

Table 1: Systematic reviews of mindfulness for cancer

Source: Cramer H, Moenaert AC, CAM-Cancer Consortium. [Mindfulness \[online document\]](#). October 2019.

Study year (ref)	Design and methods	Inclusion criteria	Included studies and participants	Included interventions and outcomes	Main results/Conclusions	Comments
Overviews of systematic reviews						
Gotink, 2015 (31)	Type of review: Overview of SRs Search strategy: PubMed, Embase, PsycInfo, Cochrane, Medline, Web of Science through January 12, 2015, restricted to systematic reviews and meta-analyses Quality assessment: Checklist based on PRISMA Measure of treatment effect: SMD Data synthesis: meta-analysis of meta-analyses	Studies: SRs of RCTs Participants: Any Interventions/comparator: MBSR or MBCT compared to any comparator Outcomes: Any health outcome measure	Studies: 23 SRs including 6 on cancer patients; 23 RCTs including 16 on cancer patients Participants: 1,668 mixed cancer patients	Intervention: MBSR/MBCT Control: Active treatment, UC, WL Concurrent treatment: Not reported Outcome measures: Not reported	Results for outcome measures: Significant improvements for depression, anxiety, stress, quality of life, but not for physical health Results quality assessment: 19 (Cramer 2012), 6 (Ledesma), 8 (Shennan), 7 (Smith), 2 (Ott), and 10 (Piet 2012) items from the PRISMA checklist were rated 'yes' for the individual reviews on cancer. Conclusions: MBSR/MBCT are associated with improvements in depressive symptoms, anxiety, stress, quality of life, selected physical outcomes in the adjunct treatment of cancer	Meta-analysis of meta-analyses not differentiated by patient groups; quality assessment tool not validated; quality assessment not reflected in conclusions
Systematic reviews						
Castanheira 2018 (32)	Type of review: SR and MA Search strategy: PubMed between 2013 and 2017, published in English Quality assessment: Cochrane RoB tool, PEDro score Measure of treatment effect: SMD Data synthesis: meta-analysis	Studies: RCTs and non-randomized studies published in English between 2013 and 2017 with a PEDro score > 3 Participants: BC Interventions/comparator: MBSR compared to any comparator Outcomes: Any	Studies: 6 RCTs, 1 non-randomized study (2 RCTs in meta-analysis) Participants: 532 breast cancer patients	Intervention: MBSR Control: UC, nutritional intervention, metacognitive treatment Concurrent treatment: not reported Outcome measures: BFI, EORTC QLQ-C30, HADS, FSS, MADSI, SCL-90-R	Results for outcome measures: Significant improvements for fatigue, depression, anxiety, cognitive symptoms in single studies. No effects on fatigue in a meta-analysis of 2 RCTs. Results quality assessment: low risk of selection bias in 3 out of 6 RCTs; blinding high RoB in 4 out of 6 RCTs; low risk of selective reporting in 4 out of 6 RCTs; low risk of attrition and other bias; mean PEDro score 6.71 (standard deviation 0.48). Conclusions: Mindfulness-Based Stress Reduction can be considered a promising alternative for the treatment of breast cancer symptoms.	Methods incompletely reported. Search very limited; missed a number of eligible studies, results therefore incomplete. Safety not assessed.

