Supportive Care in Cancer (2019) 27:1801–1809
https://doi.org/10.1007/s00520-018-4438-0

ORIGINAL ARTICLE

Efficacy of Pennebaker's expressive writing intervention in reducing psychiatric symptoms among patients with first-time cancer diagnosis: a randomized clinical trial

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Received: 13 February 2018 / Accepted: 22 August 2018 / Published online: 29 August 2018

Abstract

Purpose The aim of this randomized clinical trial was to examine the efficacy of Pennebaker's expressive writing intervention (EWI) in improving the perceived quality of life (QoL) and in reducing psychiatric symptoms among patients who received a cancer diagnosis.

Methods Seventy-one consecutively recruited patients who received a cancer diagnosis for the first time in their life were randomized into two groups: an EWI group (EWG: $n = 35$) and a control group (CG $n = 36$). At the baseline, anamnestic information was collected for all patients, and the patients completed a series of self-reported measures assessing psychiatric symptoms, alexithymia, and health-related QoL. A modified Pennebaker's EWI adapted to cancer diagnosis was also administered to the EWG. Six months later, 32 patients (EWG: $n = 17$, CG: $n = 15$) participated in the follow-up and filled out the same questionnaires.

Results The Pennebaker's EWI was effective in decreasing global psychopathology ($d = -.55$). Small but significant effects were also observed for alexithymia levels and health-related QoL, with the EWG showing a reduction in alexithymia levels ($d = -.31$) and an increase in the mental component of QoL ($d = .31$) compared to the CG.

Conclusions Our findings indicate that the Pennebaker's EWI is effective in reducing the negative impact of cancer diagnosis on patients' mental health.

Keywords Randomized clinical trial · Cancer · Expressive writing intervention · Alexithymia · Psychopathology · Quality of life

Introduction

A cancer diagnosis is frequently experienced as a traumatic event that threatens both physical and psychological survival [1]. Recent evidence indicates that a cancer diagnosis is a risk factor for developing psychological difficulties and psychiatric symptoms, such as: marked anxiety, depression, irritable mood, and hopelessness [2–4]; somatic symptoms such as pain, fatigue, anorexia, and dyspnea [5–7]; and marked alterations in relationships and roles, including feelings of loneliness and social withdrawal [8, 9]. Accordingly, multiple physical and psychological problems in cancer patients may lead to a worse quality of life (QoL), defined as the individuals' perception of their position in the context of culture and value systems, which is affected in a complex way by physical health, psychological state, personal beliefs, and social relationships.

The presence of physical symptoms and the perception of a reduced QoL might also foster secondary alexithymic responses among cancer patients. The term alexithymia describes a psychological disposition characterized by a difficulty in identifying and describing feelings and a tendency toward an operatory and non-symbolic thinking [10]. Secondary alexithymic responses may emerge in cancer patients as defensive unconscious strategies that allow these individuals to avoid the painful affects resulting from a severe threat to life [11–13]. All these psychological difficulties may generate, in a vicious circle, avoidance behaviors, longer rehabilitation time, complications with treatment, and possibly lower survival rates in cancer patients [14].

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Meta-analytic findings point out that psychological interventions are effective in managing distress, reducing psychiatric symptoms, and improving QoL among cancer patients [15]. In this context, extensive research has shown that expressive writing interventions (EWIs) may improve the psychological well-being of individuals diagnosed with cancer [16, 17]. Specifically, as suggested in a recent systematic review by Merz and collaborators [18], the possibility of expressing the worries and the painful feelings related to the disease in written form can exert positive influences on patients' mental and physical health, thereby improving their QoL.

Many studies have been performed to test the efficacy of EWIs to improve QoL in both healthy [19] and medical samples [18], with an average effect size of $d = .47$ and $d = .19$, respectively. However, conflicting findings have been reported on the efficacy of EWIs with cancer patients. In fact, EWIs have generated small or no effects in some studies [20–22], while they have proven to be moderately effective in other studies [18, 23, 24] with respect to the psychological health and the QoL of patients with a cancer diagnosis. The available findings are also ambiguous regarding what concerns alexithymia: in fact, some studies suggested that EWIs may be ineffective for alexithymic and emotionally repressed individuals [25], while other studies support the view that EWIs might be beneficial for alexithymic individuals [26].

