

# Effect of stress inoculation training on the levels of stress, anxiety, and depression in cancer patients

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## ABSTRACT

**Background:** Cancer is a broad group (over 270 types) of diseases. This disease, like other chronic diseases, occurs in all ages and ethnic groups, and is considered as a major health problem. Stress is one of the most important psychological factors influencing the occurrence of physical diseases, and can lead to severe anxiety, depression, and negative effects on health. It can also make individuals vulnerable to physical diseases, and in the long term, leads to death. This study was conducted to determine the effect of inoculation training on stress, anxiety, and depression in cancer patients.

**Materials and Methods:** This study was conducted in 2013 as a clinical trial with convenient random sampling of patients from the chemotherapy clinic of Seyed Al-Shohada hospital of Isfahan. Forty patients with cancer who were eligible for the study were randomly assigned to either case or control group. The case and control groups had the same treatment plans, and the only difference was stress inoculation training administered in the case group, which was composed of eight 90-min sessions over 8 weeks. Data were collected using Depression, Anxiety, Stress Scales 42 (DASS-42) questionnaire and demographic questionnaire, and analyzed by analysis of covariance (ANCOVA) and *t*-test in SPSS.

**Results:** The results showed that there was a significant difference between case and control groups in terms of stress, anxiety, and depression ( $P < 0.001$ ). Stress inoculation training reduced stress, anxiety, and depression in cancer patients.

**Conclusions:** Stress inoculation training significantly reduced stress, anxiety, and depression. Therefore, teaching this skill and the strategies of coping with stress is recommended for these patients, in addition to medication treatment.

**Key words:** Anxiety, cancer, depression, inoculation training, Iran, nursing, stress

## INTRODUCTION

Cancer is a disease that incidence is rising in human beings due to various factors. In addition to physical problems, this life-threatening disease causes specific mental effects in individuals. On the other hand, mental pressures highly influence and speed up the development of various types of malignant tumors practically as their cause or etiology.<sup>[1]</sup> The diagnosis of cancer puts a cancer patient in numerous personal, familial, and social problems. It leads to a feeling of dependence, low self-confidence and self-control, and an increase in patients' vulnerability, confusion, physical

signs, and suicidal thoughts, and disturbs their daily function and social activities.<sup>[2]</sup> Cancer is accompanied with numerous mental pressures that result in reduction of quality of life (QOL), and anxiety or depression. For instance, patients often experience psychological complications of treatment, such as anger, anxiety, or worry, more severely than physical complications such as alopecia and nausea, and even some patients quit chemotherapy as a result of the psychological complications of treatment.<sup>[3,4]</sup> In fact, different elements and conditions including genetic background, social interactions, and individuals' psychological and behavioral characteristics play a role in the incidence of each disease. One of the most important psychological factors effective on the incidence of physical disease is stress, which negatively influences human beings' health through its effect on behavior and body organs, including cardiovascular system and endocrine and immunity systems, and leads to physical diseases.<sup>[4,5]</sup> The association between stress and a disease is an interactional bilateral association. In other words, physical diseases if they are chronic will conduct as major life events and stressors.<sup>[6]</sup> Anxiety and depression are common among cancer patients, and are caused after a chronic stressful period at the end of treatment of the disease, its physiological factors, or medication treatment. It is such that 10–30% of cancer patients have clinical signs

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of stress at the time of cancer diagnosis.<sup>[4,5]</sup> A study estimated the incidence of psychological disorders to be 30–40% among cancer patients, and reported stress and anxiety in about 80% of patients in early stage of patients' referrals to medical centers.<sup>[1]</sup> Another study reported a Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) mental disorder among 40% of metastatic breast cancer patients, of whom about 6% suffered from an anxiety disorder and over one third were involved in depression.<sup>[7]</sup> Prevalence of depression among the cancer patients was reported as 5.4–42%, which increases due to pain, development of the disease, level of dependency, and increase in disability.<sup>[4,5]</sup> Several medicational methods have been used for the treatment of psychological pressures of cancer. Anti-anxiety and anti-depressant elements have a wide use in this field, although these medicational factors often do not eventually treat all signs of mental pressures, and as they are applied in long term, they are accompanied with side effects. Numerous researchers have adopted non-medicational methods to lower the complications of the disease.<sup>[8]</sup> In addition to following the treatment protocol, social and psychological aspects of a chronic disease should also be considered.<sup>[9]</sup> Several studies have shown that individuals with high stress have more of both physical and psychological complaints. Therefore, efficient programs are those that are directly associated with and planned based on stress-coping methods.<sup>[10]</sup> Nurses, especially in the oncology ward, can apply strategies such as provision of appropriate environmental and educational conditions and complementary health services, as well as administration of some physical interventions for these patients. They can be helpful to cancer patients by methods of investigating the effects of cancers and their treatment complications on patients' QOL.<sup>[4,11]</sup> In this way, they can reduce the destructive effects of cancer on physical, psychological, and spiritual dimensions among these patients.<sup>[4,5]</sup> Among the non-medicational methods are the cognitive behavioral methods which have had a vast domain in past the 20 years. This type of intervention is to lower stress based on an important psychological mediating role in causing and continuation of stress. Stress inoculation training (SIT) technique, suggested in 1985 by the Canadian psychologist Meichenbaum, who was one of the founders of cognitive behavioral therapy, states that cognitive and behavioral methods alone cannot prepare individuals to cope with stress. Therefore, he combined these methods and created cognitive behavioral method for individuals to cope with stress.<sup>[12]</sup> SIT education (Meichenbaum) emphasizes on learning coping skills, especially the skill of negative self-talk detection in stressful situations, and helps the clients overcome stressful situations. This education is like measles vaccination, which through slight stimulation of the biological system, makes the body immune against the more

