

Review Article

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The effectiveness of compassion-based interventions among cancer patients: A systematic review and meta-analysis

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Abstract

Objectives. This study examined the effects of compassion-based intervention on mental health in cancer patients by using systematic review and meta-analysis of randomized controlled trials (RCTs).

Methods. Eleven bibliographic databases were searched from their earliest data available date up to March 1, 2022. The databases were PubMed, CINAHL, MEDLINE, PsycINFO, WOS, Cochrane, Embase, Scopus, ProQuest Dissertations, Airiti Library, and the National Digital Library of Theses and Dissertations in Taiwan.

Results. Ten studies from 2015 to 2021 were included with a total of 771 cancer patients. Most were targeted at women with breast cancer. Brief compassion-based interventions of approximately 30 minutes were conducted by audio file, paper, and web-based self-guided writing prompts. Most were conducted after the completion of active treatment. Anxiety was the most measured outcome. Constructive compassion-based interventions with 4- to 12-week sessions were conducted by a trained facilitator. Most were conducted for patients who had undergone treatment, and depression was the most measured outcome. The meta-analysis indicated that compassion-based interventions had a significant effect of reducing depression and increasing self-compassion. Moderation analysis indicated that constructive intervention showed more benefits of increased self-compassion than brief intervention. Both face-to-face and non-face-to-face web-delivered formats had benefits for increasing self-compassion compared with the control condition.

Significance of results. Compassion-based interventions might provide an effective strategy for improving self-compassion and depression among patients with breast cancer. Suggestions for further research and health-care providers follow.

Introduction

Cancer is a common disorder worldwide, and there were an estimated 19.3 million new cancer cases in 2020 globally (Sung et al. 2021). A review study indicated that stress from living with cancer has negative impacts on patients' emotional status: 4–49% of cancer patients suffer from depression and 3.4–43.0% of cancer patients suffer from anxiety (Brandenburg et al. 2019; Niedzwiedz et al. 2019). Approximately 20–30% of cancer patients' psychological distress remains for a long time after the initial diagnosis (Campos et al. 2012). Psychological distress influences cancer patients' quality of life, self-concept, and emotional well-being; it is associated with poor disease progression, cancer recurrence, and lower cancer survival rates (Niedzwiedz et al. 2019; Walker et al. 2020; Wang et al. 2020).

The protective factor of self-compassion is associated with a decrease in psychopathological symptoms, and it can also improve the quality of life of cancer patients (Pinto-Gouveia et al. 2014). Furthermore, a growing number of studies show that compassion-based intervention leads to positive outcomes for cancer patients, such as reducing depression and anxiety (Brooker et al. 2020; Campo et al. 2017; Dodds et al. 2015; Sadeghi et al. 2018; Trindade et al. 2020) and increasing body image satisfaction, self-compassion, mindfulness (Brooker et al. 2020; Campo et al. 2017), physical health, and the quality of social relationships (Trindade et al. 2020). However, there were no significant improvements in anxiety, depression, fear of recurrence, or psychological distress in other studies (Dodds et al. 2015; Gonzalez-Hernandez et al. 2018; Sherman et al. 2018). As the results were inconsistent, the effectiveness of compassion-based intervention on cancer patients remains unclear. Thus, a comprehensive systematic review and meta-analysis examining the effectiveness of compassion-based intervention in cancer patients are necessary. The aim of this study was to provide an overview of compassion-based intervention studies and to synthesize their effectiveness in cancer patients.

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Background

The concept of compassion has been rooted in religious, spiritual, or philosophical traditions for thousands of years (Gilbert et al. 2017). Compassion is defined as a sensitivity to suffering, with a commitment to try to alleviate and prevent it (Gilbert 2014). Self-compassion is defined as individuals focusing on their inner self while in a stress event, and it consists of 3 main components: self-kindness, a sense of common humanity, and mindfulness (Neff and Germer 2013). According to the 3-circle model of emotion, there are at least 3 types of emotion regulation systems, namely threat and protection systems, drive resource seeking and excitement systems, and soothing and safeness systems (Depue and Morrone-Strupinsky 2005; Gilbert 2014). Compassion is linked with attachment theory and plays a key role in soothing and safeness systems, helping individuals to maintain emotional balance even when facing stressful events (Gilbert 2009, 2014).

Compassion-based intervention is designed to cultivate cognitive, emotional, or motivational compassionate habits by using specific techniques and procedures. It is a combination of developmental, social, neuroscience, and Buddhist psychologies (Gonzalez-Hernandez et al. 2018; Sadeghi et al. 2018). According to Kirby (2017), at least 6 types of compassion-based interventions have been developed: compassion-focused therapy (CFT; Gilbert 2014), mindful self-compassion (MSC; Neff and Germer 2013), compassion cultivation training (Jazaieri et al. 2013), cultivating emotional balance (Kemeny et al. 2012), loving-kindness meditation (Hofmann et al. 2011), and cognitively based compassion training (CBCT; Pace et al. 2009). The previous studies on compassion-based intervention focused on nonclinical adult populations (Kirby et al. 2017) and patients with psychological disorders (Leaviss and Uttley 2015; Shonin et al. 2014). There is a review study on patients with long-term physical conditions, which includes those with both cancer and persistent pain (Austin et al. 2020). To explore the effectiveness of compassion-based intervention focusing solely on cancer patients, we conducted a systematic review and meta-analysis to examine the effectiveness of depression, anxiety, self-compassion, and other outcomes relating to mental health.

Objectives

The objectives of this study were (a) to provide a comprehensive systematic review of compassion-based interventions for cancer patients from randomized controlled trials (RCTs) and (b) to examine the effectiveness of compassion-based interventions among cancer patients

Methods

Design

A systematic review and meta-analysis were performed in this study, and they complied with the recommendations for the latest Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (Page et al. 2021).

Search methods

Eleven bibliographic databases were searched: PubMed, CINAHL, MEDLINE, PsycINFO, WOS, Cochrane, Embase, Scopus, ProQuest Dissertations, Airiti Library, and the National Digital

Library of Theses and Dissertations in Taiwan. We employed the following search strategies: *compassion* * [Title/Abstract] OR *Compassion-Focused Therapy* [Title/Abstract] OR *Mindful Self-Compassion* [Title/Abstract] OR *Cultivating Compassion Training* [Title/Abstract] OR *Cognitively-Based Compassion Training* [Title/Abstract] OR *loving kindness meditation* [Title/Abstract] *combination with "cancer"* [Title/Abstract] OR *"neoplasms"* [Title/Abstract] OR *"neoplasms"* [MeSH Terms]. The search had no year range limit, and English and Chinese were the selected languages. The last search took place on March 1, 2022. Databases were searched by title and abstract by the first author, and the results of the search were exported to EndNote X9 for further duplication management. After the removal of duplicated studies, the abstract and title were screened by 2 authors to select the studies based on eligibility criteria, and full-text reviews were also conducted by the 3 authors to confirm the inclusion.

Inclusion criteria

Studies had to meet the following inclusion criteria: (a) studies had RCT designs or were RCT pilot studies for compassion-based intervention in cancer patients, (b) studies were published in a peer-review journal or in a dissertation, (c) interventions included compassion-based activities or practices for cancer patients, and (d) outcomes included at least one psychological measurement with quantitative methodology. Exclusion criteria were (a) outcome measurements without quantitative methodologies and (b) documents published in conference papers or protocols. Participants included those with any type or stage of cancer, and there were no limits for age or geographical location. The types of interventions mainly focused on cultivating cognitive, emotional, or motivational compassionate habits, such as CFT, MSC, compassion cultivation training, CBCT, or any intervention including the following components: (a) an open awareness of suffering and (b) an intention or motivation to relieve the suffering with emotional empathy or a noncritical approach. There was no limit to the duration, frequency, or delivery method. Types of comparisons were not limited to any type of control group, including a treatment as usual group or any kind of active treatment control group. Outcomes included at least one self-report measure relating to mental health (depression and anxiety), self-compassion, mindfulness, or well-being.

Quality appraisal

Risk of bias was assessed with version 2 of the Cochrane risk-of-bias tool for randomized trials (Higgins et al. 2016; Sterne et al. 2019). The bias domains included randomization process, deviations from the intended intervention, missing outcome data, measurement of outcome, selection of the reported results, and overall bias. First, 2 authors categorized the risk of bias into low risk, high risk, or some concerns for each domain independently. Afterwards, these authors discussed any inconsistencies in their judgments by repeated reviews of the studies and comprehensive discussion until the judgments of risk of bias from authors achieved consistency.

