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The Effectiveness of Acceptance-Commitment Therapy (ACT) on Perceived Stress, Symptoms of Depression, and Marital Satisfaction in Women With Breast Cancer

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ABSTRACT

Background: Breast cancer is a completely heterogeneous disease caused by interaction of factors, such as genetic and environmental risks leading to a progressive accumulation of genetic and epigenetic changes in breast cancer cells. Moreover, it deeply affects patients' mental and social health. The present study aimed at examining the effect of group commitment-acceptance treatment on perceived stress, symptoms of depression, and marital satisfaction in women with breast cancer.

Methods: The present research was a Randomized Controlled Trial (RCT), the study population of which consisted of women with breast cancer referred to Avicenna Research Institute in Tehran, Iran. The participants were selected randomly using random sampling method and Morgan table, and they were assigned to 2 groups of trial (20 individuals) and control (20 individuals). The trial group underwent 8 sessions (each taking 2 hours) for 1 month and received therapy in mind empowerment clinic based on acceptance and commitment, but the control group received no therapy except the routine management. Both groups were examined in terms of psychology using standardized questionnaires. Afterwards, the collected data were analyzed using mean and standard deviation, *t*-test, univariate analysis of covariance, and multivariate analysis of covariance by employment of SPSS software.

Results: The results of analysis of covariance indicated that the performed therapy improved the level of perceived stress, symptoms of depression, and marital satisfaction in the trial group. The calculated eta-squared (0.40) indicated that 40% of individual differences in post test scores of perceived stress, marital satisfaction, and symptoms of depression is related to ACT. In addition, the results of univariate analysis of covariance indicated that 48% of individual differences in scores of perceived stress, 63% of individual differences in scores of marital satisfaction, and 58% of individual differences in scores of symptoms of depression were related to ACT.

Conclusions: The results of the present study show that acceptance-commitment group therapy is effective and productive in reduction of psychological problems of women with breast cancer. The findings of this study, in general, provide an experimental support for ACT in terms of reduction of psychological problems of patients with cancer.

Introduction

According to the global statistics, breast cancer is the most common type of cancer among women.[1] In addition, it has been reported to be the most common and the second disease causing death among Iranian women.[2] The results of the related studies indicate that some of the most common consequences of breast cancer are physical problems (pain and

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fatigue), psychological problems (depression and anxiety), and other socio-mental problems leading to lower life quality in women especially among young women.[3, 4] The incidence of breast cancer is an experience associated with stress and anxiety. Women whose breast cancer is diagnosed on time receive medical care and surgery that have side effects, such as hair loss, nausea, lymphatic, and sexual problems. Prolonged treatment disturbs women's abilities to play their social role as household or working women and to perform their roles in future status and the possibility to go back to work. High level of stress has a long-term negative effect on women's self-assurance and leads them to have negative impact on family and marital performance. Moreover, it could result in lower life quality.

About 10% to 30% of patients experience PTSD clinical signs at the time of diagnosis.[5] Depression and anxiety are common psychiatric disorders in women with breast cancer.[6, 7] Patients with cancer have high levels of psychiatric disorders, the scope of which consisted of depression, anxiety, lack of coping with illness, loss of self-confidence, emotional disorders, and fear of recurrence and death.[8] In addition, due to surgery, women with breast cancer lose a part of their body representing their genders.[9] Such issues result in impairment in body image of oneself leading to the reduction of self-confidence and feminine charm and along with it, stress, depression, and disappointment may come through.[10] Moreover, some of the studies show that even 3 years after medical treatments, the patient may have stress and depression.[11] One of the most significant reasons resulting in the emergence of depression in such patients is the pain caused by metastasis, reduction in social activities, and disability.[12, 13] Depression is a dangerous factor in reduction of survival rate in patients with cancer and an important factor in lack of acceptance of treatment by such patients.[14-16] Recently, a meta-analysis of studies was carried out on prevalence of mood and anxiety disorders among patients with cancer. The results of this research indicated that 12.9% to 29.8% of patients and 5.1% to 17% of patients experienced depression and anxiety, respectively.[17] According to a study conducted by Mahdavi *et al.*[18] there is a significant difference between patients with cancer and cardiovascular patients in terms of marital satisfaction, perceived stress, and depression; in patients with cancer, there is lower marital satisfaction, higher perceived stress, and depression. In addition, findings of their study indicated that perceived stress in patients with cancer and depression in cardiovascular patients predict the levels of marital satisfaction.

