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Original Article

Efficacy of Mindfulness-Based Cognitive Therapy and Cognitive Behavioral Therapy for Anxiety, Depression, and Fatigue in Cancer Patients: A Randomized Clinical Trial

Masoume Sheikhzadeh[1], Zahra Zanjani[2*], Alireza Baari[3]

Abstract

Objective: Cancer is associated with some psychological problems that play an important role in the severity and continuity of cancer. Cancer may lead to maladaptive psychological reactions such as anxiety, depression, and fatigue. Depression and anxiety are highly prevalent in cancer patients. This study aimed to compare the efficacy of mindfulness-based cognitive therapy (MBCT) and cognitive behavioral therapy (CBT) for anxiety, depression, and fatigue in cancer patients.
Method: The present study was a randomized clinical trial (RCT). Of the 100 patients diagnosed with cancer, 60 patients were eligible to participate in this study according to the inclusion / exclusion criteria. They were randomly assigned into 3 groups: MBCT, CBT, and wait-list group (WLG). Afterward, the experimental groups received 8 weekly treatment sessions. All the participants fulfilled the Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI), and Cancer-Related Fatigue Scale (CFS) before and after the intervention. Data were analyzed using SPSS-16 software by Analysis of Covariance (ANCOVA).
Results: The results indicated a significant reduction in depression, anxiety, and fatigue scores in CBT and MBCT groups. There was a significant difference between both treatment groups with WLG in the anxiety and depression, but no significant difference was found between MBCT and CBT groups. Additionally, there was only a significant difference between the CBT group and WLG in terms of fatigue (P = 0.01).
Conclusion: CBT and MBCT performed equally well in decreasing anxiety and depression in cancer patients, and they were significantly better than WLG. It seems that MBCT is a good alternative to CBT for decreasing emotional symptoms in cancer patients. As a result, CBT and MBCT could be considered a good addition to pharmacological treatment of cancer patients with comorbid psychological symptoms. However, CBT was preferable to MBCT in decreasing fatigue.
The study was registered at the irct.ir database under registration number IRCT20180503039509N1.

Key words: *Anxiety; Cognitive Behavioral Therapy (CBT); Depression; Fatigue; Mindfulness; Randomized Clinical Trial (RCT)*

1. Department of Clinical Psychology, Qom Branch, Islamic Azad University, Qom, Iran.
2. Department of Clinical Psychology, School of Medicine, Kashan University of Medical Sciences, Kashan, Iran .
3. Department of Internal Medicine, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.

***Corresponding Author:**
Address: Department of Clinical Psychology, School of Medicine, Kashan University of Medical Sciences, Kashan, Iran, Postal Code: 8715973474.
Tel: 98- 31 55443022, Fax: 98-31 55464950, Email: z_zanjani2005@yahoo.com

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Cancer is a chronic illness that is the second reason of death in developed countries and the third cause of mortality in developing countries (1). According to the Global Cancer Observatory (GCO) statistics, it was reported 14.1 million new cancer cases and 8.2 million cancer-associated deaths around the world in 2012 (2). The GCO statistics in 2018 reported about 110 000 new cancer cases and about 56 000 patients died of it in Iran in 2018 (3). Furthermore, cancer is considered as the third cause of death in Iran. In this regard, the most common types of cancer among Iranians are breast, colorectal, bladder, stomach, and prostate cancers. In addition, breast and gastrointestinal cancers cause the highest mortality rates (4).

Research has shown that the cancer is highly associated with some psychological problems (5). Anxiety and depression are the most common comorbidity of cancer (6). It has been stated that 60% of individuals with cancer have psychological symptoms (especially depression and anxiety) associated with cancer and according to the American Cancer Society, more than 25% of patients with cancer suffer from clinical depression symptoms (7,8). Anxiety may increase feelings of pain and interfere with sleep and decrease the quality of life. Also, anxiety may even shorten the cancer patient's life (9). Cancer-associated fatigue is another common disabling symptom among individuals with cancer and a symptom that is experienced by majority of individuals with cancer (10). The prevalence of cancer-related fatigue has been reported from 59% to nearly 100% depending on the clinical status of the cancer (11). This type of fatigue is intensified during chemotherapy and radiation therapy and may also persist after the treatment period (12). It usually leads to irritability, inability to cope with the disease, withdrawal from social activities, and inability to do daily activities (13).

