Comparison of Effectiveness of the Metacognition Treatment and the Mindfulness-Based Stress Reduction Treatment on Global and Specific Life Quality of Women with Breast Cancer

Soheila Rahmani[1], Siavash Talepasand[1], ALi Ghanbary-Motlagh[2]

Abstract

Background: This study is conducted to compare the metacognition treatment and the mindfulness-based stress reduction treatment on life quality of women with breast cancer.

Methods: In a quasi-experimental design, with pre-test, post-test and control group, 36 patients with diagnosis of breast cancer, among patients who referred to the Division of Oncology and Radiotherapy of Imam Hossein hospital in Tehran, were selected in accessible way and were assigned randomly to three experimental groups, the first group receiving meta-cognition treatment (n=12), the second one receiving mindfulness-based stress reduction program (n=12), and the other was the control group. Participants completed global life quality in cancer patient's questionnaire and specific quality of life in breast cancer patient's questionnaire in three stages: baseline, after intervention and two-month follow-up. Data were analyzed using the multivariate repeated measurement model.

Results: Findings showed both treatments were effective in improving global and specific quality of life in patients with breast cancer. The mindfulness - based stress reduction treatment excelled in functions and roles, fatigue, pain, future perspective and treatment side effects symptoms at the end of the treatment and follow-up in comparison to the metacognition treatment.

Conclusion: Results of this research showed the mindfulness-based stress reduction treatment can be effective in improving global and specific life quality of women with breast cancer and is a selective method for improving quality of life in patients.

Keywords: Mindfulness; Metacognition therapy; life quality; breast cancer

1. Dept. of Psychology and Educational Sciences, Semnan University, Semnan, Iran
2. Radiation and Oncology Center, Imam Hossein Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Corresponding Author:
Siavash Talepasand, MD;
Associate professor of Educational Psychology
Tel: (+98) 231 3350713
Email: stalepasand@semnan.ac.ir

Introduction

Chronic diseases are one of the most important health and psychological problems of modern society, among which cancer is a major one. Cancer is considered as one of the problems and substantial hygienic issues in the world that causes several personal, family and social damages in physical, mental, and social dimensions by threatening health and active life of human being in different ages [1]. Breast cancer is a common, malignant and progressive disease and affects different aspects of individual's life [2]. Early diagnosis and extensive treatments that increase patients' life span (survival of five years, 87%) cause women to experience several physical and mental disorders during and after the treatment and it affects patients' life quality, especially because this disease is one of the common and increasing diseases [3].

In recent decades, considerable advancements have taken place in expansion of psychosocial interventions for patients with cancer [4], not only because it may increase success of medical treatment, but also because of increase in life quality of these patients who are suffering more than other

patients with physical diseases [5]. Controlling and reducing psychological symptoms that follow physical diseases, not only cause increase in skills and fighting spirit in these patients, but also enhances the effectiveness of immune system and thus leads to decrease in physical symptoms and recovery [6].

Several different psychological methods had been applied for improving life quality of women with breast cancer; cognitive-behavioral treatment, group self-oriented cognitive treatment, religion-based cognitive treatment and mindfulness-based stress reduction treatment to mention but a few examples. Although all of these methods are effective, they vary based on effectiveness [7]. Treatments that have the same effects as long-term treatments, in a shorter time and the therapists need low training or there is no need to a therapist and have less financial cost to the clients, are in the priority in comparison to treatments that have high financial cost, based on the mentioned items, to the health system and clients [8]. Metacognition treatment is one of the treatments that is based on information process model [9] and emphasizes on changing and acceptance [10]. Despite the fact that this treatment is short [11], it is mostly based on strategies and processes that assess, control and monitor cognitions. Metacognition is a kind of information that individuals have about understanding of inner states and their effective coping strategies [9, 12]. In metacognition treatment, particular emphasis was placed on reducing the frequency of rumination and worries about responding. Another technique called *faulted mindfulness* is used instead of mindfulness. It includes a kind of slight and passive awareness of negative thoughts, extricating concern and postponing rumination. It particularly emphasizes on challenging with positive and negative metacognition beliefs [11].

In addition, another new theory that is presented by Kabat-Zinn in Medical Center of Massachusetts University in 1979 is Mindfulness-Based Stress Reduction (MBSR) treatment [13, 14]. Mindfulness skills for coping with life stresses and raising awareness from the present time that include meditations related to thought, calmness and Hatha yoga are taught in this treatment [15, 16]. Mindfulness means paying attention to the present time in a special, targeted and without judgment [13]. One of the main goals of this program is health promotion and stress reduction [17]. Meditation and mindfulness practices lead to increase in mindfulness skill and self-acceptance in patients [18] and using Hatha yoga practices in this treatment cause states of relaxation, breath awareness, and body sensations in individual and thus a kind of unity is formed between body and mind. Being advantageous in terms of time, cost, facilities and ease of implementation, and having a specific treatment manual are of the most important features of these two treatments and many studies also were conducted about usefulness of effects of these two treatments. Mindfulness-based stress reduction program has had some successes in cancer treatment [19]. Effect of mindfulness-based stress reduction program on immune system in patients with cancer and AIDS shows its effectiveness on NK cells activities in these patients [20]. Positive effects of mindfulness-based stress reduction program were reported in patients with cancer in the cases of stress, anxiety, depression, and sleep [21]. A research showed that this treatment is effective in improving life quality in these patients [22]. It is also effective in treating depression disorder [23], post-traumatic stress disorder [24] and anxiety disorders [25].

Considering the importance of effectiveness researches in generalizing the results to the population and real treatment situations, although many researches were conducted about improving life quality of women with breast cancer, there is no research about examining the effectiveness of these two research treatments. The aim of this study is the comparison of the effectiveness of these two treatment methods on global and specific life quality of patients with cancer. However, both treatments discussed in this study are of the third wave of psychological therapies. They focus on the process of thought formation rather than challenging the content of the thoughts and beliefs of patients in pathology and treatment of the patients. Both treatments have more limited number of treatment sessions compared to the other psychological treatments. Therefore, comparing these two treatments can help the therapist to use more efficient treatment.

Materials and Methods

This study is a quasi-experimental that is conducted with a randomized controlled clinical trial. All women who referred to the Division of Oncology and Radiotherapy of Imam Hossein

hospital during March 1391 to May 1392 comprised statistical population of this study. After obtaining consent from the hospital, among patients diagnosed with breast cancer, a sample size of 36 patients were selected accessibly and 12 patients were assigned to one of the first two experimental groups (mindfulness-based stress reduction treatment), 12 patients to the second experimental group (metacognition treatment), and 12 patients to the group without intervention (control group). Inclusion criteria for this study included: person should be diagnosed with stages I, II, III of breast cancer; duration of breast cancer diagnosis should be more than a month; patient should not suffer from another kind of cancer; patient's age should be between 30 to 55 years; patient should not have received psychological treatment from the time the disease is diagnosed; patient should have a degree of junior high and above; patient should agree and have ability to take part in desired courses. Exclusion criteria for experimental group included: absence of more than two sessions of intervention sessions; not wanting to continue participating in the intervention; disease recurrence or creating metastasis elsewhere in the body during the research. Exclusion criteria for control group: lack of consent to continue participation in the intervention sessions, disease recurrence or creating metastasis elsewhere in the body during the research. Written consent for participating in the study was obtained from all patients.

