The Effects of Expressive Writing Interventions for Patients With Cancer: A Meta-Analysis

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Purpose/Objectives: To evaluate the effects of expressive writing (EW) interventions in patients with cancer.

Data Sources: Electronic databases searched included both international and Korean databases through January 2015.

Data Synthesis: Of the 20 trials that met the eligibility criteria of this review, a meta-analysis was conducted of 14 articles involving 13 randomized and 1 nonrandomized trials with 1,718 patients with cancer. EW interventions were compared with a neutral writing intervention or usual care (no writing). A significant small effect was noted on relieving cancer symptoms; however, the effects on psychological and cognitive outcomes were not significant. When subgroup analysis by control condition was performed, a significant effect on health-related quality of life was found between the EW intervention group and the usual care group.

Conclusions: EW had significant small effects only on cancer symptoms. The findings suggest that the traditional EW intervention protocol may need to be intensified to confirm its effect on patients with cancer.

Implications for Nursing: Current evidence for EW as a nursing intervention for improving physical, psychological, and cognitive outcomes among patients with cancer is promising, but not conclusive.

Although cancer survival has improved with advancements in early diagnosis and treatment, cancer can be an overwhelming and traumatic event that may profoundly affect multiple aspects of an individual's life (Frisina, Borod, & Lepore, 2004; Merz, Fox, & Malcarne, 2014). About 30% of patients with cancer have been diagnosed with at least one psychiatric disorder, such as adjustment disorder or major depression (Mehnert et al., 2014). Potential risk factors for poor adjustment in patients with cancer include intrusive thoughts (unwanted and recurrent thoughts about a stressful experience) and avoidance behaviors (consciously recognized avoidance of certain thoughts and feelings) (Dupont, Bower, Stanton, & Ganz, 2014; Milbury et al., 2014). These are considered an adaptive part of processing trauma; however, they can cause negative effects or somatic symptoms (e.g., depression, fatigue, sleep disturbance), leading to poor adjustment (Devine, Parker, Fouladi, & Cohen, 2003; Dupont et al., 2014; Golden-Kreutz & Andersen, 2004; Johnson Vickberg et al., 2001).

Expressive writing (EW) is a psychosocial intervention for reducing psychological morbidity that was developed by Pennebaker and Beall (1986). The expression of emotions by writing about one's deepest thoughts and feelings, particularly regarding stressful or traumatic experiences, has long been a

means of coping with emotional strain (Pennebaker & Beall, 1986). A large number of studies have tested the efficacy of EW intervention in healthy individuals compared to those with specific diseases. The results showed that EW has a positive effect on physical symptoms, psychological well-being, and immunologic function (Pennebaker & Beall, 1986; Pennebaker, Colder, & Sharp, 1990; Pennebaker, Kiecolt-Glaser, & Glaser, 1988). Specific mechanisms underlying the beneficial effects of EW may include decreasing autonomic arousal to stressful thoughts and feelings and cognitive processing of events into a coherent and meaningful narrative (Lepore & Greenberg, 2002; Low, Stanton, & Danoff-Burg, 2006). Alternatively, the social integration model suggests that EW may prompt patients to seek social support and improve well-being (Mosher et al., 2012; Pennebaker & Graybeal, 2001).

Smyth (1998) presented a meta-analysis of 13 studies examining the effects of EW intervention in healthy populations. Smyth (1998) reported an overall effect size of d = 0.47, indicating a significant medium effect of EW intervention, which suggests its usefulness for health promotion. However, Frisina et al. (2004)'s meta-analysis of a clinical population did not produce the same robust improvements on health as it did in healthy subjects. They reported a smaller effect size of d = 0.19; in addition, the EW intervention was significantly effective only on physical health, not psychological health. According to the largest meta-analysis (Frattaroli, 2006), the EW intervention had valuable effects for psychological problems (e.g., anxiety, depression), immune parameters, self-reported physical health, and general functioning. However, the effect size of d = 0.15 was quite small. One possible explanation for the small effect size is the heterogeneity of studies. Study participants varied from healthy to those diagnosed with a clinical condition. In addition, the application of the intervention also varied with regard to number and duration of sessions, instruction provided, spacing of sessions, time of follow-up assessment, and type of outcomes. These factors could make it difficult to draw conclusions on the state of EW intervention.

Evidence on the effect of EW intervention among patients with cancer is accumulating. Several researchers have hypothesized that patients with cancer tend to feel emotionally inhibited (Servaes, Vingerhoets, Vreugdenhil, Keuning, & Broekhuijsen, 1999; Zakowski, Ramati, Morton, Johnson, & Flanigan, 2004), and this inhibition has been linked to poorer psychological health (Tamagawa et al., 2013). Therefore, an EW intervention may be a beneficial tool for expressing feelings related to cancer, thereby promoting health. Unexpectedly, however, previous researchers failed to show a significant effect of EW intervention on psychological outcomes, such as perceived stress, mood disturbance, anxiety, depression, and health-related quality of life (HRQOL) (Craft, Davis, & Paulson, 2013; de Moor et al., 2002, 2008; Jensen-Johansen et al., 2013; Low, Stanton, Bower, & Gyllenhammer, 2010; Mosher et al., 2012; Rosenberg et al., 2002; Stanton et al., 2002), or cognitive outcomes including intrusive thoughts and avoidance behaviors (Jensen-Johansen et al., 2013; Low et al., 2010; Zakowski et al., 2004). On the other hand, an EW intervention was beneficial for improving physical symptoms such as sleep disturbance and pain (de Moor et al., 2008; Rosenberg et al., 2002; Stanton et al., 2002). Therefore, to date, studies on EW interventions conducted among patients with cancer have yielded mixed results.

