



## The Controlled Trial of Behavioral Activation Treatment for Depression in Females with MS

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### Abstract

Multiple Sclerosis (MS) is one of the most common chronic diseases of the central nervous system which affects mostly young, intelligent and active members of the society, and no cure has been found for it yet. This study was aimed at evaluating the effectiveness of behavioral activation treatment (BAT) in reducing depression in females with MS referring to the Tehran Association for MS in 2014. The statistical population was all females referring to the Tehran Association for MS and the sample was 30 females (15 in experimental group and 15 in control group) selected by purposeful sampling method then random assignment. This study was a quasi-experimental research (pre- and post-test and follow-up with the control group). The experimental group received 10 group sessions of BAT. Data collection tool was Beck Depression Inventory-Edition II (BDI-II). The inventory validity and reliability was approved by Dadsetan and Mansur (1990). Rajabi (2001) reported the Cronbach's alpha coefficient for the whole questionnaire as equal to 0.87, split-half coefficient as equal to 0.83 and test-retest coefficient after 3 weeks as equal to 0.49. Data was analyzed using mixed analysis of variance (Mixed ANOVA). The results showed that BAT could reduce depression in females with MS, belonging to the experimental group ( $F_{1, 28}=25,391; P=0.000$ ) in the post-test and follow-up ( $F_{1, 28}=52,330; P=0.000$ ). BAT improved their motivation and solidarity, and ultimately reduced their level of depression through enhancing self-management skills in patients with MS.

**Keywords:** Depression, Behavioral Activation Treatment, Multiple Sclerosis



## Introduction

Progressive neurological disease of MS has already affected about two million people across the world; about 3 thousands of them live in the United States (Abramovitz, 2008).

MS is diagnosed in the late second or third decade of life; however, it may also affect older individuals. The prevalence of MS in children and adolescents is rare, and it affects females twice as much as *it* affects males. Spread of MS is not the same all over the world; however, as a whole, its prevalence is higher when moving from the equator towards the north and south. In parts of Asia, Africa and America which are located on the equator, cases of MS are rarely seen, while in Canada, and especially in Scotland, the prevalence is very high (Sadighi, 2007).

Since MS is a chronic disease with multiple physical and disabling symptoms, various psychological and psychiatric disorders are associated with it, and it also influences the emotional and personality aspects of patients (Noy et al., 1995). One of the psychological characteristics of people with MS is irritability (or being touchy). In other words, most people with this disease are irritable and sensitive individuals. They may cry easily and rarely may rejoice funny issues (Tagha, 2004).

The main problem in MS is the sudden occurrence of movement disorders and the loss of neurological functions. The durations of the attacks which are different and similar plaques (the same number of damaged myelin) can cause varying degrees of damages in the patients. Some patients may develop severe paralysis and others may have just a mild numbness or tingling in a specific area. In some cases, the area suffering a loss of myelin membrane may heal without any problem (Abramovitz, 2008).

MS is now considered to be one of the autoimmune diseases. An autoimmune disease is a disease in which the immune system that should target the invading microbes damages the tissues (Sarafino, 2006).

There are four main types of MS: Relapsing-remitting, primary progressive, secondary progressive and progressive-relapsing type. Relapsing-remitting MS is the most common type of this disease; and about 75% of patients suffer from this type of MS at the beginning of MS. In this type of disease, the patients suddenly experience attacks that affect one or more parts of the body. Then, they are completely or largely improved and the disease does not progress until the next attack. The next attack could happen soon or several years later. The most dangerous type of MS is the primary-progressive one which affects about 15 percent of patients. Patients with progressive-primary type of MS are continuously worsened and do not feel any improvement in between attacks, or experience a little improvement. Such patients often have severe disabilities during the first five years of their disease. Patients with progressive-secondary type of MS develop firstly the relapsing-remitting type of this disease; and finally will change to the progressive type. During the ten years since the onset of the disease, about 50% of patients who have initially suffered from relapsing-remitting type of MS will change to the progressive-secondary type of this disease. Within 25 years since the onset of disease, 90% of patients with relapsing-remitting MS will change to the progressive-secondary type of this disease. Patients with the fourth type of MS, i.e. the progressive-relapsing type suffer from progressively lesions from the beginning; but they also experience acute attacks, the symptoms of which appear and disappear after a while. This type of MS affects about 6 to 10 percent of patients. Out of these four types, doctors have detected a mild version of the disease called sensory-benign that causes only the loss of vision or other senses (Abramovitz, 2008).