Haller 2017 (33)	<p>Type of review: SR and MA Search strategy: PubMed (including MEDLINE), Scopus, Cochrane, through October 2016, Quality assessment: Cochrane RoB tool Measure of treatment effect: SMD Data synthesis: meta-analysis</p>	<p>Studies: RCTs Participants: BC Interventions/comparator: MBSR or MBCT compared to any comparator Outcomes: Any</p>	<p>Studies: 10 RCTs Participants: 1,709 breast cancer patients</p>	<p>Intervention: MBSR or MBCT Control: usual care, enhanced usual care, wait-list, supportive expressive group therapy, group nutrition education program Concurrent treatment: None in 6 RCTs; chemotherapy and/or radiotherapy allowed in 4 RCTs</p> <p>Outcome measures: C-SOSI, CES, CES-D, CPSS, EORTC QLQ-30, FACT-B, FSI, HADS, MDASI, MOS-SF36, MOSS, PSS, PSQI, QLAQS, SCL-90-R, POMS, STAI, WHO-5, adverse events</p>	<p>Results for outcome measures: Significant short-term improvements for quality of life, fatigue, sleep, stress, anxiety, depression. Significant medium-term improvements for anxiety, depression. Significant long-term improvements for anxiety. Compared to active interventions short-term improvements of anxiety and depression. Insufficient data for adverse events.</p> <p>Results quality assessment: Unclear methods randomization and/or allocation concealment in 7 out of 10 RCTs; blinding unclear RoB; low risk of attrition bias; high risk of selective reporting; low risk of other bias</p> <p>Conclusions: Evidence for short-term effectiveness and safety. Clinical relevance remains unclear.</p>	<p>No grey literature included; publication bias could not be assessed.</p>
Huang, 2016 (34)	<p>Type of review: SR and MA Search strategy: PubMed, EMBASE, Cochrane through June 30, 2014 Quality assessment: Cochrane RoB tool, NOS Measure of treatment effect: MD Data synthesis: meta-analysis</p>	<p>Studies: RCTs and non-randomized studies Participants: BC Interventions/comparator: MBSR compared to UC or SC Outcomes: Quality of life, psychological function</p>	<p>Studies: 3 RCTs, 1 non-randomized CCTs, 4 uncontrolled trials Participants: 880 BC (728 in RCTs)</p>	<p>Intervention: MBSR Control: free choice of stress management techniques, nutrition education, UC Concurrent treatment: Active radiation and/or chemotherapy for a subset of patients in 1 RCT</p> <p>Outcome measures: BAI, BDI, CES-D, C-SOSI, FACT-B, MMOS, PSS, SCL-90</p>	<p>Results for outcome measures: Short-term innergroup effects on depression, anxiety, and stress.</p> <p>Results quality assessment: Only 1 RCT had adequate randomization and blinding of outcome assessors</p> <p>Conclusions: Positive effect of MBSR in decreasing anxiety, depression and stress and improving overall quality of life among breast cancer survivors. This approach should be recommended to breast cancer patients.</p>	<p>Search strategy incompletely reported; MD used although different outcome measures were used (MA biased); no between-group comparisons but only within-group comparisons in MA; safety not assessed.</p>

Rush, 2017 (35)	<p>Type of review: SR and MA Search strategy: Medline, Alt Health Watch, CINAHL between October 2009 and November 2015, restricted to adults and English language Quality assessment: None Measure of treatment effect: NA Data synthesis: qualitative</p>	<p>Studies: Any Participants: Any cancer Interventions/comparator: MBSR compared to any comparator Outcomes: Stress, anxiety</p>	<p>Studies: 8 RCTs, 2 non-randomized CCTs, 3 uncontrolled trials Participants: 1,575 mixed cancer patients (1,143 in RCTs)</p>	<p>Intervention: MBSR Control: nutrition education, UC, WL Concurrent treatment: None (not reported for some studies) Outcome measures: BAI, BDI, blood pressure, CES-D, CSES, Cortisol, C-SOSI; FACT, FACT-Sp, FFMQ, HADS, heart rate IES, MAAS, MAC, MSCL, POMS, respiratory rate, RRQ, RSES, SCL-90, UCLA Loneliness Scale</p>	<p>Results for outcome measures: Not synthesized Results quality assessment: None Conclusions: MBSR is a promising modality for stress management among cancer patients. All practitioners must include MBSR as one of the approaches for stress reduction as part of cancer care.</p>	<p>Studies not indexed in the searched databases were excluded; search strategy inadequate; no RoB assessment; results not synthesized but only listed in a table; safety not assessed; conclusions not based on evidence (too strong).</p>
Schell, 2019 (36)	<p>Type of review: Cochrane SR and MA Search strategy: Cochrane, MEDLINE, Embase, WHO ICTRP, ClinicalTrials.gov through April 10, 2018, no restrictions Quality assessment: Cochrane RoB tool Measure of treatment effect: SMD Data synthesis: meta-analysis</p>	<p>Studies: RCTs Participants: BC Interventions/comparator: MBSR plus anticancer therapy compared to anticancer therapy alone Outcomes: Quality of life, overall survival, fatigue, anxiety, depression, quality of sleep, adverse events</p>	<p>Studies: 14 RCTs (10 RCTs in MA) Participants: 1,756 BC patients (1571 BC patients in MA)</p>	<p>Intervention: MBSR plus anticancer therapy (not defined) Control: anticancer therapy (not defined) Concurrent treatment: None in 6 RCTs; chemotherapy and/or radiotherapy allowed in 3 RCTs Outcome measures: BAI, BDI, CES-D, EORTC QLQ-30, EORTC QLC-BR23, FACT-B, FACT-ES, FSI, GAD-7, HADS, IBCSG QoL, ISI, MOS- SF-36, MOSS, PHQ-8, POMS, PSQI, SCL-90-R, STAI, survival</p>	<p>Results for outcome measures: Significant short-term improvements for quality of life (low-quality evidence), fatigue (moderate-quality evidence), anxiety (moderate-quality evidence), depression (high-quality evidence). Significant medium-term improvements for fatigue (moderate-quality evidence), anxiety (moderate-quality evidence), depression (moderate-quality evidence), and quality of sleep (moderate-quality evidence). No long-term effects on quality of life, anxiety or depression. No data on overall survival or adverse events. Results quality assessment: Unclear methods randomization and/or allocation concealment in 10 out of 14 RCTs; blinding high RoB in all RCTs; high or unclear risk of attrition bias in 8 out of 14 RCTs high or unclear risk of selective reporting in 13 out of 14 RCTs; low risk of other bias in 12 out of 14 RCTs Conclusions: May improve quality of life and fatigue in the short-term, anxiety and depression up to six months after the end of the intervention. No effects up to two years after the intervention.</p>	<p>Anticancer therapy is given as an inclusion criterion; only 3 out of 10 RCTs in the meta-analysis fulfil this inclusion criterion.</p>