Merz et al. (2014) reported a systematic review of EW interventions for patients with cancer. The authors synthesized 13 studies published through November 2012 and provided valuable information in terms of future research and practice. Merz et al. (2014) also concluded that there were some positive results from EW interventions in patients with cancer. Unfortunately, the authors did not perform a pooled quantitative analysis of the findings. Meta-analysis is important to determine the magnitude and significance of an EW intervention.

Therefore, the authors of the current article conducted a meta-analysis of the effectiveness of EW interventions for patients with cancer. The aims of the current study were (a) to synthesize the evidence for the tested effect of EW intervention and (b) to calculate a robust estimate of the effect of EW interventions on physical, psychological, and cognitive outcomes in patients with cancer.

Methods

The review procedure was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (Liberati et al., 2009). The authors included studies that met the following conditions: (a) were randomized, controlled trials (RCTs) or non-RCTs; (b) included only adults aged 18 years or older who had been diagnosed with cancer; (c) compared EW interventions with neutral writing intervention or usual care; and (d) measured physical, psychological, and cognitive outcomes. Specifically, physical outcomes include cancer symptoms; psychological outcomes include anxiety, depression, perceived stress or distress, mood disturbance, and HRQOL; and cognitive outcomes include intrusive thoughts and avoidance behaviors.

Information Sources

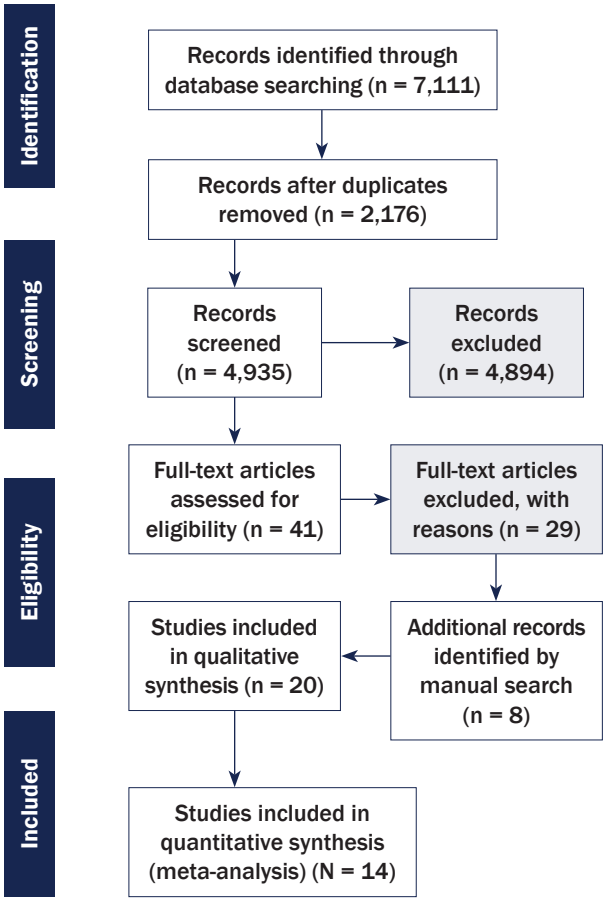
The authors conducted electronic searches in MEDLINE®, EMBASE®, Cochrane Library CENTRAL,

CINAHL®, and several Korean databases (KOREAMED, KMBASE, RISS, KISS, and NANET). In addition, the authors performed a manual review of reference lists in identified studies extracted from the database searches. The searches were inclusive of studies published in English or Korean from the earliest publication date available in each database and updated through January 2015. The main search strategy was *neoplasm* OR *cancer* AND *expressed emotion* OR *self-disclosure* OR *expressive writing* OR *disclosure* OR *psychological* OR *psychotherapy* AND *controlled clinical trials* OR *randomized controlled trials*.

Study Selection and Data Extraction

All titles and abstracts retrieved by electronic searches were downloaded to a reference management database and duplicates were deleted. Study selection was performed on two levels: studies were primarily screened using titles and abstracts, and, if necessary, studies were then screened using the full text. Two authors independently screened each study through defined inclusion criteria. Any disagreement was resolved by consensus between the two. A standardized data extraction sheet was developed for this review.

FIGURE 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Flow Diagram



Pilot testing was performed on five studies by two independent reviewers before data extraction. Differences of opinion were resolved by consensus. Data extracted from the study included authors, year of publication, country of origin, sample characteristics, study design, intervention details (setting, sessions, duration, and spacing), control condition, and study outcomes.

RCT studies were assessed for methodologic quality using the Risk of Bias, which was developed by the Cochrane Bias Method Group (Higgins & Green, 2011). This tool evaluates seven items: random sequence generation, allocation concealment, blinding of participants and staff, blinding of outcome assessment, incomplete outcome data, and selective reporting. Each item was rated as having low, unclear, or high risk of bias. Studies were assessed in relation to the five sources of bias: selection bias, performance bias, attrition bias, detection bias, and reporting bias. Two authors independently reviewed each study for methodologic qualities. A pilot test was conducted on four studies before the authors independently assessed study quality.

Analysis

The authors used the between-group standardized mean difference (SMD) with 95% confidence interval (CI) as the summary report of effect size. Each effect size was weighed by its inverse variance weight in calculating mean effect sizes. Inverse variance approach gives more weight to studies with larger sample sizes and minimizes the imprecision of the pooled effect estimate (Higgins & Green, 2011). Mean and standard deviations of outcomes were used for computation of SMD (Cohen's d) (Cohen, 1988). Cohen's d of 0.8 was considered large, 0.5 was considered medium, and 0.2 was considered small (Cohen, 1988). Heterogeneity was examined among study results using I^2 statistic. If no statistical heterogeneity was present, the authors used a fixed-effect model. I^2 values higher than 50% were considered as having substantial heterogeneity, and the random-effects model was, therefore, applied to analyze the data (Higgins & Green, 2011). Subgroup analyses were conducted by dividing the studies into groups according to control conditions (neutral writing or no writing).

