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Mindfulness and Meditation (MBSR)

Mindfulness-Based Stress Reduction (MBSR) is one of the most extensively studied non-pharmacological interventions. The primary focus is on **exhaustion** and **cognitive function**, while other areas of application have been less frequently investigated. The robustness of the findings varies considerably between indications.

2,275

STUDIES IN
TOTAL

1,654

IN HUMANS

937

OF WHICH
CONTROLLED

5

IN ANIMALS

0

IN THE LAB

Figures from the IHR study database · Last updated 2026-10-15

How to Read This Dossier

ESTABLISHED

measured in humans, with a comparison group

PLAUSIBLE

supported by mechanism, animal studies or observation

HYPOTHESIS

a likely connection that still needs to be tested

Mindfulness and Meditation (MBSR) at a Glance

ORIGIN:

Mindfulness-Based Stress Reduction (MBSR) is a structured group programme developed in the 1970s by Jon Kabat-Zinn.

EVIDENCE BASE:

1,010 evaluated studies · 443 controlled human trials · 288 observational studies · 47 review articles · 3 animal studies · 0 cell culture studies

STRONGEST EVIDENCE:

- **Oncology:** Systematic reviews and meta-analyses (ASCO 2023, 25 RCTs in lung cancer patients) demonstrate significant improvements in anxiety and depression through MBSR. Subjective cognitive impairments in breast cancer patients were reduced, though objective tests showed no changes. Effects on quality of life and pain were particularly pronounced in early cancer stages.
- **Fatigue and Stress** Randomised studies confirm the efficacy of MBSR and mindfulness-based interventions (e.g., MORE) for chronic pain, opioid misuse, and burnout. Significant reductions in stress, emotional distress, and compassion fatigue were observed among caregivers, with stable effects over 3 months. No significant reduction in pregnancy complications (SGA), but improvements in psychological well-being.
- **Cognition and Mental Health** MBSR was non-inferior to pharmacological treatment with escitalopram for anxiety disorders (276 adults). In older adults with subjective cognitive complaints, no objective improvements were observed, but subjective relief was reported. Significant reductions in blood pressure (24-hour measurements) and improvements in psychological parameters were noted in hypertensive patients.
- **Chronic Pain** A systematic review (18 RCTs) showed MBSR's superiority over standard care for fibromyalgia in pain symptoms and disease burden. Effects were less consistent for chronic back pain and headaches.

LIMITATIONS:

- The heterogeneity of interventions (classic MBSR, MBCT, online formats) and measurement methods (subjective scales vs. objective parameters) complicates direct comparisons and meta-analyses.
- Many studies lack blinding, active control groups, or long-term follow-ups. Placebo effects are difficult to control, as participants often expect the intervention to be effective.
- Generalisability is limited, as studies frequently recruit motivated, well-educated participants. Marginalised groups are underrepresented, reducing external validity.

CLASSIFICATION:

Mindfulness-Based Stress Reduction (MBSR) is an evidence-based group programme for reducing anxiety, depression, and subjective distress, with demonstrated efficacy in oncology, fatigue syndromes, and chronic pain. However, long-term effects and physiological parameters require further clarification.

1. What Mindfulness and MBSR Are

Mindfulness-Based Stress Reduction (MBSR) is a structured group programme developed in the 1970s by Jon Kabat-Zinn. It combines **meditation techniques**, **body awareness exercises (Body Scan)**, and **yoga elements** to cultivate conscious awareness of the present moment. Originally designed for chronic pain patients, MBSR is now used in various settings, including clinics, rehabilitation facilities, and workplace health programmes. Delivery typically follows an **eight-week course** format with weekly sessions and daily self-practice.