Some possible reasons for these mixed findings could be related to the different types of cancer diagnosis, the stage of the disease, and the illness condition of the patients involved. Moreover, the patients' capacity to reflect on their feelings and write about them might also change in relation to patients' age, personality traits, and perceived social support [25, 27]. Some cancer patients may also activate strong defenses against death anxiety related to their illness [28], including alexithymic responses [12]. These psychological defenses can reduce the ability to reflect on one's own internal states, which is necessary to benefit from EWI [29].

A well-known EWI approach to the medical patient is the one developed by Pennebaker [30], whose purpose is to promote the cognitive and affective processing of a distressing experience by producing a written description of that experience and the thoughts and emotions connected to it. Based on these considerations, the aim of this clinical trial was to examine the efficacy of Pennebaker's EWI in a group of patients with a first-time cancer diagnosis. In light of previous findings, we hypothesized that the application of a modified Pennebaker's EWI concerning the experience of receiving a cancer diagnosis would have improved the patients' psychological health by increasing their perceived QoL and by reducing both psychiatric symptoms and alexithymia levels.

Materials and methods

Research design

The research design was a randomized clinical trial on the efficacy of a modified Pennebaker's EWI on improving QoL in cancer patients. Participants who had been diagnosed with cancer for the first time in their life completed a series of self-reported questionnaires on psychiatric symptoms, alexithymia, and health-related QoL, and they were randomly assigned to a Pennebaker's expressive writing group (EWG) or to a control group (CG). Six months later, the available participants completed the same measures to test the effects of the Pennebaker's EWI.

Based on previous studies in which the Pennebaker's EWI and measures of psychological distress, QoL, and alexithymia were administered to cancer patients [21, 26], we observed that even a very small sample size could be appropriate for detecting clinical effects of the EWI on the study variables. For example, considering the study by Mosher and colleagues [21], our study would have required a sample size of only 8 participants for each group (i.e., a total sample size of 16, assuming equal group sizes for the intervention group and the CG) to achieve a power of 80% and a two-sided level of significance of 5% to detect a true difference in anxiety scores. However, as our objective was to test the efficacy of the Pennebaker's EWI on cancer patients after quite a long period (6 months), we were aware that the attrition rate could be particularly high in our sample. Therefore, we set our sample size to a minimum of 60 individuals at baseline. Considering potential refusals to participate in the study, we decided to consecutively recruit 80 patients who received a cancer diagnosis for the first time in the hospital where the study took place.

Procedure

Of the 80 patients contacted and informed about the nature of the study, 72 patients (90%) provided informed consent. One of the participants died before the study started. At the baseline, the study involved 71 patients. Participants were randomly assigned to the CG or to the Pennebaker's EWG. All the participants filled out self-report questionnaires on psychological variables, but only the EWG completed the Pennebaker's EWI adapted to the event of cancer diagnosis after filling out the questionnaires. About 6 months later (see Table 1 for details), the available participants ($N = 32$ patients, 45% of the initial sample; EWG: $n = 17$, CG: $n = 15$) completed the same self-reported measures. Cancer diagnoses were communicated to the patients by specialist oncologists who did not receive any specific training in psychological techniques for communicating and discussing the diagnosis. Patients were consecutively recruited from February 2016 to November

Table 1 Socio-demographic characteristics of patients

	Baseline assessment					Follow-up assessment				
	Total sample ($N = 71$)	EWG ($n = 35$)	CG ($n = 36$)			Total sample ($N = 32$)	EWG ($n = 17$)	CG ($n = 15$)		
	N (%)					*N* (%)				
Gender	37 (52.1)	19 (54.3)	18 (50.0)	$x^2_{(1)}$	p	13 (40.6)	9 (52.9)	4 (26.7)	$x^2_{(1)}$	p
Male	34 (47.9)	16 (45.7)	18 (50.0)	.13	.72	19 (59.4)	8 (47.1)	11 (73.3)	2.28	.13
Female										
Education level	28 (39.4)	14 (40.0)	14 (38.9)	$x^2_{(2)}$	p	9 (28.1)	3 (17.7)	6 (40.0)	$x^2_{(2)}$	p
Low	27 (38.1)	13 (37.1)	14 (38.9)	.00	1.00	18 (56.3)	10 (58.8)	8 (53.3)	2.92	.23
Intermediate	16 (22.5)	8 (22.9)	8 (22.2)			5 (15.6)	4 (23.5)	1 (6.7)		
High										
Marital status	46 (64.8)	25 (71.4)	21 (58.3)	$x^2_{(1)}$	p	25 (78.1)	14 (82.4)	11 (73.3)	$x^2_{(1)}$	p
Married	25 (35.2)	10 (28.6)	15 (41.7)	1.33	.25	7 (21.9)	3 (17.6)	4 (26.7)	.38	.54
Not married										
	M (SD)			$t_{(69)}$	p	M (SD)			$t_{(30)}$	p
Age	54.54 (15.13)	53.54 (15.27)	55.00 (15.32)	.54	.59	51.34 (14.40)	52.53 (13.97)	50.00 (15.25)	− .49	.63
Days since diagnosis	127.03 (87.00)	126.86 (86.99)	127.19 (88.24)	.02	.99	297.31 (75.12)	293.53 (88.51)	301.60 (59.18)	.30	.77

