ELSEVIER

Patient Education and Counseling 72 (2008) 436–442

Patient Education and Counseling

www.elsevier.com/locate/pateducou

Mindfulness-based stress reduction training for oncology patients: Patients' appraisal and changes in well-being

Arenda Kieviet-Stijnen *, Adriaan Visser, Bert Garssen, Welmet Hudig

Helen Dowling Institute, Center for Psycho-oncology, P.O. Box 85061, 3508 AB Utrecht, The Netherlands

Received 25 January 2008; received in revised form 27 May 2008; accepted 28 May 2008

Abstract

Objective: This study explores satisfaction and changes in well-being in cancer patients following mindfulness-based stress reduction training.
Method: Data were collected in 47 cancer patients before and after the training, and also 1 year later. Standardized questionnaires were used to measure quality of life, joy in life, mood disturbances (depression, anger, vigor, fatigue, and tension), meaning in life and physical symptoms.
Results: Participants were highly satisfied and said they had reached their goals with the training. The results show that directly after the training patients reported a better quality of life, more joy in life, less tension, and fewer physical symptoms. These effects appeared even stronger at follow-up. A year after the training a decrease was also found in depression, anger, vigor and total mood disturbance. No changes could be established for meaning in life and fatigue. Effect sizes varied between 0.28 and 0.60, indicating small-to-moderate changes.
Conclusion: Mindfulness training potentially supports cancer patients in handling the stress due to their life-threatening disease and increases their well-being. Several suggestions for further research are discussed.
Practice implications: Mindfulness training provides cancer patients with tools to deal with their limitations and worries, both during and after their treatment.

Keywords: Cancer; MBSR; Quality of life; Joy in life; Distress; Evaluation; Goals

1. Introduction

Cancer and its treatment make great demands on patients' coping abilities. The confrontation with cancer can be considered a traumatic event, due to the often life-threatening character and the far-reaching physical consequences of the treatment, the perceived lack of control and the uncertainty about the outcome of the disease [1]. Stress symptoms range from 20% in patients with early stage cancer to 80% in patients with a recent recurrence [1,2]. Screening studies indicate that about 35% of cancer patients experience significant general psychological distress [3,4].

Several types of psychological interventions have been developed to help patients in the adjustment to their disease and treatment [5]. A promising, relatively new therapeutic approach, developed to help people in their adjustment to cancer, is mindfulness-based stress reduction training, which is successfully used in chronically ill patients and cancer patients [6–11]

1.1. Mindfulness-based stress reduction

The mindfulness-based stress reduction training (MBSR) developed by Kabat-Zin et al. [7] is designed to support people who face stress, pain and illness, making use of the classic principles of mindfulness meditation. Mindfulness means paying attention to what is present in the moment and registering with full awareness without making any judgment about the relevance, cause or consequences of the experiences [6]. Training to develop the capacity to evoke and apply mindfulness is done with the help of meditation exercises. In these exercises patients pay direct attention to bodily sensations, thoughts, and emotions and learn to distinguish them from the associated attributions and evaluations. Through careful and detached observation patients learn to recognize the onset of symptoms (e.g., pain, depressive thoughts, anger, fatigue), and to change or enhance coping strategies to deal with them [7]. People can learn to "live in the moment," which

* Corresponding author. Tel.: +31 30 2525032; fax: +31 30 2524022.
E-mail address: akieviet@hdi.nl (A. Kieviet-Stijnen).

0738-3991/$ – see front matter
doi:10.1016/j.pec.2008.05.015

is especially advantageous in times of doubt, fear and confusion ''to notice what are, for them, stressful conditions'' and to respond to these conditions mindfully instead of reacting automatically and unconsciously [8]. Teasdale et al. [12] included cognitive elements in the mindfulness-based approach, which they used in their treatment of depression. Patients are taught to view their thoughts and feelings as passing mental events, rather than aspects of themselves or facts reflecting the reality, in order to prevent the rumination of negative thoughts. This is also a useful element for cancer patients, who are particularly vulnerable of becoming absorbed in anxiety, worries and depressive thoughts.

