Received: 3 June 2018 | Revised: 31 October 2018 | Accepted: 5 November 2018

DOI: 10.1002/pon.4940

PAPER

WILEY

Early rehabilitation of cancer patients—An individual randomized stepped-care stress-management intervention

Cecilia Arving[1,2] | Jörg Assmus[3] | Inger Thormodsen[1] | Sveinung Berntsen[2,4] | Karin Nordin[2,4]

[1] Department of Oncology and Medical Physics, Haukeland University Hospital, Bergen, Norway

[2] Department of Public Health and Caring Sciences, Uppsala University, Uppsala, Sweden

[3] Centre for Clinical Research, Haukeland University Hospital, Bergen, Norway

[4] Department of Public Health, Sport and Nutrition, Faculty of Health and Sport Sciences, University of Agder, Kristiansand, Norway

Correspondence
Cecilia Arving, Department of Public Health and Caring Sciences, Uppsala University, Box 564, SE-751 22 Uppsala, Sweden.
Email: cecilia.arving@pubcare.uu.se

Funding information
Norwegian Cancer Society; Grieg Foundation

Abstract

Objective: To evaluate the effects of an individual stepped-care stress-management intervention for cancer patients on cancer-related stress reactions (intrusion/avoidance), and secondarily on psychological distress (anxiety/depression) and emotional reactivity (impatience/hostility).

Methods: Consecutively 291 cancer patients were included in a randomized controlled intervention study. Patients randomized to the intervention who did not report clinically significant stress levels (n = 72) after the first counseling session participated in only one counseling session and a follow-up (Step 1). The remaining patients (n = 66) received an additional three to eight sessions, depending on individual needs (Step 2). The intervention used techniques derived from cognitive behavioral therapy (CBT) such as daily registration of events and behaviors as well as scheduled behavioral and physical activity, along with short relaxation exercises. The intervention was completed within 26 weeks of inclusion. The Impact of Event Scale, Hospital Anxiety and Depression Scale, and Everyday Life Stress Scale were used to evaluate effects for 2 years.

Results: The linear mixed effects model analysis showed a difference between the randomization groups in favor of the intervention for avoidance and intrusion after the first 6 weeks (P = 0.001 and P = 0.003) and for emotional reactivity after 17 weeks (P = 0.007). There were no differences in psychological distress. Decreases in cancer-related stress reactions and depression were noted for the Step 2 intervention.

Conclusions: An individual stepped-care stress-management intervention for cancer patients, performed by specially educated health professionals using techniques derived from CBT, seems beneficial for cancer patients and may therefore be a realistic complement to routine cancer care.

KEYWORDS

anxiety, cancer, counseling, depression, life stress, linear mixed effects model, methods derived from cognitive behavioral therapy, oncology, psychological, stress disorders

1 | BACKGROUND

There is a call for rehabilitation in cancer care, due to a new situation characterized by a stable rise in the incidence of cancer overall and an increasing number of cancer survivors.[1,2] Based on a holistic approach to rehabilitation and the Model of Functional Health, a theoretical framework of rehabilitation,[3] cancer rehabilitation aims to prevent and reduce the physical, psychological, social, and spiritual consequences of a cancer disease and its treatment.[4]

Cancer may result in *cancer-related stress reactions* such as intrusive thoughts (eg, re-experiencing the trauma) and avoidance (eg, denial of the event and emotional numbing).[5-7] Prevalence of intrusive

thoughts and avoidance among cancer patients varies from 12% to 75% and 3% to 14%, respectively.[8-10] Intrusive thoughts and avoidance may be predictors of psychological distress and can therefore be used to identify patients who are at risk of possible future problems involving psychological distress and/or emotional reactivity.[9,11-13] *Psychological distress* is defined as "a multifactorial unpleasant emotional experience of psychological (cognitive, behavioral, emotional), social, and/or spiritual nature that interfere with the ability to cope with cancer, its physical symptoms and its treatment".[14] It is a subjective experience and includes symptoms such as anxiety and depression. Reviews report prevalence rates between 17% and 49% for anxiety and between 5% and 60% for depression among cancer patients.[15-17] In an already challenging situation, day-to-day stressors, such as hassles related to work or caring for others, may evoke more severe and disrupting *emotional reactivity*, manifested as impatience, anger, hostility, and aggravation, in newly diagnosed cancer patients.[18,19] Curt and colleagues report irritability and frustration in about 50% of their study participants.[20]

Reviews[21-23] report that interventions using techniques derived from cognitive behavioral therapy (CBT) are often successful, but how to determine the amount of specialist therapist time required for the individual patient needs to be further explored. One way to approach this issue is to use stepped-care models.[24,25] According to a stepped-care model, the intervention starts with a low-intensity intervention, expected to generate some effects. Only patients who do not respond to the low-intensity intervention, or who have more severe symptoms, are offered a more extensive intervention as a second step.[26] Experiences of using a stepped-care model in cancer care are scarce.[13,27,28] The Breast Cancer and Stress (BAS) project,[13,28] using a stepped-care design, reported no difference in effects of a stress-management intervention delivered in a group compared with an individual setting. However, the attrition rate in the group setting was much higher.