EWG Pennebaker's expressive writing intervention group, *CG* control group

2016 at two units of Medical Oncology in a Hospital in Palermo (Sicily). All participants received treatment as usual before and after the completion of the study, mostly involving chemotherapy and immunotherapy. No payment was provided for participation in the study. Further details concerning the study procedures are reported in Fig. 1.

Study group

At baseline, the group included 71 medical patients with a first-time cancer diagnosis. The group consisted of 37 males (52.1%) and 34 females (47.9%), aged between 18 and 77 years ($M = 54.54$; $SD = 15.22$). Patient details are provided in Table 1. Lymphoma, leukemia, and bowel cancer were the most frequent diagnoses in the sample (see Table 2). Thirty-two patients were available at the follow-up (45% of the initial sample). Reasons for dropout mainly included worsened disease conditions that prevented patients from continuing in participation and retraction of consent to participate in the second wave of the study (see Fig. 1 for details).

Intervention

Expressive writing intervention

A single session of a modified Pennebaker's EWI adapted to cancer diagnosis was individually administered to the participants in the EWG in a quiet room inside the hospital at which they received medical therapy. The Pennebaker's EWI consists of a writing technique that is postulated to allow individuals to process traumatic or distressing events by writing about the emotions, thoughts, and feelings they experience during such events [31]. The EWG was instructed to consecutively write for 15 min about the experience of receiving the cancer diagnosis. Participants received a notebook and a pen, and they were asked to connect with the feelings and emotions they associated with the communication of the diagnosis and to write about the experience. The instructions follow: "Please, write for 15 consecutive minutes about the emotions, thoughts, and feelings you felt when you received the cancer diagnosis. All your writing is confidential. Do not worry about form or style, spelling, punctuation, sentence structure, or grammar." The instructions of Pennebaker's EWI were modified according to Pennebaker's suggestions for the application of his method in clinical settings [32]. Ethical reasons were considered because the invitation to link the potentially traumatic experience of a cancer diagnosis with other parts of the participants' life, such as childhood experiences, relationships with others, and expectations for the future (as proposed in the original instructions) could potentially evoke further negative states in the patients. The participants were free to interrupt the task if they thought doing so was appropriate. The intervention was conducted and monitored by a qualified psychologist.

Questionnaires

General psychopathology

The Symptom Checklist-90-Revised (SCL-90-R) [33] was used to assess the presence and severity of psychiatric