Although there is evidence for the efficacy of chemotherapy and radiation therapy in treating cancer, they do not necessarily improve patients' psychological symptoms (14). Some patients may even leave chemotherapy due to their psychological symptoms (15). Psychological treatments have been shown to be effective in psychological symptoms; CBT as a 2-wave therapy is the most common psychological treatment for depression and anxiety (16). The usefulness of CBT in reducing fatigue has been also confirmed in several studies, and it has been reported that CBT is significantly more effective than usual care that included the treatment for cancer based on the guidelines of the comprehensive cancer center (17). In this respect, Cohen and Cotton investigated the efficacy of CBT in cancer patients and found diminished symptoms of anxiety and depression (18). Another study by Eichler et al indicated a 70% decline in fatigue, 33% for anxiety, and 57% for depression among breast cancer patients following the CBT (19). Despite the high degree of empirical support for CBT, recently third-wave therapies have been increasingly popular.

There are several reasons for the development of third-wave therapies. First, challenging patients' dysfunctional thoughts through CBT not only fails to convince them that they are wrong but also it may aggravate their feelings of incompetence. Second, rational responses can often turn into obligatory statements like "must" and "should" that can increase pressures on patients. Third, because a rational response acts as a stream of hope for patients, these individuals lose their hope if it is not supported with evidence (20).

MBCT is a third-wave treatment that is based on mindfulness (21), as a receptive and nonjudgmental awareness of the present moment (22). It consists of a combination of the main techniques of CBT and mindfulness (20). Mindfulness meditation activates the regions of the brain that are responsible for positive emotions and thus has a beneficial effect on immune functions of the body (23). This process allows individuals to make less painful sense of present-moment events. When individuals become aware of the present moment, they do not focus on the past or the future. Instead, the majority of psychological disorders are created by focusing on the past (24). This treatment aims to improve patients by using the main techniques of both waves of therapy (21). MBCT and CBT have similar objectives and both of them intend to help individuals recognize the role of negative automatic thoughts in inducing depression symptoms (25). Unlike traditional cognitive therapy, putting emphasis on evaluating and changing the validity of thought content and composing alternative thoughts, MBCT encourages attention and awareness of thought and feeling as well as observes them as they come and go, so that the association between negative automatic thoughts and unhappy feelings is decreased (26). According to the results of a study in Japan, MBCT was well accepted via Japanese cancer sufferers and had a positive effect on their mental status and quality of life (27).

The reason for examining the psychological interventions on cancer includes the high frequency of emotional difficulties comorbidities in cancer and it seems that the use of psychological therapies is necessary for them. Since there are various psychological therapies, it is necessary to be selected as the most effective one. Based on the authors' knowledge, there was no study that compared the efficacy of MBCT and CBT for anxiety, fatigue, and depression in cancer patients. Therefore, the comparison of these treatments affects the emotional symptoms of cancer patients can help determine a more effective psychotherapy for them. Finally, the present study aimed to investigate whether the given treatments (MBCT and CBT) have different effects and to find which one has more efficacy in reducing anxiety, fatigue, and depression in cancer patients.

Materials and Methods

Design and Participants

A parallel randomized clinical trial (RCT) with a pretest and a posttest was conducted on 3 groups (2 experimental groups and a WLG). A total of 100 cancer patients who referred to Ghaem and Imam Reza hospitals in Mashhad, Iran, in 2018, were screened based on inclusion/exclusion criteria. Inclusion criteria were confirmed during an initial interview by the first author .

The below formula was used to determine the sample size:

$$n = \frac{(Z_{1-\alpha/2}+Z_{1-\beta})^2(\sigma_1^2 + \sigma_2^2)}{(\mu_1-\mu_2)^2}$$

$\alpha = 0.05$, $\beta = 0.2$, μ and σ were estimated according to the results of a previous study (28); therefor, $\mu 1 = 35.7$ (mean score for fatigue after intervention), $\sigma 1 = 11.0$, $\mu 2 = 43.4$ (mean score for fatigue in the control group), $\sigma 2 = 8.7$.