Data abstraction

The information on the study characteristics included author, year, country, participants' characteristics, study method, contents,

homework, instructor, comparison type, and outcome measured as suggested by the Cochrane Collaboration (Higgins *et al.* 2019). The means, standard deviations, and sample sizes were extracted for meta-analysis. For studies without available data, authors were contacted for additional results via email. Finally, studies were excluded if the authors were unable to provide data (e.g., mean and standard deviations of outcome variables) or did not respond to our emails.

Data analyses

Comprehensive Meta-Analysis version 3 was used to analyze the effects of compassion-based intervention. Primary outcome variables included depression, anxiety, and self-compassion, which were analyzed by Hedges's g and 95% confidence intervals (CIs) due to small sample sizes (Hedges and Olkin 1985). The interpretations of effect sizes were small (0.2), moderate (0.5), and large (0.8) (Cohen 1988). Due to large variations in follow-up length among compassion-based interventions, we could only pool data immediately after the intervention.

Heterogeneity testing among the studies was assessed by Q value and I^2 statistics. When the Q value was statistically significant, $p < 0.10$ was interpreted as heterogeneity, while I^2 demonstrated low (25%), moderate (50%), or high (75%) degrees of heterogeneity (Higgins *et al.* 2003). The subgroup moderation analysis was conducted with sufficient available data to explore the root of heterogeneity (Card 2012). The random-effect model was used in this study, as some of the studies' outcome measurements were not identical. Publication bias was examined by a funnel plot. An asymmetrical funnel indicates potential publication bias.

Sensitivity analysis (Bown and Sutton 2010) was conducted to examine the robustness of the results by using leave-one-out test. A pooled effect size was estimated by removing studies judged as at high risk of bias or studies with small sample sizes (<50) to evaluate the influence of such studies.

The Hartung–Knapp–Sidik–Jonkman (HKSJ) adjustment was applied due to the small number of studies in the meta-analysis. The HKSJ method, based on t distributions, provides a more robust estimation of the CIs. Some have suggested applying HKSJ method for random-effects meta-analyses when 5 or fewer trials are included (Bender *et al.* 2018; Friede *et al.* 2017; Knapp and Hartung 2003; Saueressig *et al.* 2021). The HKSJ pooled effects were calculated by Excel conversion from DerSimonian and Laird method for random effects (IntHout *et al.* 2014).

Results

This study was guided by the PRISMA 2020 flow diagram in Figure 1. The search yielded a total of 945 studies, and 10 studies went into the systematic review. After excluding one study without available data (Milbury *et al.* 2020), 9 studies were included in the meta-analysis.

Study characteristics

Table 1 presents the characteristics of the included studies. Ten studies were published between 2015 and 2021. Eight of them were published in the last 5 years. Seven studies were designed as 2-armed, and 3 studies (Cheung *et al.* 2017; Mifsud *et al.* 2021; Wren *et al.* 2019) had 3-armed designs.

Population characteristics

A total of 771 participants were involved across the included studies. The mean age was 55.51 years (range 38–60). Most of the interventions targeted women with breast cancer, while 2 studies targeted people with metastatic brain tumors (Milbury *et al.* 2020) and skin cancer (Latifi *et al.* 2020). One study selected mainly anxiety and depression participants according to the Beck Depression and Anxiety Inventory (2 standard deviations) (Sadeghi *et al.* 2018). Approximately 98% of intervention participants were female.

Intervention characteristics

The interventions fall into 2 types: constructive compassion-based interventions with 4–12 weeks multiple sessions ($n = 6$) and brief compassion-based interventions with a single session of approximately 30 minutes ($n = 4$). The constructive compassion-based interventions were theoretical: 2 CBCT (Dodds *et al.* 2015; Gonzalez-Hernandez *et al.* 2018), 1 CFT (Sadeghi *et al.* 2018), 1 mindful compassion meditation (Milbury *et al.* 2020), 1 lessons in linking affect and coping intervention (Cheung *et al.* 2017), and 1 self-healing training intervention (Latifi *et al.* 2020). Four out of 6 constructive interventions were conducted for patients who were undergoing treatment (Cheung *et al.* 2017; Latifi *et al.* 2020; Milbury *et al.* 2020; Sadeghi *et al.* 2018). Depression was the most measured outcome: 5 out of 6 constructive interventions measured depression (Cheung *et al.* 2017; Dodds *et al.* 2015; Gonzalez-Hernandez *et al.* 2018; Milbury *et al.* 2020; Sadeghi *et al.* 2018). Four out of 6 constructive interventions were delivered in a face-to-face group format with 8–16 sessions (90–120 minutes per session) (Dodds *et al.* 2015; Gonzalez-Hernandez *et al.* 2018; Latifi *et al.* 2020; Sadeghi *et al.* 2018). One study (Cheung *et al.* 2017) used both an online and a face-to-face delivery format to examine the comparison benefit. The interventions were led by experienced, qualified, and well-trained psychologists or social workers.

More than half the brief compassion-based interventions were developed based on Neff's concept of self-compassion, which includes self-kindness, common humanity, and mindfulness (Mifsud *et al.* 2021; Neff and Germer 2013; Przedziecki and Sherman 2016; Sherman *et al.* 2018). The brief interventions included 1 single compassionate writing session and 1 audio-based loving-kindness meditation. Three out of 4 brief interventions used writing guided by self-compassionate prompts: participants described distressing events they experienced after breast cancer treatment (Mifsud *et al.* 2021; Przedziecki and Sherman 2016; Sherman *et al.* 2018). One study provided an audio-based loving-kindness meditation intervention during which participants listened to an MP3 during a biopsy procedure and they were encouraged to continue this as a daily practice afterward (Wren *et al.* 2019). Most of the brief interventions were conducted at the posttreatment cancer survivorship stage (Mifsud *et al.* 2021; Przedziecki and Sherman 2016; Sherman *et al.* 2018). Anxiety was the most measured outcome: 3 out of 4 brief interventions measured anxiety (Mifsud *et al.* 2021; Sherman *et al.* 2018; Wren *et al.* 2019). Three out of 4 brief interventions were delivered in a non-face-to-face format, which included web-based or paper-based compassion writing prompts (Mifsud *et al.* 2021; Przedziecki and Sherman 2016; Sherman *et al.* 2018). The interventions were implemented by playing an MP3 or providing self-guided writing prompts.