Within the past 2 decades, a number of psychotherapies have developed as a third wave, including Dialectical Behavior Therapy (DBT), Acceptance and Commitment Therapy (ACT), Schema Therapy, Cognitive Behavioral Analysis System psychotherapy (CBASP), Mindfulness-based Cognitive Therapy (MBCT), and Metacognitive Therapy (MCT). More exactly, Cognitive-behavioral therapy is a comprehensive expression for a general set of therapies and ACT is one of the many forms of CBT.[19] The main difference between ACT and CBT is that ACT protocol focuses on the clarification of values and goals as well as emphasizing a desire for experiencing all emotions and situations (primary strategies based on acceptance).[20] ACT is associated with a research program called "Relational Frame Theory (RFT)". Obviously, this approach accepts function changes in thoughts and emotions instead of changes in form, meaning, or frequency.[21] The main purpose of this approach is to provide mental flexibility, i.e. providing the ability to make practical choices from different proper options in order to avoid thoughts, emotions, memories, or problematic intentions that dominate individuals.[22] In these types of therapies, it is initially tried to increase individuals' flexibility in terms of mental acceptance of intellectual experiences (thoughts and emotions) and to reduce ineffective control.

Patients are told that any effort to avoid or control these unexpected intellectual experiences is ineffective or has inverse effects, leading to an increase in them. We should accept these experiences without external or internal reactions to completely eliminate them. In the second step, individuals' psychological awareness increases, i.e. they become aware of all of their emotions. In the third step, they are trained to separate themselves from such intellectual experiences (cognitive separation), so that they can act irrespective of these experiences. In the fourth step, efforts to reduce excessive obsession with personal stories (like being a victim). In the fifth step, individuals are helped to identify their main personal values in order to turn them to special behavioral goals (clarification of values); finally, providing motivation to act committedly, i.e. activities towards clear values and goals together with acceptance of intellectual experiences. Such experiences can lead to depressive thoughts, obsessions, tension, and thoughts related to fears and different accidents.[22] In addition to the importance of third wave behavior-cognitive therapies, such as ACT approach as an important emerging field of psychotherapy, which indicated its effective impact on stress, depression, anxiety disorders, and other clinical conditions,[23-25] there are limited number of research studies on the application of ACT techniques in psychotherapy of patients with cancer. For instance, the investigation of Hulbert-Williams, Storey and Wilson[26] can be reviewed, in which the ACT approach was considered an effective and practical intervention in coping with cancer.

Having the aforementioned issues in mind, the aim of the present study was to inform the patient of their emotions, thoughts, and behaviors about the risk of breast cancer and make them experience it without refusal so as to motivate them to pursue their life goals and values as well as accepting cancer and maintaining mental health. Hence, the present research aimed at specifying whether ACT can amend the level of perceived stress, symptoms of depression, and marital satisfaction in women with breast cancer.

Methods

The present research was a Randomized Controlled Trial (RCT), in which the study population consisted of women with breast cancer referred to Avicenna Research Institute in Tehran. The participants were selected randomly using random sampling method and Morgan table and they were assigned to 2 groups of trial (20 individuals) and control (20 individuals). The inclusion criteria included patients aged between 25 and 50, spending at least 1 month and at most 8 months from the diagnosis time, being under chemotherapy or radiation therapy in the past or present, having enough motivation for participating in the research at the primary interview, and not participating in other psychological courses at the same time. Moreover, the exclusion criteria included absence for more than 2 sessions and physical problems. The trial group received therapy based on acceptance and commitment for 8 sessions (each taking 2 hours) within 1 month, but the control group received no therapy. Prior to implementation of the therapy and after that, all participants were tested using Enrich's short-form marital satisfaction questionnaire (35 items), Cohen's perceived stress questionnaire (14 items), and Beck's short-from depression questionnaire (13 items). Eventually, the collected data were analyzed using mean and standard deviation, *t*-test, univariate analysis of covariance, and multivariate analysis of covariance by employment of SPSS software.