There are a growing number of studies on the effects of mindfulness training for cancer patients. Only two studies that concerned cancer patients were included in Baer's 2003 review of 21 studies about the effects of mindfulness training [13,14]. These two studies showed that patients who had followed mindfulness meditation training reported fewer mood disturbances, measured by the POMS [15] and lower stress levels, measured by the SOSI [16]. Brown and Ryan later confirmed these findings [10]. A later review of MBSR intervention studies for cancer patients [17] included four other published studies and three ongoing ones. Outcomes of MBSR for cancer patients showed significant improvements in quality of life and decreased symptoms of stress, which lasted over a 6-month follow-up period [13,18,19]. In another recent review, Ott et al. [9] described the results of nine studies, consistently showing an improvement in psychological functioning, reduction of stress symptoms, increased well-being and enhanced coping skills in cancer outpatients following a mindfulness meditation training. A study of Carlson showed better sleep quality and a decrease in fatigue, stress and mood disturbance in cancer outpatients after following MBSR [19]. However, in a randomized controlled trial of Shapiro et al. [20] no differences in sleep efficacy were found between the patients who followed MBSR and the control group. Nevertheless, there was a positive relation in these MBSR groups between the amount of meditation practice and sleep quality.

The reviewed studies show some methodological weaknesses. First, studies applied a follow-up no longer than 6 months [9,14]. Second, the spectrum of measured effects is often limited to distress, while measures of quality of life and positive feelings are often missing [9]. Third, there is a need for more insight into the goals of patients who participate in MBSR and how satisfied they are with this training [9,17].

1.2. Research questions

We have studied the goals of cancer patients participating in a MBSR training and satisfaction after the training. We also measured changes in their well-being on a wide spectrum of indicators from pre- to post-treatment, and at 1 year follow-up. We expected to find a reduction in mood disturbance and physical symptoms and an improvement in overall quality of life, joy and meaning in life.

2. Methods

2.1. Intervention

The MBSR training consists of eight weekly sessions of 2.5 h. Clients are encouraged to practice at home daily for 3/4 h using an exercise CD and to do other homework assignments. In the sixth week of the training course, participants practice meditation in silence for a whole day of 8 h, which is a standard component of the Kabat-Zinn training. Each training group is guided by two therapists; both are experienced in working with cancer patients and one of them has been trained in MBSR.

The training program contained the following ingredients: (a) learning to meditate, (b) systematic monitoring of the body, (c) exploring one's own limits and carefully trying to shift these limits, (d) recognizing and investigating thoughts and cognitions, (e) recognizing daily stress inducing conditions and their emotional impact, and (f) learning more possible ways to handle daily stress. Besides the meditation group exercises, practicing mindfulness in everyday life is emphasized. During the course several exercises like ''mindful eating and walking'' are practiced, to encourage clients to maintain mindful presence during their daily activities. This program is mainly based at the original approach by Kabat-Zinn et al. [7,8].

Our MBSR program also includes cognitive elements. Clients are explicitly asked to be alert to potentially ruminative thoughts [12]. They learn a three-minute exercise in which they focus on their breathing, as a tool to avoid a negative spiral of thoughts and emotions. This exercise can be used when one notices that one is becoming absorbed in a stressful situation. As part of the homework, clients register frequent thoughts that are beneficial or not, stressful communication, pleasant and unpleasant events and the accompanying physical sensations, emotions and thoughts.

2.2. Participants and procedures

Clients of twelve training groups were invited to participate in the study by completing questionnaires. The MSBR groups were part of the clinical practice of our institute. However, participants of these groups were not obliged to participate in the study. In a few cases partners of cancer patients also followed the training, because the institute also provides psychosocial care for partners, but only the patients were recruited for this study. There were no further inclusion or exclusion criteria for participation in the study. Clients were informed at the first meeting about the study by the researcher and received the first questionnaire to be sent back by mail. Those who agreed to participate in the study gave written informed consent. A total of 142 patients followed the training, of whom 93 (65%) participated in the study (see Table 1). Sixteen participants failed to return the post-treatment questionnaire, handed to them at the last meeting (17% dropout). At the follow-up measurement (a year after the training), 30 patients (39%) did not respond to the mailed questionnaire. Reasons for non-response are mostly unknown ($n = 39$); two participants left the training prematurely and in

Table 1
Participants and dropouts in the study

	Pre measurement ($N = 93$)[a]	Post measurement ($N = 77$)	Follow-up ($N = 47$)
Men	26	23	13
Women	67	54	34
Non participants	49	16	30
Dropout (%)	35[a]	17	39

[a] A total of 142 patients participated in the training groups.

five patients the dropout was due to worsening of medical conditions or death. Data from 47 participants were available for all three time points; that is 33% of the group of patients who took the training ($N = 142$) and 51% of the group of patients who consented ($N = 93$).

