Table 1: Systematic reviews of mindfulness and cancer-related fatigue (CrF)

Source: Mora DC, CAM-Cancer Collaboration. Systematic reviews of mindfulness and cancer-related fatigue (CrF) [online document]. Mindfulness | CAM Cancer, May 2026.

Fatigue			
Review characteristics	**PICO of included studies** Population, intervention, control, outcome	**Results and conclusions**	**Assessment**
McCloy, K., Hughes, C., Dunwoody, L., Marley, J., & Gracey, J. (2022). *Effects of mindfulness-based interventions on fatigue and psychological wellbeing in women with cancer: A systematic review and meta-analysis of randomised control trials.* **Psycho-Oncology, 31**(11), 1821–1834. https://doi.org/10.1002/pon.6046.			
Type of review Systematic review **Searches** ***Databases*** CINAHL, Ovid MEDLINE, Ovid PsycINFO, Scopus, Cochrane Central Register of Controlled Trials (CENTRAL), Cochrane Database of Systematic Review. ***Dates*** From inception to April 2021; updated in August 2022. **Data synthesis** Meta-analysis **Risk of bias assessment** Cochrane Risk of Bias tool RoB2	**Studies and participants** 23 publications, 2,326 participants (20 RCTs). Adults ≥18 years diagnosed with cancer **Interventions** MBSR, MBCT, MBAT, compassion-based and other adapted mindfulness approaches. **Controls** WLC, UC, and active comparators (e.g., supportive care, education, relaxation, metacognition therapy). **Outcome measures and measurement tools** Primary outcome: CrF (17 RCTs), depression, anxiety (7 RCTs), sleep (5 RCTs), and quality of life (QoL) (5 RCTs); multiple validated psychometric scales were used across studies (not a single uniform tool). **Measure of treatment effect** SMD with 95% CI. 17 studies included in meta-analysis.	**Results for risk of bias assessment of primary studies included in the review** Overall high risk of bias in over 50% of the included studies, primarily due to the lack of blinding of participants and outcome assessors, and deviations from intended interventions. Low risk of bias for missing outcome data and the randomization process in most studies. "Some concerns", particularly for selective reporting. **GRADE** Overall, the evidence base was rated as having low to very low certainty due to these methodological limitations, along with substantial heterogeneity and potential publication bias. **Results for outcome measures** ***Post Intervention*** Significant improvements in CrF, Anxiety, Depression but not QoL and sleep. Cancer-related fatigue: SMD= −0.81, 95% CI (−1.17, −0.44), $p < 0.001$ ***Follow-up*** Cancer-related fatigue: SMD = −0.55, 95% CI (−0.86, −0.25), p-value = 0.0003 ***Subgroup analysis*** Little difference in SMD for adapted type of mindfulness (p = 0.42), wait list control compared to	**Quality assessment of the SR** Moderate-high according to AMSTAR 2 checklist. No critical flaws identified, only minor. **Comments:** Although the SR is of moderate quality, the evidence was considered to have low to very low certainty due to a high risk of bias (mainly due to blinding), substantial heterogeneity (across interventions, populations, and outcome measures), and potential publication bias.

		active comparator (p = 0.05) or length of intervention (p = 0.29). **Adverse events** Five studies reported no adverse events associated with the interventions. The remaining publications did not report on adverse events. **Conclusions** *"There appeared to be a large effect of mindfulness on fatigue, anxiety, and depression; however, there was little or no effect on sleep and QoL. In terms of subgroup analysis, there was little difference in the groups, suggesting that all types of mindfulness and duration of intervention were effective. Follow-up showed that the response was sustained, although slightly reduced when compared to post-intervention."*	
Lan, X., Xie, H., Fu, L., & Peng, W. (2024). *Effects of mindfulness-based stress reduction on cancer-related fatigue in patients with breast cancer: A meta-analysis of randomized controlled trials.* Frontiers in Oncology, 14, 1425563. https://doi.org/10.3389/fonc.2024.1425563			
Type of review: Systematic review ***Databases*** PubMed, Cochrane Library, Embase, Web of Science, China Biomedical Document Service System, China National Knowledge Infrastructure (CNKI), Wanfang Data, VIP database ***Dates*** From inception to April 10, 2023 ***Data synthesis*** Meta-analysis ***Risk of bias assessment*** Cochrane Risk of Bias tool RoB (original version)	**Studies and participants** 13 RCTs, 1992 participants Adults (≥18 years) diagnosed with breast cancer (histopathologically confirmed), either undergoing or having completed treatment. **Interventions** MBSR, typically 6–8-week structured programs including meditation, body scanning, and mindfulness exercises **Control** Usual care (e.g. routine nursing/standard care). **Outcome measures and measurement tools** Cancer-related fatigue PFS-R: 1 RCT; CFS: 3 RCTs; POMS: 2 RCTs; MDASI: 2 RCTs; FSI: 2 RCTs; QLQ-C30 (fatigue subscale): 1 RCT; FSS: 1 RCT; MFSI-SF: 1 RCT **Measure of treatment effect** SMD 95% CI, effect size calculations	**Results for risk of bias assessment of primary studies included in the review** High risk of bias for blinding: none of the 13 studies used blinding for subjects or interveners, and only 3 used blinding for outcome indicator evaluators. Eight studies adopted the correct randomization method. Five studies conducted allocation concealment. **GRADE** Not assessed. **Results for outcome measures:** Significant improvements in overall early and mid-term follow-up effects on CrF: Early effect CrF SMD = −0.32 (−0.42, −0.22) p < 0.01 Mid-term follow-up effect (3–6 months) SMD = −0.19 (−0.31, −0.07) **Subgroup analyses for early effects on CrF:** According to sample size, intervention method, intervention duration, geographic region and fatigue assessment tool.	**Quality assessment of the SR** Moderate according to AMSTAR 2 checklist. Risk of bias assessed, but the integration in the interpretation very limited. **Comments:** No formal GRADE assessment and no analysis of how risk of bias affected results. The included studies had high heterogeneity (particularly regarding outcome measures). Most studies reported a high risk of bias, mainly due to lack of blinding. Most of the studies included a small sample size Important subgroups were not analysed, such as cancer stage, usual care treatment type (e.g., chemo vs survivorship). Some subgroups had very few studies (e.g., Europe 1 study).

