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Cognitive-behavioral therapy plus hypnosis to reduce emotional distress associated with radiotherapy for breast cancer: A randomized trial

Guy H. Montgomery, Madalina Sucala, Matthew J. Dillon, and Julie B. Schnur

Icahn School of Medicine at Mount Sinai, Department of Oncological Sciences

Abstract

Radiotherapy is a common and effective treatment for women with breast cancer. However, radiotherapy has also been shown to adversely affect patients' emotional well-being. Currently, few mind-body interventions are designed to improve patients' quality of life during radiotherapy. One intervention which has demonstrated clinical efficacy in the breast cancer radiotherapy setting is CBTH (Cognitive-Behavioral Therapy plus Hypnosis). The goal of this study was to investigate the impact of CBTH on emotional distress in women with breast cancer undergoing radiotherapy. One hundred patients were randomly assigned to either the CBTH ($n=50$) or Attention Control (AC) ($n=50$) group. Results revealed significant benefits of CBTH on emotional distress at the midpoint ($d=0.54$), the conclusion ($d=0.64$), and four weeks following the conclusion ($d=0.65$) of radiotherapy (all $ps < .05$). In conclusion, results support further study of CBTH as an evidence-based intervention to reduce emotional distress women with breast cancer. CBTH has the benefits of being brief, noninvasive, lacking side-effects, and producing beneficial effects which last beyond the conclusion of radiotherapy. Given these strengths, we propose that CBTH is a strong candidate for greater dissemination and implementation in cancer populations.

Keywords

Radiotherapy; Cognitive-Behavioral Therapy; Hypnosis; Breast Cancer

Radiotherapy is a common and effective treatment for women with breast cancer. Approximately half of the estimated 252,710 women diagnosed with breast cancer in 2017 (Siegel, Miller, & Jemal, 2017) will undergo radiotherapy (American Cancer Society, 2014), and radiotherapy has been demonstrated to increase disease-free survival and life expectancy (Darby et al., 2011). These important benefits, however, are not without their costs. Radiotherapy has been shown to adversely affect emotional and physical well-being (Lee et al., 2008; Lewis et al., 2014; Muszalik, Kolucka-Pluta, Kedziora-Kornatowska, & Robaczewska, 2016; Schnur, Ouellette, Bovbjerg, & Montgomery, 2009), and yet few mind-body interventions are designed to improve quality of life during this challenging phase of breast cancer treatment.

One intervention which has demonstrated clinical efficacy in the breast cancer radiotherapy setting is our group's CBTH (Cognitive-Behavioral Therapy plus Hypnosis), designed as a brief and low-burden mind-body intervention (Montgomery et al., 2014). The development of CBTH was based on literature showing that both hypnosis (Montgomery, Schnur, & Kravits, 2013) and CBT (Compas, Haaga, Keefe, Leitenberg, & Williams, 1998; Kangas, Bovbjerg, & Montgomery, 2008; Redd, Montgomery, & DuHamel, 2001; Tatrow & Montgomery, 2006) have been used independently to reduce a wide variety of symptoms and side effects of cancer and its treatment. Furthermore, our group has demonstrated that combining hypnosis with CBT can significantly improve outcomes in both clinical and experimental settings (Kirsch, Montgomery, & Sapirstein, 1995; Montgomery et al., 2009; Schnur, David, et al., 2009).

The type of CBT we used in CBTH was Rational Emotive Behavior Therapy (REBT). REBT is one of the earliest forms of cognitive-behavioral therapy, and holds that it is not the events that directly cause our suffering, but rather how we evaluate those events (David, Lynn, & Ellis, 2010; Ellis, 1994). Among the various schools of CBT, we chose REBT because it is both efficacious and, in our opinion, an especially validating form of therapy in the face of negative events (like cancer) which cannot be changed. When patients' describe stressful life events, REBT therapists work with patients to think through "what if" the worst was true, rather than assessing the likelihood of the worst case scenario.