With increasing numbers of long-term cancer survivors, it is important to care for the person affected by cancer. As the cancer treatment continues for a long period of time, and since cancer poses a future threat through worries about what the future might hold, it is vital to recognize when cancer rehabilitation is needed and to what extent. The BAS project[13,28] had no control group; thus, it became interesting to evaluate the same individual stepped-care stress-management intervention, in comparison to a control group, since the individual intervention did not cause a high attrition rate and therefore might be effective. Further interests were to evaluate the intervention performed and completed during the medical treatment, and to include both men and women as well as different cancer diagnoses.

The present study reports the main outcomes of the Norwegian randomized controlled trial "Early rehabilitation of cancer patients"[29] (ClinicalTrials.gov Identifier: NCT 01588262) with a focus on stress management for cancer patients during curative treatment. The aim was to evaluate the effects of an individual stepped-care stress-management intervention for cancer patients on the primary outcome of cancer-related stress reactions (intrusion/avoidance), and the secondary outcome of psychological distress (anxiety/depression) as well as emotional reactivity (impatience/hostility), compared with a control group.

2 | METHOD

2.1 | Design

The study was a prospective, longitudinal intervention study with a stepped-care approach, whereby patients were randomized to individual stress-management intervention using methods derived from CBT in two steps (Step 1 = 2 sessions and Step 2 = an additional 3-8 sessions) or control (C). Power calculations were done for the Impact of Event Scale (IES)[6] based on data from another study.[30] Based on these conditions (power = 0.8, $P = 0.05$ and effect size = 0.59), at least 128 patients had to be included in each group to detect a significant difference on the IES.

2.2 | Patients and procedure

Between May 2011 through June 2013, 1987 patients with a recent diagnosis of cancer were referred to the Department of Oncology and Medical Physics, Haukeland University Hospital, Bergen. Those who were over the age of 18, had Stage I-III disease and were scheduled for neo/adjuvant or curative treatment were considered for inclusion ($n = 1923$). Exclusion criteria were previous cancer diagnosis ($n = 593$), ongoing psychiatric condition as determined by medical chart review ($n = 19$), or language deficiencies ($n = 631$).

Consecutively, after receiving information about the neo/adjuvant/curative treatment, eligible patients ($n = 677$) received written information about the study. Of these, 371 declined participation. Further, 15 patients (2%) did not return the baseline questionnaires. Thus, 291 patients (43%) agreed to participate in the study and returned the written informed consent and baseline (BL) questionnaires by post. Participants were included in the project a mean 107 days post diagnosis (as defined by the date on the histopathological report). All patients were randomized to either intervention or control, using block randomization (block size 4) stratified for cancer types.

An appointment for the first session was made with each patient randomized to the intervention. For details on design, assessment points, and attrition, see Figure 1. The intervention was conducted by health professionals (HPs) with experience of caring for cancer patients. Prior to inclusion, the HPs attended a basic 4-day education about cancer and its treatment, healthy living, and stress reactions, held by a senior researcher experienced in both education in and clinical practice of the techniques used in the stress-management intervention.[13,28,29] HPs were trained in giving instructions on various techniques for expressing negative feelings, communicating with others more effectively, and changing behaviors related to stress, anger, worry, and depression. The HPs conducting the intervention received ongoing supervision throughout the project by the same senior researcher, for support in handling specific situations that might have arisen during the sessions.

The Medical Research Ethics Committee and the Data Inspectorate of Norway approved the project: Dnr 2010/1911.