Among the 100 cancer patients, 60 who met the inclusion criteria were selected by the purposive sampling method (Figure 1). Participants were randomly placed in the WLG and 2 experimental groups using a random number table. The inclusion criteria were as follows: age 18 to 50 years, at least a ninth-grade literacy level, diagnosis of cancer with minimum duration of 6 months, awareness of the diagnosis, no severe mental disorders (psychosis or bipolar disorder), no suicidal ideation, no physical illnesses except cancer (based on medical records and self-reports), ability to participate in therapy sessions (ability to sit for 90 minutes and have enough time), and signing the informed consent form. Exclusion criteria were being absent in therapy sessions more than 2 times, receiving other psychotherapies, suicide thoughts, and drug abuse.

The current study was approved by the ethics committee of Mashhad University of Medical Sciences with the number of Ir.mums.REC.1397.025. This study is registered at the irct.ir database under registration number IRCT20180503039509N1.

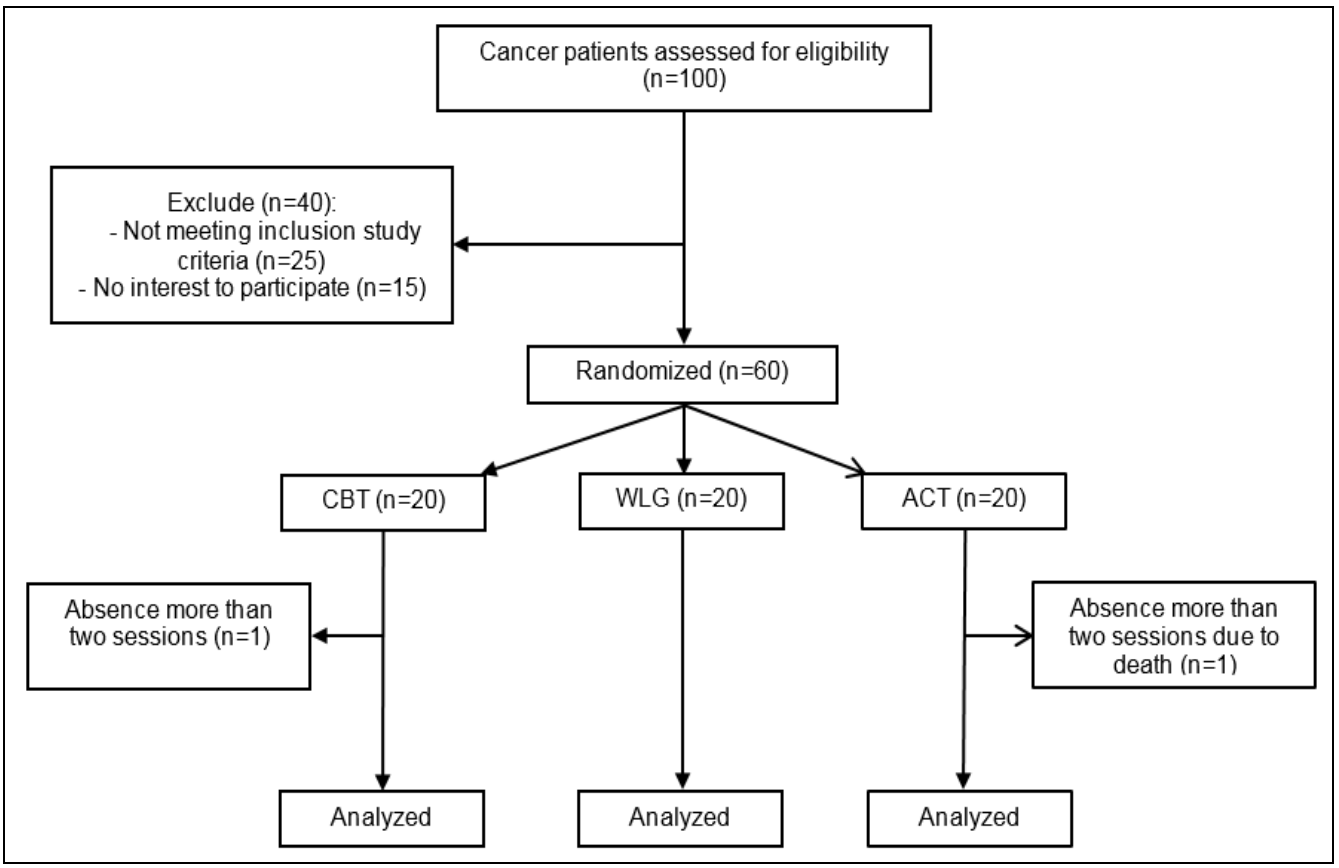

Figure 1. Flow Diagram of the Study

Measurements

Primary Outcome Measures

Beck Anxiety Inventory (BAI)

This inventory was comprised of 21 items based on a 4-point scale from not at all to severely. In this inventory, each item described a common symptom of anxiety. The scores variety from 0 to 63 (29). A score <8 shows no anxiety, scores 8 to 15 indicate mild anxiety, 16 until 25 moderate anxiety, and higher than 26 indicate severe anxiety. The internal consistency coefficient of the BAI (Cronbach's α) was reported at 0.92. Its test-retest reliability during one week was also by 0.75 with item-total correlations (30). The Persian version of BAI

indicated a great reliability (Cronbach's Alpha= 0.92) and validity (31). BAI had good reliability in the current study (Cronbach's Alpha = 0.88).

Beck Depression Inventory (BDI)

This 21-item inventory has been developed to assess the severity of depression. In this questionnaire, each item described a common symptom of depression. The items were also presented in the form of 4 alternative statements and the scores ranged from 0 to 63, and higher scores show more severe depression. A score less than 13 show no depression, between 14 and 19 show mild depression, 20 until 28 display moderate anxiety, and higher than 29 show severe depression. The concurrent validity of the original version of BDI was 0.79 and its test-retest reliability has been reported