

Randomized Controlled Trial of Expressive Writing for Patients With Renal Cell Carcinoma

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Published online ahead of print at www.jco.org on January 27, 2014.

Supported in part by National Cancer Institute Grant No. R01CA090966 (L.C.).

Presented in part at the 48th Annual Meeting of the American Society of Clinical Oncology, June 1-5, 2012, Chicago, IL; and the 9th International Conference of the Society for Integrative Oncology, October 8-10, 2012, Albuquerque, NM.

Authors' disclosures of potential conflicts of interest and author contributions are found at the end of this article.

Clinical trial information: NCT00505310.

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0732-183X/14/3207w-663w/\$20.00

DOI: 10.1200/JCO.2013.50.3532

ABSTRACT

Purpose

This randomized controlled trial examined the quality-of-life benefits of an expressive writing (EW) intervention for patients with renal cell carcinoma (RCC) and identified a potential underlying mechanism of intervention efficacy.

Patients and Methods

Patients (N = 277) with stage I to IV RCC were randomly assigned to write about their deepest thoughts and feelings regarding their cancer (EW) or about neutral topics (neutral writing [NW]) on four separate occasions. Patients completed the Center for Epidemiologic Studies Depression Scale (CES-D), MD Anderson Symptom Inventory (MDASI), Brief Fatigue Inventory (BFI), Pittsburgh Sleep Quality Index (PSQI), Medical Outcomes Study Short Form-36 (SF-36), and Impact of Event Scale (IES) at baseline and 1, 4, and 10 months after the intervention.

Results

The mean age of participants (28% stage IV; 41% female) was 58 years. Multilevel modeling analyses, using a Bonferroni-corrected $\alpha = .021$ for six outcomes adjusted for the correlation among outcomes, revealed that, relative to the NW group, patients in the EW group reported significantly lower MDASI scores ($P = .003$) and higher physical component summary scores on the SF-36 ($P = .019$) at 10 months after the intervention. Mediation analyses revealed that significant group differences for MDASI scores at 10 months were mediated by lower IES scores at 1 month after the intervention in the EW group ($P = .042$). No significant group differences were observed in the BFI, CES-D, PSQI, and mental component summary of the SF-36.

Conclusion

EW may reduce cancer-related symptoms and improve physical functioning in patients with RCC. Evidence suggests that this effect may occur through short-term improvements in cognitive processing.

J Clin Oncol 32:663-670. © 2014 by American Society of Clinical Oncology

INTRODUCTION

A cancer diagnosis may be experienced as a traumatic event, eliciting trauma symptoms such as intrusive thoughts (unbidden, distressing thoughts and images) and avoidance behaviors (consciously recognized avoidance of certain thoughts and feelings).¹⁻³ Some intrusive thoughts are an adaptive part of processing and integrating traumas⁴; however, they often elicit negative affect (eg, depression)^{1,2,5-8} and somatic symptoms (eg, fatigue, sleep disturbances).⁸⁻¹¹ Managing patients' psychological responses to their cancer experience may be an important aspect of effective patient care considering that depression has been related to tumor progression and decreased survival.¹²⁻¹⁸

Expressive writing (EW) is a brief and simple intervention that may help patients cognitively and emotionally process the cancer experience. The EW paradigm is designed to induce processing of a traumatic event by prompting participants on several occasions to briefly write about their deepest thoughts and feelings regarding the experience; this processing may help convert disorganized emotions into organized thoughts.¹⁹ Through this integration of thoughts and feelings, patients may develop a coherent narrative of the experience, create meaning, and eventually derive benefit from the experience.²⁰⁻²²

Most studies examining the effectiveness of EW interventions have been conducted in healthy populations, but some equivocal evidence of benefit can also be seen in patients with cancer. Stanton et al²³