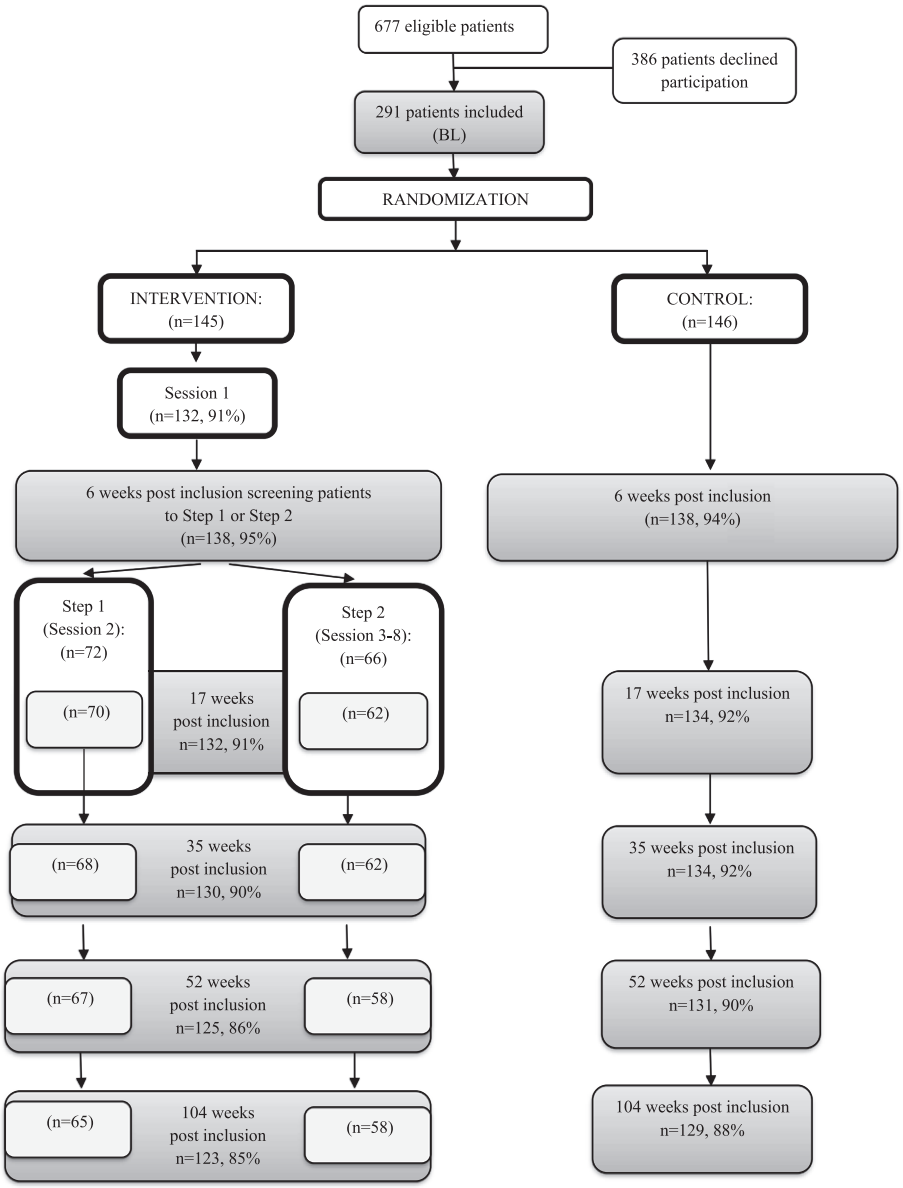

FIGURE 1 Flowchart of the design, assessment points, and patient attrition throughout the study

2.3 | Data collection

A brief study-specific questionnaire was used to collect demographic data. Medical records supplied medical data and information on primary treatments.

2.3.1 | Cancer-related stress reactions

The IES,[6] a validated[31] 15-item questionnaire, was used to assess cancer-related stress reactions, ie, Intrusion and Avoidance. Cut-off scores to indicate cases of low (=8), medium (9–19) and high (≥20) levels of cancer-related stress reactions have been recommended.[32] Levels of cancer-related stress reactions ≥9 were the cut-off score chosen for the present study to indicate clinically significant levels.

2.3.2 | Psychological distress

The Hospital Anxiety and Depression Scale (HADS),[33] a validated[34] 14-item questionnaire, was used to assess psychological distress. There are two recommended cut-off scores: 8 to 10 to indicate cases warranting further psychiatric investigation and ≥11 for a clinical level of anxiety/depression. The cut-off score chosen for the present study was ≥8 to indicate clinically significant levels.

2.3.3 | Emotional reactivity

The Everyday Life Stress Scale (ELSS) measures subjective responses to stressors, principally other people's behavior.[35] It consists of 20 short statements regarding self-rated stress behaviors in everyday life

situations and scores can range from 0 to 60, whereby a higher score indicates more stressful reactions.

The questionnaires, accompanied by written instructions and a prepaid return envelope, were mailed to the participants. A reminder was sent within 14 to 21 days if the questionnaire had not been returned.

2.4 | The manualized stepped-care intervention

The intervention included the same topics as in an earlier study described by Rissanen et al (2014).[28] The fidelity of treatment was checked in the supervision. It proved that the HPs followed the manuals and were similar in their administration of the intervention.

All sessions, in both Step 1 and Step 2, lasted 45 to 60 minutes. The intervention started a mean 27 days after inclusion and the start of neo/adjuvant/curative therapy, and was completed within 26 weeks of inclusion (M = 70 days, standard deviation = 66 days) for both Step 1 and Step 2.

Step 1: All patients (n = 145) received one counseling session when they started their neo/adjuvant/curative therapy at the Department of Oncology, and a follow-up session face-to-face (or over the telephone [n = 48, 34%] if the patient had been discharged from the hospital or lived at a great distance from it).[29] At the counseling session, the patient received oral and written information about the causes and symptoms of stress, self-care measures to influence stress such as the daily registration of events and behaviors, and scheduled behavioral and physical exercises, along with brief relaxation training. Six weeks post inclusion and after having received a counseling session, participants were screened. Patients who did not report clinically significant levels of cancer-related stress reactions or psychological distress (cut-off scores described elsewhere) participated in only one counseling session and a follow-up but were followed regularly for 2 years (Figure 1).