The hypnosis intervention we used in CBTH was based on a sociocognitive model of hypnosis (Irving, 1999; Kirsch, 1991; Lynn, Rhue, & Kirsch, 2010). Hypnosis was defined as, "An agreement between a person designated as the hypnotist and a person designated as the client or patient to participate in a psychotherapeutic technique based on the hypnotist providing suggestions for changes in sensation, perception, cognition, affect, mood or behavior" (Montgomery et al., 2010, p.80). In addition to targeting fatigue directly through suggestions, our hypnosis intervention also secondarily targeted patients' emotional distress, as distress can be an important contributor to fatigue (Bennett, Goldstein, Lloyd, Davenport, & Hickie, 2004).

In our randomized clinical trial of 200 breast cancer radiotherapy patients, we demonstrated that CBTH was effective for controlling radiotherapy-related fatigue during treatment and afterwards (Montgomery et al., 2014). The effect sizes were medium to large (ranging from $d = 0.62$ to 1.69) across fatigue outcomes. However, we did not examine the effects of CBTH on breast cancer radiotherapy patients' emotional distress. Emotional distress is an important component of cancer patients' quality of life (Cella, 1994). Emotional distress is aversive in and of itself, it can have a significant impact on cancer patients' physical and social functioning (Pasquini & Biondi, 2007; Smith, Gomm, & Dickens, 2003), and it has been shown to affect breast cancer patients' experience of treatment-related side-effects (Bower et al., 2006; Schreiber, Kehlet, Belfer, & Edwards, 2014). Thus, it is critical to explore whether CBTH can benefit patients undergoing breast cancer radiotherapy by reducing their emotional distress.

Therefore, the goal of this study was to investigate the impact of CBTH on emotional distress in women with breast cancer undergoing radiotherapy. We hypothesized that breast

cancer radiotherapy patients assigned to the CBTH group would have lower levels of emotional distress than similar patients assigned to an attention control group.

Methods

Participants

Patients included in the present study are a subset of those included in our previous published RCT (Montgomery et al., 2014). To be eligible for the present study, women had to be: scheduled for a 6-week course of external-beam radiotherapy; able to speak and read English; older than age 18; have completed a measure of emotional distress (SV-POMS, see below), and be willing to be randomly assigned to study treatment group (CBTH vs. attention control). Patients were excluded from the present study if they had any uncontrolled comorbid medical or psychiatric illness (on the basis of chart review); were taking medications or having conditions associated with fatigue (e.g., chronic fatigue syndrome); or had metastatic disease. All participants provided written informed consent. The study was approved by the Mount Sinai Program for the Protection of Human Subjects.

One hundred patients were randomly assigned to either the CBTH ($n=50$) or Attention Control (AC) ($n=50$) group using computer-generated random positive integers (Altman, 1999). Random assignment was performed by one of the authors (G.H.M.) using randomized block lengths, with an average block length of 10.

Sample characteristics, by group, are presented in Table 1. No patient characteristics differed by random group assignment.

Measures

The Demographics and Medical Questionnaire is a face-valid set of items that was used to assess demographic and medical variables with the potential to function as moderators of group effects. Additionally, electronic medical charts were reviewed.

The Shortened Version of the Profile of Mood States (SV-POMS) was used to assess our primary outcome, emotional distress. The SV-POMS (DiLorenzo, Bovbjerg, Montgomery, Valdimarsdottir, & Jacobsen, 1999; Shacham, 1983) is a 37-item shortened version of the long-form Profile of Mood States (POMS). The SV-POMS has been used extensively in cancer as a measure of patients' emotional distress, and is a valid and reliable instrument (DiLorenzo et al., 1999). Each item is rated on a 5-point scale (ranging from 'not at all' to 'extremely'). The SV-POMS was administered at 4 time points: prior to the initiation of breast cancer radiotherapy, 3 weeks into radiotherapy, at the conclusion of radiotherapy, and 4 weeks following the conclusion of radiotherapy. The SV-POMS total mood disturbance score was the primary outcome used for the present study.