2.3. Measures

2.3.1. Background characteristics

Demographic and medical data (type of disease, date of diagnosis, metastases and current treatments) were collected during the pre-measurement. Changes in treatment and the disease status were reported at the post-measurement and the follow-up.

2.3.2. Well-being measures

Overall quality of life was measured with a 10 cm Visual Analogue Scale running from ''very bad'' to ''very well'' [21]. The position of the scores along the scales was rounded off to full centimeters.

Physical symptoms were measured by seven selected items of the Rotterdam Symptom Checklist [22]. Patients scored on a scale, ranging from 1 (''not at all'') to 4 (''very much'') how severely they experienced the following symptoms: fatigue, lack of energy, pain, lack of appetite, concentration difficulties and feeling tense.

Mood disturbance was measured with the Dutch short version of the Profile of Mood States [15,23] containing 32 items divided into five subscales: depression, anger, fatigue, tension, and vigor. Patients rated on a scale from 0 (''not at all'') to 4 (''very much''). The mean of each subscale was used and a total score was calculated by summing up the scale means while weighting the ''vigor-activity'' subscale negatively [24].

Joy in life was measured with the subscale of the Health and Disease Inventory [25]. This scale contains twelve items inquiring after positive moods, which are rated from 1 (''never'') to 6 (''always'').

Experienced meaning in life was studied with four questions, which are rated from 0 (''not at all'') to 4 (''wholly''). This scale was self-developed and used in several other studies among cancer patients [21,26-28], proving to be sensitive for measuring effects of psychological interventions for cancer patients.

Social desirability was measured with the Dutch Short Version of the Marlowe Crowne Social Desirability Scale [21,29].

2.3.3. Goals and evaluation

Personal training goals were formulated by the clients in the first questionnaire. At post-treatment they scored changes with respect to their self-formulated goals. The procedure for analyzing the content of the goals was developed in a separate study [30].

Satisfaction with the training was assessed at post-measurement with the Dutch version of the Client Satisfaction Questionnaire (CSQ-8) [31]. This scale has proven to be reliable in several studies [26–28], and not sensitive for the influence of the measured social desirability tendency. Clients

Table 2
Demographic and medical characteristics of the patients who complete the three measures ($N = 47$)

Characteristics	Participants (*N*, %)
Sex (*N*, %)	
men	13 (28)
women	34 (72)
Age (years)	
M (S.D.)	48.4 (7.6)
range	31–65
missing	3 (6)
Type of cancer (*N*, %)	
breast	19 (40)
hematological	6 (13)
gynecological	6 (13)
gastrointestinal	4 (9)
skin	3 (6)
other types	6 (13)
missing	3 (6)
Metastases (*N*, %)	
yes	13 (28)
no	15 (32)
missing	19 (40)
Months after diagnose (*N*, %)	
<12	18 (38)
12–24	8 (17)
>24	11 (24)
missing	10 (21)
Treatment at pre-test (*N*, %)	
No treatment	4 (9)
Surveillance	11 (23)
Hormonal	8 (17)
Chemo	8 (17)
Radio	3 (6)
Other treatments	3 (6)
Alternative /complementary	10 (21)
Treatment changes during training (*N*, %)	
Nothing changed	29 (62)
Treatment ended	6 (13)
Treatment started	6 (13)
Treatment changed	4 (9)
Missing	2 (4)
Treatment changes during follow-up period (*N*, %)	
Nothing changed	25 (53)
Treatment ended	10 (21)
Treatment started	3 (6)
Treatment changed	7 (15)
Missing	2 (4)

were also asked to give a school mark (running from 1 to 10, higher scores expressing more appreciation), which could be explained with remarks.