Research Tools

A) Perceived stress questionnaire (14 items): this questionnaire was provided by Cohen *et al.* in 1983, consisting of 3 versions of 4, 10, and 14 items, which are used to measure general perceived stress in 1 month and evaluate thoughts and emotions about stressful events, control, dominance, and coping with psychological pressure and experienced stresses. Homology scale reliability coefficients were obtained through Cronbach's alpha in a magnitude of 84% to 86% in a group of university students and a group of smokers. Scoring style of the questionnaires was based on a 5-point Likert scale (0: never, 1: almost never, 2: sometimes, 3: often, and 4: most of the time). The lowest score was 0 and the highest score was 56. Higher marks showed higher perceived stress.[27] In a study conducted by Mahdavi *et al.*[18] Two methods were used for the reliability of the perceived stress questionnaire including Cronbach's alpha method and split-half method. The reliability of the whole questionnaire was 0.84 and 0.85, which showed that the reliability coefficients were acceptable.

B) Enrich's marital satisfaction questionnaire (35 items): this shortened questionnaire is a 115-question list, which was developed by Fowers and Olson.[28] This questionnaire is a self-report tool for measuring the reliability of marriage and level of satisfaction in marriage. The revised scale consists of 4 sub-scales, each of which has 35 items that can be used as research tools for marital satisfaction, communications, problem solving, and ideal falsification. The questions of the questionnaire have 5 answer choices: 1(I totally agree), 2(I agree), 3(I neither agree nor disagree), 4(I disagree), and 5(I totally disagree); they were scored on a scale of 1 to 5. The questionnaire's alpha coefficient for subscales, such as marital satisfaction, communi-cations, problem-solving, and ideal falsification were 86%, 84%, 83%, and 86%, respectively. The retest validity of the questionnaire for each subscale was 81%, 90%, 92%, and 93%.[28] Alpha coefficient in Asoodeh's study (2010): sample size: 365 couples, respectively, 68% (by removing item 24, alpha will be 78%), 78%, 62%, and 77%.[29] In a study conducted by Mahdavi *et al.*[18] ,2 methods were used to obtain the reliability of the questionnaire: Cronbach's alpha and split-half. For the whole questionnaire, the reliability was 0.72 and 0.71, respectively, which showed that the reliability coefficients were acceptable.

C) Beck's short-form depression questionnaire (13 items): this questionnaire consisted of 13 self-report items, which expressed certain depression signs. Each item of this questionnaire includes a 4-choice scale with a score range of 0 to 3. Maximum and minimum scores were 39 and 0, which were provided for measurements in different semiotics areas of depression, such as emotional depression, cognitive depression, motivational depression, and physiological depression. Lait, Fout and Elior[30] reported that Beck's short-form Cronbach's alpha coefficient (13 items) is 0.87; and they reported that the re-testability is 0.90 within 2 weeks. In addition, in a study, Rajabi[30] examined internal homology and the reliability of short-form items of the questionnaire for students in Shahid Chamran University, Ahvaz, Iran. Based on the analysis of the main components, 2 factors were obtained: the first factor was negative emotion towards oneself, which expressed 43.9% of the items' variance; and the second factor was lack of joy, which expressed 8.6% of the items' variance. Cronbach's Alpha Coefficient and Split Half were reported to be 0.89 and 0.82 for the whole questionnaire and correlation coefficient between the short-form and 21-item form of Beck's depression

questionnaire was 0.67. Short-from split-half internalcoordination coefficient of Beck'sdepression questionnaire, after applying Spearman-Brown corrected formula for the whole questionnaire, was 0.82; 0.82 for negative emotion towards oneself (first factor) and 0.76 for lack of joy (second factor).In a study conducted by Mahdavi *et al.*[18], to determine the reliability of Beck's depression questionnaire, 2 methods (Cronbach's alpha and split-half) were used for the whole questionnaire and they were, respectively, 0.94 and 0.90, showing that reliability coefficients were acceptable.

