

Effect of mindfulness-based training on quality of life and resilience of chemical warfare disabled veterans in Sardasht, Iran

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Abstract

Aim of the study: Chemical warfare survivors are at risk of various psychological traumas due to physical problems caused by chemical weapons, which can affect the quality of life and resilience of these people. The aim of this research is to examine the effectiveness of mindfulness-based training for the quality of life and resilience of chemical warfare disabled veterans in Sardasht, Iran.

Material and methods: This research is a quasi-experimental study with a pre-test and post-test design and a control group. The statistical population consists of all male disabled veterans in the city of Sardasht, 30 of whom were selected via convenience sampling and randomly divided into two groups, experimental and control (15 per each). The experimental group received the mindfulness-based plan during eight 1.5-hour sessions. The tools used in this research were the World Health Organization Quality of Life (WHOQOL) questionnaires and the Connor-Davidson Resilience Scale, which were used in two phases of pre-test and post-test, and the research data were assessed by SPSS v.22 and univariate analysis of covariance with adjustment of the pre-test effect.

Results: There was a significant difference between the mean post-test scores of the experimental group and the control group. In other words, mindfulness-based intervention increased the quality of life ($p < 0.001$) as well as the resilience ($p < 0.001$) in chemical warfare disabled veterans.

Conclusions: According to the findings, it can be concluded that the mindfulness-based plan increases the mental health and improve the quality of life of chemical warfare disabled veterans.

Key words: mindfulness, quality of life, resilience, chemical warfare disabled veterans.

Introduction

Chemical warfare is one of the worst anomalies of wars reported in history. The use of chemical agents as an effective weapon in disabling or defeating the enemy has a long history. The history of using chemical weapons goes back to Ancient Greek wars, but the widespread use of these weapons began in the 19th century. Increased knowledge and large-scale production led to the use of chemical weapons in World War I (Kibong *et al.* 2011; Mangerich and Esser 2014; Szinicz 2005). The chemical bombing of 12,000 people occurred on June 28, 1987, during which the city of Sardasht was hit by chemical bombs containing mustard gas at six locations, and now the city has the largest number of chemical warfare survivors exposed to mustard gas. Currently, 900 people injured in

chemical bombing have a record in the Foundation of Veterans Affairs of the city (Khateri *et al.* 2003). The complications of chemical gases cause restrictions in daily activities, occupational tasks, and psychological problems because of physical changes, and it seems that it limits the social relationships of injured people compared to the normal population (Jamali 2005). Many factors such as physical and mental health, job satisfaction, and marital satisfaction can affect the quality of life of people (Olive *et al.* 1997). Regarding the negative effects of chemical gas on quality of life, in a study entitled “Evaluating the quality of life of injured people in chemical bombing in Sardasht and a comparison with normal population”, Barahmani concluded that the chemical gases affect various dimensions of life, including the physical dimension (cough,

shortness of breath, phlegm, change in voice), psychological dimension (concerns over treatment costs, sadness), social dimension (loneliness, dissatisfaction with relationships with friends), and spiritual dimension (Barahmani 1998). In addition to physiological issues and pain caused by disability, the mental stresses can also disrupt the daily life and decrease the quality of life. These chronic and progressive complications constantly affect the quality of life of injured people (Panahi *et al.* 2005). In the studies conducted by Mousavi *et al.* (2010), it was found that the mean scores of survivors in all 8 factors of quality of life were significantly lower than in the normal group and the minimum score was related to physical pain, and providing support services improves their quality of life. Moreover, in another study on 108 spouses of chemical warfare survivors, which was carried out by Jafari *et al.* (2011), the results showed that the quality of life of this group was significantly lower than that of the normal population. Chemical warfare survivors with ophthalmologic complications suffer from poor health-related quality of life. The findings imply that the healthcare system should provide supportive strategies and interventions appropriate to the situation of this population (Mousavi *et al.* 2009). Given the mental and physical problems of survivors, resilience is a new concept that has been considered in recent years. Determining resilience factors with respect to individual, family, and social characteristics has attracted the attention of researchers in the field of resilience. Resilience is a psychological concept that explains how to cope with unexpected situations (Conner and Davidson 2003). The construct of resilience refers to the capability of returning from an unpleasant and difficult situation to the initial situation with more power and expertise (Walsh 2016). Resilient people are resourceful and flexible and can adapt quickly to changes and conditions and return to a recovery state after overcoming the stressful factors. After stressful events, these individuals have a greater capacity to achieve physiological balance and social relationships (Anasuri 2016). In a study, Mashayekh *et al.* (2012) conducted resilience modeling of survivors and their families based on cognitive and emotional variables and found that cognitive impairment and emotional reactivity and expression of emotions are directly and indirectly related to family resilience. Thus, with reduction of emotional and cognitive impairment, the resilience of family and war survivors increases. One of the therapy methods that

