Published in final edited form as:

Psychol Health. 2015 March ; 30(3): 284–300. doi:10.1080/08870446.2014.971798.

Randomized Controlled Trial of Expressive Writing and Quality of Life in Men and Women Treated for Colorectal Cancer

Stephen J. Lepore,

Temple University, Department of Public Health 1301 Cecil B. Moore St 957 Ritter Annex
Philadelphia, PA 19122

Tracey A. Revenson,

Hunter College and The Graduate Center, City University of New York Department of Psychology
695 Park Avenue New York, NY 10065 tarevenson@gc.cuny.edu, (212) 396-6769

Katherine J. Roberts,

Columbia University, Department of Health & Behavior Studies 525 W 120th St, New York, NY
10027 kjr20@columbia.edu, (917) 817-0785

Julie R. Pranikoff, and

The Graduate Center, City University of New York, Department of Psychology 695 Park Avenue
New York, NY 10065 tarevenson@gc.cuny.edu, (212) 396-6769

Adam Davey

Temple University, Department of Public Health 1301 Cecil B. Moore St 9th floor Ritter Annex
Philadelphia, PA 19122 adavey@temple.edu, (610) 905-4877

Abstract

Objective—This randomized trial tested (1) whether a home-based expressive writing (EW) intervention improves quality of life in patients with colorectal cancer and (2) whether the intervention is more beneficial for men or for people who feel constrained in disclosing cancer-related concerns and feelings.

Design—Patients treated for colorectal cancer were randomized to an EW ($n = 101$) or control writing (CW; $n = 92$) group. Assessments were completed at 1 month pre- and post-intervention. Sex and perceived social constraints on disclosure were evaluated as moderators.

Main Outcome Measures—Primary outcomes were depressive symptoms, sleep problems and quality of life indicators.

Results—81% of participants completed all writing assignments. Consistent with hypotheses, relative to the CW group, participants in the EW group expressed more emotion in writing and rated their writings as more meaningful, personal, and emotionally revealing. There were no significant main effects of EW or moderating effects of sex or social constraints on outcomes.

(corresponding author) slepore@temple.edu, 908-370-2084.

Disclosure statement: The authors have no personal or institutional conflicts of interest to disclose.

Conclusions—Although EW is feasible to use with persons who have colorectal cancer, it was not effective as a stand-alone psychotherapeutic intervention. Nor was it more effective for men or for people who felt they could not freely disclose cancer-related concerns and feelings.

Keywords

cancer; colorectal; quality of life; psychological distress; expressive writing; social constraints

Despite the fact that colorectal cancer (CRC) is the third most commonly diagnosed cancer and the third leading cause of death among men and women (ACS, 2014), there has been scant behavioral research on quality of life outcomes or interventions to improve outcomes in this population (Chambers et al., 2012; Dunn et al., 2003, 2013, Faller et al. 2013). Because of its prevalence and adverse effects on patients' quality of life there is a need to find acceptable economical behavioral interventions that can address those widespread adverse outcomes of this disease in the population. The present study examined the feasibility and efficacy of applying expressive writing (EW) (Lepore & Smyth, 2002a; Pennebaker, 1997), a brief and inexpensive behavioral intervention, to improve the mental health and quality of life of men and women treated for CRC.

Although the EW intervention has been used with various cancer populations and with varying degrees of success (Merz, Sobel, & Malcarne, 2014), to our knowledge it has never been evaluated with CRC patients exclusively. An EW intervention might be beneficial in this population because treatments for CRC can have unpleasant effects on the bowels and bowel habits, as well as on body image and sexual functioning, which can be embarrassing to discuss and increase social withdrawal and feelings of isolation (Rozmovits & Ziebland, 2004; Wilson, Birks, & Alexander, 2010). Holding back disclosure about cancer-related concerns has been linked to poorer functioning in marital relationships and increased psychological distress among patients with gastrointestinal cancers, including CRC (Porter, Keefe, Hurwitz, & Faber, 2005).

In meta-analyses of EW interventions, average effect sizes have been modest ($r = .23$; $d = .47$) in non-clinical populations (Smyth, 1998) and small ($r = .10$; $d = .19$) in clinical populations (Frisina, Borod, & Lepore, 2004). In a recent narrative review of 13 EW studies conducted with cancer survivors, the majority of studies failed to show significant intervention effects on either mental health or quality of life (Merz et al., 2014). Therefore, EW may not yield much benefit for medical populations such as cancer patients. However, given that positive effects of EW have been found in a few studies of cancer survivors (C. de Moor et al., 2002; Henry, Schlegel, Talley, Molix, & Bettencourt, 2010; Stanton et al., 2002), coupled with the low cost, low harm, and ease of using this intervention, it warrants further evaluation.