To assess publication bias, the authors used a funnel plot to graph the effect size of each study according to its respective standard errors. The authors assumed publication bias existed if there were no small studies with favoring effect sizes (Higgins & Green, 2011). A test of statistical significance was performed using Egger's linear regression asymmetry test (Egger, Davey Smith, Schneider, & Minder, 1997). A meta-analysis was conducted with Cochrane Review Manager 5.3 and RevMan Analyses software. The authors

TABLE 1. Risk of Bias of Studies Included in Qualitative Synthesis

Study	Random Sequence Generation	Allocation Concealment	Blinding of Participants and Personnel	Blinding of Outcome Assessment	Incomplete Outcome Data Addressed	Selective Reporting
Arden-Close et al., 2013	Yes	Yes	No	Yes	Yes	Yes
Bruera et al., 2008	Unknown	Unknown	No	Unknown	No	No
Cepeda et al., 2008	Yes	Yes	No	Yes	Yes	Yes
Craft et al., 2013	Unknown	Unknown	No	Yes	Yes	Yes
de Moor et al., 2002	Yes	Unknown	No	Unknown	Yes	Yes
de Moor et al., 2008	Yes	Unknown	No	Unknown	No	Yes
Gellaitry et al., 2010	Yes	Unknown	No	Unknown	Yes	Yes
Henry et al., 2010	Unknown	Unknown	No	No	Yes	Yes
Jensen-Johansen et al., 2013	Yes	Unknown	No	Unknown	Yes	Yes
Lepore et al., 2015	Yes	Yes	No	Yes	Yes	Yes
Low et al., 2010	Yes	Yes	No	Unknown	Yes	Yes
Milbury et al., 2014	Yes	Unknown	No	Yes	Yes	Yes
Mosher et al., 2012	Yes	Unknown	No	Yes	Yes	Yes
Park & Yi, 2012	No	No	No	No	Yes	Yes
Pauley et al., 2011	Yes	Yes	No	Yes	No	Yes
Rini et al., 2013	Yes	Yes	No	Yes	Yes	Yes
Rosenberg et al., 2002	Unknown	Unknown	No	Yes	Yes	Yes
Stanton et al., 2002	Yes	Yes	No	Yes	Yes	Yes
Walker et al., 1999	Unknown	Unknown	No	Yes	Yes	Yes
Zakowski et al., 2004	Unknown	Unknown	No	Unknown	Yes	Yes

considered $p < 0.05$ to be statistically significant, and all statistical tests were two-sided.

Findings

Study Selection

Twenty articles were included in this review. However, six articles did not report the necessary data for computing effect size; therefore, meta-analysis was performed with 14 articles involving 13 RCTs and 1 non-RCT (see Figure 1).

Study Quality

Table 1 summarizes the methodologic quality of the 20 articles. Thirteen studies (65%) were considered low risk for selection bias because of random sequence generation; however, five studies did not report a specific method of random assignment (Bruera, Willey, Cohen, & Palmer, 2008; Craft et al., 2013; Henry, Schlegel, Talley, Molix, & Bettencourt, 2010; Rosenberg et al., 2002; Walker, Nail, & Croyle, 1999; Zakowski et al., 2004). A study by Park and Yi (2012), which did not include randomization, was considered high risk. The result of selection bias related to allocation concealment was largely unclear given that 12 studies did not report those details. Because of the nature of the intervention characteristics, all trials were at a high risk for performance bias. However, two trials described efforts to minimize performance bias by blinding study purpose/hypotheses during intervention (Jensen-Johansen et al., 2013; Stanton et al., 2002). Ten trials performed blinding of outcome assessment and were, therefore, considered at low risk of detection bias. The majority of trials (n = 17) were at low risk for attrition bias; however, three trials were rated as high risk because of high attrition rate (Bruera et al., 2008; de Moor et al., 2008; Pauley, Morman, & Floyd, 2011). All trials except for

Bruera et al. (2008) were considered low risk for reporting bias. Bruera et al. (2008) performed a feasibility test of an EW intervention in a palliative care setting; however, they could not assess postintervention outcomes because participants did not complete the intervention. Therefore, that trial was considered high risk for reporting bias.

Study Characteristics

The characteristics of the 20 studies are described in Table 2. Sixteen studies were conducted in the United States, two studies in the United Kingdom, and two studies each in South Korea and Denmark. In terms of study design, all studies except for one were RCTs. The mean age of study participants was 55.1 years. The sample size across the 20 included studies varied from 24 to 507, with a total of 2,510 participants. The most common type of cancer was breast cancer (n = 10); other cancer types included renal cell carcinoma (n = 2), prostate cancer (n = 2), ovarian (n = 1), testicular cancer (n = 1), colon cancer (n = 1), hematologic cancer (n = 1), and mixed (n = 2). Most studies were performed in patients with early-stage cancer; however, four studies were conducted in patients at an advanced or terminal stage.

Description of the Intervention and Control Conditions

Most EW interventions (n = 17) were provided in a patient's home with researcher's guidance. The number of sessions varied from 3–6, with a mean of 3.9 sessions. Time per session varied from 15–90 minutes ($\overline{X}$ = 23.9 minutes) and the duration of the intervention ranged from 3 days to 6 weeks. As for spacing of the intervention, one-week interval (n = 8) and one-day interval (n = 7) were common. The control groups were characterized by neutral writing intervention or usual care (no writing). Twelve studies used neutral writing as a control.