2.3.4. Data analyses

Quantitative data analyses were performed using the Statistical Package for the Social Sciences (SPSS), version 11.1 for Windows. Missing data on item level were imputed if no more than 25% of the items scores for a particular subscale of a participant were missing. The replacement value was based on the median score of that particular item and the subscale mean of the participant (based on the remaining items). To investigate the impact of dropout, subjects with complete data were compared to the dropouts on their pre-measurement scores, using *t*-tests. Differences in demographic and medical variables were investigated with chi-square tests. Differences in pre-, post- and follow-up scores were tested with the General Linear Model for repeated measures (rMANOVA). Significance level was set at $p \leq .05$. In addition, Cohen's effect sizes were calculated with the following formula: d = (mean post or follow-up − mean pre)/S.D. pre [32]. To analyze the training goals of the participants, we made use of open coding and categorizing, using axial coding [33,30].

3. Results

3.1. Reliability and influence of social desirability

Cronbach's alpha was >0.80 for all well-being scales, except for meaning in life (alpha = 0.63). This scale was not removed in the analysis, because reliability was sufficient in other studies [26–28] None of the well-being scales appeared to be significantly associated with the social desirability scores.

3.2. Participants

Demographic and medical characteristics are listed in Table 2. The group of 47 participants consisted of 34 women and 13 men; mean age at the start of the training was 48 years (S.D. = 7.6). Nineteen patients were diagnosed with breast cancer, six with hematological cancers, six with gynecological tumors, four with gastrointestinal cancers and nine with various other types. Eighteen patients started the training within the first year after their diagnosis, eight patients started between 1 and 2 years after their diagnosis and for eleven patients their diagnosis was more than 2 years prior.

Table 4
Reported goals and satisfaction by the patients

Pre measurement		
Formulated goals (*N*, %)		
Coping with illness		20 (43)
Finding inner tranquility		29 (62)
Raising self esteem		14 (30)
Living more conscious and meaningful		14 (30)
Learn to meditate		9 (20)
Contacting peers		6 (13)
Satisfaction at post measurement		
Rating as school mark	*M* (S.D.)	8.1 (0.9)
	Range	6–10
CSQ-total score	*M* (S.D.)	3.4 (0.4)
	Range	2–4

At pre-measurement, 32 participants still received standard medical treatment. Ten patients used forms of complementary care such as diets and food supplements, or alternative medical treatments. Only eleven patients had regular medical check-ups and four patients had no medical treatment at all. During the training medical treatment ended for six patients, another six patients started a new medical treatment and four patients changed their medical treatment. During the follow-up period, the medical treatment ended for ten patients and started for three patients; seven patients completed their medical treatment and started another.

A few changes were reported with respect to the course of the disease; during the training one person had a recurrence, and for another patient the tumors diminished at a faster pace. During the follow-up period two persons had metastases.

The 47 participants who completed data on the follow-up measurement were compared with the dropouts ($n = 45$). No significant differences between completers and non-completers

Table 3
Comparison of the well-being scores of participants at the pre measurement and the dropouts

	Possible range	Pre-measurement			Dropouts			*p*-values *t*-tests
		N	*M*	S.D.	*N*	*M*	S.D.	
Quality of life	0–10	42	6.1	2.0	43	6.1	2.1	0.740
Joy in life	1–6	46	4.1	0.8	45	4.0	0.8	0.672
Meaning in life	0–4	47	2.9	0.5	45	2.7	0.6	0.080
Physical symptoms	1–4	46	1.9	0.5	44	2.0	0.5	0.463
Mood								
depression	0–4	47	0.9	0.7	45	1.0	0.8	0.243
anger	0–4	47	0.8	0.5	45	1.0	0.9	0.139
fatigue	0–4	47	1.0	0.9	45	1.3	1.0	0.174
vigor	0–4	47	1.9	0.9	45	2.0	0.9	0.896
tension	0–4	47	1.1	0.9	45	1.3	0.9	0.295
Total mood disturbance	−4 to 16	47	1.8	3.0	45	2.6	3.5	0.202