For our secondary outcomes, we used the six mood subscales of the SV-POMS: Tension–Anxiety, Depression–Dejection, Anger–Hostility, Vigor–Activity, Fatigue–Inertia, and Confusion–Bewilderment. Vigor items are reverse scored.

Study procedures

The procedures for the intervention and control groups have been previously presented (Montgomery et al., 2014). We briefly describe the CBTH and AC intervention procedures below. Please see Figure 1 for an overview of intervention flow.

CBTH Intervention—On radiotherapy verification day (the day patients' treatment plans are verified in the radiotherapy suite), patients in the CBTH group received an initial intervention session lasting 30 minutes – 15 minutes CBT/REBT and 15 minutes hypnosis. The CBT segment focused on teaching the patients how to identify, dispute, and replace unhelpful beliefs, based on REBT theory (Walen, DiGiuseppe, & Dryden, 1992). In brief, patients were introduced to the idea that it is not the events that happen to them that are upsetting, but rather how they evaluate or appraise those events (i.e., unhelpful beliefs). Interventionists (doctoral-level psychologists) taught patients how to complete a thought record worksheet, and asked patients to complete two worksheets per week to be discussed in the next session. The interventionists also taught patients behavioral strategies to manage distress (e.g., exercise, distraction strategies, activity scheduling). The hypnosis segment involved: 1) debunking (dispelling myths and misconceptions about hypnosis, and addressing patient questions and concerns); 2) a relaxation induction involving guided imagery; 3) a deepening procedure (counting from 1 to 10); 4) suggestions for reduced fatigue, increased energy, and reduced emotional distress; 5) posthypnotic suggestions for reduced fatigue; and, 6) an alerting procedure (counting from 5 to 1). At the end of the session, each patient was given a CBTH workbook and worksheets that were developed by our group. Participants were asked to complete two thought record worksheets per week and to perform hypnosis whenever they liked on their own. During the six weeks of radiotherapy, patients met with study interventionists for two 15 minute sessions per week. One weekly session involved 15 minutes of CBT/REBT, and included reviewing the patients thought record "homework" and making corrections as needed. The second weekly session involved 10 minutes of "homework" review and a 5 minute hypnosis session. On patients' penultimate day of treatment, interventionists met with them for a final 30 minute session. During this session, interventionists worked with patients to review and summarize what had been learned during the intervention, to provide relapse prevention strategies, and to conduct a final 15 minute hypnosis session focused on feeling well after radiotherapy.

Attention Control (AC)—An AC condition was used to control for the effects of professional attention, notably the potential effects of simply interacting with an empathic interventionist. AC participants met with an interventionist for the same amount of time as CBTH participants on the same schedule (30 minutes initially, two 15 minute sessions per week for six weeks, one 30 minute final session). AC procedures were based on manualized approaches (Lang et al., 2000; Montgomery et al., 2007). For AC participants, the interventionist did not lead the patient in imagery, relaxation, evaluation of thought processes, or even simple discussion. Rather, the interventionist allowed the patient to direct the flow of the conversation and provided supportive/empathic comments.

Data analysis

In order to evaluate the effect of CBTH on emotional distress (primary outcome = SV-POMS total score), we first checked to determine if any medical or demographic factor differed between the groups. None did (all p s > .16, see Table 1). Next, we tested the impact of the intervention on emotional distress (SV-POMS total score) in a repeated measures analysis with one between subjects factor (Group: CBTH vs AC) and 4 levels of the repeated factor (Time) to represent each of the four assessment points. Within the repeated measures approach, simple effects of Group were checked at Baseline to determine whether the groups differed prior to the administration of the intervention (i.e., a check on the effectiveness of randomization). Next, if the primary analyses revealed a significant effect of Group on the SV-POMS over time, we re-ran the analyses with each of the six SV-POMS subscales (Tension-Anxiety, Depression-Dejection, Anger-Hostility, Vigor-Activity, Fatigue-Inertia, and Confusion-Bewilderment) in order to explore whether there were differential effects of the intervention on each of these secondary outcomes. Furthermore, significant GroupXTime interactions were explored by examining simple effects at each assessment time point. Effect sizes (Hedges & Olkin, 1985) were also calculated to estimate the magnitude of group differences at each time point.