can affect the mental health and improve the quality of life in chemical warfare survivors is mindfulness-based training. One of the processes that can be used to improve the quality of life of people and to achieve peace and a better outcome of life is mindfulness and presence of mind, which has long been used to reduce or resolve life problems and psychological distress (stress, anxiety, depression, behavioral problems, interpersonal conflicts, reluctance) (Rostami *et al.* 2016). Mindfulness might protect a person against mood dysfunction related to stress, which is one of the quality of life factors, by increasing the cognitive confrontation processes such as positive re-evaluation and enhancing emotion regulation skills such as distress tolerance (Garland *et al.* 2009). According to Lee (2014), if military personnel achieves the skills required to change the mindfulness-based challenges, it would increase the resilience, physical progress, and stress adjustment in upcoming situations in life. Given the psychological traumas among chemical warfare survivors and the necessity of using proper therapeutic methods, as well as observing the positive results of mindfulness-based therapy in improving the psychological disorders of various statistical populations, and since no study has been performed to evaluate the effectiveness of mindfulness-based training on quality of life and resilience of chemical warfare survivors, the main aim of this research was to investigate the effect of mindfulness-based training on quality of life and resilience of chemical warfare survivors.

Material and methods

Research methodology

This is a quasi-experimental study with a pre-test and post-test design and a control group, which was performed in the city of Sardasht, 2019.

Statistical population and sample

In the present research, the statistical population consists of all male survivors in the city of Sardasht. In this research, the convenience sampling method was used. After visiting the Foundation of Martyrs and Veterans Affairs and talking to a number of veterans and obtaining their consent, 30 individuals were selected via simple random sampling and divided into experimental and control groups (15 per each). This sample size was selected upon referring to scientific sources in the field of psychological

interventional research. According to Delavar, a sample size of 15 is sufficient for each group in the experimental studies, and the findings can be generalized. Inclusion criteria for subjects in the groups were as follows: being male, disability percentage of 10-30% (which is the extent of physical and psychological injury determined by the Medical Commission of the Foundation of Martyrs and Veterans Affairs per percentage from 5% to 70%), aged 35-50 years, education level of high school diploma and above, and lack of severe psychological problems. Exclusion criteria were the simultaneous use of other psychological treatments and absence from more than two sessions of the training program.

Research instruments, quality of life questionnaire

In order to determine the quality of life of the individuals, the World Health Organization Quality of Life, WHOQOL-BREF questionnaire was used, which is designed by the World Health Organization. The questionnaire evaluates four domains of physical, mental, environmental, and social health by 24 questions (WHO 1996). The domains contain 8, 6, 7 and 3 questions, respectively. The first two questions do not belong to any of the domains and evaluate the overall health status and quality of life. This questionnaire has a total of 26 questions and is a self-report scale and each question is scored from 1 to 5. Three questions have reverse scoring. After performing the necessary calculations in each score range, a score of 4-20 will be obtained, in which 4 represents the worst and 20 represents the best status. These scores can be transformed to a score range of 0-100. The reliability and validity of the Persian version of the questionnaire have been assessed by Nejat *et al.* in Iranian society, so that the values of intra-cluster correlation and its Cronbach's α were obtained above 0.7 in all domains. Cronbach's α was 0.55 only in the field of social relations (Nejat *et al.* 2006). In this questionnaire, a higher score shows a better quality of life.

Connor-Davidson Resilience Scale

This scale is used to measure resilience and contains 25 items that are scored on a Likert scale from 0 (*totally false*) to 5 (*always true*). The score range is 0-100 and a score of 50 or above means proper resilience. This scale has been normed in Iran by Mohammadi (2006). To determine the validity, first the correlation of each item was calculated by total score except for item 3,

which showed coefficients between 0.41 and 0.64. The coefficient of reliability was 0.89 using Cronbach's α . The validity was also reported as equal to 0.80 by the test re-test method.

Method

Prior to the implementation of the project, the necessary information on the purpose of the research was given to the participants and they were ensured about the confidentiality of the results. Then, the quality of life and resilience questionnaires were administered as a pre-test to all individuals. Afterwards, they were divided into two groups, experimental and control, and a mindfulness-based treatment was offered by the researcher on the experimental group during eight 1.5-hour sessions, while no interventional treatment was performed on the control group.