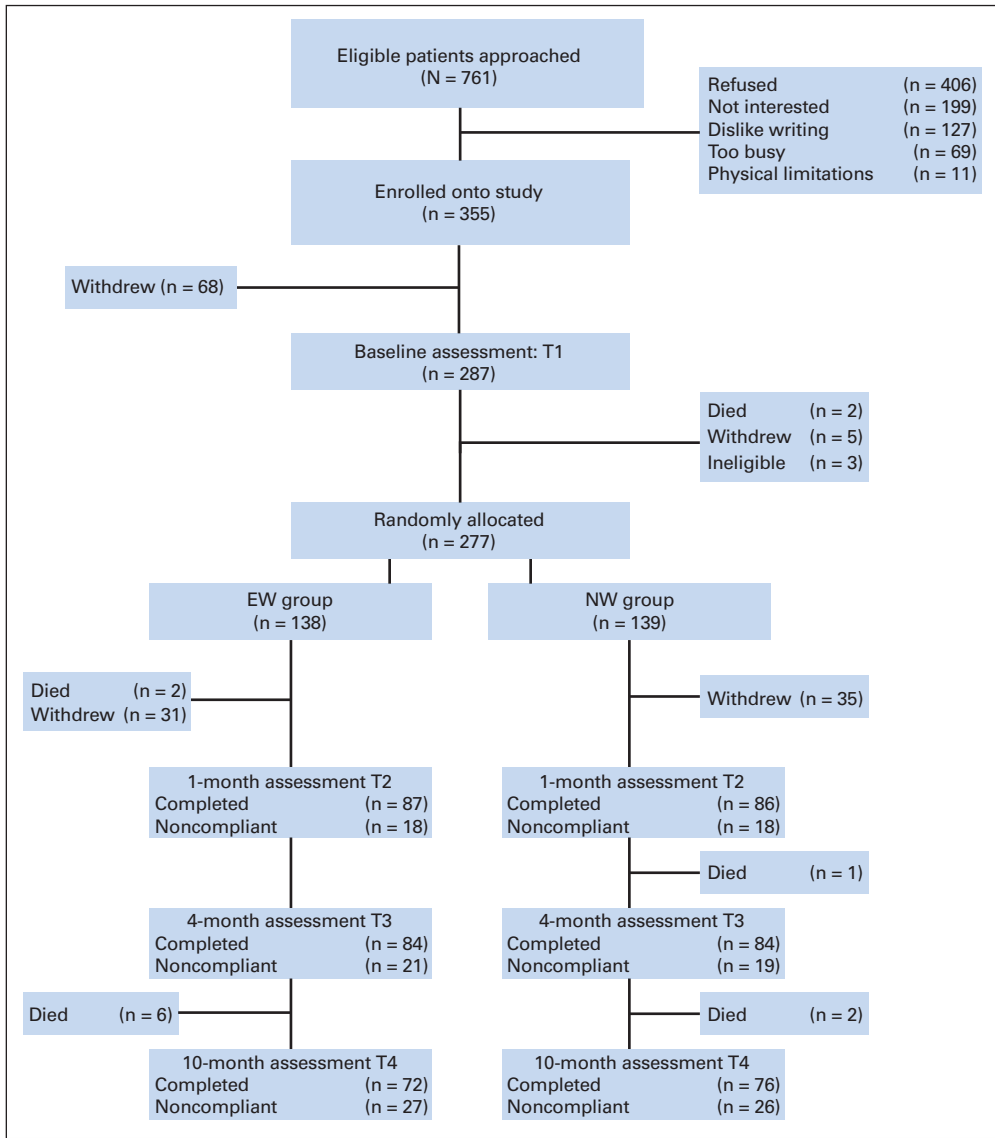


Fig 1. CONSORT flow diagram. EW, expressive writing; NW, neutral writing.

demonstrated that written emotional disclosure for patients with early-stage breast cancer with a low-avoidance coping style significantly reduced distress, physical symptoms, and number of medical appointments for cancer-related morbidities at 3 months after the intervention. Others have found beneficial effects in terms of fewer sleep disturbances²⁴ and somatic symptoms²⁵ in patients with metastatic disease. Yet some trials have failed to demonstrate significant findings regarding improved quality-of-life (QOL) outcomes.²⁶⁻²⁸

Investigations involving nononcologic populations have focused primarily on cognitive/linguistic models as mechanisms of EW.^{22,29-32} The underlying mechanisms in cancer are relatively unexplored, although Low et al³³ revealed that within writing sessions, heart rate habituations and greater use of negative emotion words mediated the effects of EW on the physical symptom decline of patients with breast cancer. Because cognitive processes such as intrusive thoughts and avoidance have been associated with increased psychological and physical symptoms in various cancer populations,⁸⁻¹¹ we examined a cognitive-processing mediation model.