Procedure

The study was conducted at the Division of Oncology of Imam Hossein hospital in Tehran by two master clinical psychologists who were familiar enough with the intervention (they have the certification for implementation of this treatment), according to the ethical standards of research such as informed consent and maintaining secrets of participants. Participants were examined in 3 stages, in baseline before intervention in experimental groups, after intervention, and two- month follow-up. Treatment was implemented for the first experimental group during 8 group sessions, once a week and for two hours, and based on mindfulness-based stress reduction program [26]. A summary of implementation instruction of mindfulness-based stress reduction treatment sessions is as follow.

Session I: The introduction of automatic guidance system/ knowing how to use present moment awareness of body sensations, thoughts and emotions in reducing stress/ practicing eating raisins (Object attention training), giving feedback and discussion about the practice/ three - minute breathing/ giving assignment for next week and distributing leaflets of the first session and CDs of meditations.

Session 2: Re-practicing the body examination/ giving feedback and discussion about body examination practice/practicing breathing mindfulness meditation/yoga stretching exercise/distributing leaflets of the second session and CDs of meditation.

Session 3: Having conscious sitting with awareness of breathing (the sitting meditation)/practicing yoga exercises(in the chapel of the hospital)/practicing three -minute breathing /distributing leaflets of the third session and video tape of yoga practices.

Session 4: Re-practicing the body examination/ practicing exercises related to conscious yoga (in the chapel of the hospital)/5-minute practicing of "seeing or hearing"/re-practicing conscious sitting with awareness of breathing and body/distributing leaflets of fourth session and CDs of meditation.

Session 5: Practicing breathing/re-practicing conscious sitting (awareness of breathing, body, sounds and thoughts)/explaining the stress and identifying participants' reactions to it/examining awareness of pleasant and unpleasant events on feeling, thoughts and body sensations/practicing conscious yoga exercises/practicing 3-minute breathing/distributing leaflets.

Session 6: Practicing conscious yoga/doing sitting meditation (mindfulness of sounds and thoughts)/distributing leaflets of the sixth session and number4 video tape to participants.

Session 7: Doing mountain meditation/ sleep hygiene/repeating exercises of the previous session/making a list of enjoyable activities/ distributing leaflets of the seventh session.

Session 8: Practicing the body examination/ overview of the whole program/examining and discussing programs/doing stone, beads and marbles meditation.

One of the intervention methods that is used in this study is metacognition treatment that includes treatment sessions and was implemented based on "step by step guide", a practical guide of metacognition treatment [11] in 8 treatment sessions. A summary of implementation instruction of metacognition treatment sessions is brought below.

Session 1: General formulation of the client/ introducing the model/identifying rumination periods (metacognition enhancement)/practicing techniques of increasing attention/completing Attention Training Technique (ATT) form/homework (practicing techniques of increasing attention twice a day and making notes of ATT task).

Session 2: Checking homework, identifying the rumination time and uncontrollable thoughts/introducing and practicing Detached Mindfulness (DM)/showing the postponing of rumination in an experimental way for modifying uncontrollable beliefs/practicing ATT/homework, practicing ATT, applying DM/practicing and postponing the rumination.

Session 3: Checking homework/identifying rumination time and in time of thinking about uncontrollable thoughts/identifying the rumination triggers of DM practice/examining active rumination and practice, and practicing postponing of rumination in the session/challenging with uncontrollable metacognitions/identifying activity levels and coping/ practicing ATT at home, applying postponing rumination and DM.

Session 4: Checking homework, examining the rumination and uncontrollable thoughts, examining activity levels and useless coping methods/ examining whether postponing the rumination is used in at least 75% of triggers and rumination periods or not/challenging with positive beliefs about rumination/practicing ATT/homework, practicing ATT, extensive use of DM and postponing the rumination.

Session 5: Checking homework, examining the rumination, examining positive thoughts and activity level/examining and extensive application of DM/ continuing to the challenge with positive thoughts about rumination/examining activity levels and increasing time of contemplation to reaction (sinking in thought), identifying and preventing harmful coping behavior (for example sleep or drinking alcohol)/practicing ATT/homework, practicing ATT, postponing the rumination, increasing the activity

Session 6: Checking homework, examining the rumination, positive thoughts and activity level/ identifying negative beliefs and challenging with them about excitement and depression/ homework, practicing ATT/practicing rumination and maintaining the activities.

Session 7: Checking homework, examining ruminations and useless coping beliefs and strategies/starting to write new designs of identifying and modifying recurrent fears/practicing ATT/homework/practicing ATT.

Session 8: Checking homework and examining the rumination/preventing of recurrence (completing overall treatment design), work on the remaining cognitive beliefs/anticipating future incentives and discussion about the way of using new program.

Tools

Questionnaire measuring the global "quality of life" in patients with cancer (QLQ-C30)

In this study, to measure life quality, the third version of life quality measurement questionnaire in patients with cancer is used that belongs to European Organization for Research and Treatment of Cancer. After its public release in 1993, this questionnaire has been widely used in cancer research and treatment centers. Persian version of this questionnaire is translated and has been validated by Montazeri et al. The results of this study suggest that the reliability of this questionnaire is 0.48-0.95 with cronbachs alpha coefficient at the initial interview and 0.52- 0.98 at the follow-up [27]. This questionnaire is multidimensional and consists of 30 questions that measures life quality in 5 functional scales (physical, role playing, cognitive, emotional, social), 9 symptoms scales (fatigue, pain, nausea and vomiting, asthma, loss of appetite, sleep disturbances, constipation and diarrhea),and economic problems caused by disease and received treatment (and an overall domain of life quality) [28].

Specialized supplemental questionnaire to measure specific "quality of life" of patients with breast cancer (QLQ-BR23)

QLQ-BR23 questionnaire is used for patients with breast cancer in disease stages and different treatments (surgery, chemotherapy, radiotherapy, hormone therapy).This questionnaire contains 23 questions that measure specific life quality in 4 functional scales including body image, sexual functioning, sexual enjoyment and future perspective and 4 symptoms scales including systematic side effects of the treatment, breast symptoms, arm symptoms and upset by hair loss. This tool is used in different studies to determine life quality of patients with breast cancer [29]. This questionnaire is used in Iran by Montazeri et al. to determine the reliability and validity of this questionnaire, the Persian version is implemented on 168 patients with breast cancer. The results suggest

Table 1. Mean and standard deviation of age of participants and age at the time of diagnosis in terms of experimental and control groups.

	Group	Mean	SD
Age	Control	44.08	3.28
	Stress reduction	43.25	3.08
	Metacognitive	44.92	1.83
Age at diagnosis time	Control	43.33	3.65
	Stress reduction	42.25	3.39
	Metacognitive	43.75	1.71

that 99% percent of the items of the questionnaire are fully understood by patients. The reliability of this questionnaire, using cronbachs alpha coefficient, was 0.63-0.95 at the initial interview and 0.72-0.92 at the follow-up. The reliability of this questionnaire, using scales consistency method, show that almost all scales are related conceptually and are correlated in expected way statistically [30].