Treatment sessions are explained as follows:

Session 1. Adjusting the overall policy considering the confidentiality of personal life of individuals, inviting people to introduce themselves to each other, automatic guidance, eating a raisin with awareness, meditation on physical examination, group formation; assignment: paying attention to daily activities, implementing what they have learned in eating a raisin when brushing their teeth or washing the dishes.

Session 2. Dealing with obstacles and problems, meditation on physical examination, practicing thoughts and feelings; assignment: ten minutes of breathing with presence of mind, paying attention to a daily activity in a different manner, writing a daily report of an unpleasant event.

Session 3. Presence of mind on breathing of motion based on mindfulness, practicing respiration and stretching, three minutes of breathing space, assignment on breathing and stretching, motion in presence of mind, and three-minute exercise of breathing three times a day.

Session 4. Being in the present, five minutes of visual or audible presence of mind, sitting meditation, walking with presence of mind; assignment: sitting meditation, three minutes of breathing as a coping strategy (while experiencing unpleasant emotions).

Session 5. Acceptance and permission, sitting meditation, awareness of breathing and body, focusing on awareness of how to respond to thoughts, feelings and physical sensations; assignment: sitting meditation and three minutes of breathing space.

Session 6. Mindfulness training, positive and negative thoughts, pleasant or unpleasant thoughts, allowing negative and positive

thoughts to enter the mind, and easily removing them from the mind without judging or paying close attention to them.

Session 7. Self-caring, sitting meditation, awareness of body breathing, sounds, thoughts and sensations, understanding the relationships between activity and mood, such as selecting a pattern from all different types of course exercises for post-course implementation.

Session 8. Using what has been learned to deal with moods in future, meditation on physical examination, completion of meditation, a review of what has been done in the period, assignment: selection of a program for home exercises that participants can continue until the following month. Finally, administration of posttest to both groups.

Ethics

The Ethics Committee of Janbazan Medical and Engineering Research Center (JMERC), Iran approved the study. All patients gave consent.

Statistical analysis of data

After collecting the questionnaires, the data were analyzed using mean, standard deviation, and analysis of covariance using SPSS 22 software.

Results

Among those participating in the research, 6.7% had a mean age of 35-40, 26.7% had a mean age of 40-45, 36.7% had a mean age of 45-50, and 0.30% had a mean age of 50 or

above. Of these people, 91.2% were married and 8.8% were single.

In Table 1, the mean and standard deviation of the experimental group and control group are presented in pre-test and post-test. Results of the table show that the mean scores of the experimental group in the quality of life variable are increased compared to the pre-intervention. Moreover, the mean scores of the experimental group in the resilience variable are increased compared to the pre-intervention condition. Univariate analysis of covariance was used for more precise examination of the intervention in experimental and control groups. In order to use univariate analysis of covariance, the assumptions were first checked. Given that the significance level of the Z-value of the Kolmogorov-Smirnov test is greater than 0.05, the claim of normality of the data distribution is accepted ($p > 0.05$). Results of the regression slope also showed that the assumption of homogeneity of regression is approved for the data. The Levene test was used to evaluate the assumption of equality of variance in the group error variance. The significance level of the Levene test shows that its value is higher than 0.05; therefore, the assumption of homogeneity of variance holds ($p > 0.05$).

The results of analysis of covariance show the impact of mindfulness-based training on quality of life (Table 2). After adjusting for the pre-test scores, there was a significant effect between the groups (Partial $\eta = 0.43$, $p < 0.05$, $F = 20.46$). Mindfulness-based training increased the quality of life of the chemical warfare survivors.

The results of analysis of covariance show the impact of mindfulness-based training on resil-

Table 1. Descriptive indicators of subjects' scores on research variables

Variable	Group	Pre-test		Post-test	
		M	SD	M	SD
Quality of life	Experimental	50.86	2.23	53.45	2.16
	Control	49.93	2.52	50.60	2.66
Resilience	Experimental	41.40	4.13	44.66	3.65
	Control	41.86	3.64	41.46	3.20

Table 2. Results of univariate analysis of covariance on mean scores of post-test quality of life while controlling for the pretest scores of quality of life

Source of changes	Sum of squares	Degrees of freedom	Mean of squares	F ratio	Significance level	Eta coefficient
Pre-test effect	122.94	1	122.94	59.70	0.001	0.74
Group	32.12	1	32.12	20.46	0.001	0.43
Error	42.39	27	1.57			
Total	81558	30				

