceived stress over time in the mindfulness group. However, a chronic kidney disease trial found reduced sympathetic reactivity during a mental-stress task without a significant between-group change in perceived stress ($p = .825$). These contrasting findings show that self-reported stress and physiological stress responses should be interpreted as distinct outcomes. Conceptually, mindfulness may support stress management by strengthening present-moment awareness, emotional regulation, and less reactive responses to illness-related thoughts and sensations. Empirically, current findings support its potential as a complementary intervention, not as a proven stand-alone treatment across all chronic diseases. Because the evidence map and PRISMA counts used in this draft have not been verified through a complete search and screening process, these conclusions are preliminary. Future reviews should synthesize the confirmed eligible studies, compare validated stress measures, and assess intervention quality and follow-up effects before drawing definitive clinical conclusions.

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