Demographic Information Questionnaire

This questionnaire was used to collect needed demographic data as basic information including age, marital status, education, socio-economic condition, educational background, career history, and also some questions about the infected breast, smoking and alcohol consumption by patient, the duration of awareness of the disease and disease stage.

Results

Age range of participants was 38 to 49 years. Average age of participants in 3 groups was almost the same and the difference was not statistically significant (table1). Participants were of average

Table 2. Mean and standard deviation of global and specific life quality dimensions in patients with cancer.

		Control(n=12)			Metacognition group therapy (n=12)			mindfulness-based stress reduction treatment group(n=12)		
		Pre-test	Post-test	Follow-up	Pre-test	Post-test	Follow-up	Pre-test	Post-test	Follow-up
GLOBAL	PHY	65.00± 12.75	66.11± 10.80	57.22± 18.74	61.11± 7.43	56.11± 9.19	46.11± 8.74	61.66± 8.58	72.77± 3.43	69.44± 13.76
	ROL	37.50± 7.53	38.88± 10.85	34.72± 11.14	31.94± 1322	31.94± 11.14	27.78± 12.97	37.50± 10.35	59.72± 8.58	56.94± 11.14
	EMO	12.50± 9.05	22.91± 10.73	22.92± 14.70	22.22± 6.49	50.69± 9.03	45.83± 9.73	11.11± 8.94	56.94± 11.14	48.61± 10.56
	COG	59.72± 8.58	59.72± 11.14	58.33± 15.07	45.83± 10.36	61.11± 10.86	58.33± 8.71	62.50± 10.35	75.00± 11.23	72.22± 12.97
	SOC	33.33± 7.10	29.16± 16.08	33.33± 14.21	29.17± 10.36	50.00± 12.31	40.27± 11.14	34.72± 13.21	51.38 ±11.14	54.17± 7.53
	FAT	76.85± 5.72	71.29± 12.93	72.22± 11.11	75.00± 8.37	64.81± 7.97	76.85± 10.00	77.77± 4.73	37.96± 8.81	47.22± 11.72
	NV	38.89± 19.24	44.44± 25.95	38.89± 19.24	72.22± 12.97	58.33± 15.07	63.89± 22.28	41.66± 15.07	16.67± 17.41	22.22± 21.71
	PAI	75.00± 15.07	73.61± 11.14	81.94± 15.00	77.78± 10.86	7083± 1256	63.89± 22.28	68.05± 4.81	37.50± 10.35	50.00± 18.80
	TQOL	60.42± 7.21	45.83± 10.95	40.28± 9.94	49.30± 6.61	27.78± 7.40	36.81± 6.61	58.33± 6.15	33.33± 9.40	38.89± 8.94
SPECIFIC	BIM	45.13± 9.03	41.66± 7.94	36.80± 17.58	39.58± 8.04	50.00± 7.11	46.52± 9.70	42.36± 8.30	50.69± 7.50	50.00± 17.77
	SEX	1389± 11.96	16.66± 14.21	12.50± 14.43	9.72± 11.14	2.78± 6.49	2.78± 6.49	16.66± 12.30	18.05± 11.14	16.66± 12.30
	FUP	8.33± 15.07	19.44± 22.28	13.88± 22.28	5.55± 12.97	30.55± 9.62	30.55± 17.16	8.33± 15.7	47.22± 22.28	50.00± 22.47
	TSE	62.30± 8.95	59.52± 7.18	61.11± 6.68	60.32± 3.10	55.16± 6.57	57.54± 6.24	63.88± 6.56	51.19± 7.35	50.00± 7.99
	UHL	80.55± 17.16	86.11± 17.16	86.11± 17.16	86.11± 17.16	80.56± 17.16	80.56± 17.16	80.55± 17.16	80.55± 17.16	80.55± 17.16

Note: PHY: Physical; ROL: Role playing; EMO: Emotion; COG: Cognition; SOC: Social; FAT: Fatigue; NV: Nausea and Vomiting; PAI: Pain; TQOL: Total score of life quality; BIM: Body Image; SEX; Sexual; FUP: Future perspective; TSE: systematic therapy side effects; UHL: upset by hair loss

Table 3. Paired comparison of global and specific life quality dimensions on the basis of experimental and control group.

Variable			The mean difference of experimental group from control group:		
			Pre-test	**Post-test**	**Follow-up**
Global quality	Functions	PHY	$^{1\text{-}2}$-3.33,$^{1\text{-}3}$3.99, $^{2\text{-}3}$0.56	$^{1\text{-}2}$6.66-,$^{1\text{-}3}$10.00*, $^{2\text{-}3}$16.67***	$^{1\text{-}2}$-12.22,$^{1\text{-}3}$11.11, $^{2\text{-}3}$23.33***
		ROL	$^{1\text{-}2}$0.00,$^{1\text{-}3}$5.56, $^{2\text{-}3}$5.56	$^{1\text{-}2}$-20.83***,$^{1\text{-}3}$6.94, $^{2\text{-}3}$27.78***	$^{1\text{-}2}$-22.22*,$^{1\text{-}3}$6.94, $^{2\text{-}3}$29.17***
		EMO	$^{1\text{-}2}$1.39,$^{1\text{-}3}$-9.72*, $^{2\text{-}3}$-11.11**	$^{1\text{-}2}$-34.83***,$^{1\text{-}3}$-27.78***, $^{2\text{-}3}$6.25	$^{1\text{-}2}$-25.69***,$^{1\text{-}3}$-22.92***, $^{2\text{-}3}$2.78
		COG	$^{1\text{-}2}$-2.78,$^{1\text{-}3}$13.89**, $^{2\text{-}3}$16.67***	$^{1\text{-}2}$-15.28**,$^{1\text{-}3}$-1.39, $^{2\text{-}3}$13.89*	$^{1\text{-}2}$-13.89,$^{1\text{-}3}$0.00, $^{2\text{-}3}$13.89*
		SOC	$^{1\text{-}2}$-1.39,$^{1\text{-}3}$4.17, $^{2\text{-}3}$5.56	$^{1\text{-}2}$-22.22***,$^{1\text{-}3}$-20.83**, $^{2\text{-}3}$1.39	$^{1\text{-}2}$20.83***,$^{1\text{-}3}$-6.94, $^{2\text{-}3}$13.89
	Symptoms	FAT	$^{1\text{-}2}$-.926,$^{1\text{-}3}$1.85, $^{2\text{-}3}$2.78	$^{1\text{-}2}$33.33***,$^{1\text{-}3}$6.48, $^{2\text{-}3}$-26.85***	$^{1\text{-}2}$25.00***,$^{1\text{-}3}$- 4.63, $^{2\text{-}3}$-29.63***
		NV	$^{1\text{-}2}$-2.78,$^{1\text{-}3}$-33.33***, $^{2\text{-}3}$-30.56***	$^{1\text{-}2}$27.78**,$^{1\text{-}3}$-13.89, $^{2\text{-}3}$-41.67***	$^{1\text{-}2}$16.68,$^{1\text{-}3}$25.00*, $^{2\text{-}3}$-41.67***
		PAI	$^{1\text{-}2}$6.94,$^{1\text{-}3}$-2.78, $^{2\text{-}3}$-9.72	$^{1\text{-}2}$36.11***,$^{1\text{-}3}$2.78, $^{2\text{-}3}$-33.33***	$^{1\text{-}2}$31.94***,$^{1\text{-}3}$8.33, $^{2\text{-}3}$-23.61***
		TQOL	$^{1\text{-}2}$2.08,$^{1\text{-}3}$11.11***, $^{2\text{-}3}$-9.02**	$^{1\text{-}2}$12.50**,$^{1\text{-}3}$18.06***, $^{2\text{-}3}$5.56	$^{1\text{-}2}$1.39,$^{1\text{-}3}$3.47, $^{2\text{-}3}$2.08
Specific quality	Functions	BIM	$^{1\text{-}2}$2.78,$^{1\text{-}3}$5.56, $^{2\text{-}3}$2.78	$^{1\text{-}2}$-9.02*,$^{1\text{-}3}$-8.33*, $^{2\text{-}3}$0.69	$^{1\text{-}2}$- 13.19,$^{1\text{-}3}$-9.72, $^{2\text{-}3}$3.47
		FUP	$^{1\text{-}2}$00.00,$^{1\text{-}3}$2.78, $^{2\text{-}3}$-2.78	$^{1\text{-}2}$-27.78**,$^{1\text{-}3}$-11.11, $^{2\text{-}3}$16.67	$^{1\text{-}2}$–36.11***,$^{1\text{-}3}$- 16.67, $^{2\text{-}3}$19.44
	Symptom	TSE	$^{1\text{-}2}$-1.59,$^{1\text{-}3}$1.98, $^{2\text{-}3}$3.57	$^{1\text{-}2}$8.23*,$^{1\text{-}3}$4.36, $^{2\text{-}3}$-3.97	$^{1\text{-}2}$11.11***,$^{1\text{-}3}$3.57, $^{2\text{-}3}$-7.54*