Table 3. Results of univariate analysis of covariance on mean scores of post-test resilience while controlling for the pre-test resilience scores

Source of changes	Sum of squares	Degrees of freedom	Mean of squares	F ratio	Significance level	Eta coefficient
Pre-test effect	287.90	1	287.90	180.07	0.001	0.87
Group	56.89	1	56.89	35.89	0.001	0.56
Error	43.16	27	1.59			
Total	56050	30				

ience (Table 3). After adjusting for the pre-test scores, there was a significant effect between the groups (partial $\eta = 0.56$, $p < 0.05$, $F = 35.89$). Mindfulness-based training significantly increased the resilience of the chemical warfare survivors.

Discussion and Conclusion

The aim of this research was to examine the effectiveness of mindfulness-based training for the quality of life and resilience of chemical warfare survivors in the city of Sardasht. The findings of univariate analysis of covariance on the mean score of post-test (after controlling for pre-test scores) of quality of life and resilience showed that there is a significant difference between the experimental and control groups in terms of abovementioned variables. According to the findings, the research hypothesis as to the effect of mindfulness-based training on the quality of life and resilience of chemical warfare survivors was confirmed. Findings of earlier research show that mindfulness-based cognitive therapy increases the psychological capital and its dimensions such as resilience, self-efficacy, optimism, and hope in disabled veterans (Shojaeyan and Abolmaali 2016). Some researchers believe that mindfulness-based training causes beneficial changes in quality of life and perceived stress. This effect persists over time and leads to increased mental health (Ruths *et al.* 2013). In explaining the effect of mindfulness-based training on the quality of life and resilience of chemical warfare survivors, it can be said that mindfulness-based training leads to cognitive change in people's way of thinking and behaviors and benefits from the principles of conditional reinforcement. It also seems that mindfulness can be effective via attention control training (Spinhoven *et al.* 2017). Given that the quality of life is formed of various dimensions, such as physical, mental, social and spiritual, the mindfulness exercises are designed in such a way as to affect all these dimensions. Therefore, this method increases the quality of life. Given the

content of mindfulness-based stress reduction sessions, there is an emphasis on the use of methods to reduce stress and being conscious of one's condition. Giving up the struggle and acceptance of yourself without judgment is the main concept in treatment of mindfulness-based stress reduction (Teasdale *et al.* 2002). In fact, acceptance without judgment is related to quality of life (Nyklíček *et al.* 2008). Mindfulness-based training teaches individuals to consciously identify the habitual and unconscious patterns of mind rumination and transform them into conscious and controllable patterns. In this method, an individual learns to identify negative emotions and thoughts by using these processes and treating them as simple and controllable events. The mindfulness method as attention without judgment on internal experiences (such as emotions and cognition) allows a person to deal with stressful experiences by reducing automatic responses. As time passes and with an increase in awareness and acceptance of life events (which can be changed), the activation of response systems to stress declines and physical symptoms decrease (Pascoe *et al.* 2017). In this approach, the chemical warfare survivors are trained to allow the negative thoughts or sensations when they emerge to remain as they are in their minds before answering. Mindfulness-based training provides a pattern to reduce mental rumination and allows the survivors to be aware of their mood swings and use mindfulness techniques to be aware of information processing that continues thoughts and emotions. Mindfulness is non-judgmental sensation of awareness that helps clear observation and acceptance of physical emotions and phenomena as they occur. Therefore, mindfulness-based training for chemical warfare survivors who suffer from psychological problems caused by physical problems makes them accept their sensations and weaknesses and the acceptance of these emotions reduces attention and excessive sensitivity to reporting these symptoms. Mindfulness-based training increased the resilience of survivors. Mindfulness-based training involves conscious

awareness based on attention to specific emotions such as physical sensations in the body from one moment to another. However, the mind is diverted to thoughts, feelings, sounds, or other physical sensations. The content of consciousness is remembered and then the attention slowly but seriously returns to the protected goals. These processes are repeated over and over again then repeated in the daily phase of inclusive consciousness training. One of the possible limitations of this study is the use of a male sample and caution is required for generalization of its results to a female sample. Another limitation of this research is the lack of follow-up to evaluate the continuity of treatment outcomes and failure to evaluate clinical variations after the intervention. It is suggested to conduct research with a longer follow-up period to evaluate the longer effect of time on treatment durability. It is recommended to use a mindfulness-based method on other samples and other dependent variables.

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