important and bigger stressors. In this way, individuals are given a chance to cope with stress and experience relative success. The principle of this educational program is to force the individuals to change their beliefs about stressful behaviors and self-talk about stress-coping methods. This education has a vast domain including collection of data, education of relaxation, cognitive practices, problem solving, behavioral practice, and cognitive behavior methods.<sup>[13]</sup> Evans and Connis, in a study on the effect of social and supportive, and cognitive behavioral group therapies in three groups of breast cancer patients, stated that the patients in two study groups reported lower depression, aggression, and physical complaints during 6 months compared to controls. The patients in social and supportive groups showed fewer psychiatric signs and lesser anxiety and interpersonal irritability.<sup>[14]</sup> Catherine *et al.* conducted a study on patients with malignant tumors in California and educated the study group about expression of their emotions, tumor function, and coping skills, and observed an efficient recovery in the study group compared to control.<sup>[15]</sup> In another study, the researchers found that use of relaxation and imagination techniques was effective in reducing patients' fears, nervous pressures, depression, and hopelessness and increasing the desire to live, feeling of optimism, and trust.<sup>[1]</sup> Therefore, reduction of stress and depression plays a major role in the recovery of cancer patients' physical and psychological condition. So far, no study has been conducted using Meichenbaum SIT' s method on cancer patients. This treatment method is new, especially in Iran, and its effect on cancer is unknown due to the vast spectrum of accompanying signs and symptoms such as pain, stress, and the difference in perception of stress among cancer patients compared to other chronic diseases. If this treatment method is efficient in controlling and lowering mood signs, the dosage and number of medication intake can be lowered in patients, which results in cost efficacy, reduced medication side effects, and patients' encouragement to continue treatment. With regard to the aforementioned issues and as few studies have been conducted on non-medicational methods, suggestion of an appropriate strategy (behavioral–psychological), accompanied with medicational methods, to prevent and control cancer signs seems to be essential. This study aimed to investigate the effect of inoculation training on stress, anxiety, and depression in cancer patients.

## MATERIALS AND METHODS

This is a two-group, pre-test post-test clinical trial (study, control) conducted during 2013. The study population comprised cancer patients with a medical file in Seyed Al-Shohada hospital, Isfahan, Iran. First of all, the medical files of cancer patients undergoing their third chemotherapy