*p<0.05   **p<0.01 ***p<0.001
Note: Control group (1) mindfulness-based stress reduction treatment group (2), metacognition treatment group (3)
Note: PHY: Physical; ROL: Role playing; EMO: Emotion; COG: Cognition; SOC: Social; FAT: Fatigue; NV: Nausea and Vomiting; PAI: Pain; TQOL: Total score of life quality; BIM: Body Image; FUP: Future perspective; TSE: systematic therapy side effects

socio-economic condition, about 20% of them were graduated from university and the rest did not have diploma, their left breast was infected and they were receiving chemotherapy.

Mean and standard deviation of global life quality in functions scales (physical, role playing, emotional, cognitive and social) and symptoms (fatigue, sleep disorder and pain) in three conditions of pre-test, post-test and follow-up on the basis of experimental and control groups are reported in table 2.

Findings show that global life quality scores in experimental groups in emotional, cognitive and social functions increased from pre-test to post-test and have relative stability in follow-up. In experimental group receiving mindfulness-based stress reduction treatment program, role function scores increased from pre-test to post-test and have stability in follow-up. The greatest increase in scores is seen in emotional dimension with mindfulness-based stress reduction treatment program. Global life quality scores in symptoms scale in fatigue, sleep disorder and pain dimensions are also reported in table 2. Comparison of means shows in fatigue and pain dimensions the greatest decrease is in mindfulness-based stress reduction treatment program but in sleep disorder the greatest decrease is seen in metacognition treatment.

Mean and standard deviation of different dimensions of specific life quality in functions scales (body image, sexual functioning and future perspective) and symptoms (therapy side effects and upset by hair loss) in three conditions of pre-test,
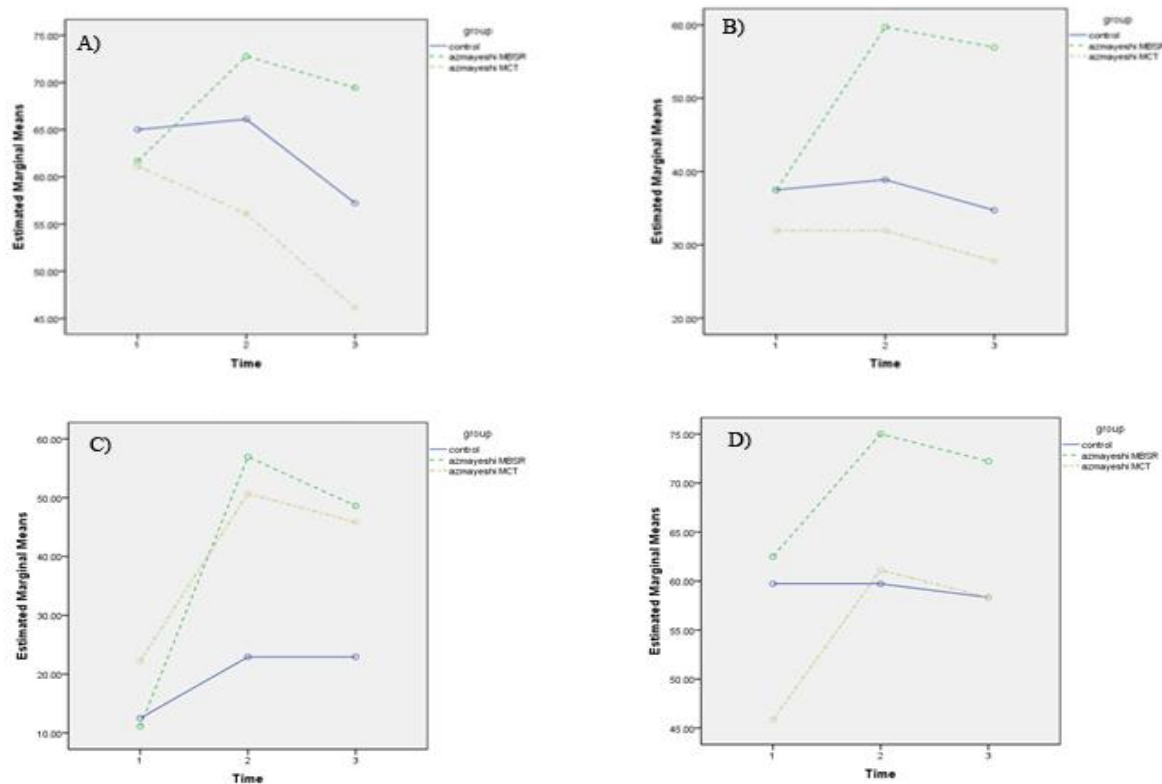
Figure 1. A) It shows global life quality-Physical dimension; B) It shows global life quality-Role dimension; C) It shows global life quality-Emotion dimension; D) It shows global life quality-Cognitive

post-test and follow-up based on experimental and control groups are reported in table 2.

Findings suggest that scores of body image and future perspective are increased from pre-test to post-test in experimental groups and scores increase in future perspective is more egregious .Specific life quality scores in body image and future perspective have relative stability in follow-up.