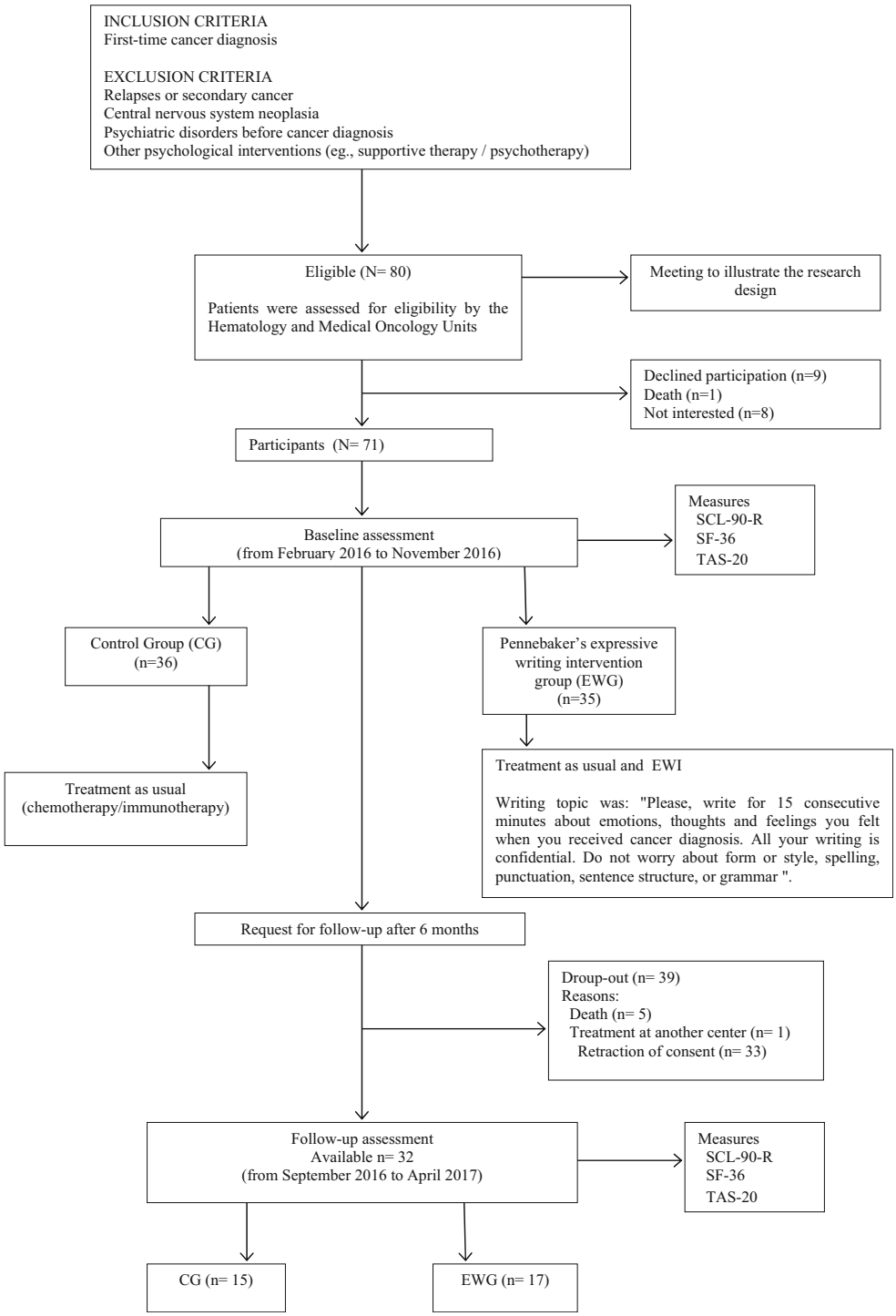

Fig. 1 Flow chart of the study design

symptoms. It includes 90 symptoms experienced during the past week and evaluates nine symptomatic domains: anxiety, depression, hostility, interpersonal sensitivity, obsessive–compulsive disorder, paranoid ideation, phobic anxiety, psychoticism, and somatization. One item example is "Feeling hopeless about the future." Each item is rated on a 5-point Likert scale (from 0 to 4). The Global Severity Index (GSI) is the mean score of the 90 items; thus, higher global psychopathology corresponds to higher scores on this index. The SCL-90-R is a well-known and widely used measure for the screening of psychopathology. It has showed good psychometric properties in worldwide research, including good to excellent internal consistency, as well as good convergent and discriminant validity [34]. In the current study, internal reliability was excellent at the baseline ($\alpha = .96$) and at follow-up ($\alpha = .95$).

Table 2 Prevalence of cancer diagnosis among patients

Cancer diagnosis	Baseline assessment			Follow-up assessment		
	Total sample ($N = 71$) *N* (%)	EWG ($n = 35$)	CG ($n = 36$)	Total sample ($N = 32$) *N* (%)	EWG ($n = 17$)	CG ($n = 15$)
Bowel	11 (15.5)	6 (17.4)	5 (13.5)	6 (18.8)	2 (11.6)	4 (26.7)
Breast	4 (5.6)	3 (8.7)	1 (2.7)	4 (12.5)	3 (17.4)	1 (6.7)
Gynecolological	3 (4.2)	1 (3.0)	2 (5.4)	2 (6.2)	0	2 (13.2)
Hepatic	3 (4.2)	1 (3.0)	2 (5.4)	1 (3.1)	1 (6.0)	0
Laryngo-pharyngeal	1 (1.4)	1 (3.0)	0	1 (3.1)	1 (6.0)	0
Leukemia	15 (21.1)	9 (26.1)	6 (16.2)	7 (22.0)	4 (23.5)	3 (20.0)
Lung	8 (11.4)	4 (11.7)	4 (10.8)	0	0	0
Lymphoma	23 (32.4)	8 (24.1)	15 (40.5)	8 (25.0)	4 (23.5)	4 (26.7)
Neuroendocrine	1 (1.4)	0	1 (2.7)	1 (3.1)	1 (6.0)	0
Pancreas	1 (1.4)	0	1 (2.7)	1 (3.1)	0	1 (6.7)
Urological	1 (1.4)	1 (3.0)	0	1 (3.1)	1 (6.0)	0