Key Considerations for Interpreting the Evidence Base include the **heterogeneity of interventions**. Alongside classic MBSR, numerous adaptations exist, such as **Mindfulness-Based Cognitive Therapy (MBCT)** or **short-term online formats**. Programmes vary in duration, setting (in-person vs. digital), and target population (patients vs. healthy individuals). Additionally, **measurement methods** differ: while some studies use **subjective scales** (e.g., questionnaires on stress or quality of life), others employ **objective parameters** (e.g., cortisol levels, cognitive tests). This diversity complicates direct comparisons and meta-analyses.

2. What the Studies Show in Detail

The foundational human studies and key reviews—organised by application, with population, duration, intervention, outcome measures, and results as reported in the original publications. Numbers are included only where explicitly stated in the source.

Distribution of **controlled human trials** by application area—numbers are non-additive, as a single study may be assigned to multiple areas:

APPLICATION AREA	CONTROLLED STUDIES
Fatigue and Stress	318
Cognition and Mental Health	285
Safety and Tolerability	84
Oncology	50
Musculoskeletal System	41

APPLICATION AREA	CONTROLLED STUDIES
Gut and Microbiome	30
Cardiovascular System	27
Inflammatory Processes	16

Oncology

A systematic review by the *American Society of Clinical Oncology* (ASCO) in 2023 evaluated 17 systematic reviews and meta-analyses, along with 44 randomised controlled trials (RCTs), to update guidelines for managing anxiety and depression in adult cancer patients. Three of the included reviews specifically examined **Mindfulness-Based Stress Reduction (MBSR)**. The findings demonstrated that psychosocial and educational interventions—including MBSR—led to significant improvements in anxiety and depression. Among these interventions, MBSR was one of the approaches showing efficacy. The study populations comprised cancer patients at various stages and phases of treatment, though exact participant numbers per study were not provided in the abstract. The duration of MBSR interventions adhered to the standard 8-week format with weekly group sessions and daily practice. ASCO recommends MBSR as part of a stepped-care model for patients with moderate depressive symptoms. A key limitation of the evidence is the underrepresentation of marginalised groups, which restricts the generalisability of the results.

A 2023 systematic review and meta-analysis examined the efficacy of **mindfulness-based interventions** across 25 RCTs involving lung cancer patients. The included studies assessed effects on anxiety, depression, and fatigue. The meta-analysis found that mindfulness interventions—including MBSR—resulted in significant reductions in anxiety (standardised mean difference, SMD, not explicitly stated in the abstract) and depression. MBSR was among the interventions showing positive outcomes. Intervention durations varied but frequently followed the standard 8-week MBSR programme. Study sample sizes ranged from 20 to 150 patients. A limitation of the analysis is the high heterogeneity among studies, with not all including an active control group. Additionally, long-term effects beyond the immediate post-intervention phase were not assessed ⁴.

In a randomised controlled trial involving 60 female breast cancer patients (30 in the MBSR group, 30 in the waitlist control group), the effect of MBSR on cognitive function was investigated. The intervention consisted of an 8-week MBSR programme with weekly group sessions and daily practice. Cognitive assessments were conducted at three time points: before the intervention, 2 weeks post-intervention, and 3 months post-intervention. The results showed a significant reduction in subjective memory impairments (prospective and retrospective memory errors) in the MBSR group 2 weeks after the intervention. However, objective cognitive tests revealed no significant changes. The study suggests that MBSR may improve subjective, but not objective, cognitive impairments in breast cancer patients following chemotherapy. A limitation of the study is the small sample size and the absence of an active control group.

A further meta-analysis from 2022 examined the effects of MBSR and **mindfulness-based cognitive therapy (MBCT)** on quality of life, pain, fatigue, anxiety, and depression in cancer patients. The results showed a significant effect of these combined interventions on quality of life (SMD 0.80, 95% CI 0.28–1.32, $I^2 = 94\%$). Subgroup analyses revealed that MBSR/MBCT was particularly effective in patients with early-stage cancer, showing effects on anxiety (SMD -3.48, 95% CI -4.07 to -2.88) and quality of life (SMD 4.30, 95% CI 3.62–4.99). Additionally, a reduction in pain (SMD -0.42, 95% CI -0.70 to -0.14) was observed within 4 weeks post-intervention. The effects on fatigue were more pronounced in younger participants (SMD -0.64, 95% CI -1.09 to -0.19). A limitation of the study is the high heterogeneity of the included studies and the lack of long-term data ¹².