Findings show sexual functioning scores decreased from pre-test to post-test just in metacognition treatment. Specific life quality scores in symptoms scale decreased in therapy side effects dimension and it suggests an increase in specific life quality in this dimension. There were no changes in total score of specific life quality in sadness triggered by hair loss dimension in mindfulness-based stress reduction program. In this study, scores of global and specific life quality in experimental and control groups were analyzed using multivariate repeated measurement model. First, assumptions of using model were examined. Results of sphericity Mauchly test show that in role playing, cognitive, emotional, total fatigue and sleep disorders dimensions sphericity assumption is not rejected but

in other values it is rejected, so the corrected value of the Huynh-Feldt was used for comparisons.

Results of multivariate tests showed that effect of time factor (pre-test, post-test and follow-up) was significant (Pillai's Trace=0.973, $F_{28,6}$=7.65, p<0.001, Partial Eta Square=0.973) and also time factor interaction effect× group was significant (Pillai's Trace=1.833, $F_{56,14}$=2.75, p<0.05, Partial Eta Square=0.917). Group factor effect (control, stress reduction treatment, metacognition treatment) was significant (Pillai's Trace=1.692, $F_{28,42}$=8.24, p<0.001, Partial Eta Square=0.846).

Results of univariate tests in global life quality scale show that time interaction effect× group is significant in functions scales .Time interaction effect× group is significant in physical function ($F_{3.21,52.97}$=4.91, p<0.05, Partial Eta Square=0.23), role function ($F_{4,36.04}$=6.81, p<0.001, Partial Eta Square=0.29), cognitive function ($F_{4,66}$=3.48, p<0.05, Partial Eta Square= 0.17), emotion function ($F_{4,66}$=12.43, p<0.001, Partial Eta Square=0.43), social function ($F_{1.54,50.68}$=6.82, p<0.01, Partial Eta Square=0.29) and the largest effect size is related to
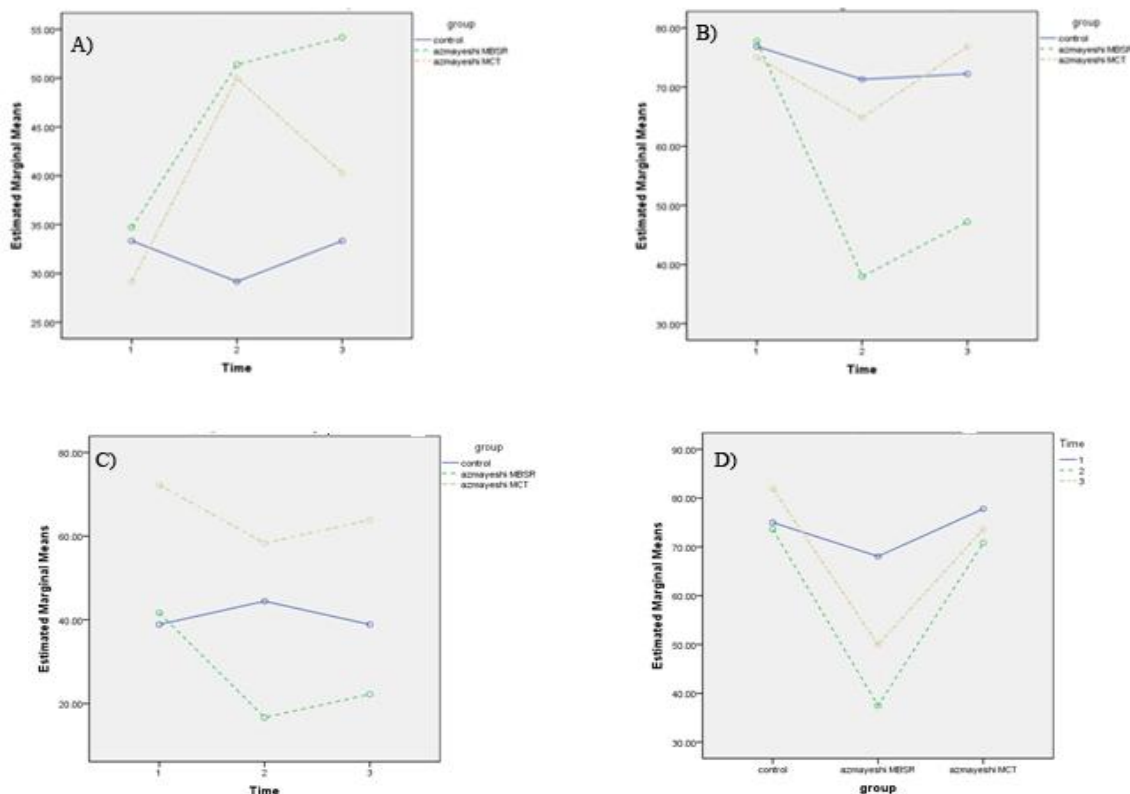
Figure 2. A) It shows global life quality-Social dimension; B) It shows global life quality-Fatigue dimension; C) It shows global life quality-Sleep disorder dimension; D) It shows global life quality-Pain dimension.

emotion function. Time interaction effect ×group in symptoms scale is significant in fatigue ($F_{2,66}$ = 18.42, p<0.001, Partial Eta Square=0.53), pain ($F_{3.57,58.85}$= 7.27, p<0.001, Partial Eta Square=0.31) and sleep disorder dimensions ($F_{2,66}$ =4.06, p<0.05, Partial Eta Square= 0.20). The largest effect size in symptoms scale is related to fatigue dimension. Time interaction effect ×group on the overall quality is also significant ($F_{3.95,65.18}$= 4.18, p<0.05, Partial Eta Square= 0.20).

Results of univariate tests in specific life quality scale show the main effect of time (pre-test, post-test, follow-up) is not significant in functions scales in sexual functioning ($F_{1.68,55.48}$=1.68, p>0.05) and in symptoms scale in upset by hair loss dimension ($F_{0,56.78}$=0.000, p>0.05). Findings suggest that time interaction effect× group in specific life quality in functions scales is significant in body image ($F_{3.21,53.00}$=3.21, p<0.05, Partial Eta Square = 0.16) and future perspective dimensions ($F_{3.64,59.99}$= 5.13, p<0.05, Partial Eta Square =0.24) and in symptoms scale, therapy side effect is

significant ($F_{3.40,56.78}$= 6.55, p<0.001, Partial Eta Square=0.28).

Findings about the comparison of the between – groups effects show there is a significant difference between experimental and control groups in global life quality functions in physical ($F_{2,33}$=8.39, p<0.01, Partial Eta Square=0.34), role ($F_{2,33}$=25.18, p<0.001, Partial Eta Square=0.60),emotion ($F_{2,33}$=31.31, p<0.001, Partial Eta Square=0.66), cognitive ($F_{2,33}$=8.86, p<0.01, Partial Eta Square=0.35) and social dimensions ($F_{2,33}$=8.94, p<0.01, Partial Eta Square=0.35).