session were reviewed and recorded in a list. Sanaei suggested the number of members for counseling therapy groups to be 10–15.<sup>[16]</sup> Based on literature review<sup>[17,18]</sup> and keeping into consideration subjects dropping out in each group, 20 members (10 males and 10 females) were considered for each group. Finally, out of 103 qualified patients, 82 agreed to participate in the study, of whom 40 patients were randomly selected and assigned to the study and control groups by random numbers chart. These 40 patients were identified concerning the baseline variables of age and sex. The inclusion criteria were: Being in the third run of chemotherapy, suffering from non-hematologic cancers, and age >20 years. The patients with a chronic disease, mental and physical disabilities, esophageal and laryngeal cancer, relapse of cancer, existence of stressful events within 6 months before the study, mental disorder patients, and patients undergoing radiotherapy or on psychotropic medication or infertility treatment were excluded from the study. Information on patients' medical care was obtained from their physicians in the hospital by the researcher during the study. Data collection tool was a two-section questionnaire. The first section contained demographic information including age, sex, marital status, education, and income, and the second section included Depression, Anxiety, Stress Scales 42 (DASS-42) questionnaire containing 42 questions. This scale was made and evaluated by Lovibond in 1995 for simultaneous measurement of depression, anxiety, and stress (each measured by 14 items). Total score of depression ranged from 0 to 28 points, for anxiety from 0 to 20 points, and for stress from 0 to 34 points. Total points of the questionnaire ranged from 0 to 82. In a study on clinical subjects ( $N = 173$ ) in Iran, Cronbach's alpha values of depression, anxiety, and stress in a 42-item form of this test were obtained as 0.92, 0.87, and 0.90, respectively. Total Cronbach's alpha for all items was 0.95.<sup>[4,19]</sup> At the beginning of the study, the DASS-42 questionnaire was completed by the groups after they gave their informed consent. Then, the patients were given some information about the research goal and background, and the subjects in the study group underwent weekly group education of Meichenbaum SIT in the chemotherapy clinic of Seyed Al-Shohada hospital in Isfahan. Total number of weekly sessions was eight and each session was held for 90 min.<sup>[17,18]</sup> The outlines of the sessions are as follows:

*First session:* Conceptualization and description of stress, its signs and effects on causing cancer, and explanation of the role of SIT in stress management

*Second session:* Relaxation education

*Third session:* Familiarization with cognitive concepts and association of thoughts and feelings and behavior

*Fourth session:* Challenging with stressful thoughts and negative thoughts test

*Fifth session:* Self-talk education and the role of negative self-talk in causing stress

*Sixth session:* Education of concentration and distraction techniques

*Seventh session:* Problem-solving education

*Eighth session:* Practicing the skills learned already in previous sessions and the necessity of their application when exposed to stressful situation.<sup>[12]</sup>

At the end of the eighth session, DASS-42 was completed by the researcher (to respect the blindness of the study) for all the participants (study and control), and the results were recorded. The data were analyzed by analysis of covariance (ANCOVA) and *t*-test in SPSS.

### Ethical considerations

This study was approved by the appropriate ethics committee, and the researcher was introduced to the hospital's manager. Potential participants received information about the aim and approach of the study, including the fact that participation was voluntary and confidential. After an explanation of the study by the first author, informed consent for participation were obtained from participants.

### RESULTS

There were 40 patients aged 28–65 years. All were married, and 68.27% were females and 31.73% were males. Most of them (47.56%) were in the age group 30–39 years and the least percentage of patients (18.02%) were in the age

**Table 1: Mean scores of depression, anxiety, and stress in the intervention and control groups after the intervention**

Variable	Stage	Groups	Mean	SD	P	t
Depression	Before	Intervention group	10.69	9.02	0.63s	0.58
		Control group	9.18	7.79		
	After	Intervention group	5.98	4.85	0.04	2.16
		Control group	9.05	5.63		
Anxiety	Before	Intervention group	7.63	6.58	0.89	0.19
		Control group	7.95	6.22		
	After	Intervention group	5.45	4.82	0.00	4.89
		Control group	9.58	6.43		
Stress	Before	Intervention group	13.53	9.52	0.84	0.85
		Control group	12.66	9.38		
	After	Intervention group	8.62	13.38	0.01	2.67
		Control group	13.51	7.92		

SD: Standard deviation

of 49 years. Majority of the subjects (about 43.15%) had high school education and the least number (about 1.28%) had master's degree. About 47.12% of the subjects were not working. Length of disease was 1–6 months in 60% of the subjects, with mean (SD) of 2.35 (3.12) and 4.68 (5.35) months in the study and control groups, respectively. In addition, the mean (SD) of age was 34.68 (5.23) and 39.54 (6.67) years in the study and control groups, respectively, and the subjects received their routine medical care during the study. Descriptive findings of the study population, including mean, SD, max., and min., for all variables have been presented in Table 1.

As observed in Table 1, the mean (SD) score of depression after intervention was significantly lower than in the control group. In addition, the mean (SD) of anxiety after intervention was significantly less than in the control group. Mean (SD) of stress was also less than in the control group after the intervention.