Some of clinical signs of MS include limb weakness, visual symptoms, sensory symptoms, sexual dysfunction, fatigue, depression and cognitive dysfunction (Kasper et al., 2015).

Depression is a state of humor which is associated with reduced self-esteem, feelings of incompetence, lack of competence and undesirable self-understanding. Everyone feels depressed at some points in the life; and he/she can associate depression with specific events. There are two important events in the development of depression, loss and failure (Ganji, 2013).

Clinical depression can cause a person not to do well in his/her everyday routines. Sometimes, depression occurs without the presence of negative events; and sometimes it takes more time than expected. The emotional, motivational, cognitive and physiological symptoms can be seen in depression (Ganji, 2013).

BA is a short-term structured treatment for depression. The purpose of this therapeutic approach is to enable clients through techniques that will enhance the rewarding experiences in their lives. BA techniques are all hand in hand to achieve a fundamental goal; i.e. increased activity and involvement of people in the world around them. To reach this goal, BA deals with the processes (such as escape and avoidance) which prevent activation. BA is based on the assumption that the problems in the lives of vulnerable people reduce their ability to receive positive reinforcement from the environment. This in turn causes the symptoms and behaviors that place them in the class of people with depression. To reduce depression, BA assumes that the clients should either involve themselves in various behaviors to finally find them enjoyable and productive; or, in a way, to improve their life situations in order these situations can produce more rewards for them (Dimidjian & Dunn, 2013).

Given that MS patients have decreased ability due to suffering with this disease and taking drugs, and suffer from mood and emotional disorders, the researcher attempted to study whether or not the BAT is effective in reducing depressive symptoms in females with MS.

### Method

As there was no possibility to control the effects of all the variables involved in this study, despite the random selection and replacement, the quasi-experimental method was used. Data were collected using pretest-posttest-follow up with a control group and an experimental group.

### The Statistical Population and Participants

The statistical population of this study consisted of all patients with MS referred to the MS Association in Tehran, with a sample size of 10300 individuals.

At first, the MS patients filled out (completed) the Beck Depression Inventory (BDI). Then 30 patients with moderate and high depression scores, and interested in cooperation in research and passing BAT training course were identified.

Analysis of age-related descriptive indicators showed that participants of the experimental group had an age range of 23 to 39 years with the mean age of 30.73 years. Participants of the control group also had an age range of 23 to 38 years with a mean age of 31.33 years. In general, participants were in an age range of 23 to 39 years with the mean age of 31.3 years. Information on other demographic data of patients is shown in Table 1.

Table 1: Distribution of demographic data

Education	Percent	Marriage	Percent	Job	Percent
High School	20	Single	76.7	Employed	40
Diploma & Associate	70	Married	23.3	Homemaker	60
Bachelor	10	Total	100	Total	100
Total	100				



### Instrument

Beck Depression Inventory-Edition II (BDI-II) was used in this study to measure the level of depression. BDI has 21 articles that measure the physical, behavioral and cognitive symptoms of depression. Each article has four options, scored on a 0-3 range, which determine varying levels of depression, from mild to severe. The highest test score is 63 and the minimum is zero. A score of 4 or less indicates no or low depression, a score of 5-7 indicates mild depression, a score of 8-15 indicated moderate depression, and a score between 16 and 39 indicates severe depression. The results of meta-analysis conducted on BDI showed that the internal consistency coefficient of BDI is between 0.73 and 0.93, and the mean score is equal to 0.86. The retest coefficients were in the range of 0.48 to 0.86 based on the interval between the frequency of implementation and type of the population (Marnat, 2008).