		The strongest effects occurred with 8-week programs, expert-guided delivery, Asian populations. consistent effects regardless of study size. Results depend to some extent on measurement instrument. **Adverse events:** One study reported there were no serious adverse events. The remaining publications did not report whether participants reported adverse events. **Conclusions** "*Taken together with all the important parameters, MBSR contributes to improving cancer-related fatigue in breast cancer patients and can be recommended as a beneficial adjuvant therapy for cancer-related fatigue in clinical breast cancer patients. In particular, for breast cancer patients currently receiving anticancer treatment, MBSR once a week for two hours for eight weeks, which is supervised by experts, has a significant impact on Crf.*"	
Johns, SA., Tarver, WL., Secinti, E., Mosher, CE., Stutz, PV., Carnahan, JL., Talib, TL., Shanahan, ML., Faidley, MT., Kidwell, KM, & Rand, KL. (2021). Effects of mindfulness-based interventions on fatigue in cancer survivors: A systematic review and meta-analysis of randomized controlled trials. Critical Reviews in Oncology / Hematology, 160, 103290. https://doi.org/10.1016/j.critrevonc.2021.103290			
Type of review **Systematic review** **Searches** ***Databases*** PubMed, MEDLINE, PsycINFO, CINAHL, Web of Science, EMBASE ***Dates*** From inception to December 2019 ***Data synthesis*** Meta-analysis ***Risk of bias assessment*** Cochrane Risk of Bias tool RoB original version	**Studies and participants** 21 RCTs, 2239 participants Adults (≥18 years) who are cancer survivors (any cancer type or stage; during or after treatment **Interventions** Mindfulness-based interventions (MBIs), including MBSR, MBCT, MBCR, MBAT, MAPs, other mindfulness-based programs **Control** Waitlist/usual care controls (majority; 15 RCTs) Active control conditions (e.g., psychoeducation, supportive therapy, qigong, metacognitive therapy) **Outcome measures**	**Results for risk of bias assessment of primary studies included in the review** In domains such as performance and reporting bias, the risk of bias was high**.** Most studies had generally low/unclear risk of bias across domains such as random sequence generation, allocation concealment, detection bias, attrition bias, and other biases. **GRADE** Quality of evidence for fatigue and vitality/vigour was rated as low. Low certainty in the effect estimates due to concerns regarding risk of bias and publication bias. **Results for outcome measures:** **Fatigue** Effects were large for fatigue at post-intervention and moderate at first follow-up. Post-intervention SMD = 0.60, 95% CI (0.36, 0.83), p-	***Quality assessment of the SR*:** High according to AMSTAR 2 checklist. All critical domains fulfilled, only minor **Comments:** Although the overall quality of the SR is high, the evidence is graded low due to high heterogeneity (regarding outcome measures) high risk of bias, mainly due to blinding and publication bias.