HYPOTHESIS

The available studies suggest that MBSR and MBCT may be effective in oncology, particularly in managing anxiety, depression, and subjective cognitive impairments. However, the effects appear to be short-term and may depend on cancer stage and patient age. There is a lack of studies examining the long-term effects of mindfulness interventions over several years and directly comparing their efficacy with established psychotherapeutic approaches such as cognitive behavioural therapy (CBT).

Fatigue and Stress

In a randomised controlled trial involving 250 adults with chronic pain and opioid misuse, the efficacy of **Mindfulness-Oriented Recovery Enhancement (MORE)** was compared with supportive group therapy. The MORE intervention consisted of 8 weekly 2-hour group sessions combining mindfulness training, cognitive reappraisal, and the experience of positive emotions. The primary endpoints were opioid misuse (measured using the *Drug Misuse Index*) and pain severity and pain-related functional impairments (measured using the *Brief Pain Inventory*). At 9 months follow-up, the MORE group showed significant improvements in both primary endpoints compared to the control group. Secondary endpoints, such as opioid dosage, emotional distress, and opioid craving (measured via ecological momentary assessment), were also significantly reduced. A limitation of the study is that participants were not blinded, and the control group did not receive an active psychotherapeutic intervention ¹.

The MBSR group received an 8-week programme adapted for pregnant women, comprising weekly 2.5-hour sessions and a full-day session. The primary endpoints were the incidence of small-for-gestational-age (SGA) births and other pregnancy complications. The results showed that the MBSR group did not exhibit a significant reduction in the SGA rate compared to the control group. However, secondary endpoints such as stress levels and psychological well-being improved significantly in the MBSR group. A limitation of the study is that the MBSR intervention was not specifically targeted at preventing SGA, and participants may have already possessed a high degree of psychological resilience ⁵.

The intervention group (n = 39) received a 6-week training programme combining elements of MBSR and other mindfulness approaches, while the control group (n = 35) received no intervention. Primary endpoints were measured using the *Professional Quality of Life Scale (ProQoL)*. The results showed significant improvements in the subscales *Compassion Fatigue* and *Burnout* in the intervention group ($p < 0.05$) with medium to large effect sizes. These effects remained stable 3 months post-intervention. A limitation of the study is the absence of an active control group and the small sample size ⁸.

In a combined analysis of two randomised controlled trials involving 218 meditation-naïve participants, it was investigated whether **MBSR** leads to structural changes in the brain. Participants were randomised to an 8-week MBSR intervention (n = 75), an active control group (n = 73), or a waitlist control group (n = 70). Structural MRI scans were conducted before and after the intervention, analysing changes in grey matter, grey matter density, and

cortical thickness. In contrast to earlier studies, the authors found no significant differences between the groups, neither at the global level nor in specific brain regions previously identified in MBSR studies. A limitation of the study is that participants may not have meditated long enough to induce structural changes¹⁰.

HYPOTHESIS

The studies suggest that mindfulness interventions such as MBSR and MORE may be effective in reducing stress, burnout, and compassion fatigue in high-stress professions such as nursing and in patients with chronic pain. However, the effects on physiological parameters such as blood pressure or birth complications are less consistent. There is a lack of long-term studies examining the sustainability of these effects over several years and directly comparing the efficacy of mindfulness interventions with other evidence-based approaches such as CBT or physical activity.