The small to modest effect sizes found with EW interventions may signal that subgroups of cancer patients might benefit from the intervention (Merz et al., 2014). Because EW provides an opportunity for individuals to safely express and process cancer-related thoughts and feelings in a non-social context without the possibility of receiving unhelpful, unsupportive or critical feedback, individuals who feel constrained in expressing cancer-related thoughts and feelings to friends and family and, as a result, attempt to inhibit their

thoughts and feelings, should benefit more from EW interventions. A high level of social constraints on disclosure has been associated with avoidance in thinking about cancer, which appears to impede psychological adjustment (Lepore & Helgeson, 1998; Mosher et al., 2012). An EW intervention helps to counteract avoidance tendencies by directing attention to cancer-related thoughts and feelings and promoting open emotional expression (Lepore, Greenberg, Bruno, & Smyth, 2002; Lepore & Greenberg, 2002), which has been associated with enhanced physical and mental health outcomes among cancer patients (Stanton & Danoff-Burg, 2000, 2002).

Three studies provide preliminary tests of the hypothesis that EW will be most beneficial to individuals with high social constraints, with mixed effects. In a sample of mixed-diagnosis cancer patients (gynecological and prostate cancer), there was an interactive effect of EW and social constraints: level of social constraints was positively associated with global distress among patients writing in a factual (control) condition, but was unrelated to distress among patients writing expressively about their cancer (Zakowski, Ramati, Morton, Johnson, & Flanigan, 2004). The authors' interpretation was that EW buffered the negative effects of social constraints on distress. In a sample of women receiving an EW intervention prior to surgery for breast cancer, social constraints moderated the effects of intervention on self-reported pain (J. S. de Moor et al., 2008): Specifically, among women with high social constraints, those in the EW group reported lower pain than those in the control writing group. In contrast, among women with low social constraints, those in the EW group reported greater pain than those in the control writing group. However, this study failed to find an interactive effect of EW and social constraints on a measure of global distress. In both studies, there were no main effects of EW on outcomes. A third study found no main effects of EW or an interaction between EW and social constraints on psychological distress symptoms in a sample of women who recently completed treatment for breast cancer (Jensen-Johansen et al., 2013). Thus, the question of whether EW is especially effective for those with high social constraints remains unanswered.

Gender is another social moderator of interest. To our knowledge, gender-related variables, including biological sex of participants, have not been studied as potential moderators of EW effects with cancer patients. In a recent systematic review of 13 EW trials with cancer patients, 9 trials had all female patients, 1 had all male patients, and 3 had both males and females but did not examine gender differences in response to EW (Merz et al., 2014). Because behavioral interventions often focus on women with cancer (Faller et al., 2013), it is important to examine whether behavioral interventions benefit both men and women.

Outside the context of cancer, investigators have considered whether men and women benefit equally from EW interventions. One meta-analytic study identified four trials that examined whether participants' sex influenced the effects of EW on psychological indicators of distress (Frattaroli, 2006). Three of the studies were with college students and one was with persons infected with HIV. All four studies failed to find an interaction between EW and gender, but the samples were quite small for interaction analyses and statistical power was not reported. In Smyth's (1998) earlier meta-analysis of EW studies conducted mostly with college students, studies with more men had significantly larger effect sizes than studies with fewer men, although sex was not directly tested as a moderator. Theoretically,

Smyth reasoned that men might benefit more than women from EW because, relative to women, men's social roles restrict their expression of emotions. Indeed, in the context of cancer, socialized male gender norms appear to inhibit men's emotional expression (Hoyt, 2009). Thus, EW might offer a unique outlet for men to express rather than inhibit their cancer-related thoughts and feelings. Other theorists have similarly proposed that individuals with traditionally masculine gender schemas may benefit the most from EW because it allows them to psychologically process previously avoided emotional information that is trauma related and discordant with their gender schema (Range & Jenkins, 2010).

The interplay of social constraints and gender has rarely been studied. It is not clear, for example, whether social constraints are related to gender. Compared with men, women experience more social interaction overall, including more positive and more negative interactions (Schuster, Kessler, & Aseltine, 1990; Turner, 1994). Based on these findings, we might expect women to experience more social constraints than men. In a survey study of patients diagnosed with gynecological or prostate cancer, women tended to report a higher level of social constraints from spouse/partner and others than men did, but the mean differences were not statistically significant (Zakowski et al., 2003). However, due to the small sample size ($N = 81$) and the different cancers experienced by men and women, respectively, it is difficult to interpret these findings.