To address the limitations of previous investigations (ie, small sample sizes, short follow-up periods, and lack of mechanistic models), we conducted a large, randomized controlled trial (RCT) with a longer follow-up period and an a priori hypothesized intervention mechanism. Because previous work primarily focused on women with breast cancer,^{23,25,26,28,33} we evaluated the benefits of EW in a non-sex-specific cancer, renal cell carcinoma (RCC). Furthermore, RCC is an immunogenic cancer,³⁴ and previous research found that EW modulates the immune system.³⁵⁻³⁷ We hypothesized that over a 10-month period, patients assigned to the EW group would report better QOL (ie, fewer cancer-related and depressive symptoms, less fatigue, fewer sleep disturbances, and better overall QOL, both physical functioning and mental health) compared with patients in a neutral writing (NW) group (CONSORT diagram, Fig 1). We also hypothesized that long-term effects on QOL would be mediated by early intervention effects (ie, 1 month) on reducing intrusive thoughts and avoidance behaviors (hypothesized intervention mediation model, Fig 2).

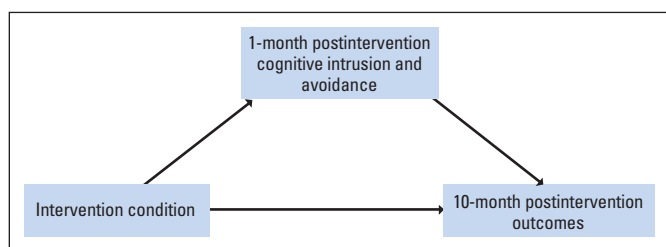


Fig 2. Hypothesized intervention mediation model.

PATIENTS AND METHODS

Study Population

Newly diagnosed patients with stage I to IV RCC, a Zubrod performance status of ≤ 2 , and no serious intercurrent medical illness requiring hospitalization and who were at least 18 years old and able to read, write, and speak English were eligible to participate in the study. Patients who were unable to provide consent, on immunosuppressive drugs, currently receiving psychological (ie, nonpharmacologic) interventions, and/or had a history of primary or secondary immunodeficiency were excluded from the study. The trial was conducted at MD Anderson Cancer Center (MDACC) between 2006 and 2009.

Procedures

After providing written informed consent, participants completed baseline (T1) questionnaires approximately 6 months after their surgical procedure or at the time of their initial consult before receiving systemic treatment. Participants were then randomly assigned to either the EW or NW group through a form of adaptive random assignment called minimization,³⁸ ensuring that the groups were balanced on stage, sex, age, systemic treatment (yes *v* no), and surgery (yes *v* no). Participants in both groups completed three additional assessments at 1 (T2), 4 (T3), and 10 months (T4) later. Questionnaires were returned via mail. Participants also provided blood and saliva samples (biologic data and other self-reported secondary outcomes will be discussed in later reports). Participants received a \$20 gift card for completing each assessment. MDACC's Institutional Review Board approved the protocol.

Description of Intervention

We followed the general writing procedures as outlined by Pennebaker and Beall¹⁹ with modifications based on our pilot work.^{24,27} Participants in the EW group were asked to write about their deepest emotions and thoughts regarding their cancer experience with slightly different probes at each session (eg, how the diagnosis and treatment interfere with their lives; treatment-related decision making; and fears about the future). Participants in the NW group were prompted to write about the following four neutral topics: dietary behaviors, physical activity and exercise behaviors, attitudes toward smoking and other substance use, and sleep habits. Participants in both groups were asked to complete four 20-minute writing assignments in their home over a 10-day period, with at least 1 day and no more than 3 days between sessions. A research assistant prompted participants with a phone call to begin and stop writing. Participants were provided with envelopes for mailing each writing sample as soon as it was completed.

Measures

Demographic and medical data were collected and extracted from medical records.

Intervention outcomes. Cancer-related symptoms were assessed with the MD Anderson Symptom Inventory (MDASI),³⁹ which asks patients to rate the severity of 13 core symptoms common across all cancer diagnoses and treatments and the extent to which these symptoms interfere with daily activities. Higher scores denote greater severity and interference. We report on the combined scales.

Fatigue was measured with the Brief Fatigue Inventory (BFI),⁴⁰ a nine-item questionnaire asking participants to rate the severity of their fatigue and the degree to which it interferes with their lives. Higher scores represent worse fatigue, and a score of greater than 3 indicates clinically significant fatigue.

Depressive symptoms were assessed with the Center for Epidemiologic Studies Depression Scale (CES-D),⁴¹ a 20-item self-report measure focusing on the affective component of depression. A score of ≥ 16 indicates the need to screen for a depressive disorder.