Cognition and Mental Health

In a randomised controlled trial involving 276 adults with diagnosed anxiety disorders, the efficacy of **MBSR** was compared with escitalopram (a selective serotonin reuptake inhibitor). The primary endpoint was anxiety severity, measured using the *Clinical Global Impression of Severity Scale (CGI-S)*. After 8 weeks, MBSR was found to be non-inferior to the pharmacological treatment (non-inferiority analysis with a predefined non-inferiority margin). A limitation of the study is that participants were not blinded, and the study did not include a placebo control group².

In a randomised controlled trial involving 585 older adults (aged 65–84) with subjective cognitive complaints, the efficacy of **MBSR**, physical exercise, and a combination of both interventions on cognitive function was investigated. Participants were randomised into one of four groups: MBSR (n = 150), physical exercise (n = 138), a combination of MBSR and exercise (n = 144), or a health education control group (n = 153). The interventions lasted 18 months and included group sessions and home practice. The primary endpoints were composite scores for episodic memory and executive function. The results showed no significant differences between the groups in the primary endpoints. However, subjective cognitive complaints improved in all groups. A limitation of the study is that participants had subjective cognitive complaints but no objective cognitive deficits, which limits the generalisability of the results³.

In a randomised controlled trial involving 42 patients with arterial hypertension, the effect of **MBSR** on blood pressure and psychological parameters such as anxiety, stress, and depression was investigated. The intervention group (n = 24) received an 8-week MBSR programme with weekly 2-hour sessions, while the control group (n = 18) attended health education lectures. The results showed that the MBSR group had significantly lower 24-hour ambulatory blood pressure values after 8 weeks (124/77 mmHg vs. 126/80 mmHg, $p < 0.05$) and lower nocturnal systolic blood pressure (108 mmHg vs. 114 mmHg, $p < 0.05$). Additionally, clinically measured systolic blood pressure improved in the MBSR group (130 mmHg vs. 133 mmHg, $p = 0.02$). The effects remained stable 12 weeks post-intervention.

In a systematic review, 18 RCTs comparing the efficacy of **MBSR**, mindfulness-based cognitive therapy (MBCT), and cognitive behavioural therapy (CBT) in chronic pain were analysed. The studies included patients with fibromyalgia (n = 5), chronic low back pain (n = 5), headaches/migraine (n = 4), and non-specific chronic pain (n = 4). The review found that MBSR was superior to standard care and an educational control group (Fibroqol) in terms of pain symptoms and disease burden in fibromyalgia. For chronic low back pain, MBSR was superior to standard care but not to CBT. For headaches and non-specific chronic pain, MBSR was superior to standard care, though direct comparisons with CBT were lacking.

The results showed that mindfulness-based therapy and CBT were statistically equivalent in efficacy for depression, both immediately post-intervention (Hedges' $g = -0.009$, $p < 0.001$) and at follow-up ($g = -0.033$, $p = 0.001$). Subgroup analyses revealed that the differences between CBT and **mindfulness-based cognitive therapy (MBCT)** were smaller than those between CBT and other mindfulness-based interventions. A limitation of the meta-analysis is that most studies did not use an active control group, and follow-up periods were short⁹.

HYPOTHESIS

The available studies suggest that MBSR and MBCT *may show effects* comparable to established approaches such as CBT or pharmacological therapies in managing anxiety disorders, depression, and chronic pain. However, the effects on cognitive function in older adults are less consistent. There is a need for studies examining the long-term effects of mindfulness interventions on cognitive function and mental health over several years and evaluating their efficacy in specific populations, such as patients with neurodegenerative diseases.

Heart and Circulation

In a pilot study involving 20 older African American adults from low-income backgrounds, the feasibility and acceptability of an **MBSR programme** for lowering blood pressure were investigated. Participants were randomised to an 8-week MBSR intervention (n = 10) or a control group (n = 10). The MBSR group showed a reduction in systolic blood pressure post-intervention (average reduction of 10 mmHg), while no significant changes were observed in the control group. The study provides an initial indication of potential effects, though participants were not blinded, increasing the risk of bias⁶.

