

Effect of cognitive behavior therapy integrated with mindfulness on perceived pain and pain self-efficacy in patients with breast cancer

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Abstract

Context: Cancer pain in a complicated situation for patients with breast cancer. Researchers suggested to use complementary and alternative method in order to reduction pain and side effects in these patients.

Aims: This study was aimed to investigate the effectiveness of mindfulness integrated with cognitive behavioral therapy (MiCBT) on perceived pain and pain self-efficacy in patients with breast cancer.

Settings and Design: In this clinical trial study, a semi-experimental method was used. Patients with breast cancer were recruited from cancer clinic of a hospital of Mashhad University of Medical Sciences.

Material and Methods: Twenty-four patients with breast cancer selected through purposive sampling method and randomly assigned with permutation blocks in two groups of intervention ($n = 12$) and control ($n = 12$). The groups were assessed by demographic questionnaire, Perceived Pain Scale, and Pain Self-efficacy Scale before, immediate, and 1 month after the intervention. Participants in the interventional group received MiCBT for 8 weeks.

Statistical Analysis Used: Data were analyzed using descriptive methods and multivariate analysis of covariance.

Results: The results showed that the interventional group had a significant decrease in perceived pain ($P > 0.05$). The pain self-efficacy of patients significantly increased in comparison to the control group in posttest and follow-up stage ($P < 0.05$).

Conclusion: According to the results, it can be concluded that using integrated therapy with mindfulness has been effective in reducing pain and enhancing pain self-efficacy in breast cancer patients. Therefore, it can be an adequate complementary therapy for patients with breast cancer.

Keywords: Breast cancer, Mindfulness integrated with cognitive behavioral Therapy, Pain, Pain Self-fficacy

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INTRODUCTION

In recent years, prevention of cancer and cancer complications has been noticed as this is recognized as one of the mortality factors worldwide.^[1] Nearly, a quarter of the cases of breast cancer in Iran fell within the age

group of <40 years, and they have been involved with cancer about a decade earlier than females in the advanced countries.^[2] Breast and prostate cancers are predicted to remain at the top of the cancer list by 2030. The annual mortality rate is about 17.9 among the percentage of breast

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cancer patients. It is anticipated that, by implementing appropriate interventions and treatments, this amount will be reduced to 13.9 by 2020.^[3] Obviously, when a patient is diagnosed with breast cancer, it can lead to inevitable psychological, emotional, and physical impact on her and her family members.^[4]

Cancer is associated with pain, like any other illness. Pain occurs in cancer patients following primary tumors, tumor metastasis, radiation therapy, chemotherapy, or surgery.^[5] When pain persists and does not relieve, it causes significant psychological and physical consequences.^[6] Although pain as a general sense has biological foundations, the underlying mechanism of pain is interrelated with psychosocial and social factors also.^[7] According to the biopsychosocial model of pain, body pain is associated with biological, social, and psychological factors.^[8] Although the role of behavioral and psychological factors has not known to be a cause of cancer, these factors play a decisive role in the continuation of pain and disability in cancer patients.^[9] Many times, experienced physicians have encountered patients who report significant pain without any particular physical reason. In contrast, some people can easily relapse with pain.^[10] Psychological abilities such as self-efficacy in controlling pain seem to be affected by physical disability or depression and fatigue resulting from cancer.^[11] Reducing the ability to manage pain can affect all of the individual and social aspects of a person's life, as Bandura believes that mental health problems is a result of self-efficacy and low self-esteem.^[12] Feeling disabilities, low energy, and frequent failure experience in relieving pain can exacerbate pain.^[13]

In spite of high technology and scientific improvements in different fields, more than 70% of patients with cancer complain of uncontrolled pain^[14] and are not satisfied with the treatment outcomes.^[15] As in most of the cases, there has been no physical response, only psychological factors could explain the persistence and severity of pain. Various supplementary therapies have been designed to alleviate cancer pain including positive psychotherapy, hope therapy,^[16] yoga and meditation,^[17] social support interventions,^[18] relaxation and musical therapy,^[19] and cognitive behavioral therapy,^[20] each of the methods mentioned above overall showed to be effective than using only medication.