Current study

This randomized controlled trial 1) evaluates the main effects of an EW intervention on quality of life outcomes among patients with CRC and 2) tests two theoretically plausible social moderators of the intervention: sex and level of social constraints on disclosure. CRC was chosen for study because it has both short- and long-term negative effects on quality of life outcomes (Jansen et al., 2011), patients may find it difficult to discuss their CRC-related concerns and symptoms with others (Porter et al., 2005), and the prevalence of CRC among women and men is roughly equivalent (American Cancer Society, 2014). We hypothesized that CRC survivors assigned to the EW condition would report fewer depressive symptoms, greater quality of life in multiple domains (e.g., social, physical, emotional), and fewer sleep problems post-intervention than their counterparts assigned to a control (non-emotionally expressive) writing condition. We also predicted that the intervention would be more beneficial for men than for women and for individuals perceiving greater social constraints on emotional disclosure than those with fewer constraints.

Methods

Overview

The study used a two-group, pre-post design. Data were collected one month before and one month after the intervention using structured telephone interviews. Following the baseline interview, participants were randomly assigned to either an EW or control writing (CW) condition using a computerized random numbers generator. Randomization was stratified by sex. Sequentially numbered envelopes were used to conceal allocation and thus the assessment staff conducting the baseline interviews were blind to experimental condition. Participants were asked to conduct their writing while in their home environment and not

asked to come into a laboratory in order to examine the feasibility of home-based writing, which would be more cost-effective and easier to put into medical practice.

Participants and Procedures

Between 2006 and 2011, participants were recruited from multiple sources, including hospital oncology units, Internet announcements, and a state tumor registry. We aimed to enroll an equal number of women and men. Research staff conducting enrollment contacted respondents by telephone to screen for eligibility. Participants received \$25 following completion of the baseline and follow-up interviews to compensate them for their time. The appropriate Institutional Review Boards approved the study.

Patients diagnosed with Stage I-III cancer of the colon or rectum who had completed surgical treatment within the prior five years were eligible. Patients with Stage 0 cancer were excluded because the cancer had not grown beyond the mucosa and did not involve major surgery. Patients with Stage IV cancer were excluded because the cancer affected other sites. Patients with a history of another cancer (except non-melanoma skin cancer), those who could not read or write in English, and those who had a medical or psychiatric condition that would significantly interfere with their ability to read, write, or process information were excluded.

At the time this study was designed, there were few studies on EW with cancer patients. We assumed a medium effect size (ES) on outcomes based on a meta-analysis by Smyth (1998) that reported an overall ES of .47 and individual ESs of .68 for physiological functioning, .66 for psychological adjustment, and .42 for self-reported health. To detect medium sized intervention effects within this range ($d = .40$ to $.60$) with $\alpha = .05$ and power set to .80, we needed to enroll 128 participants, or 64 per group (Cohen, 1992). We ultimately enrolled more participants ($N = 193$) to enable us to detect potentially smaller effects, including interactions between experimental condition and the moderators of sex and social constraints.

Participants completed informed consent procedures by telephone before the baseline data collection interview, which also was conducted over the telephone. Once randomized, participants were mailed a sealed packet containing a description of the condition assignment (i.e., writing instructions) and contact information if they had any questions. Thus assessment researchers who conducted follow-up interviews also were blind to experimental condition. The name and telephone number of a consultation-liaison psychiatrist was provided as well, although no one used it. In addition to the writing instructions, the sealed packet included a copy of the National Cancer Institute's publication, *Life After Cancer Treatment* (National Cancer Institute, 2006), a comprehensive guide to adjustment to cancer diagnosis and treatment. This book was provided in advance as a thank-you. All participants were contacted a week after the mailing to prompt them to begin journal writing if they had not begun yet. There was no further contact with participants until the end of the writing period. Follow-up data collection telephone interviews were scheduled within one month after the end of journal writing.

In the EW condition, participants were instructed to write for 15 minutes twice a week for two weeks about their deepest thoughts and feelings concerning their cancer. The instructions also acknowledged that for some people, dealing with a cancer diagnosis is only one of many possible stressors and that they did not have to limit their writing to how cancer had affected their life; they could write about other highly upsetting experiences. These instructions are similar to those used in EW studies of cancer patients at the time (C. de Moor et al., 2002; Stanton et al., 2002). Full instructions are available upon request to the authors.

A number of investigators have suggested that the writing instructions may influence the content of the writing and thus outcomes of EW (Sloan, Marx, Epstein, & Lexington, 2007). We considered asking participants to write exclusively about their cancer or, alternately, to write about the most stressful event of their life. Our experience, and that of other EW researchers (M. Lumley and J. Smyth, personal communication), is that participants who are asked to write exclusively about a medical condition often end up writing about stressors that appear to be unrelated to their medical condition. In addition, when clinical populations are asked to write about the most emotionally upsetting or traumatic experience in their life, they often do not spontaneously write about ongoing medical conditions. Given this limited knowledge, we decided to give participants an opportunity to write about their cancer or another stressor or both.