In a qualitative study involving participants from the *Mindfulness-Based Blood Pressure Reduction (MB-BP)* trial, the mechanisms by which **MB-BP** influences cardiovascular health were examined. Participants reported that mindfulness practice helped them adopt healthier behaviours, such as physical activity, healthy eating, and medication adherence. Additionally, stress management strategies and the ability to regulate emotional responses to stress improved. A limitation of the study is that it is a qualitative analysis, which does not measure quantitative effects on blood pressure or other cardiovascular parameters. Furthermore, the results are based on self-reports, which limits objectivity¹⁸.

In a review, systematic reviews and meta-analyses on the effect of **Transcendental Meditation (TM)** on blood pressure were analysed. The results showed that TM led to a significant reduction in systolic and diastolic blood pressure, particularly in patients with hypertension. However, effect sizes varied between studies, and some reviews highlighted methodological flaws in the included RCTs, such as lack of blinding and small sample sizes. A limitation of the review is that most studies did not include long-term follow-ups, and the comparability of results is limited by differing TM protocols. The findings are *specific to TM* and *do not apply to MBSR* or other mindfulness-based interventions.

HYPOTHESIS

The available studies suggest that mindfulness interventions such as MBSR may be potentially effective in lowering blood pressure in patients with hypertension. The mechanisms appear to be both behavioural (e.g., improved medication adherence) and psychophysiological (e.g., stress reduction). However, large-scale RCTs with active control groups and long-term follow-ups are lacking to investigate the efficacy of MBSR compared with established non-pharmacological approaches such as physical activity or dietary changes.

Viral Infections

In a randomised controlled trial involving 60 nurses working in COVID-19 intensive care units, the effect of an **online-based MBSR programme** on sleep quality was investigated. Sleep quality was measured using the *Pittsburgh Sleep Quality Index (PSQI)* before and after the intervention. The results showed that the MBSR group exhibited significant improvements in the subscales *subjective sleep quality*, *sleep latency*, and *sleep efficiency*. In the control group, subjective sleep quality deteriorated, and no significant changes were observed in the other subscales.

In a systematic review, 28 studies examining the efficacy of **mindfulness-based interventions (MBIs)** on the mental health of healthcare professionals during the COVID-19 pandemic were analysed. The included studies comprised RCTs, non-randomised controlled trials, and non-randomised non-controlled studies. The results showed that MBIs led to significant improvements in stress, anxiety, depression, and burnout. However, effect sizes varied widely between studies, and many studies had methodological limitations, such as small sample sizes and the absence of active control groups. A limitation of the review is that most studies did not include long-term follow-ups, and the heterogeneity of the interventions limits the comparability of results ¹⁹.

HYPOTHESIS

The available studies suggest that mindfulness interventions such as MBSR may be effective in improving sleep quality and mental health in healthcare professionals working in high-stress settings such as COVID-19 intensive care units. However, the effects may be short-term and dependent on the intensity of the intervention. There is a lack of studies examining the long-term effects of mindfulness interventions on the mental health of healthcare professionals in pandemic situations and evaluating their efficacy compared with other stress management strategies.

Overall Picture

The available studies indicate that **Mindfulness-Based Stress Reduction (MBSR)** and related interventions, such as **Mindfulness-Based Cognitive Therapy (MBCT)** or **Mindfulness-Oriented Recovery Enhancement (MORE)**, may be effective in various clinical and non-clinical populations. Particularly consistent effects have been observed in the areas of anxiety, depression, stress, and subjective cognitive impairments. In oncology, chronic pain, and highly stressed professional groups such as nursing staff, mindfulness interventions show significant improvements in psychological parameters and quality of life. Additionally, there is evidence that MBSR can lower blood pressure in patients with hypertension, although these effects are less consistent than those observed for psychological parameters.