Step 2: Patients (n = 66, 48%) who reported clinically significant levels of intrusive thoughts/avoidance behavior (≥9) and/or anxiety and depression (≥8) were offered additional sessions by the same HP who had conducted the first counseling session. Step 2 includes a higher-intensity stress-management intervention, with an additional three to eight sessions; for more information, see the Supporting Information (Table S1). At the end of each session, it was jointly decided whether further sessions were warranted. The main reason for continuation was presence of problems covered by the intervention that the individual wanted to address.

2.5 | Control group

This condition included the care offered to all patients, eg, all study participants and non-study participants at the Department of Oncology. It consisted of regular contact with the patient's own doctor and hospital staff, as well as the opportunity to take part in the common rehabilitation program, including patient education and physical training.

2.6 | Statistical analysis

Outcome data were analyzed according to the "intention to treat" principal. However, we also performed a "per protocol" sensitivity analysis because a large proportion of patients (20%) had chosen to end Step 2 of the stress-management intervention after only three rather than the four to eight sessions mentioned in the protocol paper.[29]

To characterize the sample, descriptive methods were employed. The association between the outcomes (IES-A, IES-I, HADS-A, HADS-D, ELSS) and the randomization group was assessed using a linear mixed-effects model (LME) including randomization group, time, and their interaction as predictors and the patient ID as random factor. We used simple contrasts in the time domain (comparison of each time point with baseline). The association between the outcome variables and intensity of intervention was assessed using the same model, substituting the randomization with the intervention intensity (ie, Step 1 and Step 2) and the baseline time point with the 6-week measurement. Step 2 vs control was not randomized, which is why we estimated it both unadjusted and adjusted for age, training intensity, comorbidities (y/n), chemotherapy (y/n), radiotherapy (y/n), hormone therapy (y/n), and surgery (y/n), as well as HADS-A (except for HADS-A as outcome) and HADS-D (except for HADS-D as outcome).

All computations were done in R 3.2.3[36] using the nlme 3.1 package,[37] and the graphical illustrations were produced by Matlab 9.0 (The MathWorks Inc., Natick, MA). The general significance level was set to 0.05. Since we observed five different outcome variables, we had to take into account multiple testing effects; this is why we adjusted the significance level using the Bonferroni adjustment, leading to the marginal significance level of 0.01.

3 | RESULTS

The mean age of the 291 participants was 61 years (range 22-81), and 47% were female. Most participants were diagnosed with breast cancer (42%) or prostate cancer (43%); for more information, see Supporting Information, Table S2. Attrition rates were 6% to 12% for the control group and 5% to 15% for the intervention group (Figure 1).

3.1 | The association between the intervention and the outcome variables

A significant group-independent change in time, ie, intervention effect, was observed for the primary outcome IES-A and IES-I during the first 6 weeks ($P \leq 0.003$); see Table 1. While the control group deteriorated, the intervention group improved (Figure 2). For IES-A, this significant group-independent change in time was stable up to 104 weeks, with one exception at 35 weeks ($P < 0.013$) (Figure 2 and Table 1). In addition, a significant group-independent change in time was observed for ELLS after 17 weeks ($P \leq 0.007$) (Figure 2 and Table 1). For the mean values (95% confidence intervals) for all measures at each point of assessment for the different study groups, ie, Control and Intervention (Step 1 or Step 2), see Supporting Information, Table S3. Thus, statistically significant differences between the

TABLE 1 Mean values and confidence intervals for ELSS and IES subscales at each point of assessment for different study groups, ie, Control and Intervention

	RCT				
	Control		Intervention		
	N	Mean (95% CI)	*N*	Mean (95%CI)	*P*-Values
IES, Avoidance					
Baseline	146	8.2 (7.1, 9.3)	144	10.3 (9.0, 11.7)	0.019[a]
6 weeks	138	10.0 (8.7, 11.2)	137	9.7 (8.3, 11.0)	**0.001**[b]
4 months	133	8.4 (7.2, 9.7)	131	8.6 (7.1, 10.0)	**0.007**[b]
8 months	133	8.5 (7.2, 9.8)	129	8.8 (7.3, 10.2)	0.013[b]
12 months	131	7.9 (6.6, 9.1)	124	7.5 (6.2, 8.8)	**0.001**[b]
24 months	129	7.9 (6.6, 9.2)	121	7.7 (6.4, 8.9)	**<0.001**[b]
Intrusion					
Baseline	146	7.1 (6.1, 8.1)	143	7.9 (6.7, 9.1)	0.311[a]
6 weeks	138	8.3 (7.1, 9.4)	137	7.0 (6.0, 8.0)	**0.003**[b]
4 months	133	6.4 (5.4, 7.4)	131	6.0 (4.9, 7.1)	0.072[b]
8 months	133	6.3 (5.2, 7.3)	129	6.1 (4.9, 7.2)	0.111[b]
12 months	131	6.2 (5.1, 7.4)	124	6.0 (4.9, 7.2)	0.177[b]
24 months	129	6.3 (5.2, 7.5)	121	6.3 (5.2, 7.4)	0.159[b]
ELSS					
Baseline	145	16.7 (14.9, 18.5)	144	17.3 (15.6, 19.0)	0.638[a]
6 weeks	136	18.0 (16.2, 19.7)	138	17.1 (15.3, 19.0)	0.273[b]
4 months	133	17.5 (15.5, 19.5)	131	15.8 (13.8, 17.8)	**0.007**[b]
8 months	131	18.4 (16.4, 20.4)	129	17.1 (15.1, 19.1)	0.036[b]
12 months	131	18.3 (16.4, 20.2)	124	17.8 (15.7, 20.0)	0.273[b]
24 months	128	18.8 (16.8, 20.7)	122	18.1 (16.0, 20.1)	0.192[b]