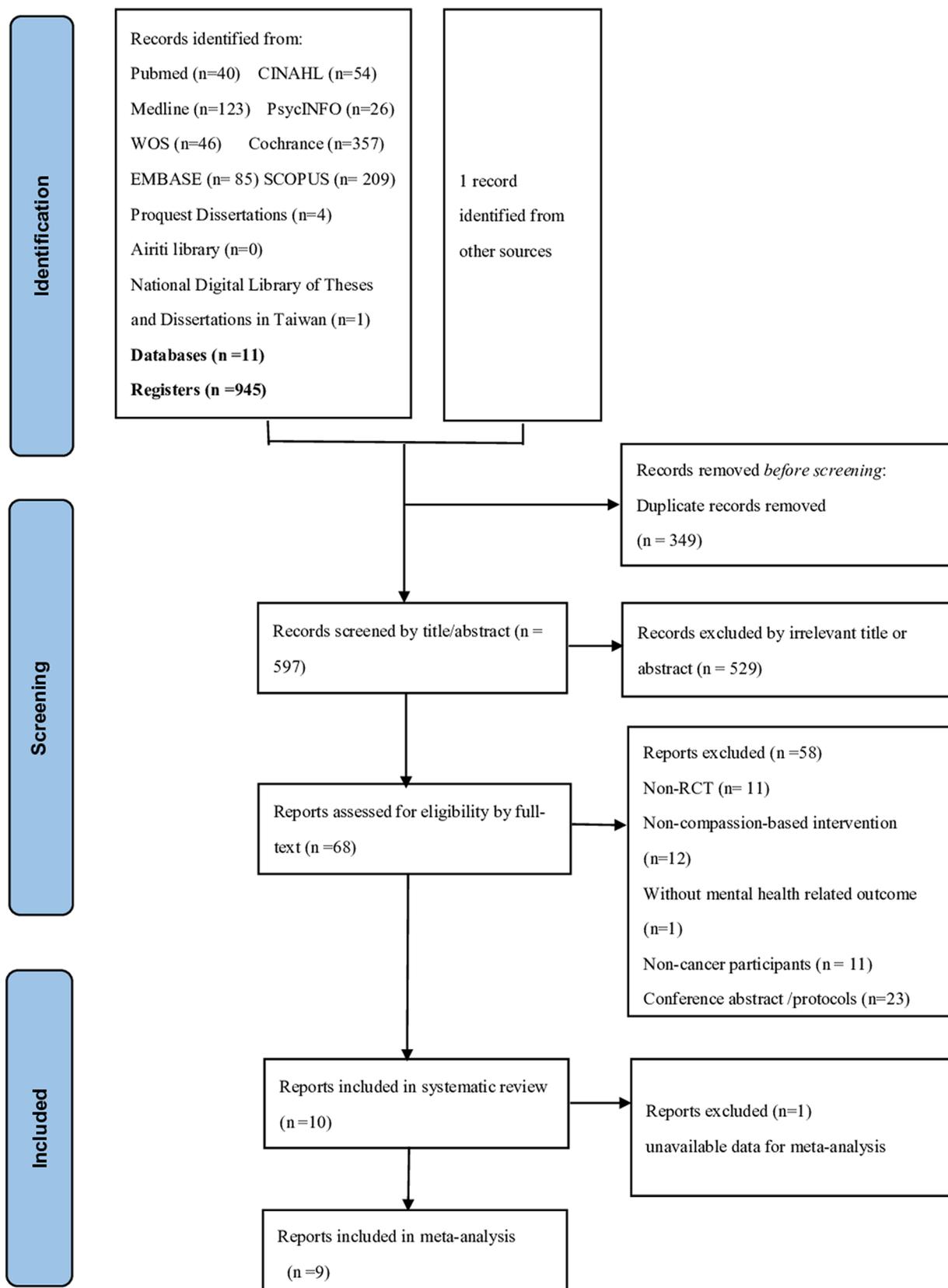


Fig. 1. PRISMA flow diagram.

Table 1. Characteristics of included studies

Author (year) and country	Age (y), mean (SD)	Gender, n (%)	Type and stage of cancer	Treatment status	Design and sample size	Delivery format and duration of compassion-based intervention	Contents of compassion-based intervention	Comparison	Outcome measured and time points
<i>Constructive compassion-based intervention with multiple sessions</i>									
Dodds et al. (2015) USA	Experimental: 54.7 (12.1) Control: 55.8 (9.7)	Female 33 (100)	Breast cancer with all stages	Treatment completed	Design: Two-arm RCT Sample size: experimental: 16, control: 17	Format: Face to face Duration: 8 weeks and 1 booster session 1 month later Frequency: weekly Length: 2 hr Sessions: 8	CBCT Contents: Session 1: Meditative concentration Session 2: Mindfulness Session 3: Suffering causes, self-compassion Session 4: Equanimity, common humanity Session 5: Appreciation and gratitude Session 6: Affection, empathy, compassion Session 7: First stage of compassion Session 8: Active compassion Homework: At least 3 times per week using 30 min audio recordings of guided meditations Instructor: Clinically trained PhD social work researcher with CBCT teacher certification	Wait list-controlled group	Outcomes measured: 1. Perceived stress: PSS-4 2. Depression: CES-D-10 3. Fear of cancer recurrence: FCRI 4. Impact of events: IES-R 5. Loneliness: R-UCLA 6. QoL: SF-12 7. Cognitive and affective mindfulness: CAMS-R 8. Gratitude: GQ-6 9. Salivette-at home saliva samples Time points: Pretest Posttest 1 month FU
Cheung et al. (2017) USA	53.35 (11.22)	Female 39 (100)	Breast cancer with stage IV	Underwent treatment (64% participant receiving radiotherapy or chemotherapy)	Design: Three-arm RCT Sample size: In-person experimental: 14; online experimental: 12; control: 13	Format: Face to face and online Duration: 5 weeks Frequency: weekly Length: 1 hr Sessions: 5	Lessons in linking affect and coping (LILAC) intervention contents (both face to face or online format): Session 1: positive events, capitalizing, gratitude Session 2: mindfulness Session 3: positive reappraisal Session 4: personal strengths, achievable goals Session 5: acts of kindness Homework: practice each skill as home practice every day Instructor: trained facilitator with community-based or public health research background	In-person attention-matched control group	Outcomes measured: 1. Depression: CES-D 2. Mindfulness: Self-design mindfulness scales 3. Positive affect: 9-item self-report scale 4. Self-compassion: SCS-SF Time points: Pretest Posttest 1 month FU

(Continued)

Table 1. (Continued.)

Author (year) and country	Age (y), mean (SD)	Gender, n (%)	Type and stage of cancer	Treatment status	Design and sample size	Delivery format and duration of compassion-based intervention	Contents of compassion-based intervention	Comparison	Outcome measured and time points
Gonzalez-Hernandez et al. (2018) Spanish	52.13 (6.96)	Female 56 (100)	Breast cancer with all stages	Treatment completed	Design: Two-arm RCT Sample size: experimental: 28; control: 28	Format: Face to face Duration: 8 weeks Frequency: Weekly Length: 2 hr Sessions: 8	CBCT Contents: Session 1-2: Attention stability and nature of mental experience Session 3-4: Cultivating self-compassion Session 5-6: Equanimity, appreciation, and empathy Session 7-8: Realizing engaged compassion Homework: Meditate daily by using the recorded meditations and to gradually increase both the length of time Instructor: Clinically trained psychologist with CBCT teacher certification	TAU	Outcomes measured: 1. Health-related QoL: FACT 2. Emotional, and general well-being: BSI-18 3. Cancer recurrence fear: FCRI 4. Self-compassion: SCS-SF 5. Compassion: COMP 6. Mindfulness: FFMQ Time points: Pretest Posttest 6 months FU
Sadeghi et al. (2018) Iran	38 (7.62)	Female 30 (100)	Breast cancer with all stages	Underwent treatment	Design: Two-arm RCT Sample size: experimental: 15; control: 15	Format: Face to face Duration: 8 weeks Frequency: Twice per week Length: 1.5 hr Sessions: 16	CFT Contents: The contents were planned based on Gilbert's compassion protocol Homework: Not mentioned Instructor: Clinical psychologists	MET (motivational enhancement therapy)	Outcomes measured: 1. Depression: BDI-13 2. Anxiety: BAI-21 Time points: Pretest Posttest
Milbury et al. (2020) USA	57.7 (12.18)	Patients: male 19 (54); female 16 (46)	Metastatic Brain tumor in Stage IV	Underwent treatment	Design: Two-arm RCT Sample size: experimental: 18; control: 17	Format: Non-face-to-face: online via FaceTime Duration: 4 weeks Frequency: weekly Length: 60 minutes Sessions: 4	Couple-based meditation program contents: Session 1: Mindfulness meditation Session 2: Interconnectedness, compassion Session 3: Gratitude, mindful compassionate sharing Session 4: Self-identified values Homework: Practicing meditations, sharing experiences, and completing written assignments Instructor: Master-level licensed psychological counselor intern	TAU	Outcomes measured: 1. Patient cancer-specific symptoms: MDASI-BT 2. Depression: CES-D 3. Mindfulness: MAAS 4. Compassion: SCS-SF 5. Intimacy: PAIR Time points: Pretest Posttest (6 weeks) 12 weeks FU

(Continued)

Table 1. (Continued.)