In recent years, new approaches in complementary therapies emerged called “third-wave therapy” or “mindfulness-” based treatments. The effectiveness of mindedness-based therapies has been reported in several studies.^[21] However, medications only affect 30%–40% of cancer pain with many side effects.^[15] Several mindfulness-based therapies have been developed, of which mindfulness integrated

with cognitive behavioral therapy (MiCBT) integrates mindfulness-based techniques with CBT. MiCBT aims at managing comorbid psychological problems such as depression and anxiety. It is a structured treatment strategy which trains clients to internalize their attention in order to regulate their emotions and attention and then externalize and use their regulated emotions and attention for managing their problems.^[22] There are rare studies in terms of the efficacy of MiCBT. Turner *et al.* in a study indicated the efficacy of mindfulness-based cognitive therapy on pain and self-efficacy of 324 patients with chronic low back pain.^[23] Banth and Ardebil also confirmed the efficacy of mindfulness-based stress reduction on pain and pain self-efficacy of patients with low back pain.^[24] However, we could not find a study in terms of the efficacy of mindfulness-based therapies on cancer pain and self-efficacy. There are studies which showed the effectiveness of mindfulness approaches in quality of life, stress, depression, anxiety, and sexual self-efficacy of patients with cancer.^[25-27] Meanwhile, in spite of enough evidence in terms of the efficacy of mindfulness approaches on mental conditions of patients with chronic pain, some studies reported no effect in physical condition. Therefore, this study aimed to investigate the efficacy of MiCBT on perceived pain and pain self-efficacy of patients with breast cancer.

MATERIAL AND METHODS

This research was a clinical trial that followed guidelines of the Helsinki declaration of 1975. The proposal of this study has been approved by the Research Committee of Islamic Azad University of Neyshabur with ethical code of R. IAU.NEYSHABUR.REC.1397.015. It was made clear that participants' privacy was to be respected, and the study would be anonymous. Before completing the questionnaire, written informed consent was obtained from all participants. In addition, participants were given the right to decline to complete the questionnaire. At the end of the study, participants in the control group received training manual of interventional sessions.

Sampling

The samples were recruited from the central hospital of Mashhad city in gynecology clinics during January–March 2018. Twenty-four women with breast cancer were selected through purposive method based on inclusion criteria and divided randomly through permutation block randomization in two groups of intervention ($n = 12$) and control ($n = 12$). Inclusion and exclusion criteria were as follows:

The inclusion criteria were diagnosed as patient with breast cancer by the physician for more than 6 months;

in the last 6 months, there has not been another trauma or distressed events, such as death of people around, noncancer diagnosis, divorce; chronic illness except cancer; being in the second or third stage of cancer; educated at least up to high school; willing to participate; no drug or alcohol abuse; and no history of psychotherapy. Patients were excluded if they did not complete the session (more than one session) and if they feel irritated or get worse.

Measurements

All participants completed standard questionnaires before, after, and at 1-month intervention. Participants in addition to the demographic questionnaire (age, stage of disease, other illness, type of treatment received, history of mental illness, marital status, and occupational status) were evaluated using the following questionnaires:

The short form of the Brief Pain Inventory (BPI) designed by the Pain Research Group at the University of Wisconsin–Madison as an instrument that would quantify and assess pain using patient self-reported information. The BPI was designed to measure the two key aspects of pain directly: sensory pain and reactive pain, as reported by the participants. The sensory pain dimension is characterized by pain intensity and is measured in four items of the BPI using a numeric rating scale (a linear scale from 0 to 10, with 0 representing “no pain” and 10 being indicative of “pain as bad as you can imagine.”) Patients were asked to rate their pain along the number continuum for items that query their pain: (1) at its worst in the last 24 h, (2) pain at its least in the last 24 h, (3) average pain, and (4) pain right now. Internal consistency of the BPI has been demonstrated in a series of studies. Cronbach’s alpha coefficients for the pain intensity scale ranged from 0.78 to 0.96.^[28] For the pain interference scale, Cronbach’s alpha coefficients ranged from 0.83 to 0.95.^[29]