Zhang, 2015 (37)	Type of review: SR and MA Search strategy: Medline, Cochrane, EMBASE, Google Scholar through November 2014, no restrictions Quality assessment: Cochrane RoB tool Measure of treatment effect: SMD Data synthesis: meta-analysis	Studies: RCTs Participants: Any cancer Interventions/comparator: Mindfulness-based interventions compared to UC Outcomes: Depression, anxiety	Studies: 7 RCTs Participants: 888 mixed cancer patients	Intervention: MBSR/MBCT/MBAT Control: UC Concurrent treatment: Not reported Outcome measures: HADS, HAM-D, POMS, SCL-90-R	Results for outcome measures: Moderate short-term effects on anxiety; large short-term effects on depression; no medium-term effects on anxiety or depression Results quality assessment: Low RoB except for blinding of participants Conclusions: Mindfulness-based interventions can relieve anxiety and depression among patients with cancer. Further research is warranted.	No grey literature included; search strategy incomplete; treatment status unclear; RoB assessment not in line with other reviews (overly positive); safety not assessed.
Zhang, 2016 (38)	Type of review: SR and MA Search strategy: PubMed, Cochrane, SCI, EBSCO, Chinese Biomedical Literature Database, Chinese Digital Journals Fulltext Database through January 2015, no restrictions Quality assessment: Jadad Score, baseline comparability, allocation concealment Measure of treatment effect: MD or SMD Data synthesis: meta-analysis	Studies: RCTs Participants: BC Interventions/comparator: MBSR or MBCT compared to UC, WL or placebo Outcomes: Physical health, psychological health, quality of life	Studies: 7 RCTs Participants: 951 BC	Intervention: MBSR, Mindful Awareness Practices Control: UC, WL Concurrent treatment: Not reported Outcome measures: BCPT, CES-D, CRS, FACT, FACT-B, FSI, MDASI, POMS, PSS, PSQI, SCL-90, STAI, QLACS	Results for outcome measures: Small short-term effects of MBSR compared to WL or UC on anxiety or emotional well-being, moderate short-term effects on fear of recurrence, large short-term effects on depression, no short-term effects on stress or spirituality. Results quality assessment: 2 RCTs \geq 4 on Jadad Score; 2 RCTs adequate randomization and allocation concealment; 2 RCTs blinded outcome assessors Conclusions: Clear support for the efficacy of MBT as adjunctive treatment of BC. More research is needed	No grey literature included; validity of Jadad Score under discussion; overestimation of the findings in light of the limited study quality; publication bias not assessed; safety not assessed.
Zhang, 2019 (39)	Type of review: SR and MA Search strategy: Cochrane Library, CEntral, PsycINFO, Web of science, Medline, EMBASE, CNKI, CBM database through May 2018, no restrictions Quality assessment: Cochrane RoB tool; NOS Measure of treatment effect: MD Data synthesis: meta-analysis	Studies: Not reported Participants: Not reported Interventions/comparator: Not reported Outcomes: Not reported	Studies: 8 RCTs, 6 non-randomized CCTs Participants: 1,505 BC	Intervention: MBSR Control: UC, WL, no treatment Concurrent treatment: Not reported Outcome measures: BPI, CAMS-R, CES-D, C-SOSI, distress thermometer scale, ECOG, EORTC QLQ-C30, EORTC QLQ-BR23, FACT-B, FACT-ES, FFMQ, FSI, GAD-7, HADS, ISI, MAAS, MOS-SF36, PHQ-8, PFS-R, POMS, PSS, SCL-90-R, SOSI, STAI, symptom scales, WBPI, WEMWBS, WHO-5	Results for outcome measures: Positive effects of MBSR on psychological function, cognitive function, fatigue, emotional wellbeing, anxiety, depression, stress, distress, mindfulness. No effects on pain, sleep quality, global quality of life. Results quality assessment: Inconsistent reporting between text and tables, RoB in RCTs cannot be interpreted; good quality of non-randomized studies Conclusions: Mindfulness-based interventions can relieve anxiety and depression among patients with cancer. Further research is warranted.	No grey literature included; inclusion criteria not reported; RoB assessment inconsistent and not interpretable; short- and long-term effects not differentiated.