The short form of this questionnaire (inventory) was normalized in Iran by Dadsetan and Mansur (1990). Rajabi (2001) reported the Cronbach's alpha coefficient for the whole questionnaire as equal to 0.87, split-half coefficient as equal to 0.83 and test-retest coefficient after 3 weeks as equal to 0.49.

### Procedures

Due to ethical principles of research, maintaining anonymity and *confidentiality* and protection of their rights, in all phases of study, the welfare of the participants drew attention and their consent was obtained.

After selecting 30 patients who meet the condition of participating in the study, they were randomly assigned to two groups of 15 participants (15 participants in the experimental group and 15 participants in the control group). The experimental group received 10 sessions of BA training course and patients in the control group received no intervention. After the end of BAT for the experimental group, both groups completed (filled out) the BDI. Finally, to assess the effects of treatment over time and after its termination, both groups completed BDI again after 2 months.

### Intervention

In the present study, BAT protocol for depression was held as 10 45-minute sessions twice a week.

#### The goals of training sessions

**First session:** 1. Meeting of the members of group with and introducing them to each other, 2-Introduction to the purpose of therapeutic treatments 3- contracting for treatment

**Second session:** conceptualization of BA, symptoms and consequences of depression in patients with MS (BA model of depression).

**Third session:** Determination of behavioral preferences and the time required for each behavior and asking patients to complete the behavioral monitoring form every day (image or the form of BA activity, monitoring the behavior and emotion)

**Fourth session:** monitoring the activity and recording the mood states and the activity that clients do every day (BA image of activity, monitoring the activity and mood states)

**Fifth session:** doing BA activity, monitoring activity, feelings of pleasure, feelings of mastery (recording the activity that is done every day)

**Sixth session:** doing BA activity, doing the planned activity (doing the specific activity that has been planned by the patient with the help of a therapist for the current week)



**Seventh session:** doing BA activity, doing the planned activity and rating the mood for each activity

**Eighth session:** filling out the ACTION sheets for leaving the life events and reactions, avoidance, and entering the life events and reactions, consecutive coping (Appendix C completed by the patient in dealing with distressing events)

**Ninth session:** conclusion and assessment of the effects of the mood states on the function (filling out or completing the ACTION sheets, the client version)

**Tenth session:** Carrying out the post-test on the experimental and control groups

### Data Analysis Plan

After collecting the depression scores of the pretest, posttest, and follow-up test of the experimental and control groups, the data was entered into the SPSS, version 22, and analyzed through descriptive statistics (including indicators of central tendency, measures of dispersion and distribution factors) and inferential statistics.

To investigate the hypothesis, and according to the nature of the measurement which is interval measurement and considering the three times measurement of dependent variable (depression) in pretest, posttest, and follow-up for both control and experimental groups, two-way analysis of variance was used because of the existence of an intergroup and intragroup factor. To determine differences between groups at different times, Bonferroni post hoc tests were used.

### Results

Table 2 shows the descriptive measures of central tendency and dispersion of participants' depression scores in both control and experimental groups in the pretest, posttest, and follow-up phases. According to this table, depression pretest scores between the two groups were not different from each other significantly, while in the post-test and follow-up evaluations, depression scores of the participants in the experimental group had a significant reduction compared with the control group.

This can be an indication of the effect of BAT on reduced depression scores of female patients with MS, the significance of which is studied in the following.

Table 2: Descriptive statistics of depression scores for control and experimental groups in pre-test, post-test and follow-up

Conditions	Groups	Min	Max	M	SD	Skewness	Kurtosis
Pre	Ex	۲۸	۴۸	۴۰٫۴۰	۷٫۰۶۹	-۰٫۴۷۵	-۱٫۵۶۴
	Co	۲۷	۴۵	۳۶٫۸۷	۷٫۱۱۰	۰٫۰۱۴	-۱٫۷۳۷
Post	Ex	۱۸	۲۹	۲۴٫۲۰	۳٫۴۶۸	-۰٫۰۱۶	-۱٫۱۴۲
	Co	۲۶	۴۹	۳۷٫۷۳	۸٫۲۲۴	۰٫۰۹۹	-۱٫۷۵۰
Follow	Ex	۱۷	۲۱	۱۹٫۲۰	۱٫۳۲۰	-۰٫۲۰۶	-۰٫۷۴۰
	Co	۲۸	۴۹	۴۰٫۰۷	۷٫۷۳۲	-۰٫۰۳۰	-۱٫۶۵۳