Results

No adverse events were reported related to the CBTH intervention. Analysis of total SV-POMS scores at Baseline revealed that the Groups did not differ [$F(1,98) = 0.00$; $p = .99$]. Repeated measures analyses revealed a main effect of Group [$F(1,98) = 6.65$; $p = .01$] collapsing across Time. MANOVA Test Criteria revealed that there was a significant effect of Time [$Wilks' \Lambda(3,96) = 11.34$; $p = .001$] and a significant GroupXTime interaction [$Wilks' \Lambda(3,96) = 11.34$; $p = .001$]. Further analyses of the interaction via simple effects revealed that participants in the CBTH Group had significantly lower total SV-POMS scores (emotional distress) at: the midpoint of radiotherapy [$F(1,98) = 7.16$; $p = .009$; $d = 0.53$, 95% CI: 0.13 to 0.93]; the conclusion of radiotherapy [$F(1,98) = 10.33$; $p = .002$; $d = 0.64$, 95% CI: 0.24 to 1.04]; and at the four week follow-up [$F(1,98) = 10.71$; $p = .002$; $d = 0.65$, 95% CI: 0.25 to 1.05] than participants in the AC group. As mentioned above, the Groups did not differ at Baseline. Please see Figure 2 for a description of these effects.

As a significant effect of Group was revealed on the total SV-POMS score, we next examined the effects of CBTH on each of the secondary outcomes, the six SV-POMS subscales. Please see Figure 3 for a description of these effects.

Tension-Anxiety

Analyses of Tension subscale scores at Baseline revealed that the Groups did not differ [$F(1,98) = 0.02$; $p = .88$]. Repeated measures analyses revealed a main effect of Group [$F(1,98) = 9.53$; $p = .003$]. MANOVA Test Criteria revealed that there was a significant effect of Time [$Wilks' \Lambda(3,96) = 6.89$; $p = .001$] and a significant GroupXTime interaction [$Wilks' \Lambda(3,96) = 7.72$; $p = .001$]. Further analyses of the interaction via simple effects revealed that participants in the CBTH Group had significantly lower Tension-Anxiety scores at: the midpoint of radiotherapy [$F(1,98) = 8.90$; $p = .004$; $d = 0.59$,

95% CI: 0.19 to 0.99]; the conclusion of radiotherapy [$F(1,98) = 7.52$; $p = .007$; $d = 0.54$, 95% CI: 0.14 to 0.94]; and at the four week follow-up [$F(1,98) = 34.67$; $p = .001$; $d = 1.30$, 95% CI: 0.50 to 2.11] than participants in the AC group.

Depression-Dejection

Analyses of Depression-Dejection scores at Baseline revealed that the Groups did not differ [$F(1,98) = 0.05$; $p = .82$]. Repeated measures analyses did not reveal a significant main effect of Group [$F(1,98) = 2.20$; $p = .141$] collapsing across Time. MANOVA Test Criteria revealed a significant effect of Time [$Wilks' \Lambda(3,96) = 12.68$; $p = .001$]. There was also a significant GroupXTime interaction [$Wilks' \Lambda(3,96) = 2.67$; $p = .05$]. Further analyses of the interaction via simple effects revealed that participants in the CBTH Group had significantly lower Depression-Dejection scores at the conclusion of radiotherapy [$F(1,98) = 5.10$; $p = .026$; $d = 0.42$, 95% CI: 0.03 to 0.82]. Scores did not differ between Groups at the midpoint of radiotherapy [$F(1,98) = 2.55$; $p = .113$; $d = 0.32$, 95% CI: -0.08 to 0.71] or at the four week follow-up [$F(1,98) = 0.01$; $p = .93$; $d = 0.02$, 95% CI: -0.37 to 0.41].