to be 0.67. Beck et al also reported its internal consistency by 0.86 and the Cronbach's α for patients and healthy participants as 0.86 and 0.71, respectively (32). Its psychometric properties have also been evaluated with an Iranian sample in which Cronbach's α was 0.87 and its test-retest reliability was 0.49 (33). BDI demonstrated good reliability in this study (α = 0.90).

Secondary Outcome Measure

Cancer-Related Fatigue Scale (CFS)

This 15-item scale consisted of 3 subscales: physical, affective, and cognitive. In this questionnaire, each item was presented on a scale from 0 (not at all) to 4 (very much). It also had a score ranging between 0 and 28 for the physical subscale, from 0 to 16 for the cognitive subscale, from 0 to 16 for the affective subscale, and between 0 and 60 for the total scale (34). Haghighat et al measured the reliability of the Persian version of this questionnaire using Cronbach's α. Its reliability for physical, affective, and cognitive subscales and the overall fatigue was 0.92, 0.89, 0.85, and 0.95, respectively (35). The scale indicated desirable reliability in the current study (α = 0.87 for the physical, 0.90 for affective, and 0.85 for cognitive subscales).

Working Alliance Inventory-Short Revised (WAI-SR)

The WAI-SR is a 12-item measurement tool assessing therapeutic alliance between participants and a therapist. Its items were presented on a 5-point Likert-type scale from 1 (rarely/ never) to 5 (always). The Cronbach's alpha coefficient for WAI-SR was reported to be 0.91. (36). Rahimian Boogar et al had measured the reliability of the Persian version of WAI-SR. In their study, Cronbach's alpha was reported 0.92 and the test-retest reliability coefficient (3-month interval) was 0.74 (37).

Credibility/Expectancy Questionnaire (CEQ)

This questionnaire has 6 items that was derived from a 45-item questionnaire and then administered before the second therapy session when treatment rationales were explained. The scale indicated high internal consistency with a standardized value from 0.79 to 0.90 (38). The Persian version of this scale includes 6-items and has been used in various studies. This scale showed good reliability in this study (α = 0.82).

Protocols

The MBCT group-based therapy plan was adapted according to the provided instructions by Segal et al (39) and the CBT protocol was adapted from instructions by Judith Beck (40). MBCT and CBT were also matched in terms of the number of sessions. The content of MBCT and CBT sessions is presented in Table 1.