The statistical significant results (level 0.01) are marked in bold.

[a]Difference at baseline (overall group effect in the model).

[b]Change from baseline difference (interaction in the model).

randomization groups in favor of the intervention for the primary outcome IES-A, IES-I and the secondary outcome ELSS were found with the LME. There were no differences in anxiety or depression.

3.2 | The association between intensity of intervention and outcome variables

The results of the LME for intensity of intervention (ie, Step 1 and Step 2) are illustrated in Figure 2. A significant changed intensity effect was observed for Step 2 on IES-A at around 52 weeks, and this remained up to 104 weeks: $P < 0.001$ to 0.004. For IES-I, a significant changed intensity effect was observed for Step 2 at 104 weeks: $P < 0.004$. Mean values and 95% confident intervals for IES-A and IES-I at 6 weeks were 15.7 (14.1, 17.2)/11.1 (9.6, 12.6), respectively. At 52 weeks, the IES-A mean was 11.9 (9.9, 14.0), and at 104 weeks, the means were 11.7 (9.9, 13.5)/8.5 (6.9, 10.2) for the IES-A and IES-I, respectively. For HADS-D, a significant changed intensity effect appeared at 17 weeks [3.1 (2.4, 3.8), $P < 0.006$]. For HADS-A and ELSS, no significant changed intensity effects were observed; for more information, see Supporting Information, Table S3. Thus, there was a decrease in cancer-related stress reactions in Step 2. Step 1 never reported clinically significant cancer-related stress reactions or psychological distress, and therefore a decrease is not possible.

The "per protocol" sensitivity analyses of the intensity of intervention effect resulted in almost the same results as for the analyses according to "intention to treat"; see Supporting Information, Table S4 and S5.

4 | DISCUSSION

The LME model analysis showed statistically significant differences between the randomization groups in favor of the intervention for the primary outcome measure cancer-related stress reactions and the secondary outcome measure emotional reactivity, but not for psychological distress. In addition, analysis of the association between intensity of intervention (Step 1 and Step 2) and outcome variables indicated that the stepped-care model was beneficial. Thus, there was a decrease in mean values for cancer-related stress reactions for the Step 2 intervention. A decrease for those who only received the Step 1 intervention was not expected, since these patients did not report clinically significant cancer-related stress reactions at 6 weeks. Neither was there an increase in mean values on any of the outcomes for those who only received the Step 1 intervention, indicating that they were truly not in need of a more extensive intervention (Step 2).

The positive effects were found within the primary outcome, cancer-related stress reactions. According to Sedgwick,[38] the primary