Ethical considerations

Obtaining informed consent from the patients, who participated in the sessions and stating that the patients can withdraw at each stage of the research. Ensuring that the information obtained from the participants will remain confidential (privacy and confidentiality). Respecting to the patients who involved in the research ethically and avoiding discrimination.

Therapy Plan

The protocol of the therapy sessions was held based on Strosal, Hiz, and Wilson's book (acceptance and commitment)[31] within 1 month.

The summary of the contents of each session is as follow:

Session 1 Meeting of group members and therapist, discussion on privacy, breast cancer, examination of negative thoughts and emotions, listing 6 of the most important problems in life, description of therapy approach, and implementation of pre-test.

Session 2 Checking the activities of session 1, measuring patients' problems in ACT viewpoint, explaining creative hopelessness, introducing external and internal world in ACT therapy plan, providing a list of advantages and disadvantages and methods of controlling problems in everyday life.

Session 3 Checking the activities of session 2, discussion over ineffectiveness of controlling negative events using metaphors and training the tendency to think and feel negative, recording cases where patients have managed to get rid of inefficient control methods.

Session 4 Checking the activities of session 3, introducing values, goals, measures, and obstacles to therapy, training the separation of assessments from personal experiences and observing thoughts without judgment, recording cases where patients have managed to observe experiences and emotions without evaluating.

Session 5 Checking the activities of session 4, discussing amalgamation and using metaphors and experimental practice, communicating with present and considering oneself as context, training mind-awareness techniques, recording cases where patients have not been able to observe thoughts, using mind-awareness techniques.

Session 6 Checking the activities of session 5, identifying patients' life values and evaluating values based on their level of importance, introducing perceived self-distinctiveness, continuing to identify life areas, role of choice in actions, providing a list of obstacles to the realization of values.

Session 7 Checking the activities of session 6, introducing fusion with life story, emphasizing living the moment, offering practical strategies for solving problems, using metaphors, planning for commitment to values, reporting steps taken for values, and thinking about the accomplishments of sessions.

Session 8 Concluding the concepts taught during sessions, asking members to explain their accomplishments, planning for the rest of their lives, implementing post-test and finally appreciating respondents for participating in the research.

Table 1. Descriptive Information of Women With Breast Cancer in Trial and Control Groups

Variable	Trial Group	Control Group
Number of Participants	20	20
Average Age	48.11	46.08
Marital Status		
Bachelor	2	1
Married	18	19
Education Status		
High school Diploma	5	8
Bachelor Degree	11	10
Master Degree	4	2
Ph.D.	0	0

Results

The descriptive information of participants are shown in table 1. The data presented in table 2 show the mean and standard deviation of trial and control group before and after interventions. As can be seen, in the trial group, the mean of perceived stress in pretest (26.80) is greater than the mean of perceived stress in post-test (22.45). In addition, the mean score of marital satisfaction in pre-test (103.15) is lower than the mean score of marital satisfaction in post-test (116.90). The mean score of symptoms of depression in pre-test (20.50) is greater than the mean score of symptoms of depression in post-test (12.60). In order to perform couple comparison of

Table 2. Mean and Standard Deviation of Trial and Control Group, Before and After Interventions

Variable/grous	Stage	Mean	Standard Deviation
Perceived Stress			
Trial	Pre-test	26.80	6.51
	Post-test	22.45	5.79
Control	Pre-test	27.45	6.37
	Post-test	28.30	6.19
Marital Satisfaction			
Trial	Pre-test	103.15	17.08
	Post-test	116.90	16.43
Control	Pre-test	96.30	14.61
	Post-test	94.85	13.11
Symptoms of Depression			
Trial	Pre-test	20.50	7.36
	Post-test	12.60	5.90
Control	Pre-test	18.40	5.44
	Post-test	19.0	5.73

Table 3: Comparison of Perceived Stress, Marital Satisfaction, and Depression in Trial and Control Group Before and After Interventions

Variable	Groups	Mean Differences Before and After Interventions	Standard Deviation Differences Before and After Interventions	t-test	DF	P-value
Perceived Stress						
Trial		4.35	3.70	5.25	19	0.000
Control		-0.85	2.25	-1.68	19	0.110
Marital Satisfaction						
Trial		-13.7	8.65	-7.11	19	0.000
Control		1.45	3.56	1.82	19	0.084
Depression						
Trial		7.90	5.12	6.88	19	0.000
Control		-0.60	1.78	-1.50	19	0.150

the effect of punctuations before and after interventions, we used *t*-test (table 3).