Procedure

The participants were placed in 3 groups (CBT, MBCT, and WLG) and completed the questionnaires. The intervention groups received 8 weekly 90-minute sessions of CBT or MBCT. The sessions were held in a room of Ghaem hospital. It should be noted that following the implementation of the exclusion criteria, 1 patient in the MBCT group passed away and 1 patient from CBT group quit the therapy because of familial problems. In the end, participants answered the questionnaires again. Recruitment of the participants in the study started in November 2018 and ended in January 2019. Participants were assigned to study groups by a person blinded to the study procedures. When the CBT sessions were finished, MBCT sessions were held. The participants in the 3 groups had no relationship with each other between the sessions. The evaluators and analysts were also blinded to the randomized assignments .

Therapists and Treatments

MBCT and CBT were run by an expert in clinical psychology with 3 years of supervised training in psychological treatments and 1 year in CBT and MBCT. Moreover, treatment adherence was monitored by a supervisor and 2 clinical psychologists with PhD degrees who were certified in CBT or MBCT.

Control Conditions

The WLG as the control group in this study received no psychological treatments, but all participants received their usual pharmacological treatments. After post assessment, the WLG participants were offered free treatments and were able to choose either MBCT or CBT.

Data Analysis

Data analysis was done by SPSS-16. Mean, standard deviation, and frequency were reported as descriptive statistics. Chi-square and independent t test were used for examining the differences between groups in demographic characteristics, and ANCOVA was used to determine the differences between groups in the posttest by controlling the pretest score. $P < 0.05$ was assumed as a statistically significant value. The difference between the 2 means divided by a standard deviation for the data was consequently utilized for calculating the effect size (Cohen's d).

Table 1. The Content of the Therapy Protocols

Session	Title	objectives	content
The Content of the Cognitive-Behavioral Therapy Protocol			
1	ntroducing and motivating	Familiarity with other members and therapy	Identification of members, Introducing the course, Psycho-education and rationale of CBT; and training relaxation techniques (relaxation practiced during all sessions).
2 & 3	Introducing the maladaptive thoughts and determine them	Identify automatic thoughts, differentiating between thought and emotion	Review the assignments of the previous session, introducing automatic thoughts; identifying maladaptive thoughts and unpleasant emotions; and assessing possible problems in recording thoughts and identifying emotions.
4 & 5	Evaluation of thoughts (cognitive techniques)	Challenge and evaluation of thoughts, Training cognitive techniques	Review the assignments of the previous session, Challenging with irrational beliefs and thoughts; and pros and cons method by Socratic questioning.
6 & 7	behavioral techniques	Skills training	Review the assignments of the previous session, Problem-solving skills training; assertiveness; and planning activities.
8	relapse prevention	Complete the treatment, overview of sessions, and relapse prevention	Review the assignments of the previous session, introducing books for further familiarity with CBT; receiving feedback; and focusing on relapse prevention.
The Content of the Mindfulness-based Cognitive Therapy Protocol			
1 & 2	Introducing the members and therapy	Familiarity with other members and therapy, Explain cognitive intervention, being in the present moment	Introducing the program, structure, and goals, broadening knowledge about cancer, anxiety, depression, and fatigue; Explaining about the importance of interpreting events and the relationship between thoughts and emotions (A-B-C model of cognitive therapy), Introducing the mindfulness, eating raisins practice, body scan mindful breathing, meditation.
3 & 4	Mindfulness, being in the present moment	Increasing mindfulness, Stay in the present moment	Review the assignments of the previous session, Body scanning; practice mindful seeing or hearing, meditation and awareness of breathing, body and thoughts
5 & 6	Acceptance thoughts	Accepting the world as it is (strengthening acceptance without judgment), confrontation with thoughts (Thoughts are only thoughts, not facts)	Review the assignments of the previous session, trainings and practicing how to recognize automatic reactions; recognizing common cognitive distortions in cancer, training techniques of responding to negative automatic thoughts, training and providing the examples about which thoughts are just thoughts, not facts, mindful breathing, body scanning.
7	self-care	Awareness of thought and events effects on body, increasing caring of self	Breathing practices, pay attention to reactions when faced with problems, focusing on its effect on the body and the mind; writing a list of amusing activities, planning for the implementation of these activities, body scanning.
8	relapse prevention	Termination of treatment, training about the signs of relapse	Review of the program, receiving group members' feedback; and focusing on relapse prevention