Despite these promising results, there are significant gaps in the evidence. Most studies have methodological limitations, such as small sample sizes, lack of active control groups, or short follow-up periods. Furthermore, direct comparisons between mindfulness interventions and established psychotherapeutic approaches, such as cognitive behavioural therapy (CBT), or pharmacological treatments are lacking. Long-term studies examining the sustainability of effects over several years are also rare. Finally, the generalisability of the results is limited, as many studies have been conducted in specific populations (e.g., breast cancer patients, nursing staff), and marginalised groups are often underrepresented.

Methodology of the Evidence Base

Many of the studies presented here are controlled human trials, including randomised controlled trials (RCTs), which are considered the gold standard for evaluating interventions. The typical duration of mindfulness interventions is 8 weeks, in line with the standard MBSR programme, although some studies have implemented longer interventions of up to 18 months. The endpoints vary depending on the study's objectives and include psychological parameters such as anxiety, depression, and stress (measured using validated scales like the *Brief Pain Inventory*, *Clinical Global Impression Scale*, or *Pittsburgh Sleep Quality Index*), physiological parameters such as blood pressure, or cognitive functions (measured using neuropsychological tests or subjective questionnaires). Systematic weaknesses of the studies include the absence of active control groups in many RCTs, short follow-up periods (usually only up to 3–6 months post-intervention), and small sample sizes, which limit statistical power. Furthermore, direct comparisons between mindfulness interventions and other evidence-based approaches, such as CBT or physical activity, are often lacking.

MBSR as a Replacement Therapy? What the Data Do Not Support

MINDFULNESS IS OFTEN PROMOTED AS A UNIVERSALLY APPLICABLE METHOD

, but the evidence base reveals clear limitations. In most areas of application—such as **chronic pain** or **depression**—MBSR is **not tested as a monotherapy** but rather as an **add-on** to established approaches. Even in high-quality studies, such as the **Differential-Efficacy Review of 2021** (comparison with cognitive behavioural therapy), MBSR does not consistently outperform control interventions for **chronic pain**. The **ASCO Guideline of 2023** recommends MBSR for cancer patients **only as a supportive measure**, not as a replacement for psychotherapeutic or pharmacological approaches.

THE ASSUMPTION THAT MBSR WORKS THROUGH SPECIFIC MECHANISMS

is only partially supported by the data. While **neuroimaging studies** show changes in brain regions such as the **amygdala** or the **prefrontal cortex**, these findings are **correlational** and do not establish causality. The **JAMA study of 2022** (MBSR vs. exercise in older adults) found **no structural brain changes** despite reported cognitive effects. Furthermore, **dose-dependent analyses** are lacking: it remains unclear whether longer or more intensive programmes yield better results. The **heterogeneity of outcomes** (e.g., subjective stress reduction vs. objective biomarkers) complicates a uniform assessment.

3. How Robust the Research Is

Research on **mindfulness** and **MBSR** focuses on two main areas: **burnout syndromes** and **cognitive functions**. In these fields, **randomised studies with active control groups** are available, such as comparisons with cognitive behavioural therapy or exercise therapy. Far less frequently studied are **oncological applications**, **cardiovascular diseases**, or **inflammatory processes**. The majority of studies have been published in the last ten years, with

guidelines (e.g., the ASCO guideline on anxiety and depression in cancer patients) increasingly recommending MBSR as a **complementary measure**.

The **methodological quality** of the studies is inconsistent. While highly cited works, such as the **JAMA study of 2023** (MBSR vs. escitalopram for anxiety disorders), use **randomised designs with active controls**, many smaller studies lack **blinding** or **long-term follow-ups**. Additionally, **placebo effects** are difficult to control, as participants often expect the intervention to be effective. **Structural brain changes** (e.g., in neuroimaging studies) are reported, but their clinical relevance remains unclear. **Generalisability** is limited: many studies recruit **motivated, well-educated participants**, which relativises the results for broader population groups.

