Psycho-Oncology
Psycho-Oncology **16**: 171–180 (2007)
Published online 20 July 2006 in Wiley InterScience (www.interscience.wiley.com). **DOI**: 10.1002/pon.1050

Changes in emotion regulation and psychological adjustment following use of a group psychosocial support program for women recently diagnosed with breast cancer

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Received: 6 September 2005
Revised: 24 February 2006
Accepted: 2 March 2006

Abstract

This study assesses the efficacy of a group intervention in altering emotion regulation processes and promoting adjustment in women with breast cancer. Using a design with 10 alternating phases of availability of the intervention versus standard care, we assessed women participating in one of three conditions: a 12-week group intervention ($N = 54$); a decliner group who refused the intervention ($N = 56$), and a standard care group who were not offered the intervention ($N = 44$). The intervention included training in relaxation, guided imagery, meditation, emotional expression, and exercises promoting control beliefs and benefit-finding. Emotion regulation processes and adjustment were assessed at baseline (following diagnosis), 4 months (corresponding with the end of the intervention), 6 months, and 12 months. At 4 months, intervention participants (compared to decliners and standard care participants) reported greater increases in use of relaxation-oriented techniques, perceived control, emotional well-being, and coping efficacy, and, greater decreases in perceived risk of recurrence, cancer worry, and anxiety. Intervention participants also reported relatively greater decreases in emotional suppression from baseline to 12 months, suggesting that the intervention had a delayed impact on these tendencies. The findings suggest an emotion regulation intervention can beneficially influence emotional experiences and regulation over the first year following diagnosis.

Keywords: cancer; group intervention; emotion regulation; distress; breast cancer

Introduction

Evidence indicates that group psychosocial interventions can promote adjustment for women with breast cancer [1–6]. Yet studies have yielded inconsistent results, with some finding no intervention effects on well-being [7–11]. These inconsistencies are undoubtedly due to the considerable variation in program contents, time of delivery, cancer prognoses of participants, timing of assessments, and outcome measures. The variability in results highlights the continuing need for research examining which interventions are efficacious and under what conditions their benefits occur.

Interventions offering training in emotion regulation skills such as relaxation techniques, emotional expression, and adaptive reappraisals of cancer experiences appear to have particular potential [1,2,12,13]. Studies of these interventions typically assess their impact on general distress and quality of life, but few have examined whether they alter emotion regulation processes as intended. This study uses the Common Sense Model (CSM) of illness self-regulation [14,15] as the theoretical framework for adapting an intervention targeting emotion regulation [16] and selecting measures to evaluate its impact on emotion regulation processes and psychological well-being.

The Common-Sense Model and emotion regulation

The CSM identifies two interactive systems of illness self-regulation. Whereas the problem-focused system involves strategies for illness control, the emotion regulation system involves efforts to control distress. These emotion regulation strategies include: (1) Alteration of emotional arousal, such as by using relaxation techniques; (2) Expression (versus suppression) of emotions; and (3) Cognitive change or reappraisal, such as by finding benefits in the illness experience and enhancing perceptions of control and invulnerability to disease progression [14,17]. These strategies are

targeted by this intervention as evidence supports their utility in promoting adjustment.

Relaxation techniques such as muscle relaxation, guided imagery, and meditation have been found to reduce distress [18–21] and influence immune function in cancer patients [22,23]. These techniques have been integrated into several group interventions [1,6,9,16], although their practice during and following the intervention has rarely been compared with their use by comparison groups.

Efforts to express or suppress negative emotions when communicating to others can also alter emotional arousal and associated physiological processes [24]. Emotional suppression has been identified as a common tendency among individuals with cancer [25–27], and it has been linked with cardiovascular arousal, altered immune function [28,29], and rapid cancer progression [25,30].

Patients often report controlling distress by changing cognitive appraisals of cancer experiences, such as by identifying benefits, developing a sense of personal control, and bolstering confidence that the cancer will not recur or spread [1,31,32]. One study demonstrated that a psychosocial intervention for women with early-stage breast cancer can increase benefit-finding; moreover, this increase was associated with enhanced lymphocyte proliferation [1,33]. Personal control appraisals are associated with better psychological adjustment [32], and interventions often encourage participants to strengthen their sense of control. One such intervention was found to enhance control-related beliefs [12], although a similar intervention was not found to enhance control beliefs [9]. High control beliefs may reduce perceptions of risk for recurrence, which can further buffer against worry and distress [34].