In the CW writing condition, participants were instructed to write for 15 minutes twice a week for two weeks about current daily activities (day 1), how they manage time (day 2), current leisure activities and ways of relaxing (day 3), and current eating habits (day 4). Participants were instructed to describe the topic using only factual details. The control writing condition is similar to that used by de Moor et al. (2002) in a study of persons with renal cancer. Presumably, these kinds of writing instructions are more credible and engaging for persons with cancer than the customary EW control writing instructions that focus on trivial topics (e.g., describe the contents of your closet).

To facilitate engagement in both writing conditions, the instruction set included several techniques developed by writing educators (Elbow, 1998). First, we instructed participants to write in a place where they would be comfortable and free from distractions. Second, we encouraged participants to select a pen that would enable them to write quickly. Third, we incorporated the principles of freewriting (Elbow, 1998) to reduce barriers to writing, such as concerns about style, structure, or grammar and spelling, by instructing writers to follow the three don'ts: don't stop, don't censor yourself, and don't go back.

Measures

Self-reported demographic and medical data that might influence adjustment were included as potential covariates. To check that participants wrote as intended, immediately after the final journal entry they completed a questionnaire designed to test the manipulation. Using a 7-point scale (1 = not at all, 7 = a great deal), participants indicated the extent to which their journal entries were “meaningful,” “personal,” and “revealing of your emotions.” Participants in the experimental condition were expected to write more meaningful, personal, and revealing entries (Lepore, 1997; Stanton et al., 2002). In addition, the

Linguistic Inquiry Word Counter (LIWC) text analysis program was used to quantify specific qualities of essays across conditions, including proportion of words in essays that reflect emotion in general (sad, happy), negative emotion (sad, angry), positive emotion (happy, love), and cognitive processing (e.g., think, know) (Pennebaker, Booth, & Francis, 2007). LIWC was used to calculate the proportion of words in each of the four categories for each day and then proportion scores were averaged across days. Theoretically, patients in the EW condition should express more emotion and cognitive processing than patients in the control writing condition (Lepore & Smyth, 2002b).

Participants' sex and level of social constraints were evaluated as potential moderators. Social constraints was measured with the Social Constraints Scale (SCS) (Lepore & Ituarte, 1999). The 15-item validated SCS measures individuals' perceptions that they are unsupported, misunderstood, or otherwise alienated from family and friends when they are seeking social support or attempting to express cancer-related thoughts, feelings, or concerns (Lepore, 2001; Lepore & Helgeson, 1998; Lepore & Revenson, 2007). Responses are measured on a 4-point scale (1 = never, 2 = rarely, 3 = sometimes, 4 = often) using the past two weeks as a time frame. Higher scores reflect greater social constraints. Cronbach's alpha was strong (.93).

Dependent measures included depressive symptoms, quality of life indicators, and sleep problems. *Depressive symptoms* were measured with the 15-item version (Stommel et al., 1993) of the Center for Epidemiologic Studies Depression (CES-D) scale (Radloff, 1977). The 15-item version removes items with a gender bias (e.g., crying). Higher scores reflect greater depressive symptoms. Cronbach's alpha was strong (.91). *Health-related quality of life* was assessed with the function and global quality of life subscales of the Cancer Quality of Life Questionnaire (QLQ-C30) a measure that has been developed and validated by the European Organization for Research and Treatment of Cancer (EORTC) (Aaronson et al., 1993). The QLQ-C30 can be used with any cancer population and assesses quality of life across nine domains. We included the five functional domains in this study (physical, role, cognitive, emotional, and social) but chose not to use the three symptom scales (fatigue, pain, and nausea/vomiting) as one scale contained a single item and two had internal consistency reliabilities < .60, nor the single-item global quality of life rating. Higher scores indicate better quality of life. The function scales had acceptable reliability, with Cronbach's alphas ranging from .75 to .87. Higher function scores reflect better quality of life. The Pittsburgh Sleep Quality Index (PSQI) was used to assess *sleep problems* using the total index summary score (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989). Higher scores on the sleep problems summary score signifies more sleep problems. Cronbach's alpha was adequate (.80).

Analytic plan

Descriptive statistics were generated for the total sample and the treatment groups for each time point. Distributional properties were analyzed to determine if variance stabilizing or normalizing transformations should be applied. Outliers were assessed and checked for accuracy. We constructed 100 multiple imputations (MI) to account for missing data (Davey & Savla, 2010). Baseline and follow-up values of all response variables, treatment

condition, potential moderators, and literature-based control variables (e.g., low education, white race, time since surgery, age, partner status, stoma) were included as covariates in imputation models. Additionally, two sets of sensitivity analyses were conducted, using listwise deletion (complete cases) and last observation carried forward. The number of differences in substantive conclusions was less than what would be expected by chance, which indicates that multiple imputations did not introduce undue bias.