Author (year) and country	Age (y), mean (SD)	Gender, n (%)	Type and stage of cancer	Treatment status	Design and sample size	Delivery format and duration of compassion-based intervention	Contents of compassion-based intervention	Comparison	Outcome measured and time points
Latifi et al. (2020) Iran	Age between 40 and 60 years old	Female 34 (100)	Skin cancer	Underwent treatment	Design: Two-arm RCT Sample size: experimental: 16; control: 18	Format: Face to face Duration: 12 weeks Frequency: Weekly Length: 90 minutes Sessions: 12	Self-healing training contents: Session 1-3: Situational stress, the immune system, cellular memories Session 4-6: Positive, negative emotions, forgiveness Session 7-9: Love-happiness comfort, patience, kindness-goodness-trust-humility, and restraint Session 10-12: Request from the heart, moderate lifestyle, intimacy, and communication Homework: Nil Instructor: Trained clinical psychologist	TAU	Outcomes measured: 1. Checklist of physiological symptoms 2. Self-compassion: SCS 3. Body Image Concern: BICI Time points: Pretest Posttest (6 weeks) 2 and 4 months FU
<i>Brief compassion-based intervention with single session</i>									
Przedziecki & Sherman (2016) Australia	54.55 (9.79)	Female 105 (100)	Breast cancer with all stages	Treatment completed	Design: Two-arm RCT Sample size: experimental: 57; control: 48	Format: Non-face-to-face: paper-based writing prompts Frequency: Once Length: Not mentioned	Paper Writing with Self-Compassion Focused Prompts contents: Self-kindness, mindfulness, common humanity components were used as the prompts in the intervention. Homework: Nil Instructor: Paper-based self-guided instructed	Paper writing with no prompts	Outcomes measured: 1. Affective and cognitive response: Self design questionnaire 2. Self-compassionate: Self-designed scale Time points: Pretest Posttest
Sherman et al. (2018) Australia	Experimental: 57.5 (8.98); Control: 57.23 (9.97)	Female 304 (100)	Breast cancer from Stage I to III	Treatment completed	Design: Two-arm RCT Sample size: experimental: 149; control: 155	Format: Non-face-to-face: web-based writing prompts Frequency: Once Length: 30 minutes	Self-compassion-focused writing activity contents: Include 6 writing part with 5 self-compassionate prompts, commencing with a narrow focus on negative aspects of the self, then gradually moving to a broad self-compassionate perspective and concluding with a narrow focus on the personal situation. Homework: Nil Instructor: Web-based self-guided instructed	Online expressive writing + Usual care	Outcomes measured: 1. Body image-related distress: Body Image Scale 2. Positive body image: Body Appreciation Scale 3. Self-Compassion: SCS-SF 4. Psychological distress: DASS-21 Time points: Pretest Posttest 1 month FU 3 months FU

(Continued)

Table 1. (Continued.)

Author (year) and country	Age (y), mean (SD)	Gender, n (%)	Type and stage of cancer	Treatment status	Design and sample size	Delivery format and duration of compassion-based intervention	Contents of compassion-based intervention	Comparison	Outcome measured and time points
Wren et al.(2019) USA	Experimental (LKM): 57.61 (11.78) Experimental (Music): 57.31 (7.53) Control: 52.35 (13.03)	Female 56 (100)	Breast cancer with all stages	Underwent treatment	<i>Design:</i> Three-arm RCT <i>Sample size:</i> LKM: 23; control: music: 16; usual care: 17	<i>Format:</i> Face to face; researcher provide MP3 listening (Listen to LKM MP3 while undergoing breast biopsy) <i>Frequency:</i> Once <i>Length:</i> Depend on the biopsy duration	<i> Loving-Kindness meditation (LKM) contents:</i> LKM focused on developing positive emotions toward oneself and extended to a wider circle of others and releasing negative emotions. <i>Homework:</i> Practice for up to 20 min of LKM daily <i>Instructor:</i> CD-based instructed	Music condition: listen to music and TAU	<i>Outcomes measured:</i> 1. Anxiety: STAI 2. Body pain: 4-item BPI 3. Breast pain: Pre-biopsy using 2 items adapted from the BPI 4. Fatigue: FACIT 5. Physiologic reactivity: BP and HR 6. Self-compassion: SCS-SF <i>Time points:</i> Pre-biopsy Post-biopsy 1 week post result 2 weeks post surgery
Mifsud et al. (2021) Australia, New Zealand, UK	58.61	Female 79 (100)	Breast cancer with stage I to III, ductal carcinoma in situ (DCIS) and/or lobular carcinoma in situ (LCIS)	Treatment completed	<i>Design:</i> Three-arm RCT <i>Sample size:</i> MyCB experimental: 39 MyCB+M experimental: 17; control: 23	<i>MyCB Format:</i> Non-face-to-face: web-based writing prompts <i>Frequency:</i> Once <i>Length:</i> 30 min <i>MyCB+M Format:</i> Non-face-to-face: web-based writing and meditation <i>Frequency:</i> Once <i>Lengths:</i> 35 min	<i>MyCB contents:</i> Step 1: Write freely about a negative body image experience Step 2-6: Identify how they treated their body with kindness; provide kind advice to themselves; connect with others; create awareness of their experience and response in a broader context; and write a self-compassionate letter to themselves <i>Homework:</i> No homework <i>Instructor:</i> Web-based self-guided instructed <i>MyCB+M contents:</i> The same writing activities as the MyCB group, plus one brief 5-minute self-compassion-based audio meditation <i>Homework:</i> The meditation audio file <i>Instructor:</i> Web-based and audio file-based instructed	Expressive writing activity with similar length to MyCB writing 3. State Self-Compassion: SCA 4. Trait self-compassion: SCS-SF 6. Positive and Negative Affect: PANAS 7. Depression, Anxiety and Stress: DASS-21 <i>Time points:</i> Pretest Posttest 1 month FU	<i>Outcomes measured:</i> 1. Body Image Distress: BIS 2. Body Appreciation: BAS 3. State Self-Compassion: SCA 4. Trait self-compassion: SCS-SF 6. Positive and Negative Affect: PANAS 7. Depression, Anxiety and Stress: DASS-21 <i>Time points:</i> Pretest Posttest 1 month FU

Notes: BDI-13, Beck Depression Inventory; BA, Beck Anxiety Inventory; BAS, Body Appreciation Scale; BIS, body image scale; BP, blood pressure; HR, heart rate; BSI-18, Brief Symptom Inventory; BPI, Brief Pain Inventory; CAMS-R, Cognitive and Affective Mindfulness Scale – Revised; CBCT, cognitively based compassion training; CFT, compassion-focused therapy; CES-D, Center for Epidemiologic Studies – Depression questionnaire; COMP, Compassion Scale; DASS, Depression, Anxiety and Stress Scale; FW, follow-up; FFMQ, Five Facets of Mindfulness Questionnaire – Short Form; FACIT, Functional Assessment of Cancer Therapy; FCRI, Fear of Cancer Recurrence Inventory; FACT, Functional Assessment of Cancer Therapy; GO-6, Gratitude Questionnaire-6; IES-R, Impact of Events Scale – Revised; LKM, Loving-Kindness Meditation; MDASI-BT, MD Anderson Symptom Inventory-Brain Tumor; MAAS, Mindful Attention Awareness Scale; MyCB, My Changed Body: self-compassion-focused writing activity; MyCB+M, My Changed Body plus meditation; PSS-4, Perceived Stress Scale; PARI, Personal Assessment of Intimacy in Relationships Inventory; PANAS, Positive and Negative Affect Schedule; R-UCLA, Revised Loneliness Scale Version 3; SF-12, Medical Outcomes Study Short Form 12-Item Health Survey; SCS, Self-Compassion Scale Short Form; STAI, State-Trait Anxiety Inventory; SCA, self-compassionate attitude; TAU, treatment as usual control group; QoL, quality of life.

Studies	D1	D2	D3	D4	D5	Overall	
Dodd et al.(2015)	+	+	!	+	+	!	● Low risk
Sadeghi et al.(2018)	!	+	!	+	+	-	● Some concerns
Cheung et al.(2017)	+	+	!	+	+	!	● High risk
Latifi et al.(2020)	!	!	+	+	+	-	
Mifsud et al.(2021)	+	+	+	+	+	+	D1 Randomisation process
Przedziecki et al.(2016)	+	!	+	+	+	!	D2 Deviations from the intended interventions
Milbury et al.(2020)	!	+	+	+	+	!	D3 Missing outcome data
Gonzalez-Hernandez et al.(2018)	+	+	!	+	+	!	D4 Measurement of the outcome
Sherman et al.(2018)	+	+	+	+	+	+	D5 Selection of the reported result
Wren et al.(2019)	!	+	+	+	+	!	

Fig. 2. The summary of risk of bias for each study.