An alternating phases design

Given evidence that some group support programs can yield psychosocial benefits, reduce health care costs [35], and influence physiological processes associated with cancer progression [36], the continued use of randomized, controlled trials (RCTs) to evaluate these programs has become problematic. Ethical problems arise because patients are randomized to conditions in which they do not receive a potentially beneficial intervention. Patients randomized to control groups are at risk of demoralization, particularly given awareness in the public arena that support groups may be beneficial. There are also practical and methodological problems with using RCT designs to assess these interventions [37]. For example, RCTs of group interventions typically suffer from low recruitment rates as patients are unwilling to have their use of such services left to chance. Randomization often creates condition differences in factors such as emotional distress and age [5,6,8,9,38–41]. For example, RCTs often end up with intervention groups who are initially more distressed than control groups, thereby creating difficulties in discerning intervention effects on distress-related outcomes [4,38,40,41]. These differences may arise from differential attrition rates in intervention and control groups as well as distress created by randomization to an intervention. In a study in which breast cancer patients learned of their condition assignment prior to completing baseline measures, women randomized to the group intervention reported greater distress compared with those randomized to standard care [42]. Evidence suggests this effect occurred because randomization took away women's choice over their use of this service, thereby undermining their well-being. The inability of participants to choose whether or not to participate in a cancer support intervention was also cited as a key reason for the failure to develop functioning groups in one RCT [43]. In sum, it is likely that an RCT design will fail to produce equivalent groups in this particular context.

In this study, we used a quasi-experimental design of 10 alternating phases of intervention and standard care programs in order to avoid problems associated with randomization. Women undergoing breast cancer treatment were invited to participate in the study and use the program (emotion regulation intervention or standard care) on offer during that phase. This design also enabled us to include a comparison group of women who were offered the intervention but declined; these women are typically omitted from RCTs. Intervention participants, women offered standard care, and women who declined the intervention completed measures following diagnosis and 4 months (after completion of the group intervention), 6 months, and 12 months later. It was predicted that, compared with standard care and decliner participants, intervention participants would exhibit greater increases in use of relaxation techniques, appraisals of personal control and benefits, emotional well-being, and coping efficacy as well as greater reductions in suppression tendencies, perceived risk, worry about recurrence, and anxiety.

Method

Participants

Women attending an Auckland breast clinic were recruited using these inclusion criteria: (a) diagnosis of primary breast cancer within the previous six weeks; (b) ability to communicate in English; (c) residence within the Auckland region; (d) no evidence of psychopathology, as determined by the clinic's psychologist; and (e) prognostic status of *good*, *average*, *poor*, or *very poor*; women with

DOI: 10.1002/pon

excellent prognoses who required no further treatment were excluded, as the intervention was aimed at providing support to women undergoing treatment.

Ethical approval was obtained from the University of Auckland Human Participants Ethics Committee. All eligible patients entering the clinic between June 2000 and March 2003 were approached, until there were at least 40 participants in each condition (providing power to detect effect sizes of 0.30 at a power level of 0.80). Of the 214 women invited to participate, 72% agreed, 21% declined, and 7% could not be followed due to lack of response to repeated contact attempts (see Figure 1). Reasons for declining participation (some women cited more than one reason) involved distance barriers ($n = 12$); time limitations ($n = 19$); no need for support ($n = 10$) beliefs that the cancer was gone ($n = 7$); wanting to forget about the cancer ($n = 8$); emotional shock ($n = 6$); and beliefs that the psychosocial materials were inappropriate for women their age ($n = 4$).

Design

The prospective design included 10 alternating phases of: (a) providing standard care; and (b) offering the group intervention. Each phase lasted until 8–11 women were recruited into the program on offer. The conditions consisted of the standard care group, the intervention group (who agreed to participate in the intervention) and the decliner group (who declined the intervention). Those offered the intervention were informed they could complete the measures and decline the intervention; they were contacted weekly until they made their decision (see [44]). Participants completed questionnaire measures at baseline, 4 months (corresponding to the end of the intervention), 6 months, and 12 months. All measures were given at each assessment, with two exceptions. Finding benefits was not assessed at baseline because the items are not relevant immediately after diagnosis, and finding benefits and emotional suppression were not assessed at 4 months due to the lengthy questionnaire and expectations that group differences would be sufficiently stable to be detected at the 6-month assessment.