The primary hypotheses were tested using multiple regression analyses, with intervention group as the predictor and adjusting for baseline status and appropriate covariates. Intent-to-treat analyses used a two-tailed alpha set at .05. Interactions terms were constructed to test moderation effects. Because we conducted 16 analyses (8 outcomes examined two times – once for each moderator), the p-value was adjusted to .003 (.05/16) for the interaction analyses.

Results

Sample Characteristics

Table 1 shows the pre-intervention characteristics of the sample by experimental condition. Participants were predominantly middle-aged, Caucasian, married, and employed. All were high school graduates, and the number of men and women was nearly equal. Slightly more participants were diagnosed with colon than with rectal cancer, and approximately half the sample had stage III cancer. On average, participants had surgery almost three years prior to enrollment. Almost 3/4 of the sample had chemotherapy in addition to surgery, and slightly more than 1/3 had radiotherapy. None of the demographic or medical variables varied by experimental condition. Level of social constraints was relatively low at baseline ($M = 1.65$, $SD = 0.72$), and varied by sex: among women, $M = 1.84$, $SD = 0.82$, among men, $M = 1.46$, $SD = 0.56$, $t(df = 191)$, $p < .001$).

Level of psychological distress and sleep outcomes were fairly low and quality of life was fairly high in the sample as a whole. Randomization did not equalize the groups on two of the eight outcome measures: Prior to intervention, mean depressive symptoms were higher among participants assigned to the EW condition than to the CW condition, $t(df = 191) = -2.19$, $p < .05$, and the QLQ-C30 cognitive functioning score was lower in the EW condition than in the CW condition, $t(df = 191) = 2.00$, $p < .05$. Thus, in all inferential analyses we controlled for the baseline value of the outcome variable.

Feasibility, treatment fidelity and manipulation checks

The majority (81.3%) of participants completed all four assigned journal entries. The number of journal entries completed was unrelated to experimental condition, $\chi^2(4, N = 193) = 7.08$, $p = .132$. Consistent with predictions, relative to the CW condition, participants in the EW condition rated their writings as more meaningful ($M = 4.59$, $SD = 1.71$ vs. $M = 5.57$, $SD = 1.54$; $t(df = 176) = -4.00$, $p < .001$), more personal ($M = 6.05$, $SD = 1.18$ vs. $M = 6.42$, $SD = 0.92$; $t(df = 176) = -2.37$, $p = .019$), and more emotionally revealing ($M = 4.42$, $SD = 1.79$ vs. $M = 5.99$, $SD = 1.19$; $t(df = 176) = -6.90$, $p < .001$). LIWC analyses confirmed that the journal entries of participants in the EW condition were more focused on emotional

expression and cognitive processing. Specifically, relative to journal entries in the CW condition, the journal entries in the EW condition had a greater proportion of text that was comprised of emotion words in general (CW $M = 3.33$, $SD = 0.98$ vs. EW $M = 4.60$, $SD = 1.26$; $t(df = 166) = 7.29$, $p < .001$), negative emotion words (CW $M = 0.64$, $SD = 0.47$ vs. EW $M = 2.16$, $SD = 0.81$; $t(df = 166) = 14.95$, $p < .001$), positive emotion words (CW $M = 2.68$, $SD = 0.78$ vs. EW $M = 2.40$, $SD = 0.92$; $t(df = 166) = 2.15$, $p < .03$), and words related to cognitive processes (CW $M = 6.65$, $SD = 5.29$ vs. EW $M = 8.82$, $SD = 3.77$; $t(df = 166) = 3.06$, $p < .01$). There was no significant difference in the average number of words expressed in the essays of the CW group relative to the EW group (CW $M = 345.24$, $SD = 117.34$ vs. EW $M = 384.14$, $SD = 1.80$; $t(df = 166) = 1.80$, $p = .073$).

Evaluating intervention effects on outcomes

As shown in Table 2, results of the intention-to-treat analyses revealed no effects of EW on post-intervention outcomes, after controlling for pre-intervention status of the outcome variables. Intention-to-treat analyses to test for the two social moderators--participant sex and level of social constraints--produced no significant interactions between condition and moderators at the adjusted .003 p-value (supplemental tables detailing these analyses can be found in electronic supplementary materials).