Pain Self-Efficacy Questionnaire

designed by Nicholas (2007), the Pain Self-Efficacy Questionnaire (PSEQ) consists of 10 items. Each item is scored on a 7-point scale ranging from 0 – “not at all confident” to 6 – “completely confident.” Higher scores reflect stronger self-efficacy beliefs. In Iranian cases, the psychometric properties (internal consistency, test–retest reliability, construct validity, and concurrent validity) of the PSEQ were found to be strong. Multiple hierarchical regression analyses indicated that pain self-efficacy scores accounted for a significant proportion of the variance in scores on the measures of disability, depression, and general health even after controlling for the possible confounding effects of pain severity and education.^[30]

Intervention

the sessions were held weekly (90 min) for 8 weeks with a trained researcher in a group ($n = 12$). Each session started with a review of previous sessions and home tasks and ended with feedback and group discussion.^[31]

The intervention was administered by a PhD student of psychology (first author) who had received specialized training in this area under the supervision of a clinical psychologist. Participants in the experimental group received MiCBT, whereas participants in the control group received only routine care. At the end of the study, participants in the control group received training manual of intervention sessions [Table 1].

Statistical analysis

The data were collected in the three stages of pre-post-follow-up from the two control and interventional groups. The completed questionnaires were scored and entered into SPSS software version 20 (Released 2011. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp). Mean, standard deviation, frequency, and percentage were used to describe data. K^2 was used to compare the demographic characteristics of the groups. Repeated measures analysis of variance was administered to find out difference of groups in different times (pre-post-follow-up). Tukey’s test was employed to find out difference of groups in the three stages. $P < 0.05$ was considered statistically significant.

RESULTS

The participation rate was 100, and there was no dropout in this study. The age ranged between 24 and 53 years (mean \pm standard deviation [SD] 40 ± 8.63 years). Disease duration was between 1 and 11 years (4.25 ± 3.24 years). Data were tested through Kolmogorov–Smirnov test and revealed distribution to be normal. Characteristics of the two groups of control and intervention compared by K^2 results indicated no significant difference between the groups [Table 2]. The repeated measures analysis of variance showed that pain was significantly reduced in the interventional group compared to the control group ($F = 44.20$, $P < 0.01$). In terms of self-efficacy also, difference of scores in two groups in different measurement time was statistically significant ($F = 58.41$, $P < 0.01$) [Table 3]. *Post hoc* results to compare groups pre-post-follow-up showed significant difference for pain and pain self-efficacy ($P < 0.01$) [Table 4].

Table 1: Sessions' content

Session	Content of session
1	Introduction, expectations, aims, fundamentals of mindfulness, an overview of MiCBT, the flow of the program, and the contents of the next sessions
2	Review of previous session, the basic principles of mindfulness, the components of CBT, and mindful breathing, home tasks
3	Review of previous session, mindful breathing (continued), step-by-step body scanning exercises, and awareness of visceral sensations
4	Review of previous session, body scanning exercises (continued), behavior therapy techniques (such as problem-solving), and the relationship of mindfulness with CBT
5	Review of previous session, body scanning exercises (continued)
6	Review of previous session, interpersonal skills, assertiveness, and role play
7	Review of previous session, acceptance and management of suffering in daily life
8	Review and evaluation