The intervention

The intervention was adapted from the 'Healing Journey' program designed by Cunningham and colleagues [16]. The 12-week program involved weekly, 2-hour sessions led by two facilitators, one man and one woman, from a group of five therapists trained by A. Cunningham and the researchers to deliver the intervention. A different pair led each program group in order to minimize therapist effects. The program provided education about emotion and cancer; training in relaxation, imagery, meditation, setting priorities and goals, emotional disclosure through writing, and anger management; and group discussion. Adaptations

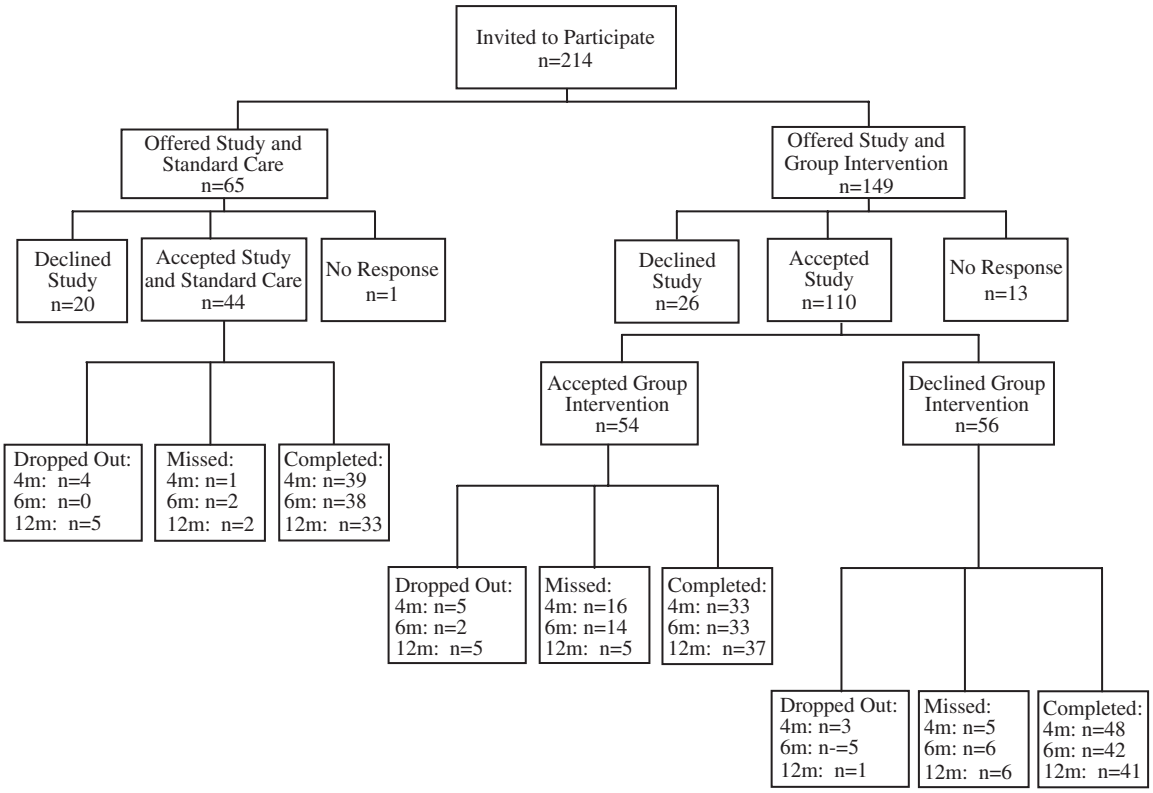

Figure 1. Flow diagram of participant progression. 4m = 4 months assessment; 6m = 6 months assessment; 12m = 12 months assessment

DOI: 10.1002/pon

included modified language and style for cultural appropriateness for New Zealand women and enhanced use of disclosure writing exercises. Therapists conducted the sessions according to manualized instructions, using designated visual aids and materials. Participants received manuals and audiocassette tapes with relaxation, imagery, and meditation exercise instructions for home practice, and homework logs. Researchers met regularly with the facilitators to monitor the sessions and ensure protocol adherence.

Standard care

Standard care participants met with an advisor and received information about services in the community, consultations with clinic psychologists, reading materials, and social gatherings of clinic patients.

Measures

Use of relaxation-related techniques

Participants were asked, 'On how many of the last seven days did you engage in relaxation, imagery, or meditation exercises?' They indicated *yes* or *no* for each of the seven days, and the *yes* responses were summed.

Emotional suppression

The Cortauld Emotional Control Scale [26] was used to assess tendencies to suppress negative emotions. The measure includes 7-item subscales for anger, depression, and anxiety control; e.g. 'When I feel angry (very annoyed), I bottle it up'; 'When I feel unhappy (miserable), I put on a bold face', and 'When I feel afraid (worried), I refuse to say anything about it'. Ratings, ranging from (1) *almost never* to (4) *almost always*, are summed to generate total scores; at baseline, Cronbach's $\alpha = 0.93$.