Outcome Measures

Physical outcomes were evaluated as cancer symptoms (n = 6). The measures included MD Anderson Symptom Inventory (MDASI), the Pennebaker Inventory of Limbic Languidness, and the Brief Pain Inventory. Psychological outcomes were evaluated as anxiety (n = 3), depression (n = 6), perceived stress or distress (n = 5), mood disturbances (n = 4), and HRQOL (n = 6). These outcomes were measured by the Perceived Stress Scale; the Global Index of Distress; the Center for Epidemiological Studies–Depression scale; the Hospital Anxiety and Depression Scale; the depression subscale from the Mood Disturbance, Depressive Symptoms, Positive and Negative Affect Scale; the Functional Assessment of Chronic Illness Therapy, Cancer–quality-of-life scale; European Organisation for the Research and Treatment of Cancer Quality of Life Questionnaire–Core 30; and SF-36®. For evaluation of cognitive outcomes, such as intrusive thoughts (n = 7) and avoidance behaviors (n = 4), the Impact of Event Scale was used.

Effects of an Expressive Writing Intervention

Table 3 shows the effect sizes according to physical, psychological, and cognitive outcomes. In terms of physical outcomes (n = 6), a significant small effect was noted on relieving cancer symptoms (d = –0.26, 95% CI [–0.43, –0.09], p = 0.003, I^2 = 0%). However, no significant effect was noted on psychological outcomes; the weighted average effect sizes were 0.11 (95% CI [–0.18, 0.39], p = 0.11, I^2 = 0%) for anxiety, –0.08 (95% CI [–0.22, 0.06], p = 0.027, I^2 = 0%) for depression, –0.09 (95% CI [–0.3, 0.11], p = 0.36, I^2 = 0%) for perceived stress or distress, –0.05 (95% CI [–0.24, –0.14], p = 0.6, I^2 = 27%) for mood disturbance, and –0.12 (95% CI [–0.36, 0.11], p = 0.31, I^2 = 46%) for HRQOL.

When the authors performed subgroup analysis by control group condition, significant effects on HRQOL (n = 3) were found between the EW intervention group and no writing control group (d = –0.37, 95% CI [–0.72, –0.02], p =0.04, I^2 = 33%). In addition, no significant effect on HRQOL (n = 4) was noted between the EW intervention group and the neutral writing control group (d = 0.04, 95% CI [–0.14, 0.22], p =0.69, I^2 = 0%) (see Table 4). Regarding cognitive outcomes, there were also no significant effects on intrusive thoughts (n = 7) (d = –0.03, 95% CI [–0.17, 0.1], p = 0.62, I^2 = 9%) and avoidance behaviors (d = –0.04, 95% CI [–0.23, 0.14], p = 0.65, I^2 = 22%).

To assess potential publication bias, the authors performed Egger's linear regression asymmetry test. No evidence was found of funnel plot asymmetry for physical, psychological, and cognitive outcomes.

Discussion

Previous meta-analyses have suggested that EW intervention has a small to moderate significant effect on health outcomes (Frattaroli, 2006; Frisina et al., 2004; Smyth, 1998). However, no robust estimate of EW intervention exists in the cancer population. Findings from the current meta-analysis indicate that an EW intervention had a significant small effect (d = 0.26) on physical outcomes, such as fatigue, pain, and sleep disturbance, but no significant effect on psychological and cognitive outcomes. The authors found several reasons why the EW intervention had null findings on psychological and cognitive outcomes in patients with cancer.

First, the intervention dosage might not be sufficient for patients with cancer. Dosage of EW intervention can

TABLE 2. Descriptive Summary of Included Studies

Study (Country)	Design	EW Intervention	Control Condition	Outcomes
Arden-Close et al., 2013 (UK)[a]	RCT of patients with ovarian cancer with experimental (n = 53) and control (n = 49) groups	Setting: Home Session: Four sessions for 3–4 days, 15–20 minutes for each Spacing: One day	Neutral writing	HRQOL, perceived stress, intrusive thoughts, illness-related couple communication
Bruera et al., 2008 (USA)	Pilot RCT of terminal patients with cancer with experimental (n = 12) and control (n = 12) groups	Setting: Unclear Session: Four sessions for 2 weeks, 20 minutes for each Spacing: 2–3 days	Neutral writing	Pain, fatigue, depression, anxiety, cancer symptoms, perceived stress, and sleep disturbance
Cepeda et al., 2008 (USA)	RCT of patients with mixed cancer with three arms: writing (n = 79), questionnaire (n = 77), and control (n = 78) groups	Setting: Home Session: Three session for 3 weeks, 20 minutes for each Spacing: One week	Usual care	Pain, well-being, and emotional disclosure
Craft et al., 2013 (USA)[a]	RCT of patients with early breast cancer with four arms: EW (cancer trauma) (n = 30), EW (self-selected trauma) (n = 29), neutral writing (n = 27), and control (n = 30) groups	Setting: Home Session: Four sessions for 4 days, 20 minutes for each Spacing: One day	Usual care	HRQOL
de Moor et al., 2002 (USA)[a]	RCT of metastatic patients with renal cell carcinoma with experimental (n = 21) and control (n = 21) groups	Setting: Clinic Session: Four sessions for 4 weeks, 20 minutes each Spacing: One week	Neutral writing	Intrusive thoughts, avoidance behavior, perceived stress, mood disturbance, sleep disturbance
de Moor et al., 2008 (USA)[a]	RCT of patients with breast cancer at stage II–III with experimental (n = 24) and control (n = 25) groups	Setting: Home Session: Four sessions for 7 days, 20 minutes for each Spacing: 1–2 days	Neutral writing	Psychological distress, perceived stress, sleep disturbance, social constraints, pain, and linguistic dimension
Gellaitry et al., 2010 (UK)[a]	RCT of patients with breast cancer at early stage with experimental (n = 45) and control (n = 48) groups	Setting: Home Session: Four session for 4 days, 20 minutes for each Spacing: One day	Usual care	HRQOL and mood disturbance
Henry et al., 2010 (USA)	RCT of patients with breast cancer with experimental (n = 40) and control (n = 40) groups	Setting: Home Session: Single session during 20 minutes Spacing: Not applicable	Usual care	Physical health, depression, and mood disturbance
Jensen-Johansen et al., 2013 (Denmark)[a]	RCT of patients with breast cancer at stage I–III with experimental (n = 253) and control (n = 254) groups	Setting: Home Session: Three sessions for 3 weeks, 20 minutes for each Spacing: One week	Neutral writing	Intrusive thoughts, avoidance behaviors, depression, mood disturbance
Lepore et al., 2015 (USA)	RCT of patients with colorectal cancer at stage I–III with experimental (n = 101) and control (n = 92) groups	Setting: Home Session: Four sessions for 2 weeks, 15 minutes for each Spacing: 2–3 days	Neutral writing	Depression, cancer symptoms, HRQOL, sleep disturbance
Low et al., 2010 (USA)[a]	RCT of metastatic patients with breast cancer with experimental (n = 31) and control (n = 31) groups	Setting: Home Session: Four sessions for 3 weeks, 20 minutes for each Spacing: 4–5 days	Neutral writing	Depression, intrusive thoughts, cancer symptoms and sleep disturbance, manipulation check, and essay rating