Table 5
Changes in well-being: pre-, post- and follow-up comparisons

	Possible range		Pre		Post		Follow-up		*p*-values[a]			Effect size[b]	
		N	*M*	S.D.	*M*	S.D.	*M*	S.D.	Overall	Pre–post	Pre–fup	Pre–post	Pre–fup
Quality of life	0–10	42	6.1	2.0	7.0	2.1	7.1	2.3	0.008	0.008	0.007	0.43	0.46
Joy in life	1–6	46	4.1	0.8	4.3	0.8	4.5	0.7	0.001	0.017	0.000	0.28	0.53
Meaning in life	0–4	47	2.9	0.5	2.9	0.5	3.0	0.5	0.087	0.854	0.031	0.02	0.32
Physical symptoms	1–4	46	1.9	0.5	1.8	0.05	1.7	0.5	0.003	0.018	0.001	−0.25	−0.39
Mood													
Depression	0–4	47	0.9	0.7	0.7	0.6	0.5	0.7	0.001	0.249	0.001	−0.20	−0.54
Anger	0–4	47	0.8	0.5	0.7	0.6	0.5	0.6	0.035	0.346	0.011	−0.16	−0.46
Fatigue	0–4	47	1.0	0.9	0.9	0.9	0.8	0.7	0.288	0.443	0.114	−0.12	−0.22
Vigor	0–4	47	1.9	0.9	20.2	0.8	2.3	0.8	0.033	0.062	0.010	0.24	0.38
Tension	0–4	47	1.1	0.9	0.8	0.6	0.6	0.5	0.000	0.009	0.000	−0.34	−0.60
Total mood disturbance	−4 to 16	47	1.8	3.0	1.0	2.6	0.1	2.7	0.006	0.054	0.000	−0.29	−0.59

[a] General Linear Model for repeated measures; contrasts with respect to the pre-measurement (simple).
[b] Cohen's effect size (*d*); calculated as M2 − M1/SD1.

were found for the demographic and medical characteristics (data not shown), and the baseline well-being measures (see Table 3).

3.3. Goals and evaluation of the training

Before the start of the training the participants formulated up to three goals for their training. We clustered the goals into six categories, which are shown in Table 4 [30]. The most common goals were to cope better with their illness, to find inner tranquility and to raise self-esteem. Other goals were to live more consciously and lead a meaningful life. Clients also expressed objectives more directly related to the content of the training, such as learning to meditate and having peer contacts. After the intervention, all clients reported progress towards at least one of their goals (data not shown).

Participants were very satisfied with the training (see Table 4). The mean rating (ranging from 1 to 10) was 8.0 (S.D. = 0.9). The mean measure on the CSQ (ranging from 1 to 4) was 3.4 (S.D. = 0.4). These findings indicate that the participants were content with the amount and quality of the support they received and the improvement in handling their problems. They would recommend the training to others. In their remarks clients expressed their appreciation for the warm and positive support. One of the clients stated:

> "*The personal guidance gave me more self-insight and strengthened to a certain degree the feeling of mastering my own life*."

Some clients missed the interaction with peers and the personal exchange about their illness. A few participants experienced the meditation exercises as vague or superficial. However, one person remarked:

> *"Sometimes I thought I missed something, but after a while I saw that the exercises, in all their simplicity, bore an enormous richness, especially when regularly practiced."*

Clients emphasized in their comments the usefulness of the training for their daily life, illustrated by the following remark:

> *"The training for me is one of the ways to handle the stress, emotions and difficult choices which are connected with having a life-threatening disease."*

3.4. Changes in well-being

Changes in wellbeing are presented in Table 5. A significant change over time was found for most variables, except for meaning in life and fatigue. In the remaining variables, a significant change was not always seen in the pre–post contrasts, but were present in the pre–follow-up contrasts due to further improvement in the period after the end of the intervention. Effect size for the pre–follow-up contrasts were small for quality of life, meaning in life, physical symptoms, anger, fatigue and vigor. Effect sizes were medium for joy in life, depression, tension and POMS total mood.

4. Discussion and conclusion

The aim of this study was to evaluate a mindfulness-based stress reduction training for cancer patients and to explore changes in well-being. Data of 47 participants were available at pre-, post- and follow-up measurements. Participants were highly satisfied and reported that they had reached their goals by following the training. These goals included coping with their illness, finding inner tranquility and raising self-esteem.

The questionnaire data showed a positive shift over time on several well-being measures. Directly after the training, patients reported a better quality of life, more joy in life, less tension and fewer physical symptoms. These effects were maintained or appeared stronger at follow-up. In addition, a decrease was found a year after the training in depression, anger and total mood disturbance, while vigor increased. No changes could be established for fatigue. Effect sizes of the significant variables varied from 0.28 to 0.60, indicating small-to-moderate changes.