Perceived control

A shortened version of the personal control subscale from the Illness Perceptions Questionnaire-Revised [45] consisted of three items: 'What I do can determine whether my breast cancer gets better or worse', 'My actions will have no effect on the outcome of my breast cancer', and 'Nothing I do will affect my breast cancer'. Ratings ranged from *strongly disagree* (1) to *strongly agree* (5). Higher summed scores reflect greater perceived control; at baseline, $\alpha = 0.80$. This shortened subscale has excellent reliability and construct validity [44].

Perceived risk of recurrence

Two items, each rated on a 0–10 point scale, assessed perceived risk: 'In your opinion, how likely is it that you will have a recurrence of breast cancer?' (*not at all likely* to *almost certain*) and 'In general, to what extent are you confident that your body can control your breast cancer and stop it from recurring or spreading?' (*not at all* to *complete confidence*). The latter item was reverse-scored and the ratings were summed; at baseline, $r = 0.60$.

Finding benefits

The Benefit-Finding Scale for Breast Cancer [1] includes 17 items (e.g. 'Having had breast cancer has helped me become a stronger person, more able to cope effectively with future life challenges'), which are rated from *not at all* (1) to *extremely* (5). For the 6 month assessment, $\alpha = 0.95$.

Emotional well-being

The emotional well-being subscale of the Functional Assessment of Cancer Therapy [46] consists of five items assessing experiences in the past week (e.g. 'I am losing hope in the fight against illness', 'I feel sad'). Ratings, from 0 (*not at all*) to 4 (*very much*) were summed, with higher scores reflecting greater well-being; at baseline, $\alpha = 0.66$.

Cancer worry

A cancer worry measure [47], tailored to assess worry about recurrence, consisted of the items, 'How worried are you about having a recurrence of breast cancer?' and 'How concerned are you about having a recurrence of breast cancer?' Ratings ranged from *not at all* (0) to *extremely* (10) and were summed; at baseline, $r = 0.86$.

State anxiety

Anxiety was assessed with the Spielberger State-Trait Anxiety Inventory-short form [48]. The items (e.g. 'I feel upset') were rated from 1 (*not at all*) to 4 (*extremely*), and ratings are summed; at baseline, $\alpha = 0.89$.

Coping efficacy

The coping efficacy measure (Lawler SP, Cameron L. A randomized, controlled trial of massage as a treatment for migraine. *Ann Behav Med*, in press) included 5 items, rated from *not at all* (1) to *very much* (5), concerning experiences during the past week; e.g. 'I feel good about the way I am handling the problems and challenges related to breast cancer.' At baseline, $\alpha = 0.72$.

Sample characteristics

Demographic characteristics were assessed with single questionnaire items. Data on diagnosis, tumor histology, surgery, and chemotherapy/radiation therapy were obtained from medical records.

DOI: 10.1002/pon

Prognostic status was calculated based on tumor size, grade, and nodal status [49].

Statistical analyses

For all analyses, preliminary analyses assessed the need to include age or use of chemotherapy as covariates. For group differences in sample characteristics, ANOVAs (ANCOVAs when covariates were included) were used for continuous measures and χ^2 analyses (logistic regressions when covariates were included) were used for categorical measures.

Two sets of analyses were used to test group differences in outcome measures. First, between-subjects ANOVAs/ANCOVAs were conducted to assess group differences using all data provided at each assessment, with LSD *post hoc* contrasts of the intervention group with each of the other groups. Second, repeated measures ANOVAs/ANCOVAs were conducted to assess group differences in changes since baseline. In order to maximize the number of cases in each analysis, we conducted sets of three analyses: responses at baseline and four months; responses at baseline and six months; and responses at baseline and 12 months. Time × Group interaction effects were further evaluated with simple effects analyses of changes over time for each group. When two groups exhibited significant changes, further contrasts compared their changes over time.

Results

Sample characteristics

The clinical and demographic characteristics of the conditions are presented in Table 1. Ages ranged from 30 to 78 years, and intervention participants were younger than those receiving standard care and those declining the intervention; $F(2, 153) = 7.14$, $p < 0.01$. Relative to decliners, intervention participants reported higher incomes, $F(2, 153) = 6.15$, $p < 0.01$ and were more likely to be employed, $\chi^2\ (2, N = 154) = 6.25$, $p < 0.04$. These income and employment differences are attributable to the group differences in age, as analyses controlling for age reveal that the group differences are not significant. For income, group differences were non-significant, $F(2, 153) = 0.98$, when age was controlled, $F(1, 153) = 26.00$, $p < 0.001$. For employment status, group differences were non-significant (Wald < 1.04, p's < 0.30) after controlling for age ($B = -0.09$, Wald $= 15.49$, $p < 0.0001$). The proportion of participants receiving chemotherapy was higher in the standard care condition than in the decliner condition, $\chi^2\ (1, N = 154) = 5.81$, $p < 0.02$. The three conditions did not differ significantly in any other characteristic.