Results

Demographic Characteristics

The participants' mean age was 47.77 years, and most of them (53.4%) aged 31 to 40 years. The results of the F-test (F = 1.50, sig = 0.23) indicated no significant difference among the 3 study groups in age. Moreover, the chi-square results showed no significant difference among the 3 groups in term of the levels of education (Chi-square = 5.83; P = 0.66) and gender (chi-square = 5.08; P = 0.08). In terms of marital status, most of participants were married (86.2%) 10.3% single, 1.7% widowed, and 1.7% divorced. Also, 79% were housewives and the rest were employed. The results of chi-square test of marital status ($\chi 2$= 11.17 and sig = 0.083) and employment status (chi-square test = 12.40 and sig = 0.13) showed no significant difference between the 3 groups regarding the type of marital status

and employment. Participants' demographic characteristics are presented in Table 2.

As shown in Table 3, a total of 67.2% of the participants had breast cancer, of whom 8.6% had colon cancer and 24.1% had lymphoma cancer. In addition, chemotherapy was the most commonly used treatment for the participants (52.6% patients on MBCT and CBT and 40% patients on WLG). No significant difference was not seen among the 3 groups on the cancer type ($\chi 2$ = 3.68; P = 0.45) and common treatment type ($\chi 2$ = 15.02; P = 0.37). Among all participants, 41.4% had metastasis (CBT = 7; MBCT = 8; and WLG = 9). All participants had moderate depression and anxiety according to the cutoff BDI and BAI. Also, there was no significant difference among the 3 groups in term of depression, anxiety, and fatigue at baseline (P >0.05).

Therapeutic Alliance and Treatment Credibility

Comparison of the results of CEQ between MBCT (mean = 34.84; SD = 12.09) and CBT (mean = 38.94; SD = 13.85) showed no significant difference between both groups regarding credibility (t = -0.97; sig = 0.33). The comparison of the results of WAI-SR also indicated no significant difference (P = 0.36; t = -0.91) between MBCT (mean = 47.57; SD = 2.16) and CBT (mean = 48.10; SD = 1.24) groups in terms of the working alliance.

Treatment Outcomes

Primary Outcomes

Depression

The ANCOVA results of depression scores showed a significant difference between groups (F = 3.39; P < 0.05, Table 4). Also, the findings of the post hoc analyses demonstrated no significant difference (P = 0.84) between MBCT and CBT groups in depression at the postintervention stage; however, CBT and MBCT groups had significant difference with WLG in depression scores at the postintervention stage (Table 5). Moreover, within-group comparisons showed a significant decrease from pretest to posttest for CBT (t = 8.17; P < 0.001; d = 1.83) and MBCT groups (t = 5.62; P < 0.001; d = 1.50). No significant differences were found for WLG from preintervention to postintervention stage (t = -1.64; P = 0.11; d = -0.16).

Anxiety

It is found generally a significant difference between groups in anxiety at posttest (F = 16.74; P < 0.001). Nonetheless, between-group comparisons also indicated no significant difference between MBCT and CBT groups at postintervention (P = 0.76). Nevertheless, the difference between both intervention groups and WLG was significant at postintervention (P < 0.001; Table 5). Within-group comparisons also showed a significant decrease from before to after intervention for CBT (t = 5.28; P < 0.001; d = 2.53) and MBCT groups (t = 7.82; P < 0.001; d = 2.13). No significant differences were observed for WLG from preintervention to postintervention (t = -1.03; P = 0.06; d = -0.17).

Secondary Outcome

Fatigue

As presented in Table 4, the results revealed a significant effect for group (F = 8.69; P < 0.05). The post hoc analyses demonstrated no significant difference between MBCT with CBT group (P = 0.84) and WLG (P = 0.10) at postintervention. However, the difference between CBT and WLG groups was significant at postintervention (P = 0.01). Moreover, within-group comparisons showed a significant decrease from pretest to posttest for CBT (t = 2.91; P < 0.01; d = 1.12) and MBCT groups (t = 2.87; P = 0.01; d = 0.80). However, significant differences were not reported for WLG from preintervention to postintervention (t = 0.67; P = 0.50; d = 0.14).