4. Common Claims—and What the Data Actually Show

STATEMENT	EVIDENCE BASE
MBSR for acute mental health crises	No controlled studies on suicidality or psychoses exist. Recommendations are limited to stable patients as a supplement to standard therapies.
Long-term effects beyond 12 months	Most studies conclude after 8–12 weeks . Data on sustained effects are either lacking or inconsistent.
MBSR in children and adolescents	Only a few controlled studies exist. The available research shows no consistent effects on anxiety or ADHD.
Physical illnesses (e.g., diabetes, autoimmune diseases)	The available evidence is limited and methodologically weak . No robust conclusions can be drawn regarding hard endpoints such as disease progression.

5. The Most Robust Studies

Ranked by evidential strength, not by prominence. The full evaluation includes significantly more studies; here, only the most robust are listed.

Controlled Human Studies

- Management of Anxiety and Depression in Adult Survivors of Cancer: ASCO Guideline Update (2023)
- ¹ Mindfulness-Oriented Recovery Enhancement vs Supportive Group Therapy for Co-occurring Opioid Misuse and Chronic Pain in Primary Care: A Randomized Clinical Trial (2022)
- ² Mindfulness-Based Stress Reduction vs Escitalopram for the Treatment of Adults With Anxiety Disorders: A Randomized Clinical Trial (2023)
- ³ Effects of Mindfulness Training and Exercise on Cognitive Function in Older Adults: A Randomized Clinical Trial (2022)
- ⁴ Effectiveness of mindfulness-based interventions on anxiety, depression, and fatigue in people with lung cancer: A systematic review and meta-analysis (2023)
- ⁵ Effects of Mediterranean Diet or Mindfulness-Based Stress Reduction on Prevention of Small-for-Gestational Age Birth Weights in Newborns Born to At-Risk Populations (2021)
- ⁶ Evaluation of a mindfulness-based intervention programme to decrease blood pressure in low-income African-American older adults (2012)
- Benefits of mindfulness meditation in reducing blood pressure and stress in patients with arterial hypertension (2019)
- ⁷ Differential efficacy between cognitive-behavioural therapy and mindfulness-based therapies for chronic pain: Systematic review (2021)
- ⁸ Mindfulness-Based Intervention for the Reduction of Compassion Fatigue and Burnout in Nurse Caregivers of Institutionalised Older Persons with Dementia (2022)
- ⁹ Comparing the efficacy of mindfulness-based therapy and cognitive-behavioural therapy for depression in head-to-head randomised controlled trials: A systematic review (2023)
- ¹⁰ Absence of structural brain changes from mindfulness-based stress reduction: Two combined randomised controlled trials (2022)
- The Impact of an Online Mindfulness-Based Stress Reduction Programme on Sleep Quality of Nurses Working in COVID-19 Care Units: A Clinical Trial (2021)
- Evaluation of Cognitive Behavioural Therapy vs Mindfulness Meditation in Brain Changes During Reappraisal and Acceptance Among Patients With Social Anxiety (2021)

- Mindfulness-based stress reduction and cognitive function among breast cancer survivors: A randomised controlled trial (2022)
- ¹¹ Enhanced mindfulness-based stress reduction in episodic migraine—effects on sleep quality, anxiety, stress, and depression: A secondary analysis of a randomised controlled trial (2022)
- ¹² Effects of Mindfulness-Based Therapy for Cancer Patients: A Systematic Review and Meta-analysis (2022)
- ¹³ Short-term Effects of Randomised Mindfulness-Based Intervention in Female Breast Cancer Survivors: A Systematic Review and Meta-analysis (2021)
- Effects of hypnosis vs mindfulness meditation vs education on chronic pain intensity and secondary outcomes in veterans: A randomised clinical trial (2022)
- ¹⁴ Effect of a Mediterranean Diet or Mindfulness-Based Stress Reduction During Pregnancy on Child Neurodevelopment: A Prespecified Analysis of the IMPACT Trial (2023)
- ¹⁵ Telehealth Mindfulness-Oriented Recovery Enhancement vs Usual Care in Individuals With Opioid Use Disorder and Pain: A Randomised Clinical Trial (2024)
- ¹⁶ Effects of mind-body exercise on perimenopausal and postmenopausal women: A systematic review and meta-analysis (2024)
- ¹⁷ The effectiveness of mindfulness-based stress reduction (MBSR) on the mental health, HbA1c, and mindfulness of diabetes patients: A systematic review (2023)
- A systematic review of cognitive behavioural therapy-based interventions for comorbid chronic pain and clinically relevant psychological distress (2023)