Overall, 19% of the sample dropped out of the study (see Figure 1). Women who dropped out were equivalent to the rest of the sample on baseline variables, except they tended to report poorer emotional well-being, $F(3, 150) = 3.66$, $p < 0.02$; greater anxiety, $F(3, 150) = 5.67$, $p < 0.01$; and lower coping efficacy, $F(3, 150) = 5.19$, $p < 0.01$. Among those who dropped out, there were no condition differences in baseline measures. Some participants missed a follow-up assessment due to illness or travel for treatment (see Figure 1). Women who missed an assessment did not differ from the rest of the sample on any baseline measure.

Emotion regulation

Relaxation techniques

Group differences in use of relaxation-related techniques emerged at 4 months (see Table 2): As

Table 1. Sample characteristics

	Intervention (N = 54)	Standard care (N = 44)	Decliners (N = 56)
NZ European ethnic identity	96%	96%	91%
Married/de facto relationship	70%	86%	73%
Tertiary level education	44%	55%	46%
Age *M* (SD)	48.28 (8.53)	53.61 (10.49)	54.56 (8.94)
Annual household income *M* (SD)	NZ$76 500 (18 400)	NZ$65 400 (20 600)	NZ$58 000 (21 300)
Currently employed	76%	55%	57%
Prognosis			
Good	35%	36%	48%
Average	41%	39%	29%
Poor	17%	16%	16%
Very poor	7%	9%	7%
Radiation therapy	74%	81%	68%
Chemotherapy	37%	52%	29%
Tamoxifen/Zoladex	61%	46%	59%
Weeks since surgery *M* (SD)	2.61 (0.72)	3.15 (0.70)	3.34 (0.74)

DOI: 10.1002/pon

Table 2. Means (S.D.s) of emotion regulation factors

Variable	Intervention	Standard care	Decliners	F
Relaxation techniques				
Baseline	2.15 (2.92)	2.30 (3.03)	2.15 (2.94)	0.04
4 months	3.87 (2.69)[a]	2.67 (2.90)[ab]	1.58 (2.66)[b]	6.79**
6 months	3.08 (2.66)[a]	3.05 (3.10)[a]	1.52 (2.58)[b]	4.04*
12 months	2.83 (2.80)	1.73 (2.51)	1.61 (2.57)	2.42†
Emotional suppression				
Baseline	45.57 (10.98)	45.66 (10.13)	47.79 (12.24)	0.66
6 months	44.11 (10.56)	46.77 (10.43)	47.04 (10.73)	0.82
12 months	41.97 (9.65)[a]	49.55 (11.50)[b]	47.18 (10.50)[b]	4.72**
Personal control				
Baseline	12.06 (2.34)	12.00 (2.44)	11.79 (2.55)	0.18
4 months	12.77 (2.03)[a]	11.52 (2.69)[b]	10.92 (2.43)[b]	5.90**
6 months	11.85 (3.05)	11.11 (3.16)	10.31 (2.85)	2.44†
12 months	12.09 (2.37)[a]	11.24 (3.21)[ab]	10.50 (2.75)[b]	3.12*
Perceived risk‡				
Baseline	5.27 (4.14)	5.00 (3.85)	5.58 (4.22)	0.26
4 months	3.73 (4.27)[a]	6.33 (4.79)[b]	6.00 (4.53)[b]	3.33*
6 months	4.67 (4.40)	5.41 (4.67)	5.66 (3.98)	0.49
12 months	4.30 (3.81)	5.67 (4.54)	6.13 (4.32)	2.15
Finding benefits				
6 months	61.63 (12.39)[a]	60.99 (14.45)[a]	53.21 (16.85)[b]	3.53*
12 months	65.63 (12.24)[a]	59.96 (18.15)[ab]	53.31 (18.59)[b]	5.30**

Row means with diering superscripts are significantly dierent, $p<0.05$.
*$p<0.05$ **$p<0.01$.
†$p<0.10$
‡Means are adjusted for age, which predicted lower perceived risk at baseline, 4 months, and 6 months (p's <0.08).

predicted, intervention participants reported higher rates of relaxation practices compared with decliners; however, the difference between intervention and standard care participants did not achieve statistical significance ($p<0.06$). At 6 months, intervention and standard care participants reported higher rates than did the decliners. At 12 months, the overall group effect did not achieve significance.