Table 2. Participants' Demographic Characteristics for Each Group and the Comparison of Three Groups

	MBCT		CBT		WLG		Total		F	sig
Age	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage		
20-30	4	21/1	1	5/3	3	15	8	13/8		
31-40	10	52/6	10	52/6	11	55	31	53/4	1.50	0.23
41-50	5	26/3	8	42/1	6	30	19	32/8		
Mean age	35/78		40/10		37/45		47/77			
Sex									Chi-square	sig
Female	17	89/5	18	94/7	14	70	49	84/5	5.08	0.08
Male	2	10/5	1	5/3	6	30	9	15/5		
Level of education										
ninth grade	10	52/6	7	36/8	7	35	24	41/4	5.83	0.66
Twelfth grade	5	26/3	8	42/1	10	50	23	39/7		
College education	4	21/1	4	21/0	3	15	11	18/9		

Table 3. The Frequency of Participants According to Their Cancer Types and Applied Medication; and Results of Chi-Square for Comparison of Three Groups

	MBCT		CBT		WLG		Total			
type of medication used	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Chi-square	sig
Chemotherapy	10	52/6	10	52/6	8	40	28	48/3		
Hormone Therapy	1	5/3	2	10/5	1	5	4	6/9		
Target Therapy	3	15/8	3	15/8	4	20	10	17/2		
Radiation therapy and chemotherapy	2	10/5	0	0	0	0	2	3/4		
Target therapy and chemotherapy	3	15/8	0	0	3	15	6	10/3	15.02	0.37
Radiation Therapy and Target Therapy	0	0	1	5/3	0	0	1	1/7		
Chemotherapy and hormone therapy	0	0	0	0	1	5	1	1/7		
medication not used	0	0	3	15/8	3	15	6	10/3		
type of cancer										
Breast	13	68/4	15	78/9	11	55	39	67/2		
Colon	1	5/3	2	10/5	2	10	5	8/6	3.68	0.45
Lanphom	5	26/3	2	10/5	7	35	14	24/1		

Table 4. The Results of ANCOVA for Comparison of Depression, Anxiety and Fatigue

Variables		Mean (±SD)			Result of ANCOVA	
		CBT (n=19)	MBCT (n=19)	WLG (n=20)	F	sig
Depression	Pre-test	25.52(±7.63)	25.42(8.76)	23.55(±8.30)	3.39	P=0.04
	Post-test	12.42(±6.64)	14(6.18)	24.90(±8.40)		
Anxiety	Pre-test	21.68(±6.80)	22.73(8.03)	20.86(±6.18)	16.74	P<0.001
	Post-test	7.42(±4.15)	7.94(5.63)	21.96(±6.42)		
Fatigue	Pre-test	25.36(±8.07)	24.21(8.82)	22.80(±8.77)	8.69	P=0.005
	Post-test	16.52(±7.70)	17.15(8.7)	21.60(±8.10)		

Table 5. The Results of Post Hoc Analyses for Depression, Anxiety and Fatigue

Variables	CBT vs MBCT			CBT vs WLG			MBCT vs WLG		
	t	sig	Effect size	t	sig	Effect size	t	Sig	Effect size
Depression	0.15	0.84	-0.24	3.10	0.004	-1.6	2.90	0.006	-1.47
Anxiety	0.30	0.76	-0.10	5.38	P<0.001	-2.68	4.99	P<0.001	-2.32
Fatigue	0.19	0.84	-0.07	2.18	0.01	-0.64	1.64	0.10	-0.52

Discussion

The primary outcomes of this study were depression and anxiety. In this study, significant difference was not found between MBCT and CBT groups in the anxiety and depression at postintervention; however, a significant difference become found between CBT and MBCT groups with WLG. In other words, CBT and MBCT were equally effective in decreasing anxiety and depression of cancer patients. According to these results, the 2 treatments were not preferred over each other despite the fact that both of them were beneficial to cancer patients and could diminish their anxiety and depression. The present study was the first RCT to compare CBT and MBCT in cancer patients whose results were also consistent with previous investigations confirming the efficacy of MBCT for anxiety (41-43) and depression in cancer patients (14, 27, 44).