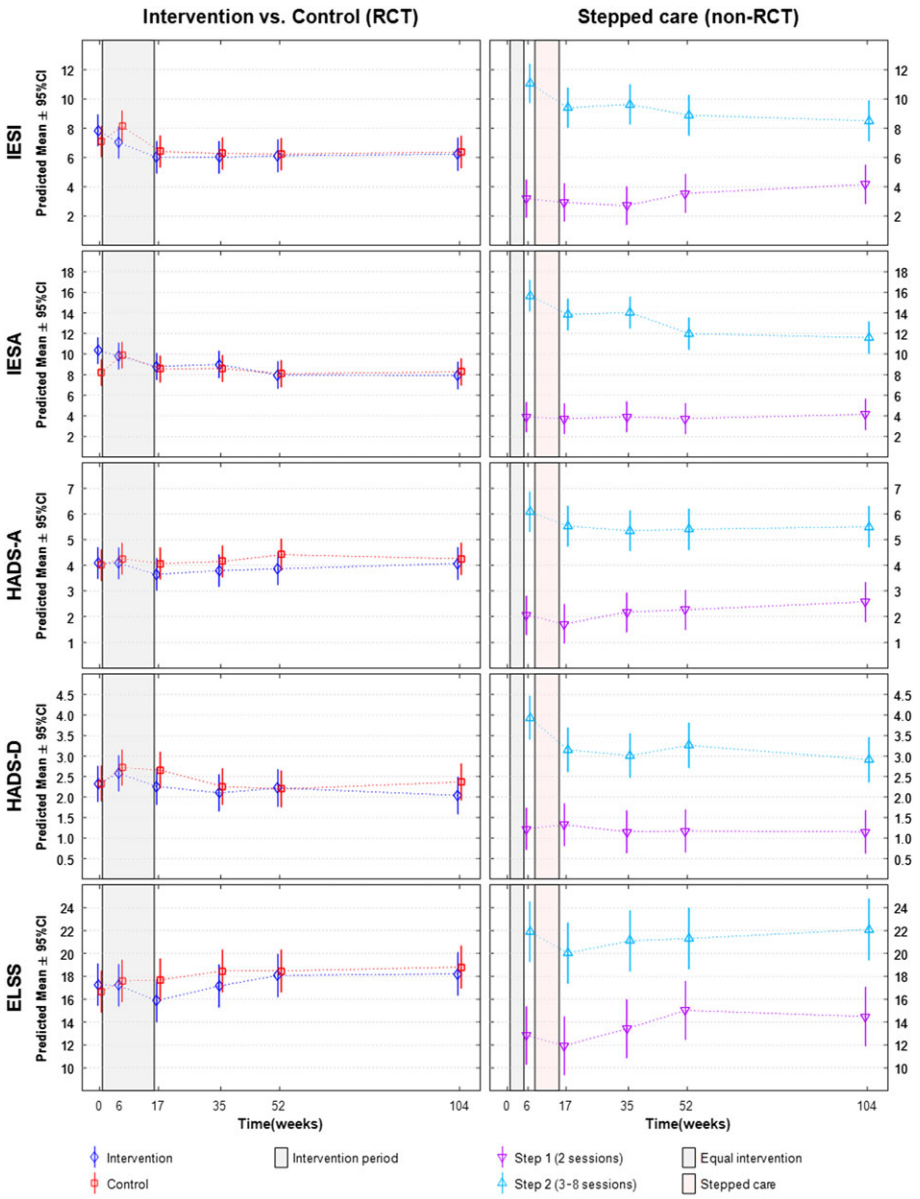

FIGURE 2 Illustrated results of the LME for the intervention effect vs control and for the intensity of intervention, Step 1 and Step 2

outcome should be defined when the trial is planned and be a clinical measure that represents the intervention's greatest benefit. Furthermore, it provides the basis for powered calculations, which reduces the risk of a false-negative result.[38] In the present study, the primary outcome measure IES formed the basis for power calculations and is accordingly stated in the protocol paper.[29]

Further, the positive result in favor of the stepped-care intervention indicates that it managed to intervene against avoidance, intrusion, and emotional reactivity during oncological treatment and within a heterogenic sample of cancer diagnoses and gender. A plausible explanation may be that the intervention used techniques derived from CBT, proven to be effective in reviews[21,22] as well as in a previous study.[30] Another explanation could be that the content of the stress-management intervention was individualized, had been tested in a previous study,[13,28] and was conducted by specially educated, and supervised, HPs experienced in caring for cancer patients.

The BAS project[13,28] reported no difference in effects of a stress-management intervention delivered in a group compared with an individual setting. However, the attrition rate in the group setting was much higher. An interpretation of the positive result in favor of the intervention in the present study could be that the individual setting was effective and, compared with a group setting, more feasible.

According to the protocol,[29] all patients randomized to the intervention were given the low-intensity intervention, but only those who indicated clinically significant levels of cancer-related stress reactions and/or psychological distress were offered an extensive intervention in the second step, as suggested in stepped-care models.[24-26] Thus, it was planned for patients in the high-intensity intervention (Step 2) to receive at least four and up to eight sessions. However, many patients ended the intervention after only one to three sessions, which may indicate that the chosen cut-off scores may have been too low. In addition, when the study was performed

it was determined that it would not be ethical to persuade patients to continue against their will.

4.1 | Study Limitations

A limitation could be that the results are based on only self-reported measures. The quality of the trial could have been strengthened with diagnostic interviews or more objective measures. However, both IES and HADS are validated and have demonstrated good psychometric properties.[31,34]

Notable is that elevated mean values were only observed for cancer-related stress reactions, ie, avoidance and intrusion. The mean values for psychological distress indicate that many of the patients were "non-cases"[33] and were therefore not easy to improve; ie, the ceiling effect. As visible in the figures, there is obviously no linear effect in time domain. That is why we used the most flexible modeling, ie, simple contrasts, well-knowing that we lose power in the model.

For those who did participate the attrition rate was low, which strengthens the credibility of the results. However, only 43% of the approached patients agreed to participate in the study, which implies that the results should be interpreted with caution. If background data had been collected for non-participants, this could have used to strengthen the representativeness of the sample.