## DISCUSSION

ANCOVA test results showed that the mean scores of depression, anxiety, and stress were significantly less in the intervention group compared to the control group. So, it can be concluded that SIT has resulted in reduction in the levels of stress, anxiety, and depression among cancer patients in the present study. Deffenbacher reported that education of stress-coping methods brings about better reaction of individuals in stressful situations.<sup>[20]</sup> Sheehy and Horan reported positive effect of group education of SIT on the reduction of stress in first year students in the Faculty of Law in Arizona, as the subjects showed lower anxiety, stress, and illogical thoughts after the intervention.<sup>[21]</sup> Hamid *et al.* also showed that SIT results in reduction of depression and an increase in QOL in Multiple Sclerosis (MS) patients.<sup>[17]</sup> A meta-analysis of 36 reviewed studies by Rees *et al.* on the effects of psychological interventions and stress management, conducted on 12,841 patients, revealed that psychological interventions and stress management programs reduced subjects' depression and anxiety.<sup>[22]</sup> Hawass reported that group psychotherapy was effective in the recovery and promotion of general health of breast cancer patients.<sup>[23]</sup> Barabadi reported that supportive group psychotherapy is effective in reducing physical disorders, anxiety, depression, aggression, and obsession.<sup>[24]</sup> The present study results are consistent with those of Catherine *et al.* on the effect of a weekly supportive expressive group therapy in metastatic breast cancer patients, with regard to the expression of their emotions, tumor function, and coping skills in the study group, which revealed more efficient recovery in them compared to the control group patients.<sup>[15]</sup>

The obtained results of the present study are not in line with the results of study of Harper and Pour Ibrahim that have been used of Group counseling and individual counseling techniques in the elderly,<sup>[25,26]</sup> It seems that this Mismatch has been arisen from the problems and diseases, aging, loneliness and separation from the family in the elderly. SIT empowers coping skills, or psychological antibodies, through attitude change, and in this way, brings about the feeling of being experienced due to obtaining successful experiences, reinforcement of skills, and formation of positive expectation, and consequently, diminishes stress. The interactional nature of stress with the expression of thoughts, feelings, imaginations, and behavior, as effective elements in the formation of stress, reveals that the person is not only the victim of stress but also the victim of his/her evaluation from the life events which determine the level of stress. Coping skills enable the individuals to react in a new way when exposed to stressful situations and to revise their previous beliefs. This issue modifies the vicious cycle of negative self-thoughts and, consequently, reduces depression.<sup>[12]</sup> In other words, the effect of Meichenbaum SIT in the reduction of anxiety can be described as follows:

- Individuals' ability to effectively cope with events is increased by learning SIT methods. Encouraging individuals to apply this method in their daily life results in receiving a positive feedback and reduces a person's avoidance of stressful situations. So that they feel to have more control on their environment, and it consequently reduces anxiety
- As evaluation of stressful situations as threatening factors is one of the causes of anxiety resulting from automatic negative thoughts in individuals, detecting these thoughts and challenging the individuals with them provide them with a chance to re-evaluate these thoughts and be able to change them, which reduces their anxiety
- Education of relaxation's methods helps the individuals access peace through formation of anti-tension signs and have a better self-control and, finally, decreases their anxiety. In addition, it increases the possibility of access to positive information in the memory and, consequently, facilitates individuals' access to the options associated with anti-risk thoughts
- Reduction of stress and its resulting signs and reduction of anxiety and depression in patients facilitate improvement of patients' sleep condition.<sup>[18]</sup> As stressful situations exist in everybody's life, lack of ability in coping with and management of these situations can influence both genders and result in reduction of their mental health, and psychological problems. Although the causes of stress are different in both genders, the purpose of Stress immunization Training is,

education of stress management and their application in people's life. Therefore, education of these methods increases individuals' coping and managerial ability when exposed to stressful situations, and lets them have a better control on their life events and face the situations more efficiently. This promotes individuals' general health and reduces the psychological problems resulting from their lack of control on life and inability to efficiently manage stressful situations. Therefore, the efficiency of this method is determined by its application and not the individual's gender.<sup>[27]</sup> These patients need multi-dimensional care in clinical centers, outpatient clinics, and at home, which necessitates cost-effective care with appropriate quality given by all health care personnel and requires resources and specific skills among the nurses working in these centers.<sup>[24]</sup> Although in the present study, the subjects were randomly assigned to two groups of study and control to avoid the confounding variables and possible bias, the study had some limitations which are as follows:

- Few studies have been done in relation to this topic, especially in Iran
- Lack of a regular follow-up test which is actually essential to investigate the long-term effects of intervention on patients.

### Suggestions

It is suggested to administer the therapy studied here in patients with metastatic cancer, with 3–6 months follow-up tests. Application of other approaches of group psychotherapy in cancer patients can contribute to research in this field.

### CONCLUSION

To conclude, the results of the study showed that SIT was effective in reducing stress, anxiety, and depression in cancer patients, and therefore, this method can be applied along with conventional medical care to improve and rehabilitate the patients.

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