Sleep disturbances were measured with the Pittsburgh Sleep Quality Index, an 18-item questionnaire that includes seven subscales and a total score assessing sleeping problems over the past month.⁴² Higher scores represent greater problems with sleep, and the total score is presented, with a score of ≥ 5 associated with clinically significant sleep disturbances.

Overall QOL was assessed with the Medical Outcomes Study Short Form-36 (SF-36),⁴³ a generic QOL instrument assessing several distinct domains. The standardized mental component summary (MCS) and physical component summary (PCS) scores are presented, with higher scores denoting better QOL.

Hypothesized intervention mediator. Intrusive thoughts and avoidance behaviors were measured with the Impact of Events Scale (IES), a 15-item scale assessing thought intrusion and avoidance during the past week.⁴⁴ Higher scores represent greater intrusive thoughts and avoidance behaviors, and the total score is reported.

Data Analyses

The primary outcomes were the 10-month QOL indices (ie, cancer-related and depressive symptoms, fatigue, sleep disturbances, and overall QOL). A sample size of approximately 140 patients per group provided 80% power (two-sided α ; $P = .05$) to detect an effect of 0.39 standard deviation (SD) units²⁴ assuming 20% attrition. Main analyses were performed with multilevel modeling using PROC MIXED (SAS, 9.2.2 version; SAS Institute, Cary, NC). We specified an unstructured covariance matrix and a random intercept. Because age, sex, and stage at diagnosis have been associated with QOL outcomes in RCC,^{9,45-47} these factors were included as a priori covariates in all main analyses. In case some participants withdrew consent, we tested for systematic differences between completers and noncompleters and controlled for these characteristics in the main analyses. To evaluate the effectiveness of the EW intervention, we used an intent-to-treat approach and examined the group-time interaction effect while controlling for main effects and baseline scores of the outcome. A Bonferroni correction for six outcomes adjusted for a correlation among outcomes of $r = 0.52$ yields an $\alpha = .021$.^{48,49} We used CONTRAST statements within the mixed procedure to test for group differences at each time point. PROC MIXED uses a likelihood-based estimation method for missing data so that attrition is less of a concern⁵⁰; however, we also examined whether our findings would replicate using a multiple imputation strategy in SAS (PROC MI and PROC MIANALYZE)⁵¹ in case of missing data.

To test for mediation, we examined IES group differences at T2 using the general linear model controlling for IES baseline scores and aforementioned covariates. If a group difference at $P \leq .05$ was found, we proceeded to examine indirect effects for significant T4 intervention outcomes. Because of recent criticism of classical mediation,⁵²⁻⁵⁴ we calculated indirect effects using the bias-corrected bootstrap procedure of Preacher and Hayes⁵⁵ with the PROCESS macro of Hayes⁵⁶ to test whether long-term (ie, 10-month; T4) benefits were mediated by earlier (ie, 1-month; T2) intervention effects on cognitive processing (IES scores). We then followed up with the Sobel test⁵⁷ to provide a significance test of the indirect effect. Lastly, we examined whether intervention efficacy was moderated by dose or sex.

RESULTS

Baseline Characteristics of Sample

We approached 761 eligible patients; 355 patients consented to participate, and 287 completed baseline measures (Fig 1). Three patients became ineligible (misdiagnosis of RCC), resulting in a sample of 284 participants. Five patients withdrew before random assignment

(death in family, $n = 2$; too busy, $n = 3$), 58 passively withdrew before initiation of the intervention, 18 passively withdrew after the intervention (unable to reach participant after repeated attempts), and 14 died over the course of the study; the dropout rate was similar in each group. χ^2 tests and t tests comparing baseline demographic and medical characteristics and outcome measures of study completers versus noncompleters revealed no significant differences except for education ($\chi^2 = 14.63$, $P = .005$) and IES scores ($t = 2.14$, $P = .023$); completers were more likely to have had higher education and lower IES scores at baseline compared with noncompleters. No significant group differences were found in regard to demographic and medical factors (Table 1) or any of the baseline study variables. Regarding clinical cutoff scores, 20.5% of the sample met the CES-D criterion for caseness (mean score, 10.7; SD, 9.3), 36.1% experienced clinical levels

of fatigue (mean score, 2.61; SD, 2.2), and 57% reported sleep disturbances (mean score, 6.89; SD, 4.2).