A repeated measures ANOVA of changes in use from baseline to 4 months revealed a Time effect, $F(1,115)=5.37$, $p<0.03$, and a Time $\times$ Group interaction effect, $F(2,116)=5.80$, $p<0.01$. Consistent with predictions, rates increased for intervention participants, $F(1,32)=18.17$, $p<0.001$, whereas they did not change for standard care participants or decliners (F's <1). For changes from baseline to 6 months, a significant Time effect revealed a general increase in rates; $F(1,110)=4.36$, $p<0.04$. The Group $\times$ Time interaction was not significant ($F<1$), although simple effects analyses verified that rates increased for the intervention group, $F(1,32)=4.53$, $p<0.05$, whereas the increase was not significant for the standard care or decliner groups, F's <1.47. For changes from baseline to 12 months, neither the Time effect nor the Group $\times$ Time interaction effect was significant (F's <1.26).

Emotional suppression

All three conditions exhibited comparable levels of emotional suppression at the baseline and 6 month assessments (see Table 2). By 12 months, intervention participants exhibited lower suppression than did standard care and decliner participants. Repeated measures ANOVA of changes from baseline to 6 months revealed non-significant Time and Time $\times$ Group effects (F's <1). Analysis of changes from baseline to 12 months revealed no Time effect ($F<1$) but a Time $\times$ Group interaction effect, $F(2,107)=3.57$, $p<0.03$. Intervention participants exhibited a decrease in emotional suppression that did not reach statistical significance, $F(1,34)=3.27$, $p<0.08$, whereas participants receiving standard care exhibited a significant increase, $F(1,32)=4.03$, $p<0.05$. For decliners, emotional suppression remained unchanged ($F<1$).

Personal control

At 4 months, intervention participants reported higher control beliefs compared with standard care participants and decliners (see Table 2). At 6 months, the overall group difference did not achieve statistical significance. At 12 months, a significant group effect again revealed that intervention participants reported higher control beliefs relative to decliners.

Repeated measures ANOVA revealed a Group $\times$Time interaction effect for changes from baseline to 4 months, $F(2,116)=4.22$, $p<0.02$; the overall Time effect was not significant. Control beliefs increased for intervention participants, $F(1,32)=4.56$, $p<0.04$; in contrast, they did not change for

DOI: 10.1002/pon

standard care participants ($F<1$) and they decreased for decliners; $F(1,48)=5.31$, $p<0.03$. Control beliefs decreased from baseline to 6 months overall, $F(2,108)=6.14$, $p<0.02$. Although the overall Group × Time interaction was not significant, $F(1,108)=2.40$, $p<0.09$, planned simple effects revealed control beliefs decreased for standard care participants, $F(1,36)=4.97$, $p<0.03$, and decliners, $F(1,42)=6.37$, $p<0.02$, but they remained stable for intervention participants, $F(1,31)=0.15$, *ns*. By 12 months, neither the Time nor the Time × Group interaction effect was significant.

Perceived risk of recurrence

As predicted, intervention participants had lower risk perceptions relative to standard care and decliner participants at 4 months (see Table 2). The group differences at 6 months and 12 months were not significant. Repeated measures ANOVAs revealed a significant Time × Group interaction for changes from baseline to 4 months, $F(2,113)=4.68$, $p<0.01$, due to a decrease for intervention participants, $F(1,30)=7.06$, $p<0.02$, and non-significant increases for standard care and decliner participants (F's<1.87). Group differences in changes in perceived risk subsequently diminished at 6 months and 12 months (F's<1.63).

Finding benefits

At 6 months and 12 months, intervention participants reported more benefits resulting from their cancer experiences than did decliners (see Table 2). However, predictions that the intervention group would report greater benefits relative to the standard care group were not supported. Standard care participants reported greater benefits relative to decliners at 6 months, although these two groups did not differ significantly at 12 months.

Psychological adjustment

Emotional well-being

Although between-subjects group differences in emotional well-being were not statistically significant at any of the assessments (see Table 3), repeated measures ANOVAs revealed significant group differences in changes from baseline to 4 months. Emotional well-being improved overall, $F(1,113)=29.38$, $p<0.001$, and the extent of improvement varied across the groups, Group × Time interaction $F(2,114)=5.18$, $p<0.01$. As predicted, intervention participants exhibited a greater increase relative to standard care participants, Group × Time interaction $F(1,114)=5.76$, $p<0.01$; and decliner participants, Group × Time interaction $F(1,114)=9.86$, $p<0.01$. The standard care and decliner groups did not differ, Group × Time interaction $F<1$. All groups exhibited improvements from baseline to 6 months, $F\times(1,108)=14.31$, $p<0.002$, and from baseline to 12 months, $F(1,105)=53.56$, $p<0.001$; the groups did not differ in the extent of improvement at either assessment (F's<2).