Anger-Hostility

Analyses of Anger-Hostility subscale scores at Baseline revealed that the Groups did not differ [$F(1,98) = 0.01$; $p = .93$]. Repeated measures analyses did not reveal a significant main effect of Group [$F(1,98) = 1.71$; $p = .194$] collapsing across Time. MANOVA Test Criteria revealed a significant effect of Time [$Wilks' \Lambda(3,96) = 15.03$; $p = .001$]. There was also a significant GroupXTime interaction [$Wilks' \Lambda(3,96) = 2.90$; $p = .04$]. Further analyses of the interaction via simple effects revealed that participants in the CBTH Group had significantly lower Anger scores at the conclusion of radiotherapy [$F(1,98) = 7.10$; $p = .009$; $d = 0.53$, 95% CI: 0.13 to 0.93]. Scores did not differ between Groups at the midpoint of radiotherapy [$F(1,98) = 2.00$; $p = .161$; $d = 0.28$, 95% CI: -0.11 to 0.67] or at the four week follow-up [$F(1,98) = 0.06$; $p = .80$; $d = 0.05$, 95% CI: -0.34 to 0.44].

Vigor-Activity

Analyses of Vigor-Activity subscale scores at Baseline revealed that the Groups did not differ [$F(1,98) = 0.44$; $p = .51$]. Repeated measures analyses did not reveal a significant main effect of Group [$F(1,98) = 3.08$; $p = .082$] collapsing across Time. MANOVA Test Criteria did not reveal a significant effect of Time [$Wilks' \Lambda(3,96) = 2.01$; $p = .12$]. However, there was a significant GroupXTime interaction [$Wilks' \Lambda(3,96) = 4.16$; $p = .008$]. Further analyses of the interaction via simple effects revealed that participants in the CBTH Group had significantly higher Vigor scores at: the midpoint of radiotherapy [$F(1,98) = 4.09$; $p = .05$; $d = 0.22$, 95% CI: -0.18 to 0.61]; the conclusion of radiotherapy [$F(1,98) = 4.56$; $p = .035$; $d = 0.42$, 95% CI: 0.03 to 0.82]; and at the four week follow-up [$F(1,98) = 4.36$; $p = .039$; $d = 0.41$, 95% CI: 0.02 to 0.81] than participants in the AC group.

Fatigue-Inertia

Analyses of Fatigue-Inertia subscale scores at Baseline revealed that the Groups did not differ [$F(1,98) = 0.02$; $p = .88$]. Repeated measures analyses revealed a main effect of Group

[$F(1,98) = 6.03$; $p = .016$]. MANOVA Test Criteria revealed that there was a significant effect of Time [$Wilks' \Lambda(3,96) = 13.98$; $p = .001$] and a significant GroupXTime interaction [$Wilks' \Lambda(3,96) = 4.42$; $p = .006$]. Further analyses of the interaction via simple effects revealed that participants in the CBTH Group had significantly lower Fatigue scores at the conclusion of radiotherapy [$F(1,98) = 9.13$; $p = .003$; $d = 0.54$, 95% CI: 0.14 to 0.94] and at the four week follow-up [$F(1,98) = 14.73$; $p = .001$; $d = 1.30$, 95% CI: 0.50 to 2.11] than participants in the AC group. Groups did not significantly differ at the midpoint of radiotherapy [$F(1,98) = 1.04$; $p = .31$; $d = 0.20$, 95% CI: -0.19 to 0.60] on Fatigue scores.

Confusion-Bewilderment

Analyses of Confusion-Bewilderment subscale scores at Baseline revealed that the Groups did not differ [$F(1,98) = 0.17$; $p = .68$]. Repeated measures analyses did not reveal a significant main effect of Group [$F(1,98) = 1.98$; $p = .163$] collapsing across Time. MANOVA Test Criteria revealed a significant effect of Time [$Wilks' \Lambda(3,96) = 13.68$; $p = .001$]. There was no significant GroupXTime interaction [$Wilks' \Lambda(3,96) = 1.42$; $p = .24$]. Therefore, simple effects were not analyzed.