Abbreviations: 7DDR, 7-Day Diet Recall; BAI, Beck Anxiety Index; BC, women diagnosed with breast cancer; BCPT, Breast Cancer Prevention Trial Symptom Checklist; BDI, Beck Depression Index; BFI, Brief Fatigue Inventory; BPI, brief pain inventory; CAMS-R, cognitive and affective mindfulness scale-revised; CARS, Concerns About Recurrence Scale; CCT, controlled clinical trial; CES-D, Center for Epidemiological Studies Depression Scale; COC, Courtauld Emotional Control Scale; CPSS, Chinese Perceived Stress Scale; CSES, Coping Self-efficacy Scale; C-SOSI, Calgary Symptoms of Stress Inventory; DWI, Dealing with Illness Questionnaire; ECOG, everyday cognition scale; EORTC QLQ-30, European Organization for Research and Treatment quality of life questionnaire-30 Items; EORTC QLC BR23, European Organization for Research and Treatment quality of life questionnaire - Breast Cancer-23 Items; FACT, Functional Assessment of Cancer Therapy; FACT-B, Functional Assessment of Cancer Therapy-Breast; FACT-ES, Functional Assessment of Cancer Therapy-Endocrine Symptoms; FACT-Sp, Functional Assessment of Cancer Therapy-Spirituality; FFMQ, Five-Facet Mindfulness Questionnaire; FSI, Fatigue Symptom Inventory; GAD, Generalized Anxiety Disorder; HADS, Hospital Anxiety and Depression Scale; HAM-A, Hamilton Anxiety Rating Scale; HAM-D, Hamilton Depression Rating Scale; IBCSG QoL, International Breast Cancer Study Group Quality of Life Core Questionnaire; IES, Impact of Event Scale; ISI, Insomnia Severity Index; LOT, Life Orientation Test; MA, meta-analysis; MAAS, Mindful attention Awareness Scale; MAC, Mental Adjustment to Cancer Scale; MBAT, Mindfulness-based Art Therapy; MBCT, Mindfulness-based Cognitive Therapy; MBSR, Mindfulness-based Stress Reduction; MD, mean difference; MDI, Major Depression Inventory; MDASI, MD Anderson Symptom Inventory; Mini-MAC, Mental Adjustment to Cancer Scale short form; MOS-SF, Medical Outcomes Studies Short-form General Health Survey; MOS-SSS, Medical Outcomes Social Support Survey; MOSS, Medical Outcome Study sleep scale; MSCL, Medical Symptom Checklist; NOS, Newcastle-Ottawa Assessment Scale; PEDro, Physiotherapy Evidence Database; PENN, Penn State Worry Questionnaire; PHQ, Patient Health Questionnaire Depression Scale; PFS-R, revised piper fatigue scale; POMS, Profile of Mood Scale; PRISMA, Preferred reporting items for systematic review and meta-analysis protocols, PSS, Perceived Stress Scale; PSQI, Pittsburgh Sleep Quality Index; QLACS, Quality of Life in Adult Cancer Survivors; RCT, randomized controlled trial; RoB, risk of bias; RRQ, Rumination-Reflection Questionnaire; RSES, Rosenberg Self-Esteem Scale; SC, standard care; SCI, Shapiro Control Inventory; SCL-90-R, Symptom Checklist-90-Revised; SMD, standardized mean difference; SOC, Sense of Coherence Scale; SOSI, Symptoms of Stress Inventory; SR, systematic review; STAI, State-Trait Anxiety Inventory; UC, usual care; WBPI, Wisconsin brief pain inventory; WEMWBS, Warwick-Edinburgh mental wellbeing scale; WHO-5, WHO five-item well-being questionnaire; WL, wait list