Completion of Intervention

Two hundred five participants (72% of baseline sample) completed all four writing sessions, nine participants completed three sessions, seven completed two sessions, and seven completed only one session. The completion of writing sessions did not differ based on group assignment ($\chi^2 = 3.74$, $P = .48$), but it did differ by sex ($\chi^2 = 10.97$, $P = .03$), with women showing greater compliance than men.

Manipulation Check

On the basis of linguistic word count analyses using the Linguistic Inquiry and Word Count⁵⁹ software, the writing samples of participants in the EW group revealed significantly more emotional content than did those in the NW group ($F = 93.17$, $P < .001$).

Intervention Efficacy

Table 2 lists the raw group means and SDs for outcomes at each assessment point. Figure 3 portrays the least square means at each assessment adjusted for baseline levels of the outcome and covariates (sex, age, stage, education, and baseline levels of the IES).

Cancer-related symptoms. The group main effect was not significant after correcting for multiple comparisons ($F = 4.31$, $P = .039$). A significant group-time interaction effect ($F = 5.16$, $P = .006$) was found, and contrast comparisons revealed a significant group difference at T4 ($F = 9.14$, $P = .003$), indicating that participants in the EW group reported lower MDASI total scores compared with those in the NW group (Fig 3A). The group difference at T2 ($F = 4.49$, $P = .035$) was not significant after correcting for multiple comparisons.

Fatigue. The group main effect ($F = 1.03$, $P = .31$) and the group-time interaction ($F = 3.69$, $P = .027$; contrast comparisons at T4: $F = 4.49$, $P = .035$) were not significant at the Bonferroni-corrected α level (Fig 3B).

Depressive symptoms and sleep disturbances. The main effects, the group-time interaction, and the contrast comparisons for time were not significant for the CES-D and Pittsburgh Sleep Quality Index scores.

Overall QOL. Neither the main effects nor the group-time interaction were significant for the MCS and PCS of the SF-36. Although none of the contrast comparisons for time were significant for the MCS of the SF-36, a significant group difference was seen at T4 for the PCS ($F = 5.55$, $P = .019$), with participants in the EW group reporting higher scores relative to the NW group (Fig 3C). For patients in the EW group, improvements from baseline to T4 were greater than half an SD, indicating clinically significant improvements not seen in the NW group.⁶¹ All findings were replicated (with some larger effects) when the imputed data were analyzed.

Dose response and sex differences. Neither number of sessions completed (dose) nor sex moderated intervention efficacy for any of the outcomes.

Intrusive Thoughts and Avoidance Behaviors As Intervention Mediator

Marginally significant group differences were found in IES scores at T2 ($F = 3.77$, $P = .053$), with participants in the EW group reporting lower scores than those in the NW group (Fig 4). Because of the a priori, theory-driven mediation hypothesis, we proceeded to examine

Table 1. Participant Demographics and Clinical Characteristics by Group

Demographic or Clinical Characteristic	EW (n = 138)		NW (n = 139)		P
	No. of Patients	%	No. of Patients	%	
Age, years					.69
Mean	58.1		57.6		
SD	9.8		9.9		
Range	31-81		34-82		
Male	83	60.1	86	61.9	.81
Race/ethnicity					.41
White	105	76.1	113	81.3	
Hispanic/Latino	19	13.8	11	7.9	
African American/Black	4	2.9	5	3.6	
Asian/Pacific Islander	1	0.7	—	—	
Native American	—	—	5	3.6	
Other	7	5.1	1	0.7	
Missing	2	1.4	4	2.9	
Marital status: married	98	71.0	99	71.2	.88
Highest level of education: some college or higher	99	72.7	109	79.0	.26
Income					.36
< \$50,000	45	32.6	40	28.8	
≥ \$50,000	85	61.6	89	64.0	
Missing	8	5.8	10	7.2	
Employment status					.18
Full-time	82	59.4	69	49.6	
Part-time	13	9.4	8	5.8	
Unemployed	2	1.4	6	4.3	
Retired	39	28.3	50	36.0	
Missing	2	1.4	6	4.3	
Stage*					.99
I	50	36.2	49	35.3	
II	18	13.0	18	12.9	
III	26	18.8	25	18.0	
IV	40	29.0	42	30.2	
Missing	4	2.9	5	3.6	
Treatment					
Surgery	98	71.0	97	69.8	.60
Systemic treatment	52	37.7	51	36.7	.87
Cell type: clear cell	107	79.9	108	80.6	.89