4.1. Discussion

The remarks to the satisfaction scores indicated that the clients would have preferred more interaction with peers and more personal exchange about their illness. Although interactions between the participants are intentionally reduced in MBSR [6–8], we have included more personal exchange in the present training program. These remarks emphasize that it is important for many patients to follow the training in a group.

Some of the reported levels of well-being can be compared with scores of norm populations. Compared to scores for general practitioner patients [23], the attendants of the mindfulness training were, at the start of the training, more depressed, upset, fatigued and tense, and less vigorous. With respect to scores for psychiatric patients [34] the cancer patients in our study had fewer mood symptoms and somewhat more vigor. After 1 year the scores of cancer patients were comparable to those of the general practitioner patients. In the psychometric study on the Health and Disease Inventory [25] the mean score for joy in life was $M = 4.8$ (S.D. = 0.8) in cancer patients visiting the hospital. Joy in life scores for the participants of this study fall in this range at all three moments, indicating that the patients in our study do not experience significantly less joy in life than a norm group of cancer patients.

Our findings are in line with the results of other uncontrolled and controlled studies examining MBSR for cancer patients as reviewed by Ott et al. [9], which indicated improved quality of life and decreased stress symptoms. In general, effect studies of MBSR found greater effects for psychological variables (e.g., anxiety, depression, stress and global psychological functioning) than for somatic outcomes (pain, physical symptoms) [6]. Physical symptoms decreased in our study as much as the psychological measures, but most of these physical symptoms are psychologically related (e.g., feeling tense, lack of energy, concentration difficulties) and it is the scores on exactly these items of this scale that did change (data not shown). The item fatigue in the symptom questionnaire showed a decrease, though the subscale fatigue (POMS) did not change significantly.

It is also important to stress that our study found effects of the MBSR on the positive measures of the well-being scales, like quality of life and joy. These are relevant aspects of the well-being of cancer patients, although seldom studied in MBSR trainings [9].

4.2. Limitations

There are some limitations in our study, such as the lack of a control group, the fact that participants referred themselves to the training and the number of dropouts. Due to the lack of a control group, the changes we found may also be the consequence of the passage of time. In 38% of the cases there were changes in the treatment during the intervention, and in 47% during the follow-up periods. These treatment changes could also have affected the results. The numbers of patients is too small to correct for these factors. It should be noted that for this study participants were recruited from cancer patients who had already decided to receive psychosocial support. These patients may have specific needs or problems, but they represent the majority of cancer patients participating in psychosocial care facilities; this increases the ecological validity of our study.

The number of patients that dropped out of the study may have influenced the results of this study. However, the non-completers did not differ from the completers with respect to demographic characteristics, disease variables, and the well-being scores at pre-measurement. We like to stress too that the whole training was intensive, with several ours of homework. This may also have caused the dropout for filling in questionnaires. The follow-up measure, which was a year after the closing the training, may have contributed too to the dropout in that stage of the study, although these long-term effects are seldom studied in the mindfulness research [14,18]. Several others authors do not give information about the found dropout rates in the studies by Mackenzie et al. [36] and Mansy and Wallerstedt [37] and the review by Grossman et al. [38]. The amount of dropouts in other studies are sometimes lower like 9% mentioned by Ott et al. [9] and 17% in Speca et al. study [14], but sometimes also comparable with the dropout in our study, like the 53% mentioned by Carlton et al. [13].

4.3. Practice implications

In our study patients followed MBSR mostly 1–2 years after treatment, at the moment they wanted to return to normal life and realized that this is not so simple. Mindfulness training could provide cancer patients with tools to deal with their limitations and worries. It could also be a way to handle the stress of medical treatment, as is demonstrated by Moscoso et al. [35], who delivered a short MBSR during chemotherapy resulting in better physical functioning, greater vitality, fewer role limitations and improved mental health.

The mindfulness-based stress reduction training seems to be a promising tool for handling a life-threatening disease and is worth studying further. To make MBSR more evidence-based, it is not only necessary to compare the intervention groups with non-treatment control groups, but also to apply it to patients who had already decided for a psychological intervention, as in this study. This limits the possibility of using a control group, but it raises the external validity of the study for cancer patients searching for psychosocial care.