In global quality symptoms there is a significant difference between groups in fatigue ($F_{2,33}$= 34.73, p<0.001, Partial Eta Square=0.68), pain ($F_{2,33}$=28.34, p<0.001, Partial Eta Square=0.63) and sleep disorder dimensions ($F_{1,22}$=18.14, p<0.001, Partial Eta Square=0.52). Overall quality also showed significant difference between two groups ($F_{2,33}$=9.98, p<0.001, Partial Eta Square=0.38).
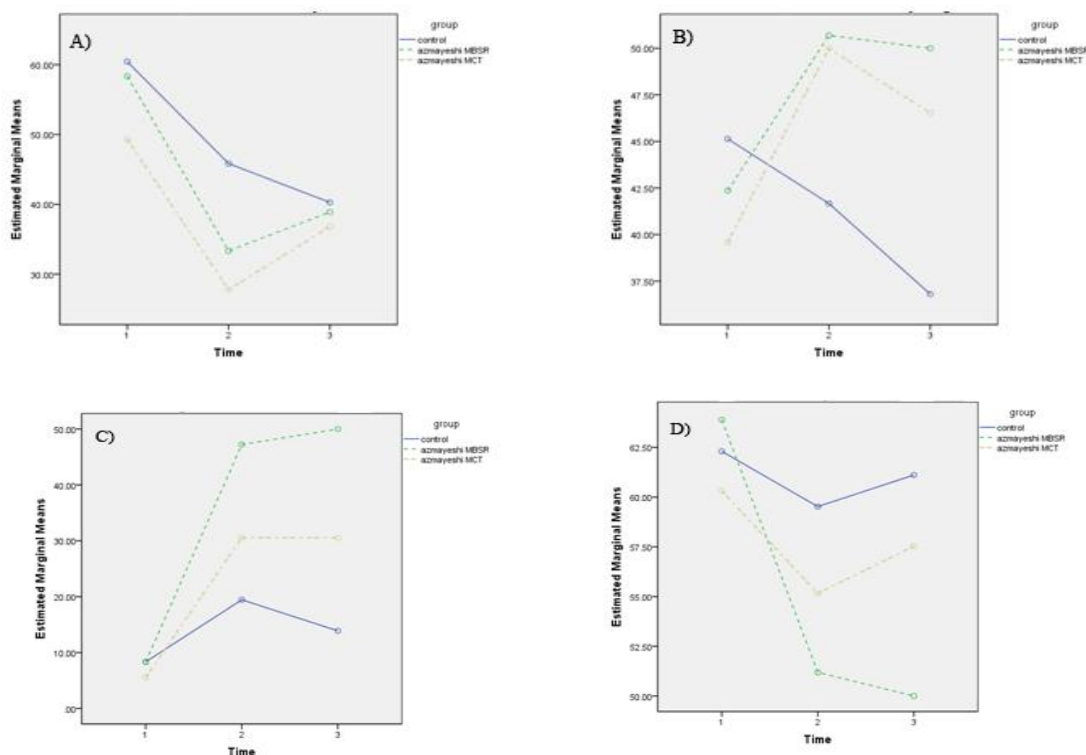
Figure 3. A) It shows global life quality; B) It shows specific life quality-Body image dimension; C) It shows specific life quality-Future Perspective dimension; D) It shows specific life quality-Systematic.

Findings show there is a significant difference between experimental and control groups in functions scales and specific life quality symptoms in sexual functioning ($F_{2,33}$=4.60, p<0.05, Partial Eta Square=0.22), future perspective ($F_{2,33}$=7.12, p<0.05, Partial Eta Square=0.30) and therapy side effects ($F_{2,33}$=3.36, p<0.05, Partial Eta Square=0.17), but a significant difference is not seen in body image ($F_{2,33}$=2.04, p>0.05) and upset by hair loss dimensions ($F_{2,33}$=0.20, p>0.05).

To examine interaction effect, post hoc tests with Bonferroni adjustment were used. Paired comparison findings are reported in table3.There is no significant difference between groups in pre-test in global life quality of functions scales in physical function. Post-test scores of physical function in metacognition program in comparison to control group (D_{ij}= -10.67, p<0.05) and mindfulness-based stress reduction treatment program (D_{ij}=-16.67, p<0.001) was significantly lower. Thus, not only did physical function of participants in this group not improve, but also has become more deteriorated. Follow-up scores of physical function in mindfulness-based stress reduction treatment program was significantly higher than metacognition

treatment (D_{ij}=23.33, p<0.01), but these scores did not have a significant difference in comparison to the control group (Figure 1, A). It can be concluded that the obtained difference is because of scores reduction of physical function in metacognition group participants, not because of increase in scores of this function in group receiving mindfulness-based stress reduction program. There is no significant difference between groups in pre-test in role function. Post-test and follow-up scores in role function in mindfulness-based stress reduction program were significantly higher in comparison to the control group and metacognition treatment program, but no difference was seen between metacognition treatment program and control group (Figure 1, B). So, metacognition program has had no effect on role function. Pre-test scores of control group in emotion function and mindfulness-based stress reduction treatment program were significantly lower in comparison to the metacognition treatment program. Post-test and follow-up scores of emotion function in mindfulness-based stress reduction treatment program and metacognition treatment program were significantly higher in comparison to the control

group (Figure 1, C). In cognitive function, pre-test scores of control group and mindfulness-based stress reduction program were significantly higher in comparison to the metacognition treatment program. Post-test scores of cognitive function in metacognition treatment program did not have significant difference with control group. This finding suggests the effectiveness of metacognition treatment. Post-test scores in mindfulness-based stress reduction treatment program were significantly higher in comparison to the control group and it suggests the effectiveness of metacognition treatment. Follow-up scores of this function in mindfulness-based stress reduction treatment program were significantly higher in comparison to the metacognition treatment program and control group. No difference was seen between follow-up scores of metacognition treatment and control group (Figure 1, D). This finding suggests that follow-up scores in mindfulness-based stress reduction treatment program and metacognition treatment are stable enough. There is no significant difference between groups in pre-test in social function. Post-test scores of social function in mindfulness-based stress reduction treatment program and metacognition treatment program were significantly higher in comparison to the control group. Follow-up scores of social function in mindfulness-based stress reduction treatment program were significantly higher in comparison to the control group and metacognition treatment program (Figure 2, A). This finding suggests that scores have more stability in mindfulness-based stress reduction treatment program in comparison to the metacognition treatment program. There is no significant difference between groups in global life quality in symptoms scale and in fatigue symptoms. Post-test and follow-up scores of fatigue symptoms in mindfulness-based stress reduction treatment program were significantly lower in comparison to the metacognition treatment program and control group (Figure 2, B). This finding means that metacognition program has no effect on fatigue symptoms. In global life quality of symptoms scale, pre-test scores of sleep disorder in metacognition treatment program were significantly higher in comparison to the mindfulness-based stress reduction treatment program and control group. Post-test scores of sleep disorder symptoms in mindfulness-based stress reduction treatment program were significantly lower in comparison to the metacognition treatment program and control

group. There was no significant difference in post-test scores of sleep disorder symptoms in metacognition treatment program in comparison to the control group. This means that metacognition treatment program has reduced sleep disorder. Follow-up scores of sleep disorder symptoms in metacognition treatment program were significantly higher in comparison to the mindfulness-based stress reduction treatment program and control group, but there were no significant differences between follow-up scores of mindfulness-based stress reduction treatment program and control group (Figure 2, C). These findings mean that follow-up scores of sleep disorder in metacognition and mindfulness-based stress reduction treatment programs are not stable. There is no significant difference between groups in pre-test in global life quality of symptoms scale, in pain symptoms. Post-test and follow-up scores of pain symptoms in mindfulness-based stress reduction treatment program were significantly lower in comparison to the metacognition treatment program and control group (Figure 2, D). So, metacognition treatment program has no effect on pain symptoms. Pre-test scores of total life quality of global life quality in metacognition treatment program were significantly lower in comparison to the mindfulness-based stress reduction treatment program and control group. Post-test scores of total life quality were significantly lower in mindfulness-based stress reduction and metacognition treatment programs in comparison to the control group. In other words, in spite of implementation of treatment programs, total life quality of participants has not been improved. Follow-up scores of total life quality between groups did not show a significant difference, i.e. the primary difference between groups in total life quality vanished. It is especially true about metacognition treatment program that has had lower scores in pre-test in comparison to the other two groups (Figure 3, A).