Abbreviations: EW, emotional writing; NW, neutral writing; SD, standard deviation.
*Group stage is based on the 2002 TNM staging of the American Joint Committee on Cancer and the International Union Against Cancer as suggested by Ng et al.⁵⁸

Table 2. Outcome Measures by Group at Each Assessment Point

Measure	Baseline (T1)		1 Month (T2)		4 Months (T3)		10 Months (T4)		Effect Size (<i>d</i>)*								
	EW		NW		EW		NW										
	Mean	SD	Mean	SD	Mean	SD	Mean	SD									
MDASI	1.52	1.53	1.48	1.59	1.22	1.51	1.62	1.52	1.31	1.48	1.40	1.44	1.09	1.42	1.64	1.64†	0.40
BFI	2.7	2.3	2.6	2.0	2.6	2.3	3.0	2.3	2.7	2.2	2.9	2.2	2.5	2.2	3.2	2.3‡	0.32
CES-D	10.3	9.7	11.3	8.9	8.8	8.6	10.2	6.7	9.9	10.1	9.5	7.1	9.5	9.6	10.5	7.4	0.10
PSQI	7.0	4.3	6.9	4.1	6.4	3.9	6.0	3.3	6.4	4.0	6.4	3.6	6.3	4.4	6.4	3.5	0.04
SF-36 MCS	49.6	8.7	47.8	9.1	44.8	47.7	48.7	8.2	48.9	9.3	48.4	7.3	48.2	8.7	48.8	7.0	0.10
SF-36 PCS	39.5	11.6	39.4	10.6	43.2	12.04	42.2	11.4	46.3	11.1	42.8	11.8	46.2	11.1	42.3	12.6‡§	0.44
IES	17.8	15.1	19.6	15.0	11.3	13.7	15.9	14.0	12.0	12.9	13.4	14.4	12.7	14.7	13.8	14.3	0.03

Abbreviations: BFI, Brief Fatigue Inventory; CES-D, Center for Epidemiologic Studies Depression Scale; EW, emotional writing; IES, Impact of Events Scale; MCS, Mental Component Summary; MDASI, MD Anderson Symptom Inventory; NW, neutral writing; PCS, Physical Component Summary; PSQI, Pittsburgh Sleep Quality Index; SD, standard deviation; SF-36 Medical Outcomes Study Short Form-36.

*Effect size, Cohen's *d*,⁶⁰ for group differences at 10 months after the intervention (T4) using least square means adjusted for baseline levels, stage, age, sex, and education and baseline levels of IES and pooled SDs. Small effect, *d* = 0.2; medium effect, *d* = 0.5; and large effect, *d* = 0.8. Significant group differences for EW v NW are noted.

†*P* < .01 from multilevel modeling analyses.

‡*P* < .05 from multilevel modeling analyses.

§Clinically significant improvement from baseline.

||*P* = .05 from multilevel modeling analyses.

IES at T2 as a mediator of significant between-group differences for intervention outcomes at T4 at $P \leq .05$ (MDASI, BFI, and PCS). For MDASI scores, bootstrapping of 5,000 random sample simulations generated a bootstrap estimate of 1.92 (SE, 1.30) with a 95% bias-corrected and accelerated CIs (BCa) of 0.03 and 5.25. Because the BCa did not cross zero and the Sobel test was significant ($z = 2.07$, $P = .042$), mediation was established. Similarly, for BFI scores, bootstrapping resulted in an estimate of 0.17 (SE, 0.12) with 95% BCa of 0.003 and 0.48 and a significant Sobel test ($z = 1.93$, $P = .050$) establishing evidence for mediation. There was no evidence that IES mediated the intervention effect for PCS scores.

DISCUSSION

The current EW trial, to our knowledge the largest conducted to date in an oncology population, found that EW reduced cancer-related symptoms and improved physical functioning and possibly fatigue in patients receiving treatment for RCC. The most pronounced group differences emerged 10 months after the intervention. This may be explained by our hypothesized mediation model, which suggested that later outcomes are mediated by the early intervention effects on intrusive thoughts and avoidance behaviors. More specifically, the current data revealed that patients who wrote about their deepest concerns related to the cancer experience reported fewer intrusive thoughts and avoidance 1 month after completing the writing sessions compared with those in the NW group, which was, in turn, related to fewer long-term cancer-related symptoms and possibly less fatigue.