Table 3. Means (S.D.s) of psychological adjustment factors

Variable	Group intervention	Standard care	Decliners	*F*
Emotional well-being				
Baseline	20.37 (2.62)	21.17 (2.14)	21.08 (2.81)	1.45
4 months	22.65 (2.58)	22.16 (3.01)	21.96 (2.95)	0.58
6 months	22.15 (2.54)	22.55 (2.83)	22.05 (3.22)	0.32
12 months	23.26 (2.32)	22.68 (2.92)	23.03 (1.95)	0.51
Cancer worry‡				
Baseline	8.71 (6.66)	7.33 (6.38)	10.16 (6.32)	2.53†
4 months	4.99 (5.77)[a]	8.50 (7.23)[b]	7.89 (6.07)[b]	3.28*
6 months	5.60 (5.90)	7.07 (6.55)	7.33 (5.36)	0.92
12 months	6.33 (5.86)	6.50 (6.28)	7.86 (6.24)	0.72
State anxiety§				
Baseline	15.06 (4.94)	13.65 (4.24)	13.67 (5.57)	1.23
4 months	10.95 (4.15)	12.75 (5.07)	12.31 (4.04)	1.63
6 months	11.47 (4.37)	10.52 (3.67)	11.55 (4.11)	0.48
12 months	10.39 (3.75)	10.29 (4.52)	10.06 (4.08)	0.06
Coping efficacy¶				
Baseline	21.09 (3.16)	21.98 (2.48)	21.75 (3.25)	1.14
4 months	22.66 (2.49)[a]	20.58 (3.29)[b]	22.23 (3.33)[a]	4.57**
6 months	22.42 (2.89)	22.05 (4.13)	22.89 (2.84)	0.59
12 months	23.97 (1.37)[a]	22.48 (3.00)[b]	23.07 (2.76)[ab]	3.34*

Row means with diering superscripts are significantly dierent, $p<0.05$.
*$p<0.05$ **$p<0.01$.
†$p<0.10$
‡Means are adjusted for age, which predicted lower worry at all timepoints, p's<0.02.
§Means are adjusted for age, which predicted lower anxiety at baseline and 4 months, p's<0.10.
¶Means are adjusted for chemotherapy, which was associated with higher scores at 4 months and 12 months, p's<0.01.

DOI: 10.1002/pon

Cancer worry

By 4 months, and intervention participants reported less cancer worry relative to standard care and decliner participants (see Table 3). Group differences in cancer worry at 6 months and 12 months were not significant.

Assessment of changes in cancer worry from baseline to 4 months revealed no overall Time effect and a significant Group × Time interaction, $F(2,112) = 6.29$, $p < 0.01$. Worry decreased for intervention participants, $F(1,31) = 11.25$, $p < 0.01$, whereas it increased for standard care participants, $F(1,35) = 4.34$, $p < 0.05$, and decliners, $F(1,46) = 5.42$, $p < 0.03$. There were no overall changes in cancer worry or group differences in changes from either baseline to 6 months or baseline to 12 months (F's < 2.10).

State anxiety

Between-subjects group differences in state anxiety were not significant at any timepoint (see Table 3). However, repeated measures ANOVAs revealed group differences in changes in state anxiety over the first four months; Time × Group interaction $F(2,114) = 4.88$, $p < 0.01$. Scores decreased for intervention participants, $F(1,32) = 27.75$, $p < 0.001$, but not for standard care or decliner participants (F's < 2.63). Anxiety decreased overall from baseline to 6 months, $F(1,108) = 34.56$, $p < 0.001$, and from baseline to 12 months, $F(1,107) = 43.71$, $p < 0.001$; in neither case did the extent of decrease vary across the three groups (F's < 1).

Coping efficacy

Intervention participants reported greater coping efficacy than did standard care participants at both 4 months and 12 months. Decliners did not differ from either group at any assessment. Repeated measures ANOVAs, with chemotherapy as a covariate, of changes from baseline to 4 months revealed no overall Time effect but a significant Group × Time interaction, $F(2,111) = 6.26$, $p < 0.01$. This effect was due to an increase in coping efficacy for intervention participants, $F(1,30) = 8.02$, $p < 0.01$, no change for decliners, $F(1,45) = 0.21$, $p < 0.65$, and a decrease for standard care participants, $F(1,34) = 5.82$, $p < 0.02$. Assessments of changes from baseline to 6 months revealed no Time or Group × Time interaction effects (F's < 1.64). Coping efficacy generally increased from baseline to 12 months, $F(1,106) = 8.61$, $p < 0.01$, but increases varied across the groups, $F(2,106) = 3.50$, $p < 0.04$. Coping efficacy increased for intervention participants, $F(1,34) = 19.50$, $p < 0.001$, whereas it did not change for either standard care participants, $F(1,31) = 0.01$, $p < 0.95$, or decliners, $F(1,39) = 1.31$, $p < 0.25$.