Comparison group

In constructive compassion-based interventions, 4 of the 6 studies (Dodds et al. 2015; Gonzalez-Hernandez et al. 2018; Latifi et al. 2020; Milbury et al. 2020) used waitlist-controlled groups or treatment as usual groups as comparison groups. The typical procedure included pharmacological treatment, outpatient care, and/or psychological counseling. Two studies used active control groups: Sadeghi et al. (2018) provided motivational enhancement therapy for participants in the control group; Cheung et al. (2017) provided a one-on-one in-person attention-matched intervention for participants in the control group, which encouraged them to express their life histories, use of complementary and alternative medicine, diet and exercise, social networks, and meaning and spirituality.

In brief compassion-based interventions, all the control groups were active control group, including those writing without compassion prompts (Przedziecki and Sherman 2016), using expressive writing (Mifsud et al. 2021; Sherman et al. 2018), or listening to music and developing a supportive dialogue as a comparison group (Wren et al. 2019).

Treatment outcomes

Treatment outcomes can be categorized into psychological (e.g., depression and anxiety), process-related (e.g., mindfulness and self-compassion), and cancer-related measures (e.g., quality of life, symptom distress, fear of cancer recurrence, body image distress, and body appreciation). Overall, the primary and the most frequent outcome measures in the included studies were depression ($n = 5$), anxiety ($n = 4$), and self-compassion ($n = 7$). There was heterogeneity in the outcome measurement scales. Depression was measured by the Center for Epidemiologic Studies Depression Scale (Cheung et al. 2017; Dodds et al. 2015), Brief Symptom Inventory (Gonzalez-Hernandez et al. 2018), Beck's Depression Inventory (Sadeghi et al. 2018), and Depression Anxiety Stress Scales (Sherman et al. 2018). Anxiety was measured by the Brief Symptom Inventory (Gonzalez-Hernandez et al. 2018), Beck Anxiety Inventory (Sadeghi et al. 2018), Depression

Anxiety Stress Scales (Sherman et al. 2018), and State-Trait Anxiety Inventory (Wren et al. 2019). Self-compassion was measured by the Self-Compassion Scale (Latifi et al. 2020), Self-Compassion Scale – Short Form (Cheung et al. 2017; Gonzalez-Hernandez et al. 2018; Mifsud et al. 2021; Sherman et al. 2018; Wren et al. 2019), and a self-designed Self-Compassion Scale (Przedziecki and Sherman 2016).

Quality assessment

Figure 2 presents the summary of risk of bias for each study. Among the 10 studies, 2 studies (20%) were judged as high risk of bias, 6 studies (60%) were judged as some concerns, and 2 studies (20%) were judged as low risk of bias.

Post-treatment effects of compassion-based interventions on depression, anxiety, and self-compassion

Figure 3 shows the results of depression, anxiety, and self-compassion for cancer patients by forest plots. Small to medium effect sizes were achieved for reducing depression (Hedges's $g = -0.497$, 95% CI = -0.864 to -0.130 , $p = 0.008$) with moderate heterogeneity ($Q = 8.739$; $p = 0.068$; $I^2 = 54.229\%$), and large effect sizes were achieved for increasing self-compassion (Hedges's $g = -0.869$, 95% CI = -1.325 to -0.414 , $p < 0.001$) with high heterogeneity ($Q = 36.271$, $p = 0.000$, $I^2 = 83.458\%$). Conversely, the results showed no significant reduction in anxiety (Hedges's $g = -0.375$, 95% CI = -0.814 to -0.064 , $p = 0.094$) with moderate heterogeneity ($Q = 8.919$; $p = 0.030$; $I^2 = 66.365\%$). A leave-one-out analysis showed that Sadeghi et al. (2018) was an influential outlier. This study used prescreening to select participants suffering from anxiety and depressive symptoms (2 standard deviations on the Beck Depression and Anxiety Inventory). After excluding this study, the effects on reducing anxiety became significant (Hedges's $g = -0.211$, 95% CI = -0.414 to -0.008 , $p = 0.041$) with no heterogeneity ($Q = 0.691$, $p = 0.708$, $I^2 = 0\%$).

Due to the small number of studies in our meta-analysis, we applied HKSJ adjustment for robust CI and to reduce the likelihood of a Type I error. The result from the HKSJ method does

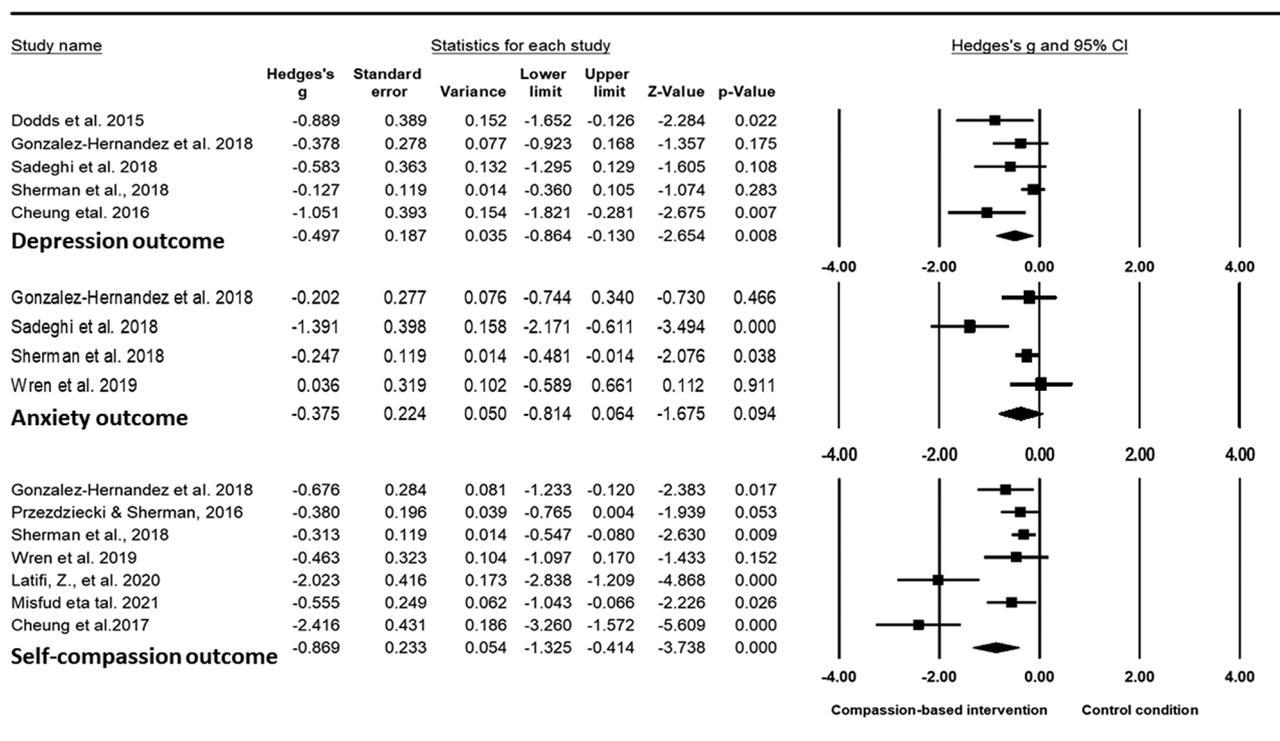


Fig. 3. Post-treatment effects of compassion-based interventions on depression, anxiety, and self-compassion.

not violate the result from the DerSimonian and Laird method. Medium effect sizes were achieved for reducing depression from HKSJ adjustment (SMD = -0.5088 , 95% CI = -1.00 to -0.018 , $t = -2.897$, $p = 0.045$), and medium to large effect sizes were achieved for increasing self-compassion from HKSJ adjustment (SMD = -0.884 , 95% CI = -1.65 to -0.12 , $t = -2.83$, $p = 0.030$). The HKSJ adjustment method did not reduce anxiety significantly (SMD = -0.381 , 95% CI = -1.29 to 0.53 , $t = -1.34$, $p = 0.27$).