According to "t" and its significance, a significant difference was shown between the scores of perceived stresses in the trial group before and after interventions (*t*-test = 5.25, P<001). However, there is not a significant difference between the scores of perceived stresses of the control group (*t*-test = -1.68, P = 0.110). There is a significant difference between the scores of marital satisfactions in the trial group before and after interventions (*t*-test = -7.11, P<0.001). But, there is not a significant difference between the scores of marital satisfactions in thecontrol group before and after interventions (*t*-test = 1.82, P = 0.084). A significant difference was shown between the scores of symptoms of depression control group before and after interventions (*t*-test=6.88, P<0.001). But, there is not a significant difference between the scores of symptoms of depression in the control group before and after interventions (*t*- test = -1.50, P = 0.150). According to the effect of independent variable (ACT) on the scores of dependent variables (perceived stress, marital satisfaction, and symptoms of depression), we used multivariate covariance analysis (MANCOVA). First, tests such as Pillai's Trace, Wilks' Lambada, Hotelling's Trace, and Roy's Largest Root were administered at the same time to examine the effect of ACT factor on the 3 dependent variables.

Table 4. Results of Multivariate Covariance Analysis of Perceived Stress, Marital Satisfaction, and Symptoms of Depression in Control and Trial Groups, Controlling the Effect of Pretest

Test title	Value	F	Df hypothesis	Df error	P-value	eta square	Statistical competence
Pillalis Trace	0.407	8.24	3	36	0.000	0.407	0.98
Wilks' Lambada	0.593	8.24	3	36	0.000	0.407	0.98
Hotelling's Trace	0.687	8.24	3	36	0.000	0.407	0.98
Roy's Largest root	0.687	8.24	3	36	0.000	0.407	0.98

The data presented in the above table show that by controlling pretest, there is a significant difference between women with breast cancer in trial and control groups in terms of perceived stress, marital satisfaction, or symptoms of depression (P< 0.001). η square, which was 0.40, shows that 40% of personal differences is in the post-test scores of perceived stress, marital satisfaction, and symptoms of depression relating to the ACT effect. In order to understand in which variable, the observed difference

Table 5. Results of Single-variable Covariance Analysis of Perceived Stress, Marital Satisfaction, and Symptoms of Depression in Control and Trial Groups, Controlling the Effect of Pretest

Variable/change source	SS	DF	MS	F	P-value	η square
Perceived stress						
Pre-test	1061.47	1	1061.47	128.48	0.000	0.77
Group	281.97	1	281.97	34.13	0.000	0.48
Error	305.67	37	8.26			
Marital satisfaction						
Pre-test	6953.56	1	6953.56	177.58	0.000	0.83
Group	2509.04	1	2509.04	64.07	0.000	0.63
Error	1448.78	37	29.15			
Symptoms of depression						
Pre-test	845.72	1	845.72	70.62	0.000	0.65
Group	611.88	1	611.88	51.09	0.000	0.58
Error	443.07	37	11.97			

is significant, we used single-variable covariance analysis (ANCOVA) for each dependent variable. The results of this analysis have been presented in table 4.

As shown in table 5, the probability of accepting "zero" hypothesis for comparing trial and control groups in post-test of all variables (perceived stress, marital satisfaction, and symptoms of depression) is lower than 0.05; in other words, after adjusting the scores of pretests, there are significant interaction differences between groups' respondents in post-test of all variables.