(Continued on the next page)

[a] Included in meta-analysis
EW—expressive writing; HRQOL—health-related quality of life; RCT—randomized, controlled trial

TABLE 2. Descriptive Summary of Included Studies *(Continued)*

Study (Country)	Design	EW Intervention	Control Condition	Outcomes
Milbury et al., 2014 (USA)[a]	RCT of patients with renal cell carcinoma with experimental (n = 138) and control (n = 139) groups	Setting: Unclear Session: Four sessions for 10 days, 20 minutes for each Spacing: 2–3 days	Neutral writing	Cancer symptoms, HRQOL, fatigue, depression, sleep disturbance, intrusive thoughts, avoidance behaviors
Mosher et al., 2012 (USA)[a]	RCT of metastatic patients with breast cancer with experimental (n = 44) and control (n = 42) groups	Setting: Home Session: Four sessions for 4–7 weeks, 20 minutes each Spacing: 1–2 week	Neutral writing	Meaning and peace, anxiety, depression, functional status, demoralization, distress, sleep disturbance, fatigue
Park & Yi, 2012 (South Korea)[a]	Quasi experimental study design of patients with breast cancer at stage II–III with experimental (n = 40) and control (n = 40) groups	Setting: Clinic Session: Six sessions for 6 weeks, 90 minutes for each Spacing: One week	Usual care	Cancer symptoms, anxiety, depression, HRQOL
Pauley et al., 2011 (USA)[a]	RCT of 48 patients with testicular cancer with three arms: EW with negative theme, EW with positive theme, control groups	Setting: Home Session: Three sessions for 5 weeks, 20 minutes for each Spacing: One week	Neutral writing	HRQOL, mental health, sexual health, expressiveness
Rini et al., 2013 (USA)	RCT of 315 stem cell transplantation survivors with four arms: EW plus peer support (n = 82), EW alone (n = 74), peer support alone (n = 79), and control (n = 80) groups	Setting: Home Session: Four sessions for 4 weeks, 20 minutes for each Spacing: One week	Neutral writing	Distress, physical symptoms, HRQOL
Rosenberg et al., 2002 (USA)[a]	Pilot RCT of patients with prostate cancer with experimental (n = 15) and control (n = 15) groups	Setting: Unclear Session: 4 session for four days, 20–30 minutes each Spacing: One day	Usual care	Healthcare use, immune function, pain, HRQOL, psychological symptoms, process measures
Stanton et al., 2002 (USA)	RCT of patients with breast cancer at early stage with three arms: emotional prompt (n = 21), benefit-finding prompt (n = 21), and control (n = 18) groups	Setting: Home and clinic Session: Four session for three weeks Spacing: One week	Neutral writing	Mood disturbance, HRQOL, cancer symptoms, medical appointments, avoidance behaviors, manipulation check, and essay rating
Walker et al., 1999 (USA)[a]	RCT of patients with breast cancer at early stage with three arms: single dose (n = 12), three dose (n = 16), and control (n = 16) groups	Setting: Home and clinic Session: Single session for 30 minutes, and three sessions for 3 days, 30 minutes for each Spacing: One day	Usual care	Mood disturbance, intrusive thoughts, avoidance behaviors, and side effects
Zakowski et al., 2004 (USA)[a]	RCT of patients with prostate cancer or gynecologic cancer with experimental (n = 62) and control (n = 42) groups	Setting: Home Session: Three sessions for 3 days, 20 minutes for each Spacing: One day	Neutral writing	Psychological distress, avoidance behavior, intrusive thoughts, and social constraints

[a] Included in meta-analysis
EW—expressive writing; HRQOL—health-related quality of life; RCT—randomized, controlled trial

be considered in terms of number, length, and spacing of writing sessions. The standardized EW intervention developed by Pennebaker and Beall (1986) instructed participants to write for 20 minutes for four consecutive days about their deepest emotions and thoughts regarding traumatic experiences. Subsequent studies that applied this standardized protocol revealed positive outcomes in a healthy population (Smyth, 1998). However, 20 minutes might be insufficient for patients with cancer to write about traumatic experiences related to their diagnosis and treatment. In the study by Arden-Close, Gidron, Bayne, and Moss-Morris (2013), for example, it took about 30 minutes for patients to write all necessary details about their experience during one session. Pennebaker and Beall (1986) reinforced that it is critical for participants to really let go and explore their very deepest emotions and thoughts. Patients with cancer may need more sessions because their traumatic experience is complicated; therefore, it may take longer to expose those deepest emotions and thoughts. Cepeda et al. (2008) reported that only 50% of patients had the desired exposure despite efforts to ensure adherence to the standardized protocol of EW.