The moderation effects of compassion-based intervention on self-compassion outcomes were further examined by using 2 subgroups analysis: intervention type and intervention delivery format. In intervention type, constructive compassion-based intervention (Hedges's $g = -1.669$, 95% CI = -2.800 to -0.539 , $p = 0.004$) showed a significantly higher effect size for self-compassion than the brief compassion-based intervention (Hedges's $g = -0.371$, 95% CI = -0.549 to -0.194 , $p = 0.000$) with a Q value of 4.941 ($p = 0.026$). The heterogeneity test showed no heterogeneity in the brief intervention ($Q = 0.861$, $p = 0.835$, $I^2 = 0\%$) but high heterogeneity in constructive intervention ($Q = 14.315$, $p = 0.001$, $I^2 = 86.028\%$). In the intervention delivery format, there was no significant difference ($Q = 2.170$, $p = 0.141$) between face-to-face delivery format (Hedges's $g = -1.011$, 95% CI = -1.853 to -0.169 , $p = 0.019$) and non-face-to-face delivery format, which indicated web or paper-based intervention (Hedges's $g = -0.363$, 95% CI = -0.548 to -0.179 , $p = 0.00$). The heterogeneity test showed no heterogeneity in the non-face-to-face format ($Q = 0.773$, $p = 0.679$, $I^2 = 0\%$) but high heterogeneity in the face-to-face format ($Q = 9.744$, $p = 0.008$, $I^2 = 79.475\%$).

Publication bias was examined by funnel plots, which were asymmetric in all outcomes (Appendix A). Sensitivity analysis was estimated by removing studies judged as at high risk of bias or studies with small sample sizes. The results did not change in depression and self-compassion outcomes. In anxiety outcome, after removing

one study judged as at high risk of bias (Sadeghi et al. 2018), the effect of reducing anxiety changed from nonsignificant to significant.

Follow-up effectiveness of compassion-based interventions on depression, anxiety, and self-compassion

Due to the limited numbers of studies and the wide range of follow-up periods, we were unable to conduct a meta-analysis of follow-up effectiveness. We analyzed the follow-up effectiveness through systematic review. Two studies with constructive intervention reported improvements in depression in the follow-up period. Cheung et al. (2017) reported that depression was below the clinical threshold by the 1-month follow-up, while Milbury et al. (2020) found an improvement in depressive symptoms from 6 to 12 weeks after completing the intervention with a marginally significant effect ($p = 0.06$). Two studies with brief interventions reported no significant changes after intervention or at the 1-month and 3-month follow-up periods (Mifsud et al. 2021; Sherman et al. 2018). Only Wren et al. (2019) showed that anxiety significantly reduced after 2 weeks of brief compassion-based intervention.

For self-compassion, the effectiveness lasted longer in constructive intervention than in brief intervention. Three out of 4 constructive interventions showed significantly increased self-compassion after 2–6 months of intervention (Gonzalez-Hernandez et al. 2018; Latifi et al. 2020; Milbury et al. 2020), while 1 study showed no significant change at the 1-month follow-up (Cheung et al. 2017). All the brief interventions showed significantly increased self-compassion after 2 weeks to 1 month, but it did not last for 3 months (Sherman et al. 2018; Wren et al. 2019). Sherman et al. (2018) further examined the mediator role of self-compassion and found that self-compassion mediated the effects of body image distress and body appreciation.

The effectiveness of mindfulness and cancer-related outcomes

No meta-analysis was performed for the intervention effects on mindfulness and cancer-related outcomes due to the limited numbers of studies and the insufficient data. Mindfulness was assessed in 4 studies featuring constructive interventions immediately after intervention, 2 of which found improvements (Dodds *et al.* 2015; Gonzalez-Hernandez *et al.* 2018), while 2 did not (Cheung *et al.* 2017; Milbury *et al.* 2020). In follow-up results, mindfulness observation was maintained for 1 month but did not achieve significant changes in the 6th month (Dodds *et al.* 2015; Gonzalez-Hernandez *et al.* 2018).

Quality of life was assessed in 2 studies featuring constructive interventions, neither of which found significant changes (Dodds *et al.* 2015; Gonzalez-Hernandez *et al.* 2018). Moreover, Milbury *et al.* (2020) found that the 4-week mindful compassion meditation intervention yielded a significant improvement in cancer-specific symptom distress. Wren *et al.* (2019) used an audio-based loving-kindness meditation intervention in their study, and they found a significant improvement in pain and heart rate when women with breast cancer received biopsy procedures.

The Fear of Cancer Recurrence Inventory was used in 2 studies featuring constructive interventions, both of which found a significant improvement immediately after intervention in some symptoms, such as psychological distress (Gonzalez-Hernandez *et al.* 2018) and functioning impairments (Dodds *et al.* 2015). Only one showed significant reductions in fear of cancer recurrence within the 6-month follow-up period (Gonzalez-Hernandez *et al.* 2018). Moreover, 2 studies found that body image distress reduced immediately after constructive intervention (Latifi *et al.* 2020) and brief compassionate sessions (Sherman *et al.* 2018). In follow-up results, Mifsud *et al.* (2021) found that body image distress reduced significantly at 1 month after brief compassionate intervention. Body appreciation was assessed in 2 brief interventions. One found enhanced body appreciation immediately after intervention, and the appreciation could be maintained for 3 months. (Sherman *et al.* 2018), while the other showed nonsignificant changes at 1 month after intervention (Mifsud *et al.* 2021).

Discussion

This systemic review and meta-analysis has examined the effectiveness of compassion-based interventions from 10 RCTs among cancer patients with a total of 771 participants. The meta-analysis showed positive effects at the end of compassion-based interventions, in terms of decreasing depression and increasing self-compassion.

Moderate effects were found in reduced depression after compassion-based interventions. This finding was similar to one systematic review, which indicated that compassion-based interventions reduced depression and anxiety among patients with cancer or persistent pain (Austin *et al.* 2020). Cancer patients commonly suffer from depression during conventional chemotherapy (Pitman *et al.* 2018). In our study, we found that depression was the most measured outcome when patients underwent treatment. Most of the interventions were theoretically based, and they demonstrated the mechanisms of decreased depression. Gilbert's CFT aims to enhance patients' emotional regulation system by having them practice compassion exercises. These exercises can increase the affiliative and soothing-oxytocin/endorphin system, which could help cancer patients to tolerate distress during the

treatment period and cultivate sympathy and empathy toward themselves and others with a non-judgmental attitude, effectively reducing depression (Gilbert 2010, 2014). Dr. Lobsang Tenzin Negi developed CBCT, which consists of intrapersonal and interpersonal domains. CBCT uses cognitive and analytic approaches to help patients to explore personal insights by practicing self-reflection on their own life experience, resulting in diminishing stress reactions and depression and enhancing compassion (Dodds *et al.* 2015; Gonzalez-Hernandez *et al.* 2018).

The results from the meta-analysis on reducing anxiety were not significant, which was inconsistent with a previous meta-analysis of compassion-based interventions in nonclinical populations (Kirby *et al.* 2017). However, after excluding one potential outlier, small to moderate effects were found in reduced anxiety after compassion-based intervention; therefore, more studies are necessary to examine the effects on anxiety. In our systematic review, we found that anxiety was the most measured outcome in brief compassion during the posttreatment cancer survivorship stage. A systematic review showed that anxiety, rather than depression, is most likely to be a problem in long-term cancer survivors compared with healthy controls (Mitchell *et al.* 2013).

Moderate to large effects were found in increased self-compassion after compassion-based intervention. This result is similar to a meta-analysis of 27 RCTs, which showed that compassion-based intervention produced a moderately significant improvement in self-compassion among both nonclinical people and patients with mental health symptoms (Ferrari *et al.* 2019). In our subgroup analysis, although both constructive and brief intervention could increase self-compassion compared to the control condition, constructive intervention showed more benefits via increased self-compassion than brief intervention. A possible reason might be because constructive interventions last longer and have more comprehensive compassion practices to help patients to cultivate their self-compassion abilities. Cultivating self-compassion needs a deep awareness of self and others. By bringing mindfulness into patients' daily lives, patients start to accept their physical or mental suffering from cancer without avoidance; furthermore, common humanity could help cancer patients not to feel so lonely or isolated from others (Neff 2015; Neff and Germer 2013). The self-compassion motivation and actions become firmer and more stable after several weeks of constructive compassion-based intervention. Cancer patients learn to treat themselves with kindness and compassion, which could facilitate emotional regulation and protect them from psychopathological symptoms (Pinto-Gouveia *et al.* 2014). We found that most of the studies used self-compassion scales as a measurement of compassion; previous studies have reported that there are 3 orientation flows of compassion: self-compassion, compassion from others, and compassion for others, which are moderately correlated with one another (Gilbert *et al.* 2017; Neff and Germer 2013). More compassion orientation flows could be explored in the future.