6. Summary

What is established: Mindfulness-based interventions such as MBSR demonstrate consistent efficacy in reducing anxiety, depression, and subjective cognitive impairments in randomised controlled trials, particularly in oncology and exhaustion syndromes. For chronic pain, especially fibromyalgia, MBSR is superior to standard care. In the treatment of anxiety disorders, MBSR is non-inferior to pharmacological therapy with escitalopram. Additionally, MBSR improves psychological well-being in pregnant women and lowers blood pressure in patients with hypertension. However, the effects on objective cognitive functions or physiological parameters such as birth complications are less clear.

HYPOTHESIS The available data suggest that MBSR and related interventions are particularly effective when used as complementary measures in stepped-care models, such as for moderate depressive symptoms or stress reduction in high-risk groups like caregivers. The effects appear to be stable in the short term but may depend on cancer stage, patient age, or the type of burden. It is plausible that structural brain changes, as reported in some neuroimaging studies, correlate with clinical effects, although their relevance remains unclear. **Hypothesis:** MBSR may be especially effective where subjective perception and psychological distress are prominent, while objectively measurable physiological or cognitive improvements may require longer or more intensive interventions.

What a study should clarify: To strengthen the evidence base, long-term studies with follow-ups over several years are needed to examine the sustainability of MBSR effects. Direct comparisons with established psychotherapeutic approaches such as cognitive behavioural therapy (CBT) or physical activity would help contextualise the relative efficacy of MBSR. Furthermore, future studies should specifically include underrepresented groups to enhance the generalisability of results. Clarifying the clinical relevance of structural brain changes induced by MBSR requires standardised neuroimaging methods and longer intervention periods. Finally, it would be important to systematically assess the efficacy of MBSR in specific applications such as cardiovascular diseases or inflammatory processes, where only a few controlled studies currently exist.

7. Open Questions

- **Dose-response relationship:** Is there an optimal level of mindfulness practice, or are effects independent of duration and intensity?
- **Neurobiological mechanisms:** Which brain processes mediate the observed effects—and are they specific to MBSR?
- **Digital formats:** Can online programmes be as effective as in-person courses, or are crucial social components missing?

Frequently Asked Questions

Is MBSR as effective for anxiety disorders as pharmacological therapy?

The **2023 JAMA study** compared MBSR with escitalopram for generalised anxiety disorder. Both groups showed **similar improvements** in primary outcomes. However, the study was **not blinded**, and the **exclusion criteria** (e.g., severe depression) limit generalisability. MBSR may be used as an **adjunct**, but it does not replace guideline-based therapy for severe cases.

Can MBSR reduce medication use in chronic pain?

Some studies report **reduced analgesic consumption** following MBSR, such as for **lower back pain**. However, **long-term data are lacking**, and the effects are **not consistent**. The **2021 Differential Efficacy Review** found no superiority of MBSR over cognitive behavioural therapy. MBSR may have a **supportive role** but does not replace **multimodal pain therapy**.

Are there risks or side effects associated with MBSR?

Severe side effects are rarely reported in controlled studies. Potential **adverse effects** include **transient increases in anxiety** or **emotional overwhelm**, particularly in trauma patients. The available data indicate that MBSR is **generally well tolerated**, but it is **not a standard therapy for acute crises**. **Individual adaptation** of the exercises is recommended.

Sources

1

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Garland EL, Hanley AW, Nakamura Y, Barrett JW, Baker AK, Reese SE et al. · 2022

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