To examine interaction effect of time × group about specific life quality subscales, post hoc tests with Bonferroni adjustment were used. Paired comparison findings are reported in table 3. In specific life quality, two-way interaction effect on body image, future perspective and therapy side effect was significant. There is no significant difference between groups in pre-test in specific life quality of functions scales, in body image scores. Post-test scores of body image in mindfulness-based stress reduction and metacognition treatment

programs were significantly higher in comparison to the control group. There was no significant difference between groups in follow-up scores of body image (Figure 3, B). There is no significant difference between groups in pre-test in specific life quality of functions scales, in future perspective scores. Post-test and follow-up scores of future perspective in mindfulness-based stress reduction treatment program were significantly higher in comparison to the control group. There was no significant difference in post-test and follow-up scores of future perspective in metacognition treatment program with control group (Figure 3, C). So, metacognition treatment program has no effect on future perspective. There is no significant difference in specific life quality of functions scales in therapy side effect scores among groups. Post-test scores of therapy side effects in mindfulness-based stress reduction treatment program were significantly lower in comparison to the control group. Follow-up scores of therapy side effect in mindfulness-based stress reduction treatment program were significantly lower in comparison to the metacognition treatment program and control group (Figure 3, D). Consequently, metacognition treatment has no effect on therapy side effect.

Discussion

It is estimated that there are about 15 million cancer patients around the world in 2020 [31]. Considering the consequences of breast cancer and its treatments, it seems that the usual treatments mostly focus on quantity of patients' lives and considering the impacts resulting from therapy side effects on other aspects of life has been faded, while today life quality is considered as one of the important consequences of disease treatments and is assessed as one of the indicators to determine the effectiveness of treatments [4]. Findings of this study showed global life quality scores increased in experimental groups in emotion, cognitive and social functions from pre-test to post-test and has a relative stability in follow-up. Mindfulness-based stress reduction treatment program has had maximum effectiveness on emotion function, pain symptoms and fatigue in patients compared to metacognition treatment. This finding is consistent with results of studies conducted in Iran and the world and suggests the effectiveness of non-pharmacological measures on reducing pain intensity associated with cancer [32]. The application of group mindfulness-based

stress reduction program has a negative effect on physical function and a positive effect on role function but metacognition program had no effect on mentioned functions. So, mindfulness-based stress reduction program is a selective treatment for improving role function. Another finding of this study suggested that global life quality in nausea and vomiting dimension had no significant improvement before and after the program. Findings of this study were consistent with previous studies [19, 33].

While application of mindfulness-based stress reduction and metacognition programs improve sleep disorder in comparison to the control group, these programs have just temporary effects in this situation. Effect range of mindfulness-based stress reduction program on global life quality symptoms is more than metacognition program. While mindfulness-based stress reduction program has effects on fatigue and pain symptoms, metacognition program has no effect on improving these symptoms. Therefore, in symptoms dimension, group mindfulness-based stress reduction program is a selective treatment for improving fatigue and pain symptoms .Finding of this study has been consistent with previous findings [21, 27]. In addition, patients' specific life quality in body image function in both experimental groups shows a considerable improvement in post-test in comparison to the control group. The improvement was more in experimental group receiving mindfulness-based stress reduction program. However, the effect of these treatments is short-time, and their effect is not significant in follow-up. Finding of this study has been consistent with previous studies [18, 34].

Patients' specific life quality in future perspective in mindfulness-based stress reduction program shows a considerable improvement in post-test in comparison to the control group, while metacognition program has no effect on future perspective [27]. Application of group mindfulness-based stress reduction program has improved therapy side effect significantly in specific life quality than baseline and in comparison to the other two groups. These findings are consistent with previous studies that have shown this program can be an effective psychosocial intervention in improving life quality of patients with cancer [18, 21]. Carlson and Space (2011) have shown doing mindfulness meditation, in addition to reducing stress, significantly increases mental clarity and mental health and decreases physical stress in patients. These researchers concluded that

mindfulness-based stress reduction program has an important role in developing recovery signs and brings positive results for the participant following the participation in treatment program [20]. Studies show that there is an important relationship between conscious practices and conscious levels, medical and psychological symptoms and also general welfare in a mindfulness-based stress reduction program [35].

Mindfulness-based stress reduction program has a broader effect range in specific life quality and has an effect on body image, future perspective and therapy side effect, while metacognition program just affects body image. Intervention of group mindfulness-based stress reduction program creates mindfulness by meditation practices, and mindfulness causes an increase in self-awareness and self-acceptance ability in patients. Mindfulness is not a method or technique, but it is defined as an available way to reduce pain and increase positive qualities such as consciousness, insight, wisdom and sympathy [17]. Using relaxation training widely and emphasis on it indicates that it is a valuable stress management skill that should be used regularly in individual's life and should be a consistent part of individual's coping skills. Expressing the emotions during all sessions of the program has different treatment advantages. Mindfulness through attention self-regulation affects affective and sensory components of the body by meditation practices. Regular exercise of Hatha yoga increases skeletal-muscle flexibility, strength and balance, and helps the individual to experience deep states of relaxation and awareness [35]. Based on the results of the present study, it seems that psychological interventions especially mindfulness-based stress reduction program can be effective in increasing mental health in patients with breast cancer. On the other hand, the metacognition program focuses on identifying rumination periods, practicing techniques of increasing attention, identifying the rumination time and uncontrollable thoughts, modifying uncontrollable beliefs and preventing harmful coping behavior. These practices are largely cognitive. As a result, they do not help the patient to experience deep states of relaxation and awareness.

This study has had some limitations such as small sample size, assessing by self-report tools, and lack of contextual and individual factors control and implementation of two treatment methods by fixed clinicians. This may cause bias in treatment results, so it is recommended to consider this issue in future studies. Although the number of participants did not decrease in this study, another possible hypothesis is that individuals overestimated the effect of the program because of personal desire, optimism and factors like that. It is recommended to conduct pseudo-therapy programs (placebo program) on control group in future studies to control the expected effect. It is also recommended to use samples with larger size to achieve a real effect size. This study was conducted on patients of Imam Hossein hospital in Tehran. Researchers are recommended to implement these two treatment methods on similar patients in other hospitals and Iranian samples to expand the findings of this study.

Acknowledgment

Conflict of Interest

The authors declare that they have no competing interests.