According to its mechanism, EW may initiate emotional regulation in several ways, including attentional processing, habituation, and cognitive processing (Frattaroli, 2006; Lepore & Greenberg, 2002). Insufficiently expressed emotions could be unhelpful or even detrimental because participants would become distressed without the time to regulate their emotions (Travagin, Margola, & Revenson, 2015). A systematic review by Frattaroli (2006) supported the contention that more frequent and longer intervention sessions were associated with stronger effects relative to less-intensive interventions. Therefore, future studies need to apply more intensive EW intervention in the cancer population.

Second, the control condition may influence nonsignificant effects of EW intervention. Among 14 trials included in the current meta-analysis, 9 used a neutral writing group as a control condition. None of these studies found a significant effect of EW intervention in psychological and cognitive outcomes. The neutral writing group was instructed to describe factual events such as daily living or lifestyle. However, these themes could also be related to their cancer diagnosis and, therefore, may stir up emotional issues. Interestingly, the subgroup analysis also supported this interpretation; the authors found a significant moderate effect ($d = -0.37$) on HRQOL when comparing the effect between EW intervention group and no writing group ($p = 0.04$). Therefore, researchers and clinicians should be cautious when administering a neutral writing group as a control condition among patients with cancer because emotional disclosure could occur in this group.

Knowledge Translation

- Expressive writing (EW) interventions for patients with cancer may have beneficial effects on relieving cancer symptoms and improving health-related quality of life.
- EW interventions may not be effective for cognitive outcomes, such as intrusive thoughts and avoidance behaviors in patients with cancer.
- The number of sessions or time per session may need to be intensified to exert efficacy.

Third, the characteristics of the participants may have affected the results. Unlike previous studies with healthy populations, patients with cancer might be reluctant to write because of conditions associated with older age, cognitive function, or unpleasant cancer symptoms. Milbury et al. (2014) reported that a dislike for writing was the main reason for study refusal. This may indicate that educated people and people who are less distressed are more comfortable with writing. Therefore, a "floor effect" of the psychological or cognitive outcomes were found in several studies (Jensen-Johansen et al., 2013; Lepore, Revenson, Roberts, Pranikoff, & Davey, 2015; Milbury et al., 2014), leading to a nonsignificant effect of EW intervention. In contrast, severe conditions related to cancer progression could influence null findings. In Arden-Close et al. (2013), about half of the participants experienced a recurrence during the study. EW intervention may be ineffective for dealing with recurrent stressors, and participants may have needed more intensive psychological intervention. Therefore, individual factors should be considered when administering an EW intervention to patients with cancer.

Finally, the timing of the follow-up assessment may relate to nonsignificant findings. Several researchers assessed outcomes (e.g., distress, stress, mood disturbance) immediately after EW intervention (Cepeda et al., 2008; de Moor et al., 2002). EW may be too painful for participants and could negatively affect outcomes, particularly psychological outcomes such as perceived distress or mood disturbance. Therefore, some length of postintervention time is needed.

Limitations

The authors did not perform moderator analysis because of the small number of studies included in the meta-analysis. Moderator analysis could give useful information about an effective format of EW intervention, and also may inform the identification of participants who may benefit from or be injured by EW. Most EW interventions were conducted in patients with early-stage cancer, but the results may

TABLE 3. Effect Size of Expressive Writing Intervention

Variable	Experimental Group $\bar{X}$	Experimental Group SD	Experimental Group Total	Control Group $\bar{X}$	Control Group SD	Control Group Total	Weight (%)	SMD (95% CI)
Cancer symptoms[a]								
de Moor et al., 2008	0.49	1.95	24	0.7	1.48	25	9.3	−0.12 [−0.68, 0.44]
Low et al., 2010	2	37.03	31	5.8	36.67	31	11.7	−0.1 [−0.6, 0.4]
Milbury et al., 2014	−0.31	1.5	138	0.07	1.56	139	52.2	−0.25 [−0.48, −0.01]
Park & Yi, 2012	−14.2	36.25	29	3.14	24.44	29	10.6	−0.55 [−1.08, −0.03]
Park & Yi, 2012	−15	40.47	29	−12.88	40.18	29	11	−0.05 [−0.57, 0.46]
Rosenberg et al., 2002	−0.78	4.39	15	3.81	6.91	15	5.2	−0.77 [−1.52, −0.03]
Subtotal	–	–	266	–	–	268	100	−0.26 [−0.43, −0.09]
Anxiety[b]								
Moor et al., 2002	−6.9	3.67	21	−7	4.12	21	2.3	0.03 [−0.58, 0.63]
Mosher et al., 2012	−7.15	3.18	44	−7.87	3.18	42	4.8	0.22 [−0.2, 0.65]
Park & Yi, 2012	−1.04	4.38	29	−0.99	4	29	3.2	−0.01 [−0.53, 0.5]
Subtotal	–	–	94	–	–	92	10.4	0.11 [−0.18, 0.39]
Depression[c]								
Jensen-Johansen et al., 2013	−0.7	3.74	100	−0.5	4.41	224	15.5	−0.05 [−0.28, 0.19]
Low et al., 2010	0.4	7.24	31	0.8	7.24	31	3.5	−0.05 [−0.55, 0.44]
Milbury et al., 2014	−1.07	9.57	138	−0.67	8.14	139	15.5	−0.04 [−0.28, 0.19]
Moor et al., 2002	−7.4	5.04	21	−6.6	5.5	21	2.3	−0.15 [−0.75, 0.46]
Mosher et al., 2012	−17.99	8.95	44	−17.87	8.94	42	4.8	−0.01 [−0.44, 0.41]
Park & Yi, 2012	−1.76	4.04	29	0.03	3.67	29	3.2	−0.46 [−0.98, 0.06]
Subtotal	–	–	363	–	–	486	44.7	−0.08 [−0.22, 0.06]
Perceived stress or distress[d]								
Arden-Close et al., 2013	0.8	7.71	53	1.49	7.54	49	5.7	−0.09 [−0.48, 0.3]
de Moor et al., 2008	−2.44	8.58	24	−2.02	6.9	25	2.7	−0.05 [−0.61, 0.51]
Moor et al., 2002	−19.8	4.12	21	−20.5	4.12	21	2.3	0.17 [−0.44, 0.77]
Mosher et al., 2012	−12.8	6.67	44	−11.94	6.64	42	4.8	−0.13 [−0.55, 0.3]
Zakowski et al., 2004	−0.07	0.42	62	0.01	0.36	42	5.6	−0.2 [−0.59, 0.19]
Subtotal	–	–	204	–	–	179	21.1	−0.09 [−0.3, 0.11]