CBT: Cognitive behavioral therapy, MiCBT: Mindfulness integrated with CBT

Table 2: Comparing film therapy and control group in demographic characteristics

Variables	Control group, n (%)	Intervention group, n (%)	Comparing results (χ^2 , P)
Education			
High school	7 (58.3)	8 (66.7)	0.68, 0.50
Undergraduate	5 (41.7)	4 (33.3)	
Disease duration (years)			
1-5	8 (66.7)	8 (66.7)	1.58, 0.20
5-10	3 (25)	2 (16.7)	
10-15	1 (8.3)	2 (16.7)	
Age			
Below 30	3 (25)	1 (8.3)	1.96, 0.16
31-40	4 (33.3)	4 (33.3)	
41-50	4 (33.3)	3 (25)	
Above50	1 (8.3)	4 (33.3)	

Table 3: Between-group effects

Variable	df	SM	F
Pain			
Stage	1	176.33	36.95*
Stage × group	1	200.83	44.20*
Error	22	4.52	
Pain self-efficacy			
Stage	1	298.84	71.77*
Stage × group	1	223.23	58.41*
Error	22	2.02	

*P>0.05.

DISCUSSION

The results showed that, with controlling the effect of pretest, intervention group had a significant difference in the amount of perceived pain and pain self-efficacy scores in the posttest and follow-up stages in compare to the control group, which means that the intervention has caused patients to have more control over their pain and

more efficacy in adjusting to pain. This finding is consistent with the results reported in the studies of Grabovac and Burrell (2014); Sanaei *et al.* (2014); Boer (2014); Jong *et al.*, (2016) and Didehdar-Ardebil (2014).^[26,32-35]

In justifying this finding, it can be said that mindfulness helps people realize that negative excitements may occur, but they are not permanent. It also allows an individual to respond to thinking and reflection instead of responding incidentally.^[22] In fact, the goal of mindfulness is not to eliminate pain. However, the goal is to learn how to be relax and mindful. Through sessions, patients learned to look at thoughts without judging. They know in their minds that this feeling or thought is not permanent as pain is also part of emotions and it is not permanent. On the other hand, participants were asked to record their pain from 1 to 10 at different intervals. The long-term assessment of patients from the condition of their physical pain and their mental changes made them realize that pain is not in a continuous state and changes according to their mental states, so this feeling or experience is changeable and is not always fixed. Mindfulness and pain relief help the patient to accept the variability of pain and to recognize that disaster is a kind of mental judgment and can make the situation worse, whereas the sense of control can relieve pain. Therefore, it has not been farfetched with regard to these explanations or findings. In fear-avoidance model, patients avoid pain which leads to more fear and impairments.^[13] Whereas during mindfulness, client looks at her pain without fear. Mindfulness affects pain through attention distraction to the body through body scan. Meanwhile, with acceptance of feelings such as sorrow and pain, instant facing with pain sensation without judgment could increase the pain self-efficacy and decrease the avoidance and fear.^[36] This happens through stopped negative thoughts' rumination, acceptance, and exposure to pain.

This study is not without some limitations as the therapist was male and clients were female and hence there were not comfortable to close their eyes some time during training. Therefore, they have been suggested to get training with open eyes. On the other hand, we have limited to patients' self-report in all conditions and there were no facilities to deep interview or laboratory tests.

CONCLUSION

Finally, based on the results of this study, it has been concluded that , MiCBT can be an effective treatment to reduce cancer pain. Therefore, it is recommended that this treatment be introduced and implemented in different

Table 4: Post hoc results to compare groups in pre-post and follow-up

Variable	Stage	Mean difference	P
Pain	Pre-post	8.93	0.000*
	Post follow-up	0.66	0.002*
Pain self-efficacy	Pre-post	-4.04	0.000*
	Pre follow-up	-0.41	0.000*

*P>0.05

health-care settings. Furthermore, most cancer patients have a variety of psychological and social problems at the same time. It is suggested that future researchers, along with group therapy, use individual treatments to reduce side effects of the disease and report their effects.

Conflicts of interest

There are no conflicts of interest.

Authors' contribution

All authors contributed to this research.