Discussion

This randomized study demonstrated that the CBTH intervention was efficacious for controlling emotional distress in women undergoing radiotherapy for breast cancer. Patients in the CBTH group had significantly less overall emotional distress, as assessed by the SV-POMS total score, at the midpoint of radiotherapy, the conclusion of radiotherapy, and four weeks following the conclusion of radiotherapy. These results are consistent with previously published research on the effects of CBT and hypnosis on distress in cancer patients in particular (Montgomery et al., 2007; Montgomery et al., 2009; Tatrow & Montgomery, 2006), and more broadly on the efficacy of combining CBT with hypnosis across a variety of outcomes (Castel, Cascon, Padrol, Sala, & Rull, 2012; Kirsch et al., 1995; Milling, Levine, & Meunier, 2003). Effect sizes were clinically significant, based on published criteria (Revicki et al., 2006). Overall, the average patient in the CBTH group was better off than 70%, 74%, and 74% of the control group patients at the midpoint of treatment, the end of treatment, and at the four week follow-up respectively in regard to overall emotional distress.

Next, we sought to explore whether the effects of CBTH differed according to the type of emotional distress being considered. Therefore, we examined the effects of CBTH on each of the six SV-POMS subscales. Positive effects of CBTH were revealed for five (Tension-Anxiety, Depression-Dejection, Anger-Hostility, Vigor-Activity, Fatigue-Inertia) of the six SV-POMS subscales, the exception being Confusion-Bewilderment. All five subscales showed significant benefit of the CBTH group at the conclusion of radiotherapy. Three subscales revealed significant benefits of CBTH at four weeks following radiotherapy (Anger-Hostility, Fatigue-Inertia, Vigor-Activity), and two showed significant benefits at the midpoint of radiotherapy (Tension-Anxiety, Vigor-Activity). Indeed, effect sizes for Tension-Anxiety ranged from moderate during and at the conclusion of radiotherapy, to large at the four week follow-up assessment. These results are consistent with previously

described benefits of CBTH on cancer patients' fatigue (Montgomery et al., 2014), and support the perspective that CBTH is an effective intervention for reducing emotional distress as well.

We were interested in the differences noted between Vigor-Activity and Fatigue-Inertia subscales. Although the items on both subscales assess energy level (e.g., vigor asks patients if they feel "energetic," fatigue asks patients if they feel "worn out"), significant effects for vigor were revealed three weeks prior to those for fatigue. Although we cannot be sure of the reasons for this finding, we can speculate that the result could be due to: a) measurement of the constructs - vigor includes emotional items (e.g., "cheerful") whereas fatigue does not; or, b) the clinical course of the symptoms – fatigue typically does not worsen until after the midpoint of radiotherapy, so maybe there was insufficient levels of fatigue to be intervened upon. Differential effects of CBTH on vigor and fatigue in the radiotherapy setting require further exploration. Regardless, the results seen here support the idea of measuring both positive and negative outcomes in behavioral medicine research (Schnur, David, et al., 2009).

Overall, the intervention was efficacious, brief (patients participated in intervention sessions for only 30 minutes per week for six weeks), and had no side effects. Based on recent classification systems for evaluating the support of psychological interventions (David & Montgomery, 2011), CBTH would fall into Category I, an evidence-based intervention, as there are empirical data supporting both the efficacy and the underlying psychological mechanisms of change [for CBT (Szentagotai, 2006; Visla, Fluckiger, Holtforth, & David, 2016) and for hypnosis (Montgomery et al., 2010)]. It is our hope, that such empirical support will encourage widespread dissemination of CBTH, but empirical data alone often fails to lead to adoption and implementation.

In order to address the all too common dissemination failures of psychological interventions, we have also developed a CBTH training course, CBTH4Fatigue[®]. The course incorporates a blended learning approach with both E-Learning and Live training components, is funded by the National Cancer Institute, and is free for clinical providers meeting eligibility criteria. For a list of these criteria, or for more information, please visit www.CBTH4Fatigue.com.