Although previous research on this subject focused primarily on women with breast cancer, we demonstrated that EW seems to be equally beneficial for men and women with RCC. Similar to previous findings, this research is consistent with EW trials that have reported somatic symptom relief and fewer cancer-related physician visits.^{23,25,62} Unlike other work, this investigation revealed overall group differences in cancer-related symptoms as opposed to differences in only a subset of the participants (eg, low

avoidance coping,²³ recently diagnosed, lacking social support²⁵). Nevertheless, in future secondary analyses, we will explore whether subsets of patients (eg, those lacking social support or low in avoidance coping or high in distress) might benefit more from EW than others. Such moderation analyses may explain our null findings regarding depression and sleep, which are consistent with the null findings of previous trials.²⁶⁻²⁸

Additionally, future research is needed to examine the mediating role of intrusive thoughts and avoidance behaviors on EW's effects on cancer symptoms and fatigue. Intrusive thoughts may cause hypervigilance/hyperarousal, which diminishes mental energy and increases catastrophizing and leads to cancer-related symptoms.^{8,63} Evidence also suggests that post-traumatic stress symptoms, such as intrusive thoughts, lead to increased activity in endocrine and inflammatory pathways,⁶⁴⁻⁶⁸ which play a role in cancer-related symptoms⁶⁹⁻⁷¹ and fatigue.^{17,72,73} Our next step is to examine the biologic outcomes from blood (eg, immune function) and saliva samples (eg, cortisol) to potentially uncover shared biologic pathways establishing a biobehavioral process as explanatory mechanisms.

Although treatment effects were generally moderate, clinically significant improvements in PCS scores were associated with EW. Considering the findings in light of an entirely self-administered, brief, safe, and virtually no-cost intervention, EW seems to be a promising supportive care approach. However, further research that uses a distress eligibility criterion is needed that will allow researchers to rigorously examine the impact of EW on distress and compare EW with other behavioral/psychosocial programs such as cognitive behavioral therapy or expressive-disclosure groups.⁷⁴ Additionally, future research is needed to explain why EW may improve some measures of mental health (eg, IES) but not others (eg, CES-D).

Our study had some limitations. Only 47% of approached patients consented to participate. Of these, 19% withdrew before baseline assessment, and 73% completed the 10-month assessment. This completion rate is somewhat lower than a previous large RCT of EW in cancer,²³ and attrition is a limitation; however, our trial included a