The data presented in table 1 and 4 show that, according to the mean score of perceived stress of the trial group (22.45), compared to the mean score of perceived stress of the control group (28.30), ACT effect significantly reduces stress in post-test ($F = 34/13$, $P<0.001$); and 48% of personal differences in the score of perceived stress is associated with the effect of ACT. On the other hand, according to the mean score of marital satisfaction in the trial group (116.90), compared to the mean score of marital satisfaction has significantly increased marital satisfaction in the trial group ($F = 64.07$, $P<0.001$); and 63% of personal differences in the scores of marital satisfactions is associated with ACT. In addition, according to the mean score of depression in the trial group (12.60), compared to the mean score of depression in the control group (19.0), ACT has significantly reduced symptoms of depression in the trial group ($F = 51.09$, $P<0.001$); and 58% of personal differences in the scores of symptoms of depression is associated with ACT.

Discussion

The findings of the present study indicated that group therapy training based on acceptance and commitment significantly reduced perceived stress, symptoms of depression, and enhanced marital satisfaction in women with breast cancer. During the treatment, patients learned to neutralize negative thoughts (observation of simplified thoughts) and to practice acceptance.

These practices led the patients to adopt a more neutral attitude towards their social and psychological problems. Knowledge and awareness growth in their thoughts and reactions might help them be aware of negative reactions and make them avoid conflict with the old life patterns as well as not to choose conflicting behaviors. In fact, this psychological training helps them experience negative thoughts and reactions in a new way. In other words, by improvement of mental flexibility, change in perception of the person, acceptance of negative thoughts and feelings, reduction of experimental avoiding, comprehensive awareness and considering the observer himself, faulting individual roles and temporary features, recreation of values, and commitment to achieve them, ACT can reduce psychological problems of women with breast cancer. In general, the research results are in line with the findings of other investigations, such as Mojtabaie and Asghari[32] that demonstrated that ACT significantly reduce symptoms of depression in women with breast cancer. Mohabbat-Bahar *et al.*[33] indicated that ACT is an effective method to reduce anxiety and depression in women with breast cancer. Moreover, Feros *et al.*[34] concluded that ACT is as effective as other psychotherapy approaches, including behavioral-cognitive therapy approach on the improvement of quality of life in patients with cancer. Another study carried out by Najvani *et al.*[35] indicated that ACT can be introduced as an intervention approach in treatment of depression in women with breast cancer. In addition, the main purpose of ACT is increasing the acceptance rate of thoughts and feelings associated with cancer as well as enhancing the psychological flexibility which leads to such changes in patients. The results of other studies in the field of using ACT show that implementing such an intervention provides psychological flexibility in patients with cancer, leading to changes in stress level , life quality, pain, and behavior.[34] As was mentioned before, mind-awareness is one of the basic concepts in the ACT model, whose findings have shown that managing stress, based on mind-awareness, can play an effective role in reducing psychological stress and enhancing life quality and spiritual health.[36] Since treatment of cancer requires strategies that help patients adapt to their therapy procedures, psychological trainings can play an effective role in

realizing this goal, especially acceptance-commitment therapy approach which believes that patients are never considered to be losers, damaged, or hopeless. In fact, this approach is always a type of rehabilitation which believes that all individuals deserve a life based on values, wealth, and meaning. In addition, pain is considered a part of life not an external essence for getting rid of life; and advancement has not been defined as an absolute level of success, but it includes the moment and consideration of future in order to reach a valuable life.[37] Generally, the acceptance of main ACT processes makes commitment easy. Commitment processes include the use of experimental rehearsals and metaphors, helping patients verbally express goals (i.e. values) that they purposefully and meaningfully select in their lives, and make commitment to consistent behavior changes that are led by these values (i.e. committed action); in addition, the acceptance of personal thoughts, emotions, and feelings has been designed to make the process of navigated committed action easy.[38]

Finally, it can be said that implementing group therapy interventions based on acceptance and commitment not only provides the possibility to accept emotions but also helps patients get rid of their useless methods for controlling and eliminating negative emotions and experiences, leading them to commitment to action based on values; this process helps reduce stress and depression as well as increase the components of marital satisfaction in women with breast cancer. Hence, we can use ACT as a proper intervention to enhance patients' capabilities in order to adapt to cancer and reduce its psychological effects. This therapy could be used as a complementary psychotherapy and medicine therapy in order to reduce stress and symptoms of depression and enhance marital satisfaction in women with breast cancer.