As a follow-up to the primary hypothesis tests, we explored whether two other factors--time since surgery and baseline level of the outcome variable--might have moderated intervention effects on outcomes. Prior research on psychosocial interventions suggests that individuals with higher baseline distress benefit more from intervention than individuals with relatively low baseline distress (Faller et al., 2013). We have not found prior evidence that time since cancer treatment influences response to psychosocial interventions, but we reasoned that individuals closer in time to their surgery might have greater need for intervention as they are first adapting to the changes in their body post-treatment. These exploratory analyses produced no significant interactions.

Discussion

This home-based EW intervention appeared to be feasible, with the majority of participants completing all four journals and reporting that their writings were personal, meaningful and emotionally revealing. Further, linguistic analyses of the essays showed that EW participants expressed more emotion and cognitive processing words in their journals than did control participants. Despite these positive findings, intention-to-treat analyses provided no evidence of direct benefits of the intervention on distress symptoms, sleep problems or quality of life outcomes. In addition, interaction analyses did not support the hypothesis that specific subgroups—specifically, men or persons with high social constraints—would benefit from the EW intervention, and exploratory analyses showed that time since surgery and level of the outcome at baseline did not moderate responses to the EW intervention. These results align with the growing body of research showing no direct benefits of EW for cancer patients and do not replicate prior research suggesting benefits of EW for patients with elevated social constraints.

Combined with findings from the literature on non-clinical and clinical populations (Frattaroli, 2006; Frisina et al., 2004) and cancer patients in particular (Merz et al., 2014), our results beg the question of whether low-intensity behavioral therapies such as EW can improve the mental and physical health of persons with cancer. A recent systematic review showed that more intensive, longer-lasting therapies tend to have more powerful and longer lasting benefits than less intensive behavioral therapies in cancer patients (Faller et al., 2013). Similarly, systematic review of disclosure interventions (including EW) with clinical and non-clinical populations, found that more frequent and longer-lasting intervention sessions were associated with stronger effects relative to less intensive interventions (Frattaroli, 2006).

The lack of interaction effects between writing condition and the two social variables suggests that EW may not be effective even for specific social groups whom we might expect to benefit from this type of intervention. Three prior studies of cancer survivors have examined the differential benefits of EW for those reporting higher vs. lower constraints on disclosure, and their findings are in opposition. One study found a significant interaction of social constraints and EW on distress in a sample of gynecological and prostate cancer patients (Zakowski et al., 2004). In contrast, two studies failed to find significant interactive effects of social constraints and EW using samples of women who had breast cancer (C. de Moor et al., 2002; Jensen-Johansen et al., 2013). With the evidence from the current study of colorectal cancer patients, the weight of the evidence suggests that there are no additional benefits of EW for those patients reporting high social constraints on disclosure.

Certainly, methodological differences between studies could account for these inconsistencies: the two studies that failed to find effects (Jensen-Johansen et al. and ours) used intention-to-treat analyses, were adequately powered, and sampled patients with one type of cancer, whereas the study that found an interaction (Zakowski et al. 2004) did not use ITT and combined two cancer sites with different treatments and mortality rates. Thus, some underlying experimental artifacts related to attrition or some unique aspects of the sample may have produced the apparent interaction effect in the one study reporting a significant interaction between constraints and EW.

It is also possible that constraints related to discussing gynecological or urological cancer are different than those related to discussing colorectal or breast cancer, which could have influenced the positive outcomes related to writing about the latter types of illness experiences. However, this seems unlikely, particularly in the context of colorectal cancer, which can produce embarrassing post-surgical side effects related to bowel problems and difficulties in sexual functioning, not unlike the difficulties experienced by patients with gynecological or prostate cancer. Another methodological factor, the timing of the follow-up assessments, does not explain the inconsistencies, because the study finding an interaction had a 6-month follow-up and the studies that failed to find an interaction had follow-ups ranging from 1-9 months. Further, time since diagnosis is not likely to account for differences in study outcomes. Similar to the present study, the study finding a significant interaction sampled patients treated within five years of the start of the study. Our exploratory analyses also suggest that time since surgery does not influence who benefits from EW.

The lack of an interaction between experimental condition and participants' sex fails to support theoretical predictions of such an effect (Range & Jenkins, 2010; Smyth, 1998), but is consistent with the lack of evidence on moderating effects of sex in the broader literature (Frattaroli, 2006) and studies of cancer populations (Merz et al., 2014). Ours is one of the few studies to date in which sex is not confounded with type of cancer, so it is a strong test of the model. Most EW studies have used samples with a single sex (e.g., breast cancer) or cancer is confounded with sex (e.g., gynecological and prostate). It is possible that one sex might benefit more than another from EW, but the present study could not find it because overall the sample had low levels of distress (i.e., need was low). Future studies could test the interaction hypothesis more rigorously if patients were selected based on their possessing elevated distress symptoms at baseline.