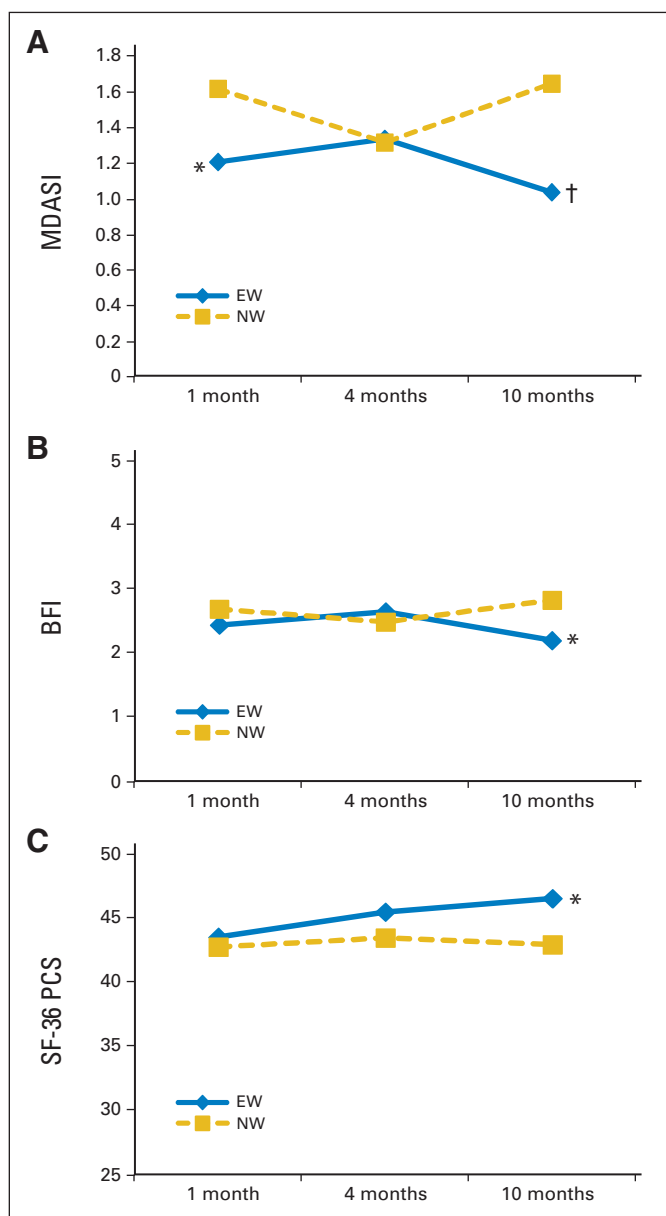


Fig 3. Least square means for (A) cancer-related symptoms (MD Anderson Symptom Inventory [MDASI]); (B) fatigue (Brief Fatigue Inventory [BFI]); and (C) physical function aspects of quality of life (Medical Outcomes Study Short Form-36, Physical Component Summary [SF-36 PCS]). Higher scores represent greater symptoms (MDASI and BFI) or better quality of life (SF-36 PCS). Group mean difference: (*) $P < .05$; (†) $P < .01$. EW, expressive writing; NW, neutral writing.

longer follow-up period than previous studies. Additionally, we performed multiple imputation analyses for the missing data, which replicated findings involving observed data, so that a bias introduced by attrition is less of a concern. Although most participants completed all four writing sessions, EW may not be an acceptable program for all patients. In fact, a dislike for writing was the main reason for study refusal. Additionally, patients with lower education and higher IES scores were more likely to withdraw from the study. This may mean that educated people and people who are less distressed are more comfortable with writing. Results regarding fatigue need to be interpreted with caution because group differences reached the

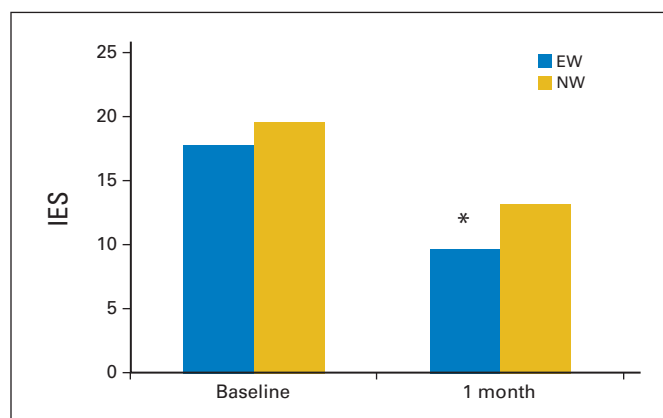


Fig 4. Baseline and 1-month (T2) postintervention group differences for intrusive thoughts and avoidance behaviors (Impact of Events Scale [IES]). At baseline, raw means are depicted. At T2, least square means controlling for baseline levels, stage, age, sex, and education are depicted. Group mean difference: (*) $P = .53$. EW, expressive writing; NW, neutral writing.

conventional but not the Bonferroni-corrected significance level; nevertheless, a medium-size treatment effect was found. Finally, although representative of the patient population at MDACC, our sample's ethnic diversity was restricted.

In conclusion, this RCT found that EW is a safe, brief, and cost-effective therapeutic approach that may improve cancer-related symptoms and physical functioning, with benefits emerging 10 months after EW. This finding may be possibly explained via early improvement in cognitive processing, which in turn are associated with long-term improvements in cancer-related symptoms.

AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

Although all authors completed the disclosure declaration, the following author(s) and/or an author's immediate family member(s) indicated a financial or other interest that is relevant to the subject matter under consideration in this article. Certain relationships marked with a "U" are those for which no compensation was received; those relationships marked with a "C" were compensated. For a detailed description of the disclosure categories, or for more information about ASCO's conflict of interest policy, please refer to the Author Disclosure Declaration and the Disclosures of Potential Conflicts of Interest section in Information for Contributors.

Employment or Leadership Position: None **Consultant or Advisory Role:** Nizar Tannir, Novartis (C), Pfizer (C), AVEO Pharmaceuticals (C), GlaxoSmithKline (C) **Stock Ownership:** None **Honoraria:** Nizar Tannir, Pfizer, GlaxoSmithKline **Research Funding:** Nizar Tannir, Pfizer, GlaxoSmithKline **Expert Testimony:** None **Patents, Royalties, and Licenses:** None **Other Remuneration:** None

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Manuscript writing: All authors

Final approval of manuscript: All authors

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