	FSI, - FACT-F) (POMS) - SF-36 / SF-12 vitality scales - CIS-FS - QLQ-C30 fatigue scale - MDASI, FSS-P, MFSI-SF (less frequent). **Measure of treatment effect** SMD with 95% CI.	value < 0.001 First follow-up SMD = 0.42, 95% CI (0.20, 0.64), p-value < 0.001 **Vitality/Vigor** Effects were moderate for vitality/vigor at both time points. Post-intervention SMD = 0.39, 95% CI (0.25, 0.52), p-value < 0.001 First follow-up SMD = 0.35, 95% CI (0.03, 0.67), p-value = 0.030 **Subgroup analyses** Effects were generally consistent across subgroups according to gender, intervention type, control type, dose, follow-up time, and drop-out rate. Older age was associated with smaller fatigue benefit at post-intervention. **Adverse events** Two studies reported there were no adverse events. The remaining publications did not report whether participants reported adverse events. **Conclusions** "*Results suggest that MBIs show promise in reducing fatigue and improving vitality/vigor at post-intervention and an average of 3–4 months later. Given notable overall risk of bias, publication bias, and heterogeneity of findings, the quality of the evidence supporting these findings was low.* "	
Haussmann, A., Schmidt, ME., Illmann, ML., Schröter, M., Hielscher, T., Cramer, H., Maatouk, I., Horneber, M., & Steindorf, K. (2022). *Meta-analysis of randomized controlled trials on yoga, psychosocial, and mindfulness-based interventions for cancer-related fatigue: What intervention characteristics are related to higher efficacy?* Cancers, 14(8), 2016. https://doi.org/10.3390/cancers14082016			
Type of review Systematic review **Searches** ***Databases*** PubMed, CINAHL, PsycINFO (plus earlier reviews using MEDLINE, Embase, Cochrane, etc.)	**Studies and participants** 69 RCTs, 6,387 participants Adult cancer patients undergoing or having completed curative systemic or radiation therapy **Interventions**	**Results for risk of bias assessment of primary studies included in the review** Random sequence and allocation were inadequate or unclear for over half of the mindfulness intervention studies. All studies were at high risk of blinding for both participants and personnel. The majority of studies were at low risk for incomplete data, selective reporting, and other data issues.	**Quality assessment of the SR: Moderate-High** according to the AMSTAR 2 checklist. The risk of bias was not integrated into the discussion of the results. **Comments:** Although the overall quality of the SR is moderate, there was high heterogeneity

Dates From inception to 19 October 2019 ***Data synthesis*** Meta-analysis ***Risk of bias assessment*** Cochrane Risk of Bias tool RoB (original version)	Yoga interventions (24 RCTs) Psychosocial interventions (31 RCTs) Mindfulness-based interventions (15 RCTs) **Control** Standard care, WLC, attention control **Outcome measures and measurement tools** CrF measured with various validated fatigue questionnaires (not exhaustively specified but multidimensional preferred) Total/general fatigue scores are preferred when multiple scales are reported. **Measure of treatment effect** SMD with 95% CI.	**GRADE** Not conducted. **Results for outcome measures:** Mindfulness-based interventions showed the largest effect size among all intervention types for reducing CRF. Mindfulness-based interventions: SMD = −0.73 (−0.98, −0.49) $p < 0.001$ Yoga interventions: SMD = −0.35 (−0.52, −0.19) $p < 0.001$ Psychosocial interventions: SMD = −0.43 (−0.60, −0.25) $p < 0.001$ **Subgroup analyses** For mindfulness-based interventions, no specific characteristic showed a significant association with higher efficacy. **Adverse events** The article did not mention if adverse events were reported **Conclusion** "*This review and meta-analysis underline that yoga, psychosocial, and mindfulness-based interventions are effective therapeutic measures to reduce CRF. Nevertheless, not every intervention necessarily delivers a significant effect on CRF… for both yoga and mindfulness-based interventions, no specific intervention characteristic emerged as being more essential or advantageous than others. Overall, longer intervention duration did not appear to be more efficient than shorter interventions.*"	(regarding outcome measures and interventions), high risk of bias, mainly due to blinding and publication bias in the included RCTs.

Abbreviations
CFS: Cancer Fatigue Scale
CI: confidence interval
CIS-FS: Checklist Individual Strength–Fatigue
CrF: Cancer-related fatigue
EORTC QLQ-C30– European Organization of Research and Treatment of Cancer Quality of Life Questionnaire
FACT-F: Functional Assessment of Cancer Therapy–Fatigue
FSI: Fatigue Symptom Inventory
FSS: Fatigue Severity Scale
KISS: Korean Studies Information Service System MA: meta-analysis

MAPs: Mindful Awareness Practices
MBAT Mindfulness-Based Art Therapy
MBCR: - Mindfulness-Based Cancer Recovery
MBCT Mindfulness-Based Cognitive Therapy
MBSR Mindfulness-Based Stress Reduction
MDASI M.D.: Anderson Symptom Inventory
MFSI-SF: Multidimensional Fatigue Symptom Inventory–Short Form
NDSL: National Digital Science Library (NDSL)
PFS-R: Revised Piper Fatigue Scale

POMS: Profile of Mood States
RCT: randomized controlled trial
RISS: Research Information Sharing Service
RoB: Cochrane Risk of Bias Tool version 1
SMD: standardized mean differences
UC: Usual care
WLC: Waitlist control

***AMSTAR 2 Critical Domain Items**

1. Was the review protocol established a priori (e.g., registered in PROSPERO)?
2. Was the search comprehensive and included multiple databases, grey literature, and appropriate search strategies?
3. [Did the authors provide a list of excluded studies and justify the exclusions?]
4. Was the risk of bias (RoB) of included studies assessed using appropriate tools?
5. If a meta-analysis was conducted, were the methods used appropriate and clearly described?
6. Did the authors consider the RoB in individual studies when discussing the results?
7. Was publication bias assessed and discussed appropriately?