EWG Pennebaker's expressive writing intervention group, *CG* control group

Health-related quality of life

The Short Form 36-Item Health Survey (SF-36) [35] was used to evaluate patient health-related QoL. It includes items rated on dichotomic, 3-point, 5-point, and 6-point scales. Two synthetic indices of physical health (Physical Component Summary, PCS) and mental health (Mental Component Summary, MCS) can be calculated on the SF-36, with higher scores on these indices indicating higher feelings of well-being. The SF-36 has shown good psychometric properties [36]. Baseline internal reliability was $\alpha = .56$ for PCS and $\alpha = .69$ for MCS. Both these values increased at follow-up ($\alpha = .70$ and $\alpha = .77$, respectively).

Alexithymia levels

The Twenty-Item Toronto Alexithymia Scale (TAS-20) [37, 38] was used to assess alexithymic traits. It consists of 20 items (e.g., "I have feelings that I can't quite identify"), each rated on a 5-point Likert scale (from 1 to 5). The total score can range from 20 to 100, with higher scores reflecting higher levels of alexithymia. The TAS-20 has demonstrated good psychometric properties worldwide, and its three-factor structure (DIF, Difficulty Identifying Feelings; DDF, Difficulty Describing Feelings; EOT, Externally Oriented Thinking) has been replicated in various studies across different countries [13]. In this study, we used the TAS-20 total and factor scores. The baseline Cronbach's α of TAS-20 score was .71; it increased at follow-up ($\alpha = .74$).

Statistical analysis

Descriptive statistics were calculated for all the study variables. Group differences were examined through a *t* test, a Chi-square test, and Fisher's exact test. Cohen's *d* effect size of the Pennebaker's EWI on psychiatric symptoms, alexithymia, and QoL were then calculated. Considering that the pretest means and standard deviations of the EWG and CG groups did not match, we used the Morris' [39] pooled pretest standard deviation for weighting the differences of the pre–post means. Cohen's *d* effect size can be interpreted as small ($d = 0.2$), medium ($d = 0.5$), or large ($d = 0.8$), according to the benchmarks suggested by Cohen [40]. However, these values should not be interpreted rigidly [41].

Results

Descriptive statistics and differences between groups

Descriptive statistics concerning the investigated variables are reported in Table 3, differentiated by gender and waves of the study. There were no significant differences between EWG and CG in sociodemographic variables at baseline and at follow-up. Also, there were no significant differences between EWG and CG at baseline (Fisher's test = 8.36, $p = .65$) and at follow-up (Fisher's test = 8.05, $p = .58$) with respect to cancer diagnosis. Among the participants, 39 (55% of the initial sample) dropped out at the follow-up after 6 months.

Effects of Pennebaker's EWI

Even though the CG reported slightly lower scores than the EWG on the SCL-90-R global psychopathology index (GSI: $t_{(69)} = 2.03$, $p = .046$) and on other psychiatric symptoms at the baseline, the SCL-90-R scores of the CG generally increased at the follow-up. An opposite trend was observed with respect to the EWG, since the slightly higher scores on psychiatric

symptoms observed at baseline in this group decreased at follow-up. Accordingly, EWG participants reported significantly lower levels of psychiatric symptoms at follow-up than the CG participants did, as shown in Table 3. An appreciable effect of the Pennebaker's EWI in reducing the GSI score ($d = .55$) was observed. Also, moderate to strong effects of the EWI were observed in anxious and depressive symptoms, interpersonal sensitivity, hostility, and psychoticism, with effects on these symptom scores being even larger than the EWI's effect on GSI scores. An interesting exception was observed in the increase of the somatization symptoms in the EWG ($d = .49$), which will be discussed afterward. As for the SF-36 scores, only a trivial negative effect was observed in the PCS of this measure. In contrast, a small but positive effect of EWI on MCS scores of the SF-36 was observed, indicating that feelings of psychological well-being decreased less in the EWG than in the CG at follow-up ($d = .31$). The EWI also generated small to moderate effects on TAS-20 scores ($d = .31$), with the EWG showing less difficulty in identifying and describing feelings than the CG at follow-up. Globally, the alexithymic responses remained quite stable in the EWG, whereas they increased in the CG at follow-up.