The present study is one of few reporting results of using a stepped-care model in cancer care.[13,27,28] A limitation is that the participants were not randomized in Step 2, which made a proper evaluation of the intervention intensity effect impossible. When the study was designed, it was not an option to randomize in Step 2, as this would have demanded a larger study sample.

4.2 | Clinical implications

The participation rates, and the fact that the intervention group improved during the first 6 weeks, may indicate that there is a need among cancer patients for at least one to three sessions of stress-management intervention at the beginning of oncological treatment; this need was not met for the control condition, since they deteriorated up to 6 weeks.

Several studies[7-12,16-18,39] among cancer patients have highlighted that cancer-related stress reactions, psychological distress, and emotional reactivity are closely related and may interact with another in different ways. Thus, screening for cancer-related stress reactions in a stepped-care model could provide an alternative in cancer rehabilitation; however, more research is needed.[26,39,40] Further, the intervention, which proved to be effective here, could be conducted by HPs after only brief training in stress management.

5 | CONCLUSION

An individual stepped-care stress-management intervention for cancer patients performed by specially educated HPs using techniques derived from CBT seems beneficial for cancer patients and may therefore be a realistic complement to routine cancer care.

ACKNOWLEDGEMENTS

We thank all the patients who participated in the study and the staff for conducting the intervention and their administrative work. The study was supported by grants from the Grieg Foundation and the Norwegian Cancer Society.

CONFLICT OF INTEREST

None declared.

ORCID

Cecilia Arving https://orcid.org/0000-0002-6063-262X

REFERENCES

1. Allemani C, Weir HK, Carreira H, et al. Global surveillance of cancer survival 1995-2009: analysis of individual data for 25,676,887 patients from 279 population-based registries in 67 countries (CONCORD-2). *Lancet*. 2015;385(9972):977-1010.
2. Coleman MP, Forman D, Bryant H, et al. Cancer survival in Australia, Canada, Denmark, Norway, Sweden, and the UK, 1995-2007 (the International Cancer Benchmarking Partnership): an analysis of population-based cancer registry data. *Lancet*. 2011;377(9760):127-138.
3. Gutenbrunner C, Meyer T, Melvin J, Stucki G. Towards a conceptual description of physical and rehabilitation medicine. *J Rehabil Med*. 2011;43(9):760-764.
4. Hellbom M, Bergelt C, Bergenmar M, et al. Cancer rehabilitation: a Nordic and European perspective. *Acta Oncol*. 2011;50(2):179-186.
5. DSM-IV APATFo. *Diagnostic and Statistical Manual of Mental Disorders: DSM-IV-TR*. 4th ed. Washington, DC: American Psychiatric Association; 2000:943.
6. Horowitz M, Wilner N, Alvarez W. Impact of Event Scale: a measure of subjective stress. *Psychosom Med*. 1979;41(3):209-218.
7. Cordova MJ, Riba MB, Spiegel D. Post-traumatic stress disorder and cancer. *Lancet Psychiatry*. 2017;4(4):330-338.
8. Mehnert A, Lehmann C, Graefen M, Huland H, Koch U. Depression, anxiety, post-traumatic stress disorder and health-related quality of life and its association with social support in ambulatory prostate cancer patients. *Eur J Cancer Care (Engl)*. 2010;19(6):736-745.
9. Elklit A, Blum A. Psychological adjustment one year after the diagnosis of breast cancer: a prototype study of delayed post-traumatic stress disorder. *Br J Clin Psychol*. 2011;50(4):350-363.
10. Voigt V, Neufeld F, Kaste J, et al. Clinically assessed posttraumatic stress in patients with breast cancer during the first year after diagnosis in the prospective, longitudinal, controlled COGNICARES study. *Psychooncology*. 2017;26(1):74-80.
11. Nordin K, Berglund G, Glimelius B, Sjoden PO. Predicting anxiety and depression among cancer patients: a clinical model. *Eur J Cancer*. 2001;37(3):376-384.
12. Salsman JM, Segerstrom SC, Brechting EH, Carlson CR, Andrykowski MA. Posttraumatic growth and PTSD symptomatology among colorectal cancer survivors: a 3-month longitudinal examination of cognitive processing. *Psychooncology*. 2009;18(1):30-41.
13. Rissanen R, Nordin K, Ahlgren J, Arving C. A stepped care stress management intervention on cancer-related traumatic stress symptoms among breast cancer patients-a randomized study in group vs. individual setting. *Psychooncology*. 2015;24(9):1028-1035.
14. National Comprehensive Cancer N. Distress management. Clinical practice guidelines. *J Natl Compr Canc Netw: JNCCN*. 2003;1(3):344-374.
15. Knobf MT. Clinical update: psychosocial responses in breast cancer survivors. *Semin Oncol Nurs*. 2011;27(3):e1-e14.