Our findings suggest that future investigations of social constraints, gender and psychosocial interventions, should pay careful attention to the relation between constraints and gender. As noted earlier, we found sex differences in level of social constraints, with women reporting greater constraints than men. This fits in with the broader social psychological literature showing that women tend to have more interactions, both positive and negative, than men. In one other study examining sex differences in level of social constraints among patients with cancer, no statistically significant differences were found (Zakowski et al., 2003). However, inspection of the mean level of social constraints by sex in that study (Table 3 in Zakowski et al. 2003) showed the effect size was relatively small and the sample too small to establish a statistically significant difference. The possible relation between sex and social constraints has implications for theorizing about the role of these factors in disclosure-based interventions. If sex and constraints are confounded, it will be necessary to tease out the unique effects of constraints from sex, perhaps by experimentally manipulating social constraints.

The present study is not without limitations. First, there was great variation in time since initial treatment in the sample. As described earlier, exploratory analyses testing whether EW might be more effective for patients shortly after primary treatment did not yield significant effects, but it is possible that too few patients were close to their surgery date for those effects to emerge. Second, our sample was not particularly distressed at baseline, providing little room for improvement. It is becoming clear that psychosocial interventions may only be effective for cancer survivors with high psychological distress (Faller et al., 2013; Schneider et al., 2010). Our exploratory analyses of the interactions between experimental condition and baseline levels of distress and quality of life outcomes did not support this hypothesis, but there may have been too few patients with very high distress and very low quality of life to adequately test the interactions. Despite these limitations, the study also had significant strengths, including experimental controls (randomization, blinding), standardized measures, and intention-to-treat analysis. Thus, the findings represent a fair test of the intervention. It is important to publish null results from well-controlled trials in order to document failed replication of previous findings and to guard against publication bias in this literature, which tends to favor publishing only studies producing significant effects (Dwan, Gamble, Williamson, & Kirkham, 2013).

Future Directions

The absence of effects in this relatively large, controlled study of patients with CRC adds to the growing number of similar failed trials. Despite this, we do not recommend that researchers and clinicians quietly file away their ideas about using EW with cancer patients and move on to other brief interventions. It may be that we need to reframe EW not as a brief, stand-alone intervention for cancer patients that will have the same powerful effect it had in the early studies of healthy college students, but as part of a package of low-intensity interventions that may enhance quality of life for cancer survivors and complement other therapies.

It is important to note that, since being applied to clinical populations, the intervention originally created by James Pennebaker has drifted. For example, patient populations are asked to write about their illness rather than to write about the most traumatic event in their life, as in the original paradigm. Cancer is not a trivial disease, but for many cancer patients there may be other events in their life that cause greater distress and may indirectly influence how they adjust to cancer. It is possible that having patients write about the most traumatic event of their life will help them to better cope with that event, which, in turn, might indirectly help them to cope with their cancer by freeing up mental capacity and enhancing emotional control. In the present study, we provided instructions that allowed participants to write about non-cancer topics, but clearly emphasized writing about cancer and its effect on their life.

From a researcher's vantage point, there are many unanswered questions to be studied. For example, it is possible that a higher dosage of writing or framing the writing with different instructions (for example, in terms of focusing on the positive, Stanton et al., 2002) would produce benefits for cancer patients. However, the lack of strong findings for EW in studies of cancer populations (Merz et al., 2013) leads to the conclusion that writing alone and for a short time may not allow patients to complete their cancer narratives, better regulate their negative emotions, reframe their issues, or provide insights into effective ways of coping with a situation that reminds them of past losses, or intensifies current stressors or future uncertainty.

If future research were to tackle these questions, then we might find EW may be more useful as an adjunct to more intensive behavioral treatments than a stand-alone intervention, perhaps as a method of stimulating or extending cognitive and emotional processing between treatment sessions (Travagin, Margola, & Revenson, 2014). Results from one small study of patients with colorectal cancer showed that those who were randomized to a multimodal intervention (psychoeducation, peer support, *and* EW) had significantly greater improvements in distress symptoms than their counterparts who were randomized to a standard care control condition (Carmack et al., 2011). Unfortunately, the study design did not allow the investigators to rule out non-specific causal factors (e.g., attention) or to determine whether the EW component contributed to the beneficial effects of the multimodal intervention. Thus, the evidence on the benefits of EW as a low-intensity stand-alone behavioral intervention or as component of a multimodal behavioral intervention for cancer patients is weak.