(Continued on the next page)

[a] Heterogeneity: $\chi^2 = 4.27$, df = 5 (p = 0.51), $I^2 = 0\%$. Test for overall effect: Z = 2.95 (p = 0.003)
[b] Heterogeneity: $\chi^2 = 0.57$, df = 2 (p = 0.75), $I^2 = 0\%$. Test for overall effect: Z = 0.72 (p = 0.47)
[c] Heterogeneity: $\chi^2 = 2.32$, df = 5 (p = 0.8), $I^2 = 0\%$. Test for overall effect: Z = 1.10 (p = 0.27)
[d] Heterogeneity: $\chi^2 = 1.04$, df = 4 (p = 0.90), $I^2 = 0\%$. Test for overall effect: Z = 0.92 (p = 0.36)
[e] Heterogeneity: $\chi^2 = 4.11$, df = 3 (p = 0.25), $I^2 = 27\%$. Test for overall effect: Z = 0.53 (p = 0.6)
[f] Heterogeneity: $\chi^2 = 9.34$, df = 5 (p = 0.1), $I^2 = 46\%$. Test for overall effect: Z = 1.02 (p = 0.31)
[g] Heterogeneity: $\chi^2 = 6.57$, df = 6 (p = 0.36), $I^2 = 9\%$. Test for overall effect: Z = 0.5 (p = 0.62)
[h] Heterogeneity: $\chi^2 = 3.86$, df = 3 (p = 0.28), $I^2 = 22\%$. Test for overall effect: Z = 0.45 (p = 0.65)
CI—confidence interval; SMD—standardized mean difference

TABLE 3. Effect Size of Expressive Writing Intervention *(Continued)*

Variable	Experimental Group			Control Group			Weight (%)	SMD (95% CI)
	$\bar{X}$	SD	Total	$\bar{X}$	SD	Total		
Mood disturbance[e]								
Gellaitry et al., 2010	−6.91	32.09	38	−7.18	41.99	42	4.5	0.01 [−0.43, 0.45]
Jensen-Johansen et al., 2013	−3.8	17.22	100	−3.2	21.64	220	15.4	−0.03 [−0.27, 0.21]
Moor et al., 2002	−15.7	21.54	21	−19.8	23.83	21	2.3	0.18 [−0.43, 0.78]
Walker et al., 1999	−1.4	5.15	16	2.63	5.54	16	1.7	−0.73 [−1.45, −0.02]
Subtotal	–	–	175	–	–	299	23.8	−0.05 [−0.24, 0.14]
Health-related quality of life[f]								
Arden-Close et al., 2013	2.72	14.01	53	−0.13	11.66	49	18.6	0.22 [−0.17, 0.61]
Craft et al., 2012	−5.76	9.57	26	5.31	20.22	30	12.6	−0.67 [−1.22, −0.13]
Gellaitry et al., 2010	−3.76	18.22	38	−2.13	23.57	42	16.3	−0.08 [−0.52, 0.36]
Milbury et al., 2014	−1.72	18.96	138	−1.93	9.88	139	27.3	0.01 [−0.22, 0.25]
Park & Yi, 2012	−5.64	11.6	29	−0.31	12.28	29	13.3	−0.44 [−0.96, 0.08]
Pauley et al., 2011	−2.62	0.98	24	−2.52	1.03	24	11.9	−0.1 [−0.66, 0.47]
Subtotal	–	–	308	–	–	313	100	−0.12 [−0.36, 0.11]
Intrusive thoughts[g]								
Arden-Close et al., 2013	0.14	7.64	53	0.29	6.85	49	11.5	−0.02 [−0.41, 0.37]
Jensen-Johansen et al., 2013	−1.5	7.89	99	−2.25	8.35	223	30.9	0.09 [−0.15, 0.33]
Low et al., 2010	−1.6	7.71	31	−0.2	7.7	31	7	−0.18 [−0.68, 0.32]
Milbury et al., 2014	−5.8	14.5	138	−5.23	14.63	139	31.3	−0.04 [−0.27, 0.2]
Moor et al., 2002	−17.4	7.79	21	−14.6	8.25	21	4.7	−0.34 [−0.95, 0.27]
Walker et al., 1999	−2.83	8.19	16	3.88	8.87	16	3.3	−0.77 [−1.49, −0.04]
Zakowski et al., 2004	−0.78	7.63	62	−1.23	7	42	11.3	0.06 [−0.33, 0.45]
Subtotal	–	–	420	–	–	521	100	−0.03 [−0.17, 0.1]
Avoidance behaviors[h]								
Jensen-Johansen et al., 2013	−0.4	7.68	99	−1.05	8.73	223	61.4	0.08 [−0.16, 0.31]
Moor et al., 2002	−17.4	7.79	21	−14.6	8.25	21	9.3	−0.34 [−0.95, 0.27]
Walker et al., 1999	−1.55	8.29	16	3.2	8.9	16	6.9	−0.54 [−1.25, 0.17]
Zakowski et al., 2004	−2.53	8.95	62	−1.69	8.61	42	22.4	−0.09 [−0.49, 0.3]
Subtotal	–	–	198	–	–	302	100	−0.04 [−0.23, 0.14]