Discussion

Women who participated in the group intervention soon after diagnosis exhibited increases in the use of emotion regulation strategies during the 8 months following program completion. From baseline to the end of the program four months later, intervention participants reported increases in the use of relaxation-related techniques and perceived control as well as decreases in perceived risk of recurrence. In contrast, women receiving standard care and women declining the intervention did not exhibit these changes; in fact, the decliners reported a decrease in perceived control. These changes in emotion regulation processes by intervention participants appear to have assisted in reducing distress during this challenging phase of treatment. Intervention participants (compared with standard care participants and decliners) reported greater improvements in emotional well-being, cancer worry, anxious mood, and coping efficacy over these four months. By the 6 month assessment, when medical treatment had been completed, intervention participants continued to report higher relaxation use relative to baseline; moreover they sustained their levels of perceived control whereas the standard care participants and decliners reported decreases relative to baseline. Group differences in perceived risk, worry, and coping efficacy were no longer evident at 6 months, and all groups reported comparable improvements in emotional well-being and anxiety at 6 months and 12 months.

In addition to these immediate changes in emotion regulation efforts, the intervention was associated with delayed changes in suppression tendencies. Intervention participants reported lower suppression relative to the other groups at 12 months. In contrast, standard care participants exhibited an increase in suppression (suggesting that suppression efforts may naturally increase over this phase) and decliners showed no change. One other study has demonstrated that a psychosocial intervention for cancer patients can alter emotional suppression tendencies [50]. This RCT assessed a year-long intervention for women with metastatic breast cancer diagnosed an average of 2–3 years earlier; many volunteered in response to community advertisements. Given the program's intensity, the women's metastatic conditions, and the selection process, these women may have been highly motivated to make psychological changes. The present results complement these findings by demonstrating that suppression can be reduced in a shorter program offered soon after diagnosis to a more heterogeneous sample of women.

Intervention participants reported greater benefits from their cancer experiences relative to decliners. With the absence of significant differences between intervention and standard care

DOI: 10.1002/pon

groups and the inability to assess benefit-finding at baseline, however, we cannot discern whether this difference is due to intervention effects or *a priori* group differences in benefit-finding tendencies. Group differences in suppression and finding benefits at 12 months correspond with the reappearance of group differences in coping efficacy appraisals at this time, with intervention participants reporting relatively greater improvement.

The variations in emotion regulation and psychological well-being over time highlight the changing dynamics of distress and emotion regulation during the first year following diagnosis. Some emotion regulation skills may be particularly useful at certain times; for example, relaxation techniques may be especially useful during treatment phases. Moreover, it may take extended time to alter emotion regulation practices such as emotional suppression. Alternatively, women may not find it useful to alter suppression tendencies until after medical treatment has ended. The findings underscore the need to evaluate intervention effects on emotion regulation dynamics over time.

Several study limitations warrant comment. First, participants tended to be of European ethnicity and moderate socioeconomic status; research is needed to determine whether the intervention will lead to similar outcomes for women of other cultural or socioeconomic backgrounds. Efforts to replicate and extend the findings are also warranted given the limited sample size. Finally, the relatively greater distress at baseline of women who dropped out of the study suggests the findings may not generalize to women exhibiting very poor adjustment following surgery.

The use of a quasi-experimental design provides correlational evidence regarding changes experienced by intervention participants relative to those undergoing standard care and those who declined the intervention. Given the many RCTs of interventions now published, as well as growing ethical concerns about RCTs and awareness of their methodological limitations, the alternating phases design offers needed complementary evidence regarding responses to a psychosocial intervention. The treatment groups did not differ on baseline measures of psychological factors, although they may have differed on other personal factors that are responsible for the greater improvements by the intervention group. If such group differences existed because women who chose the intervention were more likely to improve than those who declined, then the findings would have the pattern in which improvements in the intervention group would be greater than those in the standard care group, which would be greater than those in the decliner group. Although some findings reflect this pattern, the majority do not and so are more likely due to intervention effects.

To conclude, this study demonstrates that a theory-based intervention can promote changes in emotion regulation processes and psychological adjustment. The findings support the utility of developing self-regulation interventions for individuals with cancer.

Acknowledgements

Funding for this study was provided by the Breast Cancer Research Trust of New Zealand. The authors would like to thank Beverly Sylvester-Clark, Richard Fox, Gerald McClaurin, Joan Dallaway, Glenda O'Halloran, and Alastair Cunningham for their valuable assistance.

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DOI: 10.1002/pon