According to the results of this and other studies on effectiveness of psychological interventions on chronic disease, it is suggested that oncology specialists not only rely solely on medical treatment but also refer the patients to consultation and psychotherapy centers to use psychological interventions based on ACT in line with the improvement of mental health and the use of effective strategies to deal with the pain caused by the disease.

Time interval between the stages of pretest and posttest as well as the lack of follow-up stage to assess the extent of education impacts (ACT) on patients with breast cancer were limitations of the study.

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References

1. Jemal A, Bray F, Center MM, Ferlay J, Ward E, Forman D. Global cancer statistics. CA Cancer J Clin. 2011;61(2):69-90.
2. Akbari ME, Khayamzadeh M, Khoshnevis SJ, Nafisi N, Akbari A. Five and ten years survival in breast cancer patients mastectomies vs. breast conserving surgeries personal experience. Iranian Journal of Cancer Prevention. 2008;1(2):53-6.
3. So WK, Marsh G, Ling WM, Leung FY, Lo JC, Yeung M, *et al.* The symptom cluster of fatigue, pain, anxiety, and depression and the effect on the quality of life of women receiving treatment for breast cancer: a multicenter study. Oncol Nurs Forum. 2009;36(4):E205-14.
4. Spiegel D, Riba MB. Managing anxiety and depression during treatment. Breast J. 2015;21(1):97-103.
5. Luecken LJ, Compas BE. Stress, coping, and immune function in breast cancer. Ann Behav Med. 2002;24(4):336-44.
6. Wang F, Liu J, Liu L, Wang F, Ma Z, Gao D, *et al.* The status and correlates of depression and anxiety among breast-cancer survivors in Eastern China: a population-based, cross-sectional case-control study. BMC Public Health. 2014;14:326.
7. Burgess C, Cornelius V, Love S, Graham J, Richards M, Ramirez A. Depression and anxiety in women with early breast cancer: five year observational cohort study. BMJ. 2005;330(7493):702.
8. Lee SJ, Fairclough D, Parsons SK, Soiffer RJ, Fisher DC, Schlossman RL, *et al.* Recovery after stem-cell transplantation for hematologic diseases. J Clin Oncol. 2001;19(1):242-52.
9. Khan MA, Sehgal A, Mitra AB, Agarwal PN, Lal P, Malik VK. Psycho-behavioral impact of mastectomy. Indian Journal of Applied Psychology. 2000;26 (1-2):65-71.
10. Weis J. Support groups for cancer patients. Support Care Cancer. 2003;11(12):763-8.
11. Shields CG, Rousseau SJ. A pilot study of an intervention for breast cancer survivors and their spouses. Fam Process. 2004;43(1):95-107.
12. Ciaramella A, Poli P. Assessment of depression among cancer patients: the role of pain, cancer type and treatment. Psychooncology. 2001;10(2):156-65.
13. Lampic C, Thurfjell E, Bergh J, Sjoden PO. Short- and long-term anxiety and depression in women recalled after breast cancer screening. Eur J Cancer. 2001;37(4):463-9.
14. Pirl WF, Siegel GI, Goode MJ, Smith MR. Depression in men receiving androgen deprivation therapy for prostate cancer: a pilot study. Psychooncology. 2002;11(6):518-23.
15. Bowers L, Boyle DA. Depression in patients with