Both non-face-to-face and face-to-face delivered formats had benefits for increased self-compassion over the control condition. There was no difference between these 2 groups in the subgroup analysis. Online-delivered formats such as meditation interventions via FaceTime and online compassion-based writing are acceptable due to their low cost and the minimal user time (Mifsud *et al.* 2021; Milbury *et al.* 2020; Sherman *et al.* 2018). Sotirova *et al.*'s (2021) systematic review also indicated that internet-based interventions could increase acceptability and satisfaction, and they are cost-effective. With a face-to-face format intervention, it is easier to build a trusting relationship

between therapists and patients (Ash et al. 2021). Patients might be able to concentrate better on the present moment because both security and nurturing are foundational components of compassion-based intervention. Integrating an online approach with a face-to-face format might be a future challenge.

Implications and recommendations

The implication of this study is that it is important to develop constructive compassion-based or brief interventions for cancer patients. Since cancer is a chronic disease, patients have to learn how to live with it from the active cancer treatment stage to the posttreatment cancer survivorship stage. Most brief compassion-based interventions were conducted during the posttreatment cancer survivorship stage, and anxiety was the most measured outcome. Most constructive compassion-based interventions were conducted when patients were undergoing treatment, and depression was the most measured outcome. Recommendations for future researchers include measuring biological outcomes, home practice times, and long-term follow-up effects and examining the different compassion orientations. In our review, we found that self-compassion was the most measured concept in compassion-based interventions; therefore, more compassion orientations such as compassion for others or compassion from others could be explored. Recommendations for health-care providers include developing personalized interventions for different cancer treatment stages or different delivery formats (online, face-to-face, or a combination of both) for cancer patients.

Limitations

First, this review was limited by the small number of studies and a small number of studies; only one outcome had sufficient data to conduct subgroup analysis. Second, all the studies were based on Western cancer patients and approximately 98% of participants were female; therefore, the results of the meta-analysis may not directly apply to non-Western or to male cancer patients. Third, most of the included studies were on female breast cancer patients. The effect of compassion-based interventions on other types of cancer or different gender still needs further research. Fourth, the heterogeneity of some moderator effects remained high. Finally, the follow-up effects of compassion-based intervention were not established in this meta-analysis due to the wide range of follow-up time in the included papers. More studies are necessary to identify the long-term effectiveness of compassion-based interventions.

Conclusion

This is the first systematic review and meta-analysis of compassion-based intervention studies with RCT designs focused on cancer patients. Most compassion programs were developed and examined their effects in female breast cancer patients. The systematic review has identified the constructive compassion-based and brief interventions in online or face-to-face formats. The meta-analysis was based on small sample sizes and a small number of studies, and it suggests that compassion-based interventions might provide an acceptable and effective strategy for improving self-compassion and depression among female patients with breast cancer.

Supplementary material. The supplementary material for this article can be found at <https://doi.org/10.1017/S1478951522001316>.

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References

- Ash M, Harrison T, Pinto M, et al. (2021) A model for cognitively-based compassion training: Theoretical underpinnings and proposed mechanisms. *Social Theory & Health* **19**(1), 43–67. doi:10.1057/s41285-019-00124-x
- Austin J, Drossaert CHC, Schroevers MJ, et al. (2020) Compassion-based interventions for people with long-term physical conditions: A mixed methods systematic review. *Psychology & Health* **36**(1), 16–42. doi:10.1080/08870446.2019.1699090
- Bender R, Friede T, Koch A, et al. (2018) Methods for evidence synthesis in the case of very few studies. *Research Synthesis Methods* **9**(3), 382–392. doi:10.1002/jrsm.1297
- Bown MJ and Sutton AJ (2010) Quality control in systematic reviews and meta-analyses. *European Journal of Vascular and Endovascular Surgery* **40**(5), 669–677. doi:10.1016/j.ejvs.2010.07.011
- Brandenburg D, Maass SWMC, Geerse OP, et al. (2019) A systematic review on the prevalence of symptoms of depression, anxiety and distress in long-term cancer survivors: Implications for primary care. *European Journal of Cancer Care* **28**(3), e13086. doi:10.1111/ecc.13086
- Brooker J, Julian J, Millar J, et al. (2020) A feasibility and acceptability study of an adaptation of the mindful self-compassion program for adult cancer patients. *Palliative & Supportive Care* **18**(2), 130–140. doi:10.1017/S1478951519000737
- Campo RA, Bluth K, Santacroce SJ, et al. (2017) A mindful self-compassion videoconference intervention for nationally recruited posttreatment young adult cancer survivors: Feasibility, acceptability, and psychosocial outcomes. *Supportive Care in Cancer* **25**(6), 1759–1768. doi:10.1007/s00520-017-3586-y
- Campos RC, Besser A, Ferreira R, et al. (2012) Self-criticism, neediness, and distress among women undergoing treatment for breast cancer: A preliminary test of the moderating role of adjustment to illness. *International Journal of Stress Management* **19**(2), 151–174. doi:10.1037/a0027996
- Card NA (2012) *Applied Meta-analysis for Social Science Research*. New York: Guilford.
- Cheung EO, Cohn MA, Dunn LB, et al. (2017) A randomized pilot trial of a positive affect skill intervention (lessons in linking affect and coping) for women with metastatic breast cancer. *Psycho-Oncology* **26**(12), 2101–2108. doi:10.1002/pon.4312
- Cohen J (1988) *Statistical Power Analysis for the Behavioral*, 2nd ed. New York: Lawrence Erlbaum Associates.
- Depue R and Morrone-Strupinsky J (2005) A neurobehavioral model of affiliative bonding: Implications for conceptualizing a human trait of affiliation. *The Behavioral and Brain Sciences* **28**(3), 313–350. doi:10.1017/S0140525X05000063
- Dodds SE, Pace TWW, Bell ML, et al. (2015) Feasibility of Cognitively-Based Compassion Training (CBCT) for breast cancer survivors: A randomized, wait list controlled pilot study. *Supportive Care in Cancer* **23** (12), 3599–3608.
- Ferrari M, Hunt C, Harrysunker A, et al. (2019) Self-compassion interventions and psychosocial outcomes: A meta-analysis of RCTs. *Mindfulness* **10**(8), 1455–1473. doi:10.1007/s12671-019-01134-6
- Friede T, Röver C, Wandel S, et al. (2017) Meta-analysis of two studies in the presence of heterogeneity with applications in rare diseases: Meta-analysis of two studies in the presence of heterogeneity. *Biometrical Journal* **59**(4), 658–671. doi:10.1002/bimj.201500236
- Gilbert P (2009) Introducing compassion-focused therapy. *Advances in Psychiatric Treatment* **15**(3), 199–208. doi:10.1192/apt.bp.107.005264
- Gilbert P (2010) *Compassion Focused Therapy: Distinctive Features*. London: Routledge.
- Gilbert P (2014) The origins and nature of compassion focused therapy. *British Journal of Clinical Psychology* **53**(1), 6–41. doi:10.1111/bjc.12043