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REFERENCES

- Health Management Center. National Report of Cancer Records 2009. Tehran: Javan; 2013.
- Smittenaar CR, Petersen KA, Stewart K, Moitt N. Cancer incidence and mortality projections in the UK until 2035. *Br J Cancer* 2016;115:1147-55.
- Carioli G, Malvezzi M, Rodriguez T, Bertuccio P, Negri E, La Vecchia C, et al. Trends and predictions to 2020 in breast cancer mortality in Europe. *Breast* 2017;36:89-95.
- Wei D, Liu XY, Chen YY, Zhou X, Hu HP. Effectiveness of physical, psychological, social, and spiritual intervention in breast cancer survivors: An integrative review. *Asia Pac J Oncol Nurs* 2016;3:226-32.
- Kumar SP. Cancer pain: A critical review of mechanism-based classification and physical therapy management in palliative care. *Indian J Palliat Care* 2011;17:116-26.
- Abedi Ghelich Gheshlaghi M, Asghari-moghaddam MA, Khalilzade Poshtgol M. Psychometric characteristics of pain self-management checklist (PSMC) in patients with chronic pain. *Iran J Psychiatry Clin Psychol* 2012;18:150-6.
- Sturgeon JA, Zautra AJ. Social pain and physical pain: Shared paths to resilience. *Pain Manag* 2016;6:63-74.
- Bevers K, Watts L, Kishino ND, Gatchel RJ. The biopsychosocial model of the assessment, prevention, and treatment of chronic pain. *US Neurol* 2016;12:98-104.
- Martinez-Calderon J, Meeus M, Struyf F, Miguel Morales-Asencio J, Gijon-Nogueron G, Luque-Suarez A, et al. The role of psychological factors in the perpetuation of pain intensity and disability in people with chronic shoulder pain: A systematic review. *BMJ Open* 2018;8:e020703.
- Yazdi-Ravandi S, Taslimi Z, Jamshidian N, Saberi H, Shams J, Haghparast A, et al. Prediction of quality of life by self-efficacy, pain intensity and pain duration in patient with pain disorders. *Basic Clin Neurosci* 2013;4:117-24.
- Hoffman AJ. Enhancing self-efficacy for optimized patient outcomes through the theory of symptom self-management. *Cancer Nurs* 2013;36:E16-26.
- Pasmatzis E, Koulierakis G, Giaglis G. Self-stigma, self-esteem and self-efficacy of mentally ill. *Psychiatriki* 2016;27:243-52.
- Cheng ST, Leung CM, Chan KL, Chen PP, Chow YF, Chung JW, et al. The relationship of self-efficacy to catastrophizing and depressive symptoms in community-dwelling older adults with chronic pain: A moderated mediation model. *PLoS One* 2018;13:e0203964.
- Costa WA, Monteiro MN, Queiroz JF, Gonçalves AK. Pain and quality of life in breast cancer patients. *Clinics (Sao Paulo)* 2017;72:758-63.
- Gharayie A, Azadfallah P, Tavallaci A. The effectiveness of acceptance and commitment therapy on pain experience in women with chronic pain. *Clin Psychol Stud* 2012;2:39-50.
- Casellas-Grau A, Font A, Vives J. Positive psychology interventions in breast cancer. A systematic review. *Psychooncology* 2014;23:9-19.
- Rao RM, Amritanshu R, Vinutha HT, Vaishnaruby S, Deepashree S, Megha M, et al. Role of yoga in cancer patients: Expectations, benefits, and risks: A review. *Indian J Palliat Care* 2017;23:225-30.
- Salakari M, Pylkkänen L, Sillanmäki L, Nurminen R, Rautava P, Koskenvuo M, et al. Social support and breast cancer: A comparative study of breast cancer survivors, women with mental depression, women with hypertension and healthy female controls. *Breast* 2017;35:85-90.
- Bradt J, Dileo C, Magill L, Teague A. Music interventions for improving psychological and physical outcomes in cancer patients. *Cochrane Database Syst Rev* 2016;15:14-65.
- Johnson JA, Rash JA, Campbell TS, Savard J, Gehrman PR, Perlis M, et al. A systematic review and meta-analysis of randomized controlled trials of cognitive behavior therapy for insomnia (CBT-I) in cancer survivors. *Sleep Med Rev* 2016;27:20-8.
- Burnett-Zeigler I, Schuette S, Victorson D, Wisner KL. Mind-body approaches to treating mental health symptoms among disadvantaged populations: A comprehensive review. *J Altern Complement Med* 2016;22:115-24.
- Cayoun BA. Mindfulness-Integrated CBT: Principles and Practice. New Jersey, USA: John Wiley and Sons; 2011.
- Cherkin DC, Anderson ML, Sherman KJ, Balderson BH, Cook AJ, Hansen KE, et al. Two-year follow-up of a randomized clinical trial of mindfulness-based stress reduction vs. cognitive behavioral therapy or usual care for chronic low back pain. *JAMA* 2017;317:642-4.
- Banth S, Ardebil MD. Effectiveness of mindfulness meditation on pain and quality of life of patients with chronic low back pain. *Int J Yoga* 2015;8:128-33.
- Johns SA, Brown LF, Beck-Coon K, Monahan PO, Tong Y, Kroenke K, et al. Randomized controlled pilot study of mindfulness-based stress reduction for persistently fatigued cancer survivors. *Psychooncology* 2015;24:885-93.
- Sanaei H, Hossini SA, Jamshidifar Z. Effectiveness of mindfulness training on self-efficacy of patients infected by breast cancer. *Procedia Soc Behav Sci* 2014;159:426-9.
- Zhang MF, Wen YS, Liu WY, Peng LF, Wu XD, Liu QW, et al. Effectiveness of mindfulness-based therapy for reducing anxiety and depression in patients with cancer: A meta-analysis. *Medicine (Baltimore)* 2015;94:e0897-0.
- Atkinson TM, Mendoza TR, Sit L, Passik S, Scher HI, Cleeland C, et al. The brief pain inventory and its "pain at its worst in the last 24 hours" item: Clinical trial endpoint considerations. *Pain Med* 2010;11:337-46.
- Vakilzadeh P, Nakhaee N. The reliability and validity of the Persian version of the brief pain inventory in cancer patients. *J Rafsanjan Univ Med Sci* 2006;5:253-8.