Acknowledgements

We strongly acknowledge the participation of the patients and the therapists. The appreciated language help was provided by Elisabeth Duverlie, Baltimore, USA.

Role of funding: There was no external financial support for the conduct of the research

Conflict of interest

There is no conflict of interest.

References

[1] Gurevich M, Devins GM, Rodin GM. Stress response syndromes and cancer: Conceptual and assessment issues. Psychosomatic 2002;43: 259–81.

[2] Koopman C, Butler LD, Classen C, Giese-Davis J, Morrow GR, Westendorf J, et al. Traumatic stress symptoms among women with recently diagnosed primary breast cancer. J Trauma Stress 2002;15:277–87.

[3] Carlson LE, Bultz BD. Cancer distress screening: needs, models, and methods. J Psychosom Res 2003;55:403–9.

[4] Zabora J, Brintzenhofeszoc K, Curbow B, Hooker C, Piantadosi S. The prevalence of psychological distress by cancer site. Psychooncology 2001;10:19–28.

[5] Newell SA, Sanson-Fisher RW, Savolainen NJ. Systematic review of psychological therapies for cancer patients: overview and recommendations for future research. J Nat Cancer Inst 2002;94:558–84.

[6] Baer RA. Mindfulness training as a clinical intervention: a conceptual and empirical review. Clin Psychol Sci Pract 2003;10:125–43.

[7] Kabat-Zinn J, Lipworth L, Burney R. The clinical use of mindfulness mediation for the self-regulation of chronic pain. J Behav Med 1985;8: 163–89.

[8] Kabat-Zinn J, Massion AO, Hebert JR, Meditation Rosenbaum E. In: Holland JC, editor. Psycho-oncology. New York: Oxford University Press; 1998. p. 767–79.

[9] Ott MJ, Norris RL, Bauer-Wu SM. Mindfulness meditation for oncology patients: a discussion and critical review. Integrat Cancer Therap 2006;5:98–108.

[10] Brown KW, Ryan RM. The benefits of being present: Mindfulness and its role in psychological well-being. J Personal Soc Psychol 2003;84:822–48.

[11] Ivanowski B, Mahli GS. The psychological and neurological concomitants odf mindfulness forms of meditations. Acta Neuropsychiat 2007;19: 76–91.

[12] Teasdale JD, Segal ZV, Williams JM, Ridgeway VA, Soulsby JM, Lau MA. Prevention of relapse/recurrence in major depression by mindfulness-based cognitive therapy. J Consult Clin Psychol 2000;68:615–23.

[13] Carlson LE, Ursuliak Z, Goodey E, Angen M, Speca M. The effects of a mindfulness meditation-based stress reduction program on mood and symptoms of stress in cancer outpatients: 6-month follow-up. Supp Care Cancer 2001;9:12–123.

[14] Speca M, Carlson LE, Goodey E, Angen M. A randomized, wait-list controlled clinical trial: the effect of a mindfulness meditation-based stress reduction program on mood and symptoms of stress in cancer outpatients. Psychosom Med 2000;62:613–62.

[15] McNair P, Lorr M, Drappelman L. POMS manual. San Diego, CA: Education and Industrial Testing Services; 1971.

[16] Leckie MS, Thompson E. Symptoms of stress inventory. Seatle: University of Washington; 1979.

[17] Smith JE, Richardson J, Hoffman C, Pilkington K. Mindfulness-Based Stress Reduction as supportive therapy in cancer care: systematic review. J Adv Nurs 2005;52:315–7.

[18] Carlson LE, Speca M, Patel KD, Goodey E. Mindfulness-based stress reduction in relation to quality of life, mood, symptoms of stress, and immune parameters in breast and prostate cancer outpatients. Psychosom Med 2003;65:571–81.

[19] Carlson LE, Garland SN. Impact of mindfulness-based stress reduction (MBSR) on sleep, mood, stress and fatigue symptoms in cancer outpatients. Int J Behav Med 2005;12:278–85.

[20] Shapiro SL, Bootzin RR, Figueredo AJ, Lopez AM, Schwartz GE. The efficacy of mindfulness-based stress reduction in the treatment of sleep disturbance in women with breast cancer—an exploratory study. J Psychosom Res 2003;54:85–91.