Pre: Pre-test, Post: Post-test, Follow: Follow up, Ex: Experimental, Co: Control

Before carrying out the mixed analysis of variance test, all the assumptions related to it were reviewed and approved. For this purpose, the normal distribution of data, homogeneity of covariance matrices, homogeneity of variances, and assumption of sphericity were investigated, and it was specified that no violation has taken place.

Table 3 shows the results of the tests investigating the internal effects of participants in order to study the intragroup effects which indicates that the participants' depression scores were significantly different in different situations ( $F_{1, 28} = 52.330, p = 0.000$ ). The significance



level of less than 0.05 for the interaction between the situations and the groups also indicates that BA induces changes in depression scores in females with MS in the experimental and control groups in different situations ( $F_{1, 28} = 86.911, p = 0.000$ ). the values of partial Eta square show that 65.1% of the variance in depression scores are resulted from the intragroup factor (situations), and 75.6% of the variance in depression scores are resulted from the interaction between the intra-group and inter-group factors (situations and group).

Table 3: Results of tests of within subjects' effects

Sources	SS	df	MS	F	Sig.	Eta
Conditions	1415.556	1	1415.556	52.330	0.000	0.651
Conditions*Group	2351.022	1	2351.022	86.911	0.000	0.756
Error	757.422	28	27.051			

Table 4 shows the results of inter-participants interaction test. As the significance level of the test was less than 0.0, there is a significance relationship between control and experimental groups in terms of the depression scores ( $F_{1, 28} = 25,391; p = 0.000$ ). In other words, BAT causes significant changes in depression scores of participants in the two groups. Eta coefficient of 0.476 indicates that about 48% of the variance in the dependent variable (depression scores) is explained through the intervention.

Table 4: Results of tests of between subjects' effects

Sources	SS	df	MS	F	Sig.	Eta
Groups	2381.878	1	2381.878	25.391	0.000	0.476
Error	2626.578	28	93.806			

After intergroup factors became significant, Bonferroni post- hoc test results showed that the mean scores of depression in post-test and follow-up test and control groups were statistically different ( $P = 0.000$ ). Study of mean depression scores of the groups indicated that symptoms of depression in experimental group participants in the post-test (-13.5) and in the follow-up (-20.9) was significantly lower than the control group participants.

Bonferroni adjusted multiple comparisons for changes in depression scores of the participants in the different situations show that the mean depression scores of female participants in the experimental group was equal to 16.2 from pre-test to post-test, 21.2 from pretest to follow-up and had 5-point significant reduction from posttest to follow-up ( $p = 0.000$ ), while the mean depression score in the control group participants increased, indicating the impact of BAT on depression symptoms in women with MS.

### Conclusion and Discussion

The results of the current study showed that BAT was effective in reducing depressive symptoms in females with MS. Since the level stress, anxiety and depression in MS patients is high, which could jeopardize their health, providing appropriate education for coping with and adapting to these symptoms in MS patients seems necessary (Dehghani, Kermanshahi, Memarian, Hojati, & Shamsizadeh, 2013; Mohr & Pelletier, 2006); because MS can have an impact on the quality of life (Sangalji et al., 2013).

Like solution-focused therapy, BAT can help MS patients through self-management, resilience and the sense of solidarity (Mirhashemi & Najafi, 2014).



Through BAT, MS patients could overcome stress. Reduced stress can lead to gaining more energy and less restrictions on MS patients in the mental and physical functions (Satherland, Andersen, & Morris, 2005).

The results of several studies on the impact of BAT on reducing depression, especially in patients with MS, were consistent with the results of the current study (Abedini, Montazeri, & Ghorbani Shirudi, 2012; Aghayousefi, Shaghaghi, Dehestani, & Barghi Irani, 2012; Akbari, 2013; Bamer, Cetin, Johanson, Gibbons, & Ehde, 2008; Dehghani & Mohamadkhani Kermanshahi, 2013; Ebrahimi Atri, Khorshidi Sokhangu, & Sarvari, 2013; Esmaeeli & Hoseini, 2008; Gibson & Frank, 2002; Hart, Fonareva, & Merluzz Moher, 2005; Khezri Moghadam, Ghorbani, Bahrami, & Rostami, 2012; Mirhashemi & Najafi, 2014; Mohr & Pelletier, 2006; Parhoon, Moradi, & Hatami, 2013; Rattue, 2012; Sangalji et al., 2013; Satherland et al., 2005).

In explaining this fact that BAT triggers depression in patients of the experimental group, following items can be mentioned:

BA basic structure is primarily conducted based on activation; and based on the first principle of BA, the solution of changing the feeling of individuals is to help them to change the activity that they do. This principle suggests that until these patients wait for being excited, they still remain caught in a vicious circle of depression and no effective event will be occurred. Under such a complicated situation, the clients are asked to activate themselves from the "outside to the inside" instead of activation of from "inside to the outside" (Martell, Addis, & Jacobson, 2001). In other words, the structure of BA is focused on two issues: (1) Adherence of clients to the implementation of the activities, regardless of the feeling they have and (2) Waiting for the incentive which comes after the activity, not an activity that comes after motivation. The therapist is like a coach who helps the clients with a very difficult way of activation from the "outside to the inside". The therapist helps them to increase the possibility of the implementation of activities, even with very low motivation, through segmenting them to the small steps. They also help the clients to develop a structure for their life based on their goals in order to increase the possibility of the implementation of the activity (Dimidjian & Dunn, 2013).

The second principle of BA describes briefly the depression model from the perspective of this approach: "A change in life can trigger depression, and short-term strategies that people employ to deal with it may make them to be caught forever in the trap of depression". In fact, the emphasis on BA is introduced on this principle. This principle establishes a structure to identify what should be measured and treated.

There are many theories about depression, theories that might explain all aspects of this heterogeneous disorder. BA depression model is consistent with the behavioral models developed in the previous decades (Lewinsohn, Rohde, seeley, & Fischer, 1991). Early models of depression highlight the fact that when in there is a little positive reinforcement in people's lives or the frequency of punishment is high; the risk of depression is high. People in this situation may find that the activities they do may not lead to good outcomes. Or on the contrary, they may learn the method of escaping or avoiding the punitive environment. In fact, people learn to distance themselves from their surrounding environment and decide not to do activities. Although avoiding the surrounding environment is natural and logical in this situation, it may make them involved in the trap of depression. Reduced frequency of the activities will be resulted in the reduced willingness to do activities; and likely creates problems in one's life and leads to the accumulation of problems. When the frequency of achieving a positive reinforcement decreases, and the experience of punishment increases, the



vicious circle of depression may be established. When a person is struggling to reduce the impact of this turmoil, increased self-awareness and boredom contribute to the cognitive, behavioral, and emotional changes. Lewinsohn et al. (1991) and Beck, Rush, shaw, and Emery (1979) have described the components of this downward spiral.

It is logical that people try to reduce the effect of emotional disturbances. However, the behaviors used to achieve this goal lead to loss of contact with potential environmental amplifiers. Some of these behaviors include rumination about the confusion, escaping or avoiding annoying experiences, and trying to avoid emotional pains. Such withdrawals make depressed people captured by negative emotions. Finally, it prevents the incidence of emotions or excitements, and therefore, negative feelings trigger. This intensifies the depression of individuals and reduces their hopes to change. The main tasks of the therapist and BA client in this regard are as follows: Identification of concomitants which would increase the likelihood of activation (meaning situations in which the behavior occurs and results of this behavior) and identification of those treatments improving the lives of clients, because improving life reduces the symptoms of depression in turn (Kanter, Bosch, & Rash, 2012).





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