16. Caruso R, Nanni MG, Riba M, et al. Depressive spectrum disorders in cancer: prevalence, risk factors and screening for depression: a critical review. *Acta Oncol*. 2017;56(2):146-155.
17. Hess CB, Chen AM. Measuring psychosocial functioning in the radiation oncology clinic: a systematic review. *Psychooncology*. 2014;23(8):841-854.
18. Costanzo ES, Stawski RS, Ryff CD, Coe CL, Almeida DM. Cancer survivors' responses to daily stressors: implications for quality of life. *Health Psychol*. 2012;31(3):360-370.
19. Scheidt RA (Ed). *Heart & Mind: The Practice of Cardiac Psychology*. 1th ed. Washington, DC: American Psychological Association; 1996.
20. Curt GA, Breitbart W, Cella D, et al. Impact of cancer-related fatigue on the lives of patients: new findings from the Fatigue Coalition. *Oncologist*. 2000;5(5):353-360.
21. Galway K, Black A, Cantwell M, Cardwell CR, Mills M, Donnelly M. Psychosocial interventions to improve quality of life and emotional wellbeing for recently diagnosed cancer patients. *Cochrane Database Syst Rev*. 2012;11:CD007064.
22. Parahoo K, McDonough S, McCaughan E, et al. Psychosocial interventions for men with prostate cancer. *Cochrane Database Syst Rev*. 2013;12:CD008529.
23. Fors EA, Bertheussen GF, Thune I, et al. Psychosocial interventions as part of breast cancer rehabilitation programs? Results from a systematic review. *Psychooncology*. 2011;20(9):909-918.
24. Haaga DA. Introduction to the special section on stepped care models in psychotherapy. *J Consult Clin Psychol*. 2000;68(4):547-548.
25. Davison GC. Stepped care: doing more with less? *J Consult Clin Psychol*. 2000;68(4):580-585.
26. Bower P, Gilbody S. Stepped care in psychological therapies: access, effectiveness and efficiency. Narrative literature review. *Br J Psychiatry*. 2005;186(01):11-17.
27. Krebber AM, Jansen F, Witte BI, et al. Stepped care targeting psychological distress in head and neck cancer and lung cancer patients: a randomized, controlled trial. *Ann Oncol: Off J Eur Soc Med Oncol/ESMO*. 2016;27(9):1754-1760.
28. Rissanen R, Arving C, Ahlgren J, Nordin K. Group versus individual stress management intervention in breast cancer patients for fatigue and emotional reactivity: a randomised intervention study. *Acta Oncol*. 2014;53(9):1221-1229.
29. Arving C, Thormodsen I, Brekke G, Mella O, Berntsen S, Nordin K. Early rehabilitation of cancer patients—a randomized controlled intervention study. *BMC Cancer*. 2013;13(1):9.
30. Arving C, Sjoden PO, Bergh J, et al. Individual psychosocial support for breast cancer patients: a randomized study of nurse versus psychologist interventions and standard care. *Cancer Nurs*. 2007;30(3):E10-E19.
31. Sundin EC, Horowitz MJ. Impact of Event Scale: psychometric properties. *Br J Psychiatry*. 2002;180(03):205-209.
32. Horowitz MJ, Field NP, Classen CC. Stress response syndromes and their treatment. In: Goldberger L, Breznitz S, eds. *Handbook of Stress: Theoretical and Clinical Aspects*. 2nd ed. New York: Free Press; 1993:757-773.
33. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. *Acta Psychiatr Scand*. 1983;67(6):361-370.
34. Saboonchi F, Petersson LM, Wennman-Larsen A, Alexanderson K, Brannstrom R, Vaez M. Changes in caseness of anxiety and depression in breast cancer patients during the first year following surgery: patterns of transiency and severity of the distress response. *Eur J Oncol Nurs*. 2014;18(6):598-604.
35. Claesson M, Birgander LS, Lindahl B, et al. Women's hearts—stress management for women with ischemic heart disease: explanatory analyses of a randomized controlled trial. *J Cardiopulm Rehabil*. 2005;25(2):93-102.
36. Team. RC R: a language and environment for statistical computing. Vienna, Austria: R Foundation for Statistical Computing; 2017 [Available from: https://www.R-project.org/]
37. Pinheiro J BD, DebRoy S, Sarkar D and R Core Team. _nlme: linear and nonlinear mixed effects models_. R package version 3.1-131, 2017 [Available from: https://CRAN.R-project.org/package=nlme]
38. Sedgwick P. Clinical trials: outcome measures. *BMJ*. 2015;350(jan12 4):h121.
39. Kangas M. DSM-5 trauma and stress-related disorders: implications for screening for cancer-related stress. *Front Psych*. 2013;4:122.
40. van der Aa HP, van Rens GH, Comijs HC, et al. Stepped care for depression and anxiety in visually impaired older adults: multicentre randomised controlled trial. *BMJ*. 2015;351:h6127.

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

How to cite this article: Arving C, Assmus J, Thormodsen I, Berntsen S, Nordin K. Early rehabilitation of cancer patients—An individual randomized stepped-care stress-management intervention. *Psycho-Oncology*. 2018;1–8. https://doi.org/10.1002/pon.4940