[21] Janson R, Remie ME, Maex E, Visser AP, Garssen B. Meer dan mijn kanker - Cliënten aan het woord over de begeleiding door het Helen Dowling Instituut [Being more than my cancer: experiences with the support by the Helen Dowling Institute]. Rotterdam/Tilburg: Barjesteh Meeuwes & Co./Syntax Publ Tilburg; 1996.

[22] Haes JCJMd, Olschewski M, Fayers P, Visser MRM, Cull A, Hopwood P, et al. De Rotterdam Symptom Checklist. Eeen handleiding [The Rotterdam Symptom Checklist (RSCL). A Manual]. Groningen: Noordelijk Centrum voor Gezondheidsvraagstukken; 1996.

[23] Wald FDM, Mellenbergh GJ. De verkorte versie van de Nederlandse vertaling van de profile of mood states (POMS) [Being more than my cancer: experiences with the support by the Helen Dowling Institute]. Ned Tijdschr Psychol 1990;45:86–90.

[24] Kieviet-Stijnen A, Visser A, Garssen B. De profile of mood states (POMS) vragenlijst: berekening van subschalen en somscore [The POMS: calculation of the subscales and the total sum scores]. Gedrag Gezondh 2003;5:360–4.

[25] Bruin EJd, Dijk Mv, Duivenvoorden HJ. Assessing adjustment to cancer: the health and disease inventories (HDI). Lisse: Swets & Zeitlinger; 1996

[26] Remie ME, Zoeteman M, Brommer-Fogaras J, Maex E, Visser A, Garssen B. Ruimte voor jezelf. Evaluatie groepsbegeleiding voor mensen met kanker door het Helen Dowling Instituut [Room for yourself: evaluation of group support for people with cancer by the Helen Dowling Institute]. Utrecht: HumaDruk, 2000.

[27] Bloem E, Kieviet-Stijnen A, Visser AP, Pet JG. Evaluatie basiscursus voor mensen met kanker - 'Werken aan verwerking. [Working at the coping with cancer: evaluation of the basic course for people with cancer]. Tijdschr Kanker 2006;12–6.

[28] Janmaat M, Kieviet-Stijnen A, Visser A, Pet A, Garssen B. Ervaringsgerichte groepen voor mensen met kanker: evaluatie en veranderingen in welbevinden [Experiential groups for people with cancer: evaluation and changes in well-being]. Tijdschr Groepsdynam Groepspsychotherap 2008;3(2):7–20.

[29] Crowne DP, Marlowe D. A new scale of social desirability independent of psychopathology. J Cons Psychol 1960;24:349–54.

[30] Kieviet-Stijnen A, Visser A, Garssen B, Pet A. Stilstaan bij het leven. Doelen van mensen met kanker in groepsbegeleiding. [Mindfull living. Personal aims of people with cancer participating in support groups]. Maandbl Geest Volksgezondh 2004;9:697-710.

[31] Larsen DL, Attkisson CC, Hargreaves WA, Nguyen TD. Assessment of client/patient satisfaction: development of a general scale. Eval Program Plann 1979;2:197–207.

[32] Kromrey JD, Fosterjohnson L. Determining the efficacy of intervention: the use of effect sizes for data analysis in single-subject research. J Exp Educ 1996;65:73–93.

[33] Boeije H. A purposeful approach to the constant comparative method in the analysis of qualitative interviews. Qual Quant 2002;36:391–409.

[34] Groot MHd. Psychometrische aspecten van een stemmingsschaal (Verkorte POMS) [Pschometric aspects of a moodscale (Short POMS)]. Gedrag Gezondh 1992;20:46–51.

[35] Moscoso MS, Reheiser EC, Hann DA. Effects of a brief mindfulness meditation intervention in cancer patients. Psychooncology 2004;13: S108.

[36] Mackenzie MJ, Carlson LE, Munoz M, Speca M. A qualitative study of self-perceived effects of mindfulness-based stress reduction (MBSR) in a psychosocial oncological setting. Stress Health 2007;23:59–69.

[37] Mansky PJ, Wallerstedt DB. Complementary medicine in palliative care and cancer symptom management. Cancer J 2006;12:425–31.

[38] Grossman P, Niemann L, Scmidt S, Walch H. Mdfulness-based stress reduction and health Benefits: a meta analysis. J Psychosom Res 2004;67: 35–43.