- Gilbert P, Catarino F, Duarte C, et al. (2017) The development of compassionate engagement and action scales for self and others. *Journal of Compassionate Health Care* 4(1), 1–24. doi:10.1186/s40639-017-0033-3
- Gonzalez-Hernandez E, Romero R, Campos D, et al. (2018) Cognitively-Based Compassion Training (CBCT[®]) in breast cancer survivors: A randomized clinical trial study. *Integrative Cancer Therapies* 17(3), 684–696. doi:10.1177/1534735418772095
- Hedges LV and Olkin I (1985) *Statistical Methods for Meta-analysis*. San Diego, CA: Academic Press.
- Higgins JPT, Sterne JA, Savovic J, et al. (2016) A revised tool for assessing risk of bias in randomized trials. *Cochrane Database of Systematic Reviews* 10 (Suppl 1), 29–31.
- Higgins JPT, Thomas J, Chandler J, et al. (2019) *Cochrane Handbook for Systematic Reviews of Interventions*, 2nd edn. Chichester, UK: John Wiley & Sons.
- Higgins JPT, Thompson SG, Deeks JJ, et al. (2003) Measuring inconsistency in meta-analyses. *BMJ* 327(7414), 557–560. doi:10.1136/bmj.327.74.557
- Hofmann SG, Grossman P and Hinton DE (2011) Loving-kindness and compassion meditation: Potential for psychological interventions. *Clinical Psychology Review* 31(7), 1126–1132. doi:10.1016/j.cpr.2011.07.003
- IntHout J, Ioannidis JPA and Borm GF (2014) The Hartung-Knapp-Sidik-Jonkman method for random effects meta-analysis is straightforward and considerably outperforms the standard DerSimonian-Laird method. *BMC Medical Research Methodology* 14(1), 25. doi:10.1186/1471-2288-14-25
- Jazaieri H, Jinpa GT, McGonigal K, et al. (2013) Enhancing compassion: A randomized controlled trial of a compassion cultivation training program. *Journal of Happiness Studies* 14(4), 1113–1126. doi:10.1007/s10902-012-9373-z
- Kemeny ME, Foltz C, Cavanagh JF, et al. (2012) Contemplative/emotion training reduces negative emotional behavior and promotes prosocial responses. *Emotion* 12(2), 338–350. doi:10.1037/a0026118
- Kirby JN (2017) Compassion interventions: The programmes, the evidence, and implications for research and practice. *Psychology and Psychotherapy* 90(3), 432–455. doi:10.1111/papt.12104
- Kirby JN, Tellegen CL and Steindl SR (2017) A Meta-analysis of compassion-based interventions: Current state of knowledge and future directions. *Behavior Therapy* 48(6), 778–792. doi:10.1016/j.beth.2017.06.003
- Knapp G and Hartung J (2003) Improved tests for a random effects meta-regression with a single covariate. *Statistics in Medicine* 22(17), 2693–2710. doi:10.1002/sim.1482
- Latifi Z, Soltani M and Mousavi S (2020) Evaluation of the effectiveness of self-healing training on self-compassion, body image concern, and recovery process in patients with skin cancer. *Complementary Therapies in Clinical Practice* 40, 101180. doi:10.1016/j.ctcp.2020.101180
- Leaviss J and Uttley L (2015) Psychotherapeutic benefits of compassion-focused therapy: an early systematic review. *Psychological Medicine* 45(5), 927–945. doi:10.1017/S0033291714002141
- Mifsud A, Pehlivan MJ, Fam P, et al. (2021) Feasibility and pilot study of a brief self-compassion intervention addressing body image distress in breast cancer survivors. *Health Psychology & Behavioral Medicine* 9(1), 498–526. doi:10.1080/21642850.2021.1929236
- Milbury K, Weathers SP, Durrani S, et al. (2020) Online couple-based meditation intervention for patients with primary or metastatic brain tumors and their partners: Results of a pilot randomized controlled trial. *Journal of Pain and Symptom Management* 59(6), 1260–1267. doi:10.1016/j.jpainsymman.2020.02.004
- Mitchell AJ, Ferguson DW, Gill J, et al. (2013) Depression and anxiety in long-term cancer survivors compared with spouses and healthy controls: A systematic review and meta-analysis. *The Lancet Oncology* 14(8), 721–732. doi:10.1016/S1470-2045(13)70244-4
- Neff KD (2015) The Self-compassion scale is a valid and theoretically coherent measure of self-compassion. *Mindfulness* 7(1), 264–274. doi:10.1007/s12671-015-0479-3
- Neff KD and Germer CK (2013) A pilot study and randomized controlled trial of the mindful self-compassion program. *Journal of Clinical Psychology* 69(1), 28–44. doi:10.1002/jclp.21923
- Niedzwiedz CL, Knifton L, Robb KA, et al. (2019) Depression and anxiety among people living with and beyond cancer: A growing clinical and research priority. *BMC Cancer* 19(1), 943. doi:10.1186/s12885-019-6181-4
- Pace TWW, Negi LT, Adame DD, et al. (2009) Effect of compassion meditation on neuroendocrine, innate immune and behavioral responses to psychosocial stress. *Psychoneuroendocrinology* 34(1), 87–98. doi:10.1016/j.psyneuen.2008.08.011
- Page MJ, McKenzie JE, Bossuyt PM, et al. (2021) The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ* 372, n71. doi:10.1136/bmj.n71
- Pinto-Gouveia J, Duarte C, Matos M, et al. (2014) The protective role of self-compassion in relation to psychopathology symptoms and quality of life in chronic and in cancer patients. *Clinical Psychology & Psychotherapy* 21(4), 311–323. doi:10.1002/cpp.1838
- Pitman A, Suleman S, Hyde N, et al. (2018) Depression and anxiety in patients with cancer. *BMJ* 361, k1415. doi:10.1136/bmj.k1415
- Przedziński A and Sherman KA (2016) Modifying affective and cognitive responses regarding body image difficulties in breast cancer survivors using a self-compassion-based writing intervention. *Mindfulness* 7(5), 1142–1155. doi:10.1007/s12671-016-0557-1
- Sadeghi ZH, Yazdi-Ravandi S and Pirnia B (2018) Compassion-focused therapy on levels of anxiety and depression among women with breast cancer: A randomized pilot trial. *International Journal of Cancer Management* 11(11), e67019. doi:10.5812/ijcm.67019
- Saueressig T, Pedder H, Bowe SJ, et al. (2021) Six meta-analyses on treatments for femoroacetabular impingement syndrome in a year and readers are none the wiser: Methods advice for researchers planning meta-analysis of data from fewer than 5 Trials. *The Journal of Orthopaedic and Sports Physical Therapy* 51(5), 201–203. doi:10.2519/jospt.2021.0107
- Sherman KA, Przedziński A, Alcorso J, et al. (2018) Reducing body image-related distress in women with breast cancer using a structured online writing exercise: Results from the my changed body randomized controlled trial. *Journal of Clinical Oncology* 36 (19), 1930–1940. doi:10.1200/JCO.2017.76.3318.
- Shonin E, Van Gordon W, Compare A, et al. (2014) Buddhist-derived loving-kindness and compassion meditation for the treatment of psychopathology: A systematic review. *Mindfulness* 6(5), 1161–1180. doi:10.1007/s12671-014-0368-1
- Sotirova MB, McCaughan EM, Ramsey L, et al. (2021) Acceptability of online exercise-based interventions after breast cancer surgery: Systematic review and narrative synthesis. *Journal of Cancer Survivorship* 15(2), 281–310. doi:10.1007/s11764-020-00931-6
- Sterne JAC, Savovic J, Page MJ, et al. (2019) RoB 2: A revised tool for assessing risk of bias in randomised trials. *BMJ* 366, 14898. doi:10.1136/bmj.14898
- Sung H, Ferlay J, Siegel RL, et al. (2021). Global Cancer Statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: A Cancer Journal for Clinicians* 71(3), 209–249. doi:https://doi.org/10.3322/caac.21660
- Trindade IA, Ferreira C and Pinto-Gouveia J (2020) Acceptability and preliminary test of efficacy of the Mind programme in women with breast cancer: An acceptance, mindfulness, and compassion-based intervention. *Journal of Contextual Behavioral Science* 15, 162–171. doi:10.1016/j.jcbs.2019.12.005
- Walker J, Magill N, Mulick A, et al. (2020) Different independent associations of depression and anxiety with survival in patients with cancer. *Journal of Psychosomatic Research* 138, 110218. doi:10.1016/j.jpsychores.2020.110218
- Wang X, Wang N, Zhong L, et al. (2020) Prognostic value of depression and anxiety on breast cancer recurrence and mortality: A systematic review and meta-analysis of 282,203 patients. *Molecular Psychiatry* 25(12), 3186–3197. doi:10.1038/s41380-020-00865-6
- Wren AA, Shelby RA, Soo MS, et al. (2019) Preliminary efficacy of a loving-kindness meditation intervention for patients undergoing biopsy and breast cancer surgery: A randomized controlled pilot study. *Supportive Care in Cancer: Official Journal of the Multinational Association of Supportive Care in Cancer* 27(9), 3583–3592. doi:10.1007/s00520-019-4657-z