Discussion

Recent developments in scientific research that have adopted the Pennebaker's EWI [42] suggest that the written expression of feelings and thoughts concerning the cancer diagnosis may favor the mental processing of the event. Accordingly, we hypothesized that Pennebaker's EWI could help cancer patients process the negative emotions linked to the cancer diagnosis. Our findings support the implementation of the Pennebaker's EWI in the supportive care of cancer patients, because even a single administration of the Pennebaker's EWI demonstrated a positive effect on the mental health of participants 6 months after the intervention.

In fact, decreases in global psychopathology and in almost all psychiatric symptom domains were observed in the EWG after 6 months from the Pennebaker's EWI administration, whereas the levels of psychiatric symptoms in the CG worsened at follow-up, or at best, they were similar to the baseline. This seems to confirm some previous findings regarding patients with cancer diagnoses [18, 23]. We observed a moderate effect of EWI on reducing psychoticism. This finding indicates a significant decrease in symptoms, such as isolated lifestyle, interpersonal alienation, and thought disorders [28]. As cancer diagnosis can lead to social withdrawal and cognitive disorganization [2, 8], it is possible that the EWI initiates a positive coping processes in patients, which includes the reorganization of thoughts and active research for social support. In this context, the effect of Pennebaker's EWI on anxiety and depressive symptoms could be linked to a positive change in the way people in the EWG perceived themselves as being less vulnerable and helpless than the people in the CG. At the same time,

Table 3 Baseline and follow-up scores of patients, and Cohen's *d* effect size

	EWG				CG				
	Baseline ($n = 35$)		Follow-up ($n = 17$)		Baseline ($n = 36$)		Follow-up ($n = 15$)		Effect size
Questionnaires	M	SD	M	SD	M	SD	M	SD	*d*
SCL90-R Global Severity Index	.89	.78	.57	.38	.59	.40	.61	.49	− .55
Anxiety	.67	.51	.88	.64	.49	.34	.92	.60	− .51
Depression	.66	.50	.63	.59	.50	.34	.69	.49	− .51
Hostility	.65	.50	.45	.31	.49	.34	.60	.82	− .72
Interpersonal sensitivity	.68	.51	.23	.16	.51	.35	.30	.36	− .55
Obsessive-compulsive	.71	.52	.68	.58	.54	.36	.60	.48	− .20
Paranoid ideation	.64	.50	.38	.34	.48	.34	.48	.49	− .61
Phobic anxiety	.63	.50	.19	.33	.47	.35	.20	.35	− .39
Psychoticism	.64	.50	.28	.23	.47	.33	.43	.37	− .75
Somatization	.67	.52	1.00	.69	.65	.42	.75	.43	.49
SF-36 Physical component	33.34	6.65	35.82	8.06	31.40	7.34	34.50	8.89	− .09
SF-36 Mental component	33.09	7.20	30.50	8.26	33.78	6.13	29.10	7.06	.31
TAS-20 Total score	46.97	13.36	48.00	12.91	46.22	10.44	51.00	11.35	− .31
Difficulty identifying feelings	13.51	6.29	15.00	7.27	13.25	5.56	16.00	5.82	− .21
Difficulty describing feelings	11.91	5.95	10.00	4.40	11.28	4.18	11.00	5.11	− .32
Externally oriented thinking	21.54	6.08	23.00	5.75	21.69	5.79	24.00	4.59	− .14

SCL-90-R Symptom Checklist-90-revised, *SF-36* Short Form-36 Items Health Survey, *TAS-20* Twenty-Item Toronto Alexithymia Scale, *EWG* Pennebaker's expressive writing intervention group, *CG* control group

the quality of relationships with other individuals was more positive in EWG patients than in controls at follow-up. The moderate reduction in the scales of hostility and interpersonal sensitivity among participants in the EWG can be interpreted as a positive change in their relationships, and it likely represents the fact that the EWI has helped the participants in the EWG perceive other people as being available and reliable.