Authors' Contribution

Soheila Rahmani conceived of the study and participated in its design; Siavash Talepasand performed the statistical analysis and drafted the manuscript, Ali Ghanbary motlagh participated in coordination and revision of the manuscript.

References

1. Ali Pour A. [An Introduction to health psychology (Persian)]. 2nd ed. Tehran: Payam Noor University. 2011;120-88.

2. Chen PY, Chang HC. The coping process of patients with cancer. Eur J Oncol Nursing. 2012;16(1):10-6.

3. Micheli A, Coberg JW, Mugno E, Massimiliani E, Sant M, Oberaigen W, et al. European health systems and cancer care. Ann Oncol. 2003;14(Suppl 5):41-60.

4. Hopko D, Bell J, Armento M, Robertson S, Mullane C, Wolf N, et al. Cognitive-behavior therapy for depressed cancer patients in a medical care setting. Behavior Therapy. 2008;39(2):126-36.

5. Teasdale J, Segal Z, Williams J, Ridgeway V, Soulsby J, Lau M. Prevention of relapse/recurrence in major depression by mindfulness based cognitive therapy. J Consult Clin Psychol. 2000;68(4):615-3.

6. Daughters S, Braun R, Sargeant N, Reynolds E, Hopko D, Blanco C, et al. Effectiveness of a brief behavioral treatmentfor inner-city illicit drug users with elevateddepressive symptoms: The life enhancement treatment for substance abuse. J Clin Psychol. 2008;69(1):122−9.

7. Jacobson N, Dobson K, Truax P, Addis M, Koerner K, Gollan J, et al. A component analysis of cognitive-behavioral treatment for depression. J Consult Clin Psychol. 1996;64(2):295−304.

8. Rodin G, Mikulincer M, Peeters F, Arntz A, Van O. Rumination and worrying as possible mediators in relation between neuroticism and symptoms of depression and anxiety in clinically depressed individuals. Behav Res Ther. 2008;46(12):1283-9.

9. Fissher P, Wells A. Meta-cognitive therapy for obsessive – compulsive disorder: A case series. J Behave Ther Exp Psychiatry. 2008;39(2):117-32.

10. Williams JM, Duggan D, Crane C, Fennel M. Mindfulnes -Based Cognitive Therapy for Prevention of Recurrence of Suicidal Behavior. J Clin Psychol. 2006;62(2):201-10.

11. Wells, A. Meta-Cognitive therapy for anxiety and depression. New York: The Guilford Press; 2009.

12. Osborn R, Demoncada A, Feuerstein M. Psychosocial intervention for depression anxiety and quality of life in cancer survivors: Meta-analyses. Psychiatry in Medicine. 2006;36(1):13-34.

13. Kabat-Zinn J. Mindfulness-based interventions in context: past, present, and future. American Psychological Association. 2003;10(2):144-6.

14. Kabat-Zinn J. Coming to our senses: Healing ourselves and the world through Mindfulness. New York: Hyperion; 2005.

15. Matousek RH, Dobkin PL, Pruessner J. Cortisol as a marker for improvement in mindfulness-based stress reduction. Complement Ther Clin Pract. 2010;16(1):13-9.

16. Brantley J. Mindfulness-Based Stress Reduction. Orsillo & L.Roemer (Eds), Acceptance and mindfulness-based approaches to anxiety: Conceptualization and treatment. New York. 2005;131-45.

17. Baer R. Mindfulness-based treatment approaches: Clinician's guide to evidence base and applications. San Diego: Elsevier; 2006.

18. Speca M, Carlson L, Goodey E, Angen M. The effect of a mindfulness meditation-based stress reduction program on mood and symptoms of stress in cancer outpatients. Psychosomatic Med. 2000;62(5):613-22.

19. Carlson L, Specs M, Patel K, Goodey E. Mindfulness-based stress reduction in relation to quality of life, mood, symptoms of stress, and immune parameters in breast and prostate cancer out patients. Psychosom Med. 2003;65(4):571-81.

20. Carlson L, specs M. Mindfulness - based cancer recovery. Oakland, CA: New Harbinger; 2011. P. 17-31.

21. Lerner R, Kibler J, Zeichner S. Relationship between Mindfulness-Based Stress Reduction and Immune Function in Cancer and HIV/AIDS. Cancer Clin. Oncol. 2013;2(1):62.

22. Hasanvandi S, Valizadeh M, Mehrabizadeh M. Effect of group metacognitive therapy on depression symptom and rumination. Fundament. Ment. Health J. 2013;15(1):71-81.

23. Wells A, Welford M, Fraser J, King P, Mendel E, Wisely J. chronic treated with metacognitive therapy: An open trial. Cogn Behav Pract. 2008;15(2):85-92.

24. Wells A, Sembi S. Metacognitive therapy for PTSD: A preliminary investigation of a new brief treatment. Ther Exp Psychiatry. 2004;35(3):307-18.

25. Wells A, Papageorgiou C. Brief cognitive therapy for social phobia. Behav Res Ther. 2001;39(2):713–20.

26. Chaskalon M, Wiley J, sons. The mindful workplace: developing resilient individuals and resonant organizations with MBSR. 2011;230-2.

27. Montazeri A, Harirchi I, Vahdani M, Khalaghi F, jarvandi S, Ebrahimi M, et al. The European Organization for Research and Treatment of Cancer Quality of life questionnaire (EORTC QLQ-C30): translation and validation study of the Iranian version. Support Care Cancer. 1999;7(6):400- 6.

28. Safaee A, Moghimi Dehkordi B. Validation Study of a Quality of Life (QOL) Questionnaire for Use in Iran. Asian Pac J Cancer Prev. 2007;8(4):543-6.

29. Quality Of Life unites EORTC Data Center. Quality of Life scoring (3nd ed). Brussels, EORTC Data Center. 2001." Available at": http://www.eortc.be.

30. Montazeri A, Harirchi I, Vahdani M, Khaleghi F, Jarvandi S, Ebrahimi M, et al. The EORTC breast cancer-specific quality of life questionnaire (EORTC QLQBR23): translation and validation study of the Iranian version. Qual Life Res. 2000;9(2):177-84.

31. Talepasand S, Pooragha F, Kazemi M. Resiliency and Quality of Life in Patients with Cancer: Moderating Role of Duration of Awareness of Cancer. Iran J Cancer Prev. 2013;6(4):222-6.

32. Meeker M, Finnell D, Othman A. Family caregivers and cancer pain management: a review. J Fam Nurs. 2010;17(1):29-60.

33. Lengacher C, Barta M, Jacobsen P, Kip K, Shelton M, Budhrani P, et al. Feasibility of a Mindfulness-Based Stress Reduction Program for Early-Stage Breast Cancer Survivors. J Holist Nurs. 2011;29(1):107-17.

34. Carmody J, Bear R. Relationships between mindfulness practice and levels of mindfulness, and psychological symptoms and well-being in a mindfulness based stress reduction program. J Behav Med. 2008;31(1):23-33.

35. Forti A. Mindfulness and quality of life among breast cancer survivors: the mediating role of eslf- kindess and alexithymia. Carolina: Harvard Health Publications; 2011.