The results suggest four future research directions. First, studies examining the relative contributions of CBT/REBT and hypnosis to CBTH effects are needed. Here, we prioritized the demonstration of clinical benefit for patients, and attempted to devise the most efficacious intervention we could. However, we cannot determine the relative contributions of the active "ingredients" of CBTH with the present study methodology. In the future, we hope to experimentally study the relative contributions of CBTH components to improvements in patients' emotional distress, fatigue, and overall quality of life. Second, it will be clinically useful to determine if CBTH effects can be generalized to new populations. Certainly, emotional distress is a common element in many cancers (Bultz & Carlson, 2006), and CBTH could potentially have a broad beneficial impact across diagnoses. Third, it will be interesting to determine if CBTH can be delivered, at least in part, through mHealth or eHealth modalities. The recent surge in eHealth and mHealth interventions can represent a unique opportunity to enhance patients' access psychosocial cancer care interventions.

Increasingly, we are becoming a “wireless” nation, and interventions which can adapt to new platforms may have a broad reach. Fourth, it would be interesting if one could determine if certain aspects of mood (e.g., anxiety) drive changes in other aspects of mood (e.g., depression) or physical functioning (e.g., fatigue) during the course of radiotherapy. A more fine grained approach (e.g., ecological momentary assessment) might be useful in this regard.

In conclusion, the results demonstrated here support further study of CBTH as an evidence-based intervention to reduce emotional distress women with breast cancer. CBTH has the benefits of being brief, noninvasive, lacking side-effects, and producing beneficial effects which last beyond the end of treatment. Given these strengths, we propose that CBTH is a strong candidate for greater dissemination and implementation in cancer populations.

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Figure 1.
CBTH Intervention Flow

Figure 2. The effects over time of cognitive-behavioral therapy plus hypnosis (CBTH) on emotional distress (total SV-POMS scores) in patients with breast cancer undergoing radiotherapy.

Figure 3.

The effects over time of cognitive-behavioral therapy plus hypnosis (CBTH) on emotional distress (the six SV-POMS subscales) in patients with breast cancer undergoing radiotherapy: (A) CBTH effects on mean Tension-Anxiety, (B) CBTH effects on mean Depression-Dejection, (C) CBTH effects on mean Anger-Hostility, (D) CBTH effects on mean Vigor-Activity, (E) CBTH effects on mean Fatigue-Inertia, (F) CBTH effects on mean Confusion-Bewilderment.

Table 1Sample characteristics ($N = 100$)

Characteristic	CBTH Intervention ($n = 50$)	Attention Control ($n = 50$)	Significance
Age (y), Mean (SD)	55.26 (11.27)	54.44 (10.58)	$F(1,98) = 0.14; p = 0.71$
Education			
Less than college degree	10 (20%)	10 (20%)	Chi-Square (1) = 0.00, $p = 1.00$
College degree or higher	40 (80%)	40 (80%)	
Race			
White	39 (78%)	38 (76%)	Chi-Square (2) = 3.67, $p = 0.16$
African American	6 (12%)	2 (4%)	
Other	5 (10%)	10 (20%)	
Ethnicity			
Hispanic	4 (8%)	5 (10%)	Chi-Square (1) = 0.71, $p = 0.40$
Non-Hispanic	46 (92%)	45 (90%)	
Stage			
0	18 (36%)	14 (28%)	Chi-Square (1) = 0.12, $p = 0.73$
I	21 (42%)	23 (46%)	
II	8 (16%)	9 (18%)	
III	3 (6%)	4 (8%)	
Total radiation dose, Gy			
Mean (SD)	61.67 (3.14)	62.41 (1.97)	$F(1,98) = 1.99; p = 0.16$
Adjuvant hormonal treatment			
Tamoxifen	9 (18%)	10 (20%)	Chi-Square (2) = 0.66, $p = 0.72$
Aromatase Inhibitors	23 (46%)	19 (38%)	
None	18 (36%)	21 (42%)	
Prior Chemotherapy			
Yes	15 (30%)	19 (38%)	Chi-Square (1) = 0.71, $p = 0.40$
No	35 (70%)	31 (62%)	