The increase in somatization scores observed in the EWG at follow-up is a counterintuitive but very intriguing result. In the general context of protective effects of EWI on psychopathology, we tend to interpret this finding in terms of greater cognitive awareness of the physical aspects related to disease in the EWG. Our hypothesis is consistent with Bucci's [43] model of emotion processing, which suggests that the ability to recognize and regulate feelings depends on connections between sub-symbolic (physiological activities and imagery) and symbolic systems (language and cognition). The EWI could have favored the connection between these systems, generating greater awareness and psychological mindedness on the negative physical condition so that physical symptoms were recognized in the EWG, but these symptoms did not interfere with emotional processing and regulation, and thus did not foster psychiatric symptoms.

As far as quality of life is concerned, the mental health decreased in both groups at follow-up. However, a small effect was observed, indicating a lower decrease in the psychological well-being reported in the EWG than in CG. In contrast, EWI produced only a trivial and negligible negative effect on physical health. It seems useful to point out that this finding is not surprising and is likely related to the items concerning physical health in the SF-36 questionnaire, which mainly represent a list of usual health activities (e.g., being limited in work or activities). As argued by Pennebaker [29] in his early studies and further stressed by Smyth [19] in his meta-analysis, the Pennebaker's EWI may not be effective regarding actual behaviors, especially those concerning physical activities. So, the perception of well-being in cancer patients may not directly pass through changes in behavior, but rather through the modification of the cognitive and affective representations of experiencing the illness.

Finally, alexithymic responses at follow-up showed a higher increase in the CG than in the EWG. This finding suggests that mentally exploring one's own emotions through the EWI may reduce the development of secondary alexithymic responses. In the context of a cancer diagnosis, these responses could be conceived as a dysfunctional attempt to reduce the negative impact of an overwhelming event on self-concept and personal identity [44], and could therefore be seen as a maladaptive coping strategy based on a deactivation of affect response. Accordingly, although TAS-20 scores remained in the normal range among participants in the EWG both at baseline and at follow-up, these scores increased at follow-up among participants in the CG to the point that they reached the cut-off value of 51 for indicating the presence of prominent alexithymic traits [38].

Overall, the study's findings have relevant clinical meanings and implications, as they indicate that a single administration of the Pennebaker's EWI can be used to prevent the development of psychiatric symptoms and the surfacing of unconscious difficulties in the cognitive processing of negative emotions as a result of cancer diagnosis. This might in turn increase patients' compliance with medical treatment [45] and might improve their psychological adaptation to the diagnosis, thus reducing the risk for a worsened quality of life [14].

Limitations of the study and directions for future research

Our study supports the view that the Pennebaker's EWI can promote more adaptive psychological responses in diagnosed cancer patients. However, the results of this clinical trial must be considered in light of some limitations. A limitation concerns the reduced sample size and the dropout rate from the time of initial intervention to the follow-up 6 months later, which limits the generalizability and reproducibility of our results and their potential for impact cross-culturally. Another limitation concerns the lack of a placebo or a substitutive intervention for the CG. Furthermore, a single EWI session was administered to the EWG. Therefore, future research is warranted, which might include additional EWI sessions and might compare the EWI group with CGs engaged in different writing tasks that are unrelated to the Pennebaker's principles to test the specific impact of the Pennebaker's EWI method. In addition, although the measures used in this study were demonstrated to be valid and reliable in global research, it should be acknowledged that information collected by means of self-reported questionnaires is susceptible to a series of known biases. Future studies might consider the possibility of adopting a mixed method design that also includes psychological interviews.

Conclusions

Its limitations notwithstanding, our study may have relevant implications. To the best of our knowledge, this is the first study in which the effects of a single session of a modified Pennebaker's EWI have been tested after a period of 6 months on consecutively recruited cancer patients. The findings of our study support the use of the Pennebaker's EWI in the context of a first-time cancer diagnosis. In fact, the Pennebaker's EWI was effective in reducing the negative impact of cancer diagnosis on patients' mental health. Therefore, if the promising findings of our clinical trial are confirmed in future studies, the Pennebaker's EWI could be applied as an effective intervention method for the psychological support of cancer patients and essentially at no cost to the National Health Services.

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