Future research on EW in persons who have cancer may need to more selectively target samples of persons with high distress and a full range of social constraints in order to provide a stronger test of the efficacy of this intervention. In addition, we suggest that it be evaluated as a supplement to more traditional evidence-based interventions (e.g., support groups, cognitive-behavioral therapy, mindfulness meditation). Further, it may be necessary to revert back to the original paradigm and evaluate the benefits of writing about the most stressful events in one's life as a way of reducing other sources of stress at a time when one needs cognitive, emotional and physical resources to cope with cancer. Finally, to further advance research on EW, it would be useful to replicate findings from earlier studies and expand them to identify the most effective instructions, dosage, and underlying mediators. For example, a recent study of renal cancer patients found that intrusive thoughts appeared to mediate the effects of EW on some outcomes but not others (Milbury et al., 2014). Future research investigating mediators may provide more clues as to the processes involved in optimal adjustment and not only expressive writing.

Conclusions

In sum, this randomized controlled trial of a home-based EW intervention among patients with colon or rectal cancer adds to a growing published literature suggesting that EW alone does not significantly improve mental or physical health outcomes. EW may be a feasible and enjoyable adjunct to other types of evidence-based psychosocial interventions, but only additional studies will lead to a recommendation that it is advisable to use it in this manner.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgement

This work was supported by the National Institutes of Health under Grant CA107428. The authors thank the patients, physicians and research assistants who made this work possible.

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Figure 1.
Participant flow chart.

Table 1Baseline characteristics of sample ($n = 193$).

Variable	Control Writing ($n = 92$)	Expressive Writing ($n = 101$)	<i>P</i> Value
<i><u>Social and Demographic variables</u></i>			
Age in years ¹	55.80 (10.89)	54.44 (10.62)	.378
Sex			.935
Male	47 (51.1)	51 (50.5)	
Female	45 (48.9)	50 (49.5)	
Race ²			.740
Caucasian	79 (85.9)	85 (84.2)	
Other	13 (14.1)	16 (15.8)	
Educational attainment ²			.265
Lower (no college degree)	48 (52.2)	58 (57.4)	
Higher (college degree)	44 (47.8)	43 (49.4)	
Employed part- or full-time ²	57 (62.0)	53 (52.5)	.184
No	35 (38.0)	48 (47.5)	
Married/in marital-like relation ²	56 (60.9)	71 (70.3)	.168
No	36 (39.1)	30 (29.7)	
<i><u>Medical variables</u></i>			
Cancer site ²			.889
Colon	51 (26.4)	57 (29.5)	
Rectum	41 (21.2)	44 (22.8)	
Stage of cancer ²			.795
Stage 1/Dukes' Stage A	23 (25.0%)	26 (25.7)	
Stage 2/Dukes' Stage B	23 (25.0)	28 (27.7)	
Stage 3/Dukes' Stage C	42 (45.7)	45 (51.7)	
Unknown (Stage 1, 2, or 3)	4 (4.3)	2 (2.0)	
Years since surgery ¹	2.80 (1.10)	2.92 (1.10)	
Chemotherapy treatment ²	71 (77.2)	75 (74.3)	.637
No	21 (22.8)	26 (25.7)	
Radiotherapy treatment ²	40 (43.5)	36 (35.6)	.266
No	52 (56.5)	65 (64.4)	
<i><u>Dependent variables</u></i>			
Depressive symptoms	8.66 (9.20)	11.58 (9.30)	.030
Global Quality of Life	75.72 (20.40)	71.95 (22.01)	.219
Physical Functioning	90.14 (15.17)	90.28 (15.16)	.951
Role Functioning	84.96 (26.73)	87.13 (22.10)	.539
Emotional Functioning	75.82 (21.61)	71.04 (25.04)	.160
Cognitive Functioning	83.88 (21.84)	77.39 (23.04)	.047

Variable	Control Writing (<i>n</i> = 92)	Expressive Writing (<i>n</i> = 101)	<i>P</i> Value
Social Functioning	82.61 (25.90)	83.66 (24.49)	.772
Sleep Problems	6.71 (4.32)	6.71 (4.36)	.992

¹Data given as mean (SD).

²Data given as number (percentage). Percentages are rounded to nearest 10th.

Table 2Results of intent-to-treat analyses of intervention effects on outcome ($N = 193$).

Outcome	Estimated b	Intervention 95% CI	P Value
Depressive symptoms	0.04	−1.65 to 1.74	.964
Global Quality of Life	2.92	−1.53 to 7.37	.196
Physical Functioning	−0.45	−3.74 to 2.84	.788
Role Functioning	1.22	−5.48 to 7.92	.720
Emotional Functioning	−0.93	−5.88 to 4.01	.710
Cognitive Functioning	−3.27	−7.93 to 1.39	.168
Social Functioning	2.66	−2.97 to 8.28	.353
Sleep Problems	−0.05	−0.85 to 0.76	.905

Notes. Intervention conditions coded as: expressive writing = 1, control writing = 0. All models adjust for the corresponding baseline status of outcome variable. Unstandardized coefficients are reported.