advanced cancer. Clin J Oncol Nurs. 2003;7(3):281-8.
16. Nordin K, Berglund G, Glimelius B, Sjoden PO. Predicting anxiety and depression among cancer patients: a clinical model. Eur J Cancer. 2001;37(3):376-84.
17. Mitchell AJ, Chan M, Bhatti H, Halton M, Grassi L, Johansen C, *et al.* Prevalence of depression, anxiety, and adjustment disorder in oncological, haematological, and palliative-care settings: a meta-analysis of 94 interview-based studies. Lancet Oncol. 2011;12(2):160-74.
18. Mahdavi A, Taghizadeh MA, Esazadeh S, Salehi S, Darabi R, Rafigh P. Relationship Between Depression and Perceived Stress With Marital Satisfaction In Individuals Suffering Cancer and Cardiovascular Diseases. Advances in Natural and Applied Sciences. 2015;9(2):50-8.
19. Twohig MP. Acceptance and Commitment Therapy: Introduction. Cognitive and Behavioral Practice. 2012;19(4):499-507.
20. Wetherell JL, Afari N, Ayers CR, Stoddard JA, Ruberg J, Sorrell JT, *et al.* Acceptance and Commitment Therapy for generalized anxiety disorder in older adults: a preliminary report. Behav Ther. 2011;42(1):127-34.
21. Hayes SC, Luoma JB, Bond FW, Masuda A, Lillis J. Acceptance and commitment therapy: model, processes and outcomes. Behav Res Ther. 2006;44(1):1-25.
22. Forman EM, Herbert JD, O'Donohue W, Fisher J. New directions in cognitive behavior therapy: Acceptance-based therapies. General principles and empirically supported techniques of cognitive behavior therapy. 2009:77-101.
23. Kahl KG, Winter L, Schweiger U. The third wave of cognitive behavioural therapies: what is new and what is effective? Curr Opin Psychiatry. 2012;25(6):522-8.
24. Dionne F, Ngo TL, Blais MC. [The psychological flexibility model: a new approach to mental health]. Sante Ment Que. 2013;38(2):111-30.
25. Dionne F, Blais MC, Monestes JL. [Acceptance and commitment therapy in the treatment of chronic pain]. Sante Ment Que. 2013;38(2):131-52.
26. Hulbert-Williams NJ, Storey L, Wilson KG. Psychological interventions for patients with cancer: psychological flexibility and the potential utility of Acceptance and Commitment Therapy. Eur J Cancer Care (Engl). 2015;24(1):15-27.
27. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. J Health Soc Behav. 1983;24(4):385-96.
28. Fowers BJ, Olson DH. Enrich marital inventory: a discriminant validity and cross-validation assessment. J Marital Fam Ther. 1989;15(1):65-79.
29. Asoodeh MH. Factors affecting successful marriage from the perspective of happy couples: Tehran University; 2010.
30. Rajabi GR. Psychometric properties of Beck depression inventory short form items (BDI-13). Journal of Iranian Psychologists. 2005; 1(4):291–8.
31. Hayes SC, Strosahl KD, Wilson KG. Acceptance and commitment therapy: An experiential approach to behavior change: Guilford Press; 1999;304.
32. Mojtabaie M, Asghari N. Effectiveness of acceptance and commitment therapy (act) to reduce the symptoms of depression in women with breast cancer. Indian Journal of Fundamental and Applied Life Sciences. 2014;4(2):522-7.
33. Mohabbat-Bahar S, Maleki-Rizi F, Akbari ME, Moradi-Joo M. Effectiveness of group training based on acceptance and commitment therapy on anxiety and depression of women with breast cancer. Iran J Cancer Prev. 2015;8(2):71-6.
34. Feros DL, Lane L, Ciarrochi J, Blackledge JT. Acceptance and Commitment Therapy (ACT) for improving the lives of cancer patients: a preliminary study. Psychooncology. 2013;22(2):459-64.
35. Najvani BD, Neshatdoost HT, Abedi MR, Mokarian F. The effect of acceptance and commitment therapy on depression and psychological flexibility in women with breast cancer. Zahedan Journal of Research in Medical Sciences. 2015;17(4).
36. Fish JA, Ettridge K, Sharplin GR, Hancock B, Knott VE. Mindfulness-based cancer stress management: impact of a mindfulness-based programme on psychological distress and quality of life. Eur J Cancer Care (Engl). 2014;23(3):413-21.
37. Hayes SC, Pistorello J, Levin ME. Acceptance and Commitment Therapy as a Unified Model of Behavior Change Ψ. The Counseling Psychologist. 2012;40(7):976-1002.
38. Bricker J, Tollison S. Comparison of motivational interviewing with acceptance and commitment therapy: a conceptual and clinical review. Behav Cogn Psychother. 2011;39(5):541-59.