As mentioned earlier, a significant difference was seen between the CBT group and WLG. This result was in agreement with previous investigations confirming the impact of CBT on anxiety (19, 45, and 46). The given results were also consistent with previous studies in terms of decreasing depression by CBT (45).

In addition, the findings of the current study indicated no significant difference in fatigue (as secondary outcome) between patients in the MBCT group and WLG at posttest, which was inconsistent with previous studies such as Johns et al (47) and van der Lee et al (28) that reported the efficacy of MBCT in reducing fatigue of cancer patients. This inconsistency was probably due to differences in the duration of disease in participants of these studies, the number of therapy sessions, as well as the number of therapists. Also, given that MBCT involves a number of experimental techniques that require the visualization ability, it is possible that the participants in the present study were different in this ability from those in previous studies, so they needed to expend more energy. This might be assumed as another reason for the inefficacy of this treatment in fatigue .

It is noteworthy to mention that mindfulness leads to acceptance of thoughts, feelings, and physical sensations without any judgments as well as a widespread awareness of them (48, 49). Individuals can also become aware of their ruminations over the past and the future through mindfulness-based practices. Using this insight, they gain control over their own thoughts, feelings, and sensations, and also become free from the automatic focus on the past and the future (49). Patients with cancer can consequently feel relaxed through meditation as a basic technique in MBCT. In addition, their depression may reduce using purposeful and nonjudgmental attention to the present moment (42).

As Teasdale stated, human's mind interprets events and experiences. It can also make severe and stable reactions and emotions. After experiencing stress and distress, physical symptoms can be amplified, which can increase distress and then keeps the defective cycle revolving (26). Thus, cognitive reappraisal and replacement thoughts techniques can be used for breaking the given cycle. In this respect, CBT techniques aid in changing individuals' interpretations of distressing and stressful events and speeding up the treatment process. Relaxation techniques also pave the grounds for cognitive treatments via creating a relaxing mode for the body (reducing physical symptoms of distress). Therefore, their simultaneous use enhances their efficacy (50).

According to the secondary outcome of the present study, CBT was beneficial in terms of reducing fatigue in cancer patients. This result was consistent with previous studies such as Matthews et al (51) and Eichler et al (19). Cancer patients catastrophize and magnify their fatigue. Consequently, they deprive themselves of many activities. By cognitive reappraisal technique, patients are reminded that a part of their fatigue has resulted from their cognitive distortion (52). Also, behavioral techniques of CBT may help cancer patients to be more active and decrease psychological fatigue.

Limitation

This study had some limitations. The sample size was small. The participants had been distributed based on their cancer types, there was no follow-up measurement, and also a self-report scale was used. These factors could limit the generalizability of the findings. Despite taking possible methods to control the variables, it was always difficult to take control of any variables in dealing with human subjects and psychological treatments. Therefore, the results should be interpreted with caution. Moreover, it is suggested to compare group and individual training in future studies. In addition, as patients' families are also affected by diseases and their consequences, it seems that engaging family members in treatment sessions will produce more desired results. Thus, this issue should be taken into consideration in future research. Using more comprehensive measurement methods, such as observations and interviews, is suggested. Also, it is suggested that a similar study be conducted by a large sample size and a follow-up stage. Moreover, it is suggested that the efficacy of both treatments be compared in different cancer types.

Conclusion

The present study indicated that CBT and MBCT performed equally well in decreasing anxiety and depression in cancer patients. They were significantly better than the WLG, but CBT was preferable to MBCT in terms of fatigue treatment. It seemed that MBCT was a good alternative to CBT for decreasing emotional symptoms in cancer patients. Despite the fact that each treatment used its specific methods and techniques to accomplish its objective, both therapies had similar efficacy on depression and anxiety. Therefore, both of them can be used as complementary treatments along with pharmacological treatments for cancer patients.

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Conflict of Interest
None.

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