30. Asghari A, Nicholas MK. An investigation of pain self-efficacy beliefs in Iranian chronic pain patients: A preliminary validation of a translated English-language scale. *Pain Med* 2009;10:619-32.
31. Yazdanimehr R, Omid A, Sadat Z, Akbari H. The effect of mindfulness-integrated cognitive behavior therapy on depression and anxiety among pregnant women: A randomized clinical trial. *J Caring Sci* 2016;5:195-204.
32. Grabovac A, Burrell E. Standardizing training in mindfulness-based interventions in Canadian psychiatry postgraduate programs: A competency-based framework. *Acad Psychiatry* 2018;42:248-54.
33. de Boer MJ, Steinhagen HE, Versteegen GJ, Struys MM, Sanderman R. Mindfulness, acceptance and catastrophizing in chronic pain. *PLoS One* 2014;9:e87445.
34. de Jong M, Lazar SW, Hug K, Mehling WE, Hölzel BK, Sack AT, *et al.* Effects of mindfulness-based cognitive therapy on body awareness in patients with chronic pain and comorbid depression. *Front Psychol* 2016;7:967.
35. Didehdar -Ardebil M. Effectiveness of CBT and MBSR on Chronic Low Back Pain of Females. Doctoral Dissertation. India, Panjab; 2014.
36. Turner JA, Anderson ML, Balderson BH, Cook AJ, Sherman KJ, Cherkin DC, *et al.* Mindfulness-based stress reduction and cognitive behavioral therapy for chronic low back pain: Similar effects on mindfulness, catastrophizing, self-efficacy, and acceptance in a randomized controlled trial. *Pain* 2016;157:2434-44.