[a] Heterogeneity: $\chi^2 = 4.27$, df = 5 (p = 0.51), $I^2 = 0\%$. Test for overall effect: Z = 2.95 (p = 0.003)
[b] Heterogeneity: $\chi^2 = 0.57$, df = 2 (p = 0.75), $I^2 = 0\%$. Test for overall effect: Z = 0.72 (p = 0.47)
[c] Heterogeneity: $\chi^2 = 2.32$, df = 5 (p = 0.8), $I^2 = 0\%$. Test for overall effect: Z = 1.10 (p = 0.27)
[d] Heterogeneity: $\chi^2 = 1.04$, df = 4 (p = 0.90), $I^2 = 0\%$. Test for overall effect: Z = 0.92 (p = 0.36)
[e] Heterogeneity: $\chi^2 = 4.11$, df = 3 (p = 0.25), $I^2 = 27\%$. Test for overall effect: Z = 0.53 (p = 0.6)
[f] Heterogeneity: $\chi^2 = 9.34$, df = 5 (p = 0.1), $I^2 = 46\%$. Test for overall effect: Z = 1.02 (p = 0.31)
[g] Heterogeneity: $\chi^2 = 6.57$, df = 6 (p = 0.36), $I^2 = 9\%$. Test for overall effect: Z = 0.5 (p = 0.62)
[h] Heterogeneity: $\chi^2 = 3.86$, df = 3 (p = 0.28), $I^2 = 22\%$. Test for overall effect: Z = 0.45 (p = 0.65)
CI—confidence interval; SMD—standardized mean difference

TABLE 4. Subgroup Analysis of Expressive Writing on Quality of Life According to Control Condition

Variable	Experimental Group			Control Group			Weight (%)	SMD (95% CI)
	$\bar{X}$	SD	Total	$\bar{X}$	SD	Total		
Neutral writing[a]								
Arden-Close et al., 2013	2.72	14.01	53	−0.13	11.66	49	16.6	0.22 [−0.17. 0.61]
Milbury et al., 2014	−1.72	18.96	138	−1.93	9.88	139	24.8	0.01 [−0.22, 0.25]
Pauley et al., 2011	−2.86	1.03	24	−2.52	1.03	24	1.4	−0.32 [−0.89, 0.25]
Pauley et al., 2011	−2.38	0.93	24	−2.52	1.03	24	10.5	0.14 [−0.43, 0.71]
Subtotal	–	–	239	–	–	236	62.4	0.04 [−0.14, 0.22]
Usual care (No writing)[b]								
Park & Yi, 2012	−5.64	11.6	29	−0.31	12.28	29	11.8	−0.44 [−0.96, 0.08]
Gellaitry et al., 2010	−3.76	18.22	38	−2.13	23.57	42	14.6	−0.08 [−0.52, 0.36]
Craft et al., 2013	−5.76	9.57	26	5.31	20.22	30	11.2	−0.67 [−1.22, −0.13]
Subtotal	–	–	93	–	–	101	100	−0.37 [−0.72, −0.02]

[a] Heterogeneity: $\chi^2 = 2.55$, df = 3 (p = 0.47), $I^2 = 0\%$. Test for overall effect: Z = 0.4 (p = 0.69)
[b] Heterogeneity: $\chi^2 = 2.99$, df = 2 (p = 0.22), $I^2 = 33\%$. Test for overall effect: Z = 2.05 (p = 0.004)
CI—confidence interval; SMD—standardized mean difference

be different for patients with advanced cancer. In addition, international grey literature was not included because of technical limitations in retrieval.

Implications for Nursing

Oncology nurses play a key role in the psychosocial care of patients with cancer. EW is a promising psychosocial intervention because it can be easily administered and is cost effective (Frattaroli, 2006). However, EW may have a less obvious effect on psychological and cognitive outcomes for patients with cancer. In addition, EW intervention is not feasible for patients with advanced cancer (Bruera et al., 2008) and it may not be effective in those with a recurrence of their cancer (Arden-Close et al., 2013). Some patients may be reluctant or uncomfortable with writing (Milbury et al., 2014). Therefore, oncology nurses should consider individual characteristics of the participants, such as educational level, disease stage, and treatment trajectory, when they administer EW interventions to patients with cancer. If the participant has a low level of education, the nurse should give more detailed guidance; they should inform the patient of the importance for them to express their thoughts and emotions, not express their knowledge. If participants have a recurrence or are at an advanced stage, combined EW and psychological intervention (e.g., group therapy, individual counseling) may be needed. Cancer survivors who have completed their primary cancer therapy may particularly benefit from an EW intervention because they have relatively less symptom distress and, therefore, may be more comfortable writing. The authors recommend cancer survivors post-treatment as a target population for an EW intervention in an oncology setting.

Conclusion

The findings showed that an EW intervention had significant small effects only on cancer symptoms. Limited by the evidence on psychological and cognitive outcomes, no obvious conclusion can be drawn about the effect of EW intervention in the oncology setting. Therefore, the traditional EW intervention protocol may need to be